

# HI-FI CHOICE

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

AUGUST 1992 £2.95 US \$5.50

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

# HI-FI CHOICE

ISSUE NUMBER 109 AUGUST 1992

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# Menu

I'm getting old. There's no getting away from it, the years have finally caught up with me. What, you may ask, has occasioned this earth shattering revelation? Was it the onset of grey hair, a creeping penchant for Paul Simon records, or that fact that policemen are looking younger by the day? Actually it was none of the above, it was a fantastic documentary on TV about the making of the Beatles' *Sergeant Peppers Lonely Hearts Club Band*.

At the end of the programme I was left with that horrible thought, "they don't make 'em like they use to."

I can well remember the feeling of hopelessness as I sat watching *Top Of The Pops*, just into my teenage years, and listening to my parents winge about what a load of codswallop was on TV nowadays. They were obviously so old that they couldn't appreciate the likes of T Rex, Bad Company and Mott the Hoople. "It all sounds the same," they would wail, "how can you possibly like this noise."

Well, truth be told, I now find myself in exactly the same position. If I have to suffer one more small time soap star crooning along to chunks of whatever happened to be lying around on the studio floor at the time I think I'm going to be copiously and violently sick. Watching the *South Bank Show* on the Beatles I was gripped by a sense of people doing something for the first time, a sense of actually creating something new rather than just running with the pack for the sake of financial expediency. It's staggering to think that 25 years on this Beatles album still sells over 600,000 copies a year. Obviously this is a testament to the quality of the original album, but surely it must also be a reflection on the music being released at the moment.

I think it's rather sad that people are going out and buying CDs of well loved albums to "fill in holes in the collection" rather than going out and exploring new music and new bands in the way they once used to. And with the advent of DCC and Mini Disc this whole area of rereleases will be of massive financial importance to the record companies. After all, how many people will be rushing out to buy the new Nirvana album or the latest offering from EMF as compared with those will be buying up *Elton John's Greatest Hits* or yet another copy of *Love Over Gold*? OK, so people are entitled to buy what they want; the only question that bothers me is just what will people be buying in ten years time? For some reason I just can't take the thought of a whole industry based on the greatest hits of Kylie Minogue and Jason Donovan very seriously. Oh well, perhaps its time I had another go at getting to grips with Mahler's *Second*. On vinyl, of course.

Andy Benham



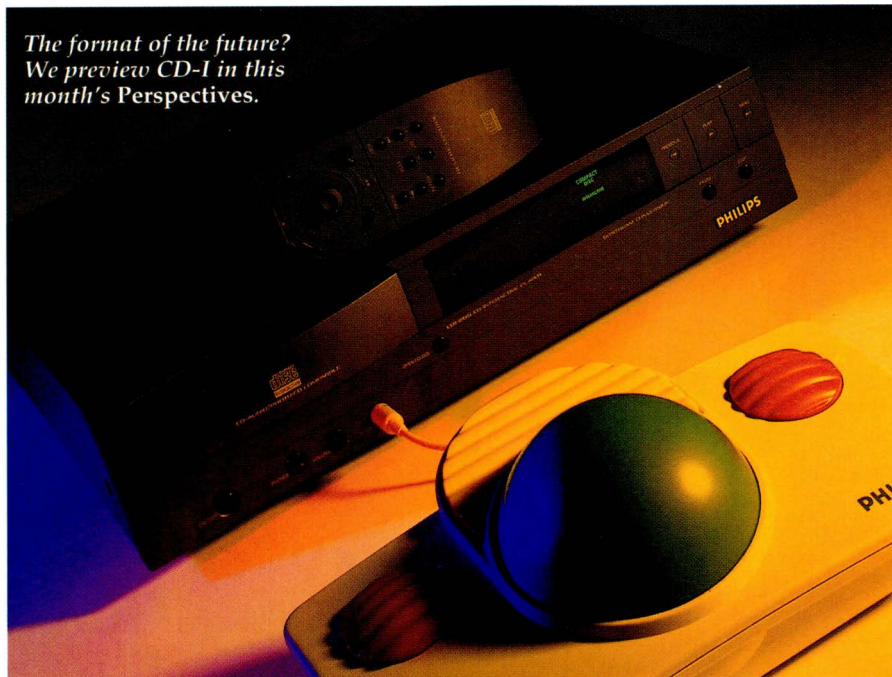
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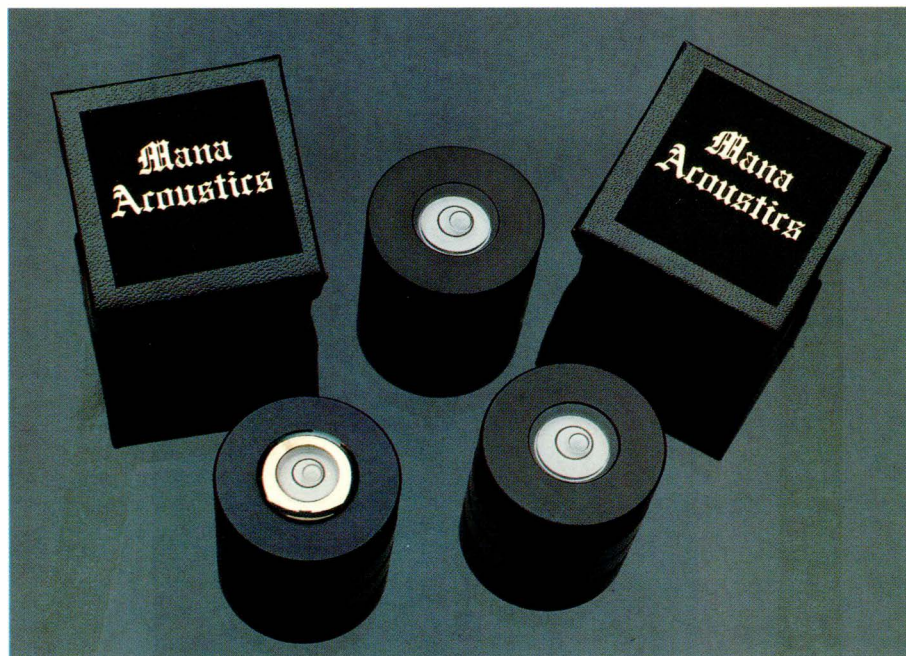
Get up on the roof and fix an aerial. There's music in them there airwaves, and it can sound remarkably fine. Richard Black explains.

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## Mini Disc takes shape in Salzburg

Early in June Sony ferried the cream of Europe's journalists (er, and some others) to Salzburg for a briefing on the status of Mini Disc. We even got to hear a production recorder in action. It was, however, a professional device; machines for the consumer market are unlikely to be seen before the Autumn, with an in the shops target of December 1992.

Sony is pushing the portable capabilities of MD very hard and three of the first four models will be designed for use outside the home. It plans to produce two personals, one a recorder, an in car unit and a compact home deck. Initial prices look like being in the vicinity of £250 for a playback only personal and £350 for one that records. Battery life for playback was quoted as one and a half to two hours, or about two discs.

Software prices will be in the same sort of ballpark as CD. But, as far as prerecorded titles are concerned, MD is trailing significantly behind DCC with only eight record companies having



*Sony's Mini Disc: format of the future?*

signed up to produce software. Sony intends to have 500 titles available for the launch, with 300 geared to Europe.

Sony expects the recording ability of MD to be a critical factor in the launch and has signed up ten blank disc manufacturers to cope with the anticipated demand.

We were given a glimpse of the packaging for MDs which has been designed for use with existing cassette racks. The packaging is the same height and

thickness as an analogue cassette shell but it's wider and is made of a softer plastic.

We were even given a demonstration of the aforementioned pro deck, with comparisons between CDs and recordings thereof on MD. Though the circumstances were hardly perfect, results were pretty good for a cassette replacement but not in the same league as CD when it came to bass extension and imaging. A very similar result to early examples of DCC, in fact.

## 'Perfection' improved?

*In an attempt to placate fears that MD might have a negative effect on the sales of CD, Sony released information about Super Bit Mapping (SBM), a technique not dissimilar to ATRAC whereby more information is squeezed onto a CD. By using noise shaping to reduce noise over the part of the spectrum where the ear is most sensitive, Sony claims to have achieved 20-bit sound quality in a 16-bit format. Basically it has borrowed some of the thinking from ATRAC, which, though more drastic in that it completely shelves information below the threshold of hearing, works in a similar fashion. The necessity for an extra SBM processor at the mastering stage will limit initial software output but Sony Music will be producing a limited edition range of discs which will be in the shops in September, the material will be classics of the pop/rock genre. SBM'd discs will of course play on existing CD players.*

## A truck load of new Celestion goodies

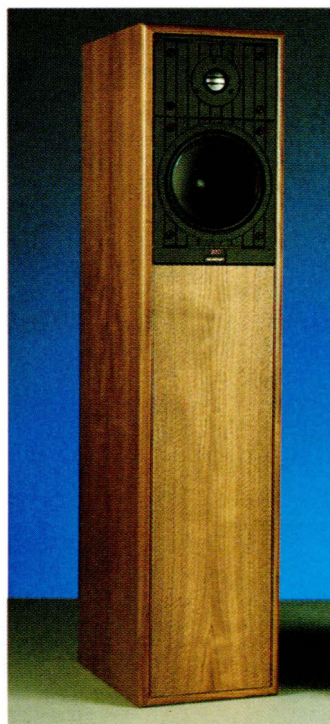
Celestion, along with KEF, has not only found itself being owned by a new parent company (Kinergetics) but has launched a truck load of new loudspeakers as if to celebrate the event.

Starting with the affordable we have the £105 *Celestion 1*, a new baby in the range. It measures 274x160x215mm (hwxwd) and uses a 105mm mid/bass driver with a felted fibre cone; the tweeter is Celestion's 25mm titanium dome.

Next up is a subwoofer to go with models like the *Celestion 1* and *3* as well as miniatures from other brands. The £129 *CS135* is a modestly sized ported enclosure (190x520x340mm) that contains a single 200mm drive unit. The latter features twin voice coils and a felted paper cone. Bass extension is claimed to be -3db at 42Hz.

At the other end of the range to the *Celestion 1* is the new *15*, a £349 floorstanding two way that's designed to combine good looks with good sound. It makes a stab at the former with its tall, reasonably slim enclosure and the latter with the aid of a new bass loading technique called AFT (acoustic filter technique). Basically the 150mm mid/bass unit and the 25mm tweeter have their own internal enclosure which is ported into the main column which is itself reflex ported.

The £999 *Celestion 300* is unusual in that it incorporates transmission line bass loading that is said to acoustically filter out the midrange component of the 165mm woofers' output. This achieves the bass extension advantages of transmission lines and avoids the midrange muddling that two way TLs can be prone to.



## The pentode subwoofer!

Pentachord has produced the *Pentode* active subwoofer for use with small bookshelf loudspeakers such as its own attractive Pentachord miniatures. The *Pentode* is a 750mm high pentagonal column containing two 100mm aluminium drive units operating in isobarik fashion. The column is made out of veneered MDF with a lead lining and its base is a solid hardwood, the speaker can alternatively be used horizontally when the base is replaced with a pair of mounting brackets.

Priced at £635 (or £571 if purchased with a pair of Pentachord satellites) the *Pentode* incorporates a gain adjustable active crossover and needs a separate channel or two of amplification. For further info contact Pentachord on (081) 788 2228.



# Pioneer in search of the lost chord

The marketing pronouncements of giant multinational corporations should always be taken with a grain of salt. So when Pioneer announced the development of Legato Link, a 'new' technology said to improve the sound of CDs, indeed which is supposed to restore some of the lost qualities of analogue recordings, we treated the statement with interest and scepticism.

Essentially the Legato Link works by filling in missing information. When music is recorded onto a Compact Disc everything over 20kHz is discarded in the process; although theoretically inaudible, this missing sound is a subtle but tangible part of the music, adding definite 'warmth' or 'presence' to a recording.

This information is removed in the digital recording chain before the music ever reaches the Compact Disc so, of course, there is no way of actually retrieving it from a CD; it's gone forever. But the Legato Link convertor analyses the musical information which survives on the disc and uses this to make a guess or approximation about the missing ultrasonics, and then fills in the gap with this approximation. In some respects, particularly the way it combats ringing, the Legato

Link resembles technology used by US company Wadia in its high-end CD players.

However, Pioneer was not just describing the Legato Link; it was demonstrating the system to us, playing the same pieces of music through two versions of the same CD player (the new *PD-S901*), with and without the Legato Link chip.

The first selection consisted

the machine without the Legato chip, the same selection seemed so lacking in depth and presence that it gave the impression that the ceiling of the room had suddenly been lowered by about a metre. Subsequent excerpts repeated the effect, the most notable differences tending to be on vocals.

Pioneer is launching three



Top of the range Legato Link equipped player; the PD-95.

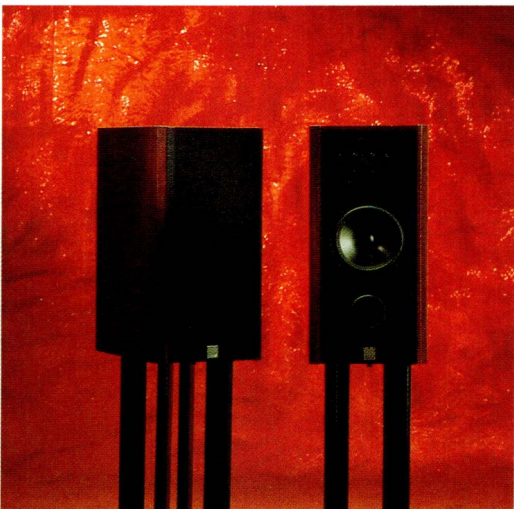
of a burst of opera featuring a male voice; not necessarily everyone's cup of tea but there was no question about the difference between the piece with and without the Link in action. The Legato-ed version had an almost cavernous depth and resonance. Played through

new players incorporating Legato Link convertors. The top of the range model is the *PD-95*, retailing for pennies under £2,000. The *PD-S901* retails for just under £400 and replaces the *PD-9700*. And the entry level *PD-S801* (replacing the *PD-8700*) costs £300.

## New Danish delivery

Danish loudspeaker manufacturer Dali has produced a new two way model called the 310. This £400 model utilises a 165mm diameter polypropylene mid/bass driver which incorporates a 32mm long throw voice coil. High frequencies are delivered by a 25mm soft dome tweeter. The reflex loaded cabinet is 19mm particle board with a 25mm front baffle. All but the latter are finished in real wood veneer.

The crossover has been designed to give a very linear impedance which is said to reduce aggressiveness with some amplifiers. The 310 is equipped for bi-wiring with two pairs of three way sockets.



Hello Dali: The latest creation from the Danish speaker specialists.



In a move guaranteed to keep the public confused about the variety of digital recording formats, Harman Audio has launched a range of That's CD-R blank discs. Manufactured by Taiyo Yuden, the discs comply with the Orange Book standard for recordable Compact Discs and can be used with CD-R machines and CD-ROM drives. They are also suitable for professional use in CD-I and Photo CD applications.

Available in 18, 63 and 74 minute playing times, the discs cost from £16.95 to £18.95 plus VAT.

## In Brief

Wollaton Audio is now distributing the XLO range of cables from America, said to offer high performance at competitive prices, the range includes analogue and digital cables. For more info contact Wollaton Audio on Nottingham (0602) 284 147.

Naim, Bose and In-Hi-fi of Edinburgh have joined BADA (the British Audio Dealers Association). The manufacturers have joined as affiliate members which involves them in discussions aimed at furthering British hi-fi and improving communication with dealers.

Uxbridge Audio is holding a series of presentations for new Linn products including the Arkiv cartridge, an £800 replacement for the Troika, and the Klout power amp. Dates are the 4th, 6th and 11th of August. Entry is free but you'll need a ticket from one of the branches of Uxbridge Audio (Chiswick or Uxbridge.)

The Harrogate show planned for the 5th to the 8th of August has been cancelled.

Bose loudspeakers have been selected for use in the Space Shuttle program. Customised versions of the Acoustimass 5 satellite model incorporating a microphone will be used for communications between ground control and astronauts. The units have already been installed in the Columbia and Atlantis shuttles.

InCar '92, the International in-car entertainment, security and communications show will take place at the Wembley exhibition centre on the weekend of the 5th and 6th of September. It promises support from many top manufacturers including Alpine, Philips, Clarion and JVC, and the National Sound Challenge, a competition to find the best in-car systems around. It will be open from 10am to 6pm daily and entrance is £5 for adults and £2.50 for children.

Grahams Hi-fi of London is having an exhibition of paintings by Andrew Murphy. The theme, surprise, surprise, appears to be hi-fi equipment!



M O N I T O R A U D I O

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To see.

To *feel*.



*The Monitor One*

Founded in 1972, Monitor Audio is one of the UK's most innovative loudspeaker manufacturers.

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***What the press say***

*"Yes, the wee Monitor One only costs as much as ten CDs. That's it. And it's a killer."*

*"... I suspect that this baby will find a cult following."*

Hi-Fi NEWS JANUARY 1992

*"Recommendation is mandatory."*

Hi-Fi CHOICE MAY 1992



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The fourth Chesterfield Show was, for the first time, extended over two days during the May day bank holiday weekend. By all accounts Sunday was a hive of activity in the Chesterfield Hotel, so I was grateful to be strolling around in the relative calm of the Monday. As with previous years the show had the air of an enthusiasts forum, where exhibitors and visitors mingle and chatter amiably. If only the major trade shows could be more like this.

The ballroom was packed with displays, a mouth-watering array of cables, kits, valves, and the like. Those present included Groove Tubes (valves), Ben Duncan's kit projects, Hunt EDA and Michell accessories, Action Hardware's range of audiophile plugs, sockets and terminations, together with Stand Design's novel and beautifully made CD storage racks. Also in attendance for DIY speaker enthusiasts were Wilmslow Audio and Falcon Acoustics, with Russ Andrews and Graham Nalty's Audiokits on hand for cables, accessories and various home constructor projects.

REL's demonstrations are always a pleasure to behold, proprietor Richard Lord injecting infectious enthusiasm into the proceedings. The company's range of subwoofers has expanded since last year's show. The original *Stygian Mk I* can now be upgraded to *Mk II* status. Serious bass enthusiasts with deep pockets can look to the two top models; the *Stadium* at £695 and *Stentor* at £1,195, the latter with polished solid oak or red mahogany cabinet. REL was sharing a room with Magnum amplifiers, whose range now includes the *Quartet* four channel integrated, two preamps in the shape of the *NP125* (line level only) and *MP300*, the *MF300* dual-mono power amp and the *MF125* mono-blocks.

In addition to its static display in the ballroom, Wilmslow Audio was demonstrating a couple of its active speaker projects. Wilmslow had also managed to cadge a smattering of exotica for the weekend. MAS *Solitaire* amplification and assorted items of Ben Duncan hardware were in evidence, along with the legendary American Basis turntable.

Concordant's Doug Dunlop was back again with the now familiar blackboard and chalk to aid explanations of his designs.



## Chesterfield 92

Our roving reporter Ian Ward reports from  
the 1992 Chesterfield Hi-Fi Show.

The *Exquisite* and *Exhilarant* valve preamps were on display alongside the outboard *Exclusive* PSU, together with the longstanding *Exultant Quad II* modifications. Sharing the room in varying states of undress was a new turntable design, the Wilson-Benesch, which could be heard working in the REL room. Anyone attempting to introduce a new top flight turntable in this day and age must be completely mad, so I will therefore offer every encouragement!

I must confess to becoming rather taken with Oliver Brooke's five-sided metal-coned Pentachord designs, both audibly and visibly. The full-range solid ash *Miniatures*, supplemented by the matching *Low Bass* speaker were making delightful music. Also standing to attention were the elegant floorstanding *Pentacolumns*, available in a variety of finishes.

The Nottingham Analogue Studio had brought along its enormous horn speakers, thoughtfully designed to fit into room corners. At £6,500 a pair however, room space is about the

only economy on offer. These monstrous but surprisingly elegant beasts were being driven with ease by Croft valve amplification. Proprietor Tom Fletcher has introduced a new turntable into his range, the *Graphic*. Priced at £1,175 it slots neatly into the existing range, between the 'budget' *Spacedeck* and the upmarket *Mentor* and *Mentor Reference* decks. The *Mentor* and *Space* tonearms were also in evidence alongside the recently introduced *Analogue Tracer* cartridges. With these three models Tom Fletcher has joined the increasing number of analogue manufacturers who favour moving magnets over moving coils.

Russ Andrews used the occasion to draw attention to his long awaited speaker project. At first glance it is simply another two-way box, but the *Visaton* ribbon tweeter, with a sensitivity figure of 99dB and power handling capability of 500W RMS suggest that this is no ordinary speaker. First impressions were extremely favourable, with openness, clarity and speed well

Top left; Russ Andrews' *Visaton* and next to it the *RMC RM30T*. Below; the gorgeous *Nottingham Analogue Graphic*.

to the fore. The speakers will be available for £1,128 ready built or £1,040 in kit form. Also on demonstration were Russ Andrews' own line level and disc preamps with a pair of modified Meridian monoblocks.

RMC or the 'Real Music Company' unveiled its £1,450 *RM30T* transmission line speakers, whose graceful cabinets embraced Dynaudio's acclaimed drive units. Ben Duncan's source components were again in evidence via the *PAS-02* preamp, DSM Digital Sources Module, and the *APS-02* Audio Power Source.

Lynwood was utilising Avondale's *Genesis* turntable and modified Moth arm with a Koetsu *Red* cartridge to demonstrate its valve phono stage. The signal was thence routed through the *Opal* line level integrated amp, which can be bi-amped by adding the *Ruby* power amp. Lynwood's solid state *Equaliser* phono stage has been re-designed into a smarter and smaller case and renamed *Gem*, though the power supply upgrade paths remain unchanged. Lynwood's now established range of mains conditioners were liberally scattered about the room; apparently these devices have proved particularly popular in potentially 'dirty mains' areas like London.

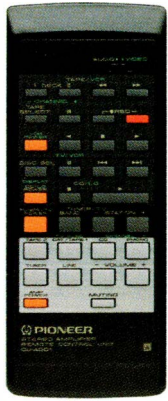
Show host Les Wolstenholme had a diverse mixture of his own RMS designs on demonstration alongside some of his now legendary modified equipment. From this latter category Avondale has become the latest heretic to dare modify the Linn *LP12*. The upgrade includes a replacement motor and pulley, subchassis, armboard, bearing and power supply. A prize to the clever clogs who can correctly guess how many bits are left from the original. The demonstration was complemented by a modified Naim preamp and 100W *RXS V2* power amp driving the metal bodied RMS *Miniature* speakers. A second Avondale room sported the same preamp, the company's own *Genesis* turntable with modified Moth arm, the 70W *V1* power amp and the three-way *Metal Monitor* speakers.





Push here for great Hi-Fi.





Remote controlled Hi-Fi has come of age. Pioneer's new range of remote amplifiers offers superb sound quality coupled with full remote convenience.

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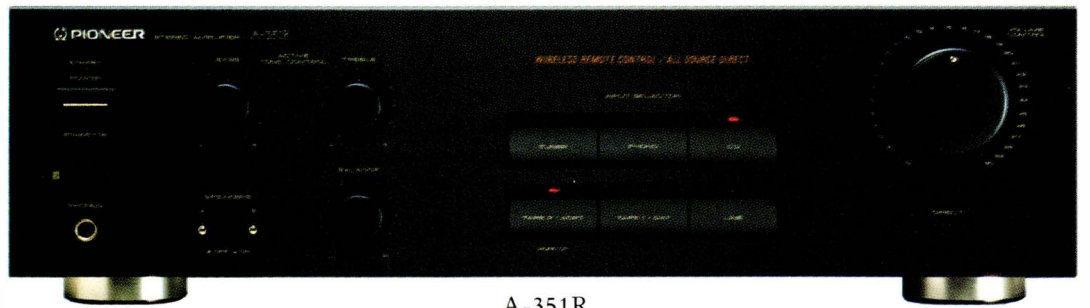
music signal from contamination. Also featured is our Super Linear Circuit: a Pioneer exclusive circuit design that achieves low-distortion amplification with a minimised application of negative feedback.

Other examples of our straightforward approach to circuit design and circuit layout, ensuring cleaner and purer reproduction, can be seen in our Direct Connection II and Clean Ground System.

These and many other innovations are typical of our commitment to higher musicality, found throughout the entire



A-501R



A-351R

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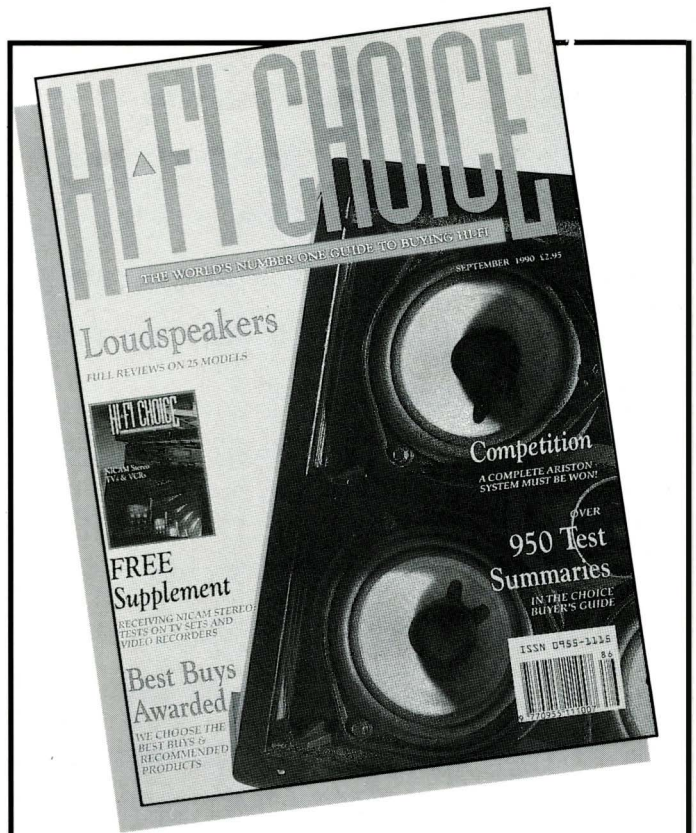
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SEPTEMBER ISSUE ON SALE 14th AUGUST 1992



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# Choice Sessions

by Jason Kennedy and Andrew Cartmel

## Domestic bliss for CD personals

*If you're talking genuinely small loudspeakers then active may well be the route to go. And it looks as if tiny active speakers and personal CD players may be about to undergo a shotgun marriage. Andrew Cartmel throws some confetti.*

Back in the Fifties it seemed like every other movie was a lurid science fiction shocker about mundane wildlife mutating into new and scary things. Previously innocuous domestic spiders went berserk, growing larger than Cadillacs and scuttling off into the desert clutching the hero's pouting, missile-brassiered lab assistant.

That's the way the hi-fi world seems at the moment. Under the impact of new technology we can see very rapid evolution and transformation of once familiar products. New technology offers new possibilities for reproducing music and the people who buy the products respond to these new possibilities — but not always in the expected ways.

Personal cassette machines were the classic example. It's unlikely that anyone could have guessed that the lumbering and boring bread box sized tape decks of the Seventies would mutate and give rise to the Walkman revolution and the ump-teen million portable, pocket sized (but still rather boring) machines that now infest the world.

On the other hand, with the precedent of personal cassette machines now firmly established, anyone could guess what would happen to CD players. Since CD machines could be built small, almost as small as cassette players, and since the discs offer lots of advantages over tape, CD personals would proliferate and thrive in the market place. Right?

Wrong.

The development of CD personals seems to have floundered on some fairly basic technical problems. Our last review of the latest players (May 1992) summed the situation up. The players we reviewed tended to be vulnerable to any form of vibration, to the extent that they weren't really suitable for use on the move. So much for the CD personal. Right?

Wrong again; because when used at

rest, as in a domestic situation, some of the players sounded pretty good. So once again music technology seems to be evolving along an unexpected path. If personal sized CD players continue to be made and sold, I would guess that the end users won't be joggers or the sort of people who sit beside you on the tube and serenade you with garage compilations through their dangling thimble earphones. Instead they will be for people who, for whatever reason, want a 'micro' system at home.

This is an opinion which seems to be shared by at least some of the manufacturers. One of the better sounding personals we reviewed in our last test was the Aiwa XP-6. The XP-6 comes complete with a very nifty wafer thin hand held remote control, ideal for use on the sofa but not on the train, which suggests that someone at Aiwa knows the direction of development for small CD players.

Now the company has gone even further in this direction with the release of the XP-6S. This is essentially the XP-6 bundled with another Aiwa product, a pair of SC-A70 active speakers. The pack-

age is being sold for £199, which is 20 quid less than the components would cost if bought separately.

So what is this combination like? Well, I've just switched off the big system and connected up the XP-6S. Not as easy as it could have been. Each active speaker is powered by four 1.5 volt batteries, and although they can be run off a mains adaptor, and a handy cable link is provided to connect the speakers to an adaptor, you don't get the adaptor itself. This is unusual for an Aiwa product and rather inconvenient for the user.

The instruction booklets are multi-lingual and distinctly minimalist, one for each product, with no extra information for the speaker plus CD player package. After referring to the booklets and making the connections, all I could achieve from the test CD was a barely audible kind of miniature insect singing. Eventually it transpired that the speakers had to be connected to the player not from the normal system socket but via the headphone output. Thanks for telling me.

Then we had lift off. These tiny black



Could the Aiwa XP-6S save the CD personal breed from extinction?



plastic boxes made a sound that was warm but annoyingly muddled whenever the music was loud or very bassy. I tried switching off the DSL (Aiwa's sound enhancer) on the CD player and received much better results. This micro system even had me inadvertently playing airdrums, and my foot was tapping away as I typed at the computer. The close-miked drums do flail and slap a bit, but no one is claiming that these speakers are Townshend *Sir Galahads*. And that foot didn't want to stop tapping.

This is rather a hastily thrown together package and it shows. Aiwa could do better on instructions; there should be a mains adapter for the speakers as well as for the CD player, and one which is intended for use with this system. There should also be some kind of carrying case to accommodate the speakers and the CD player, instead of just a big cardboard box containing more cardboard boxes. But these problems seem to relate to the speed with which the XP6-S has been put on the market, and I suspect this speed is the result of Aiwa spotting a trend: the next stage in the evolution of personal CD.

Despite these flaws this is an interesting and entertaining product, and there's no question that it can provide musical enjoyment in a remarkably small package, without recourse to headphones. If you're serious about hi-fi it's not going to displace anything in your system but it's a definite contender for a kitchen or bedroom system. Try and keep it out of the bathtub, though.

## Deep down, dirty and in the groove

*Vinyl may be the ultimate format but it's not capable of giving of its best if it isn't clean. Moth's record cleaner is one way to achieve that, and Jason Kennedy has been getting his records wet.*

Some people don't seem too concerned about vinyl cleanliness, the stylus will do the job, they say. But I have always been reasonably fastidious about my "black diamonds". So when Moth offered to lend me its RCM (record cleaning machine) I jumped at the chance to get my collection into sparkling condition.

Although many records can sound very good when in a less than scrupulous state, I am always concerned that the small amounts of dirt that exist will act as an abrasive while being dragged past the stylus and dramatically increase record wear. When records are looked after well and kept clean it's very difficult to hear the effects of extensive use, and with cartridges that track well, especially those with low tracking weight, even after a hundred or so plays the degradation is pretty subtle. Once upon a time you could go out and get another copy of your scuffed

up albums, but, as we know all too well, things are slightly different now. The selection of new vinyl available to even the most enthusiastic of collectors is none too impressive. Therefore the longevity of our collections needs to be encouraged in every way possible.

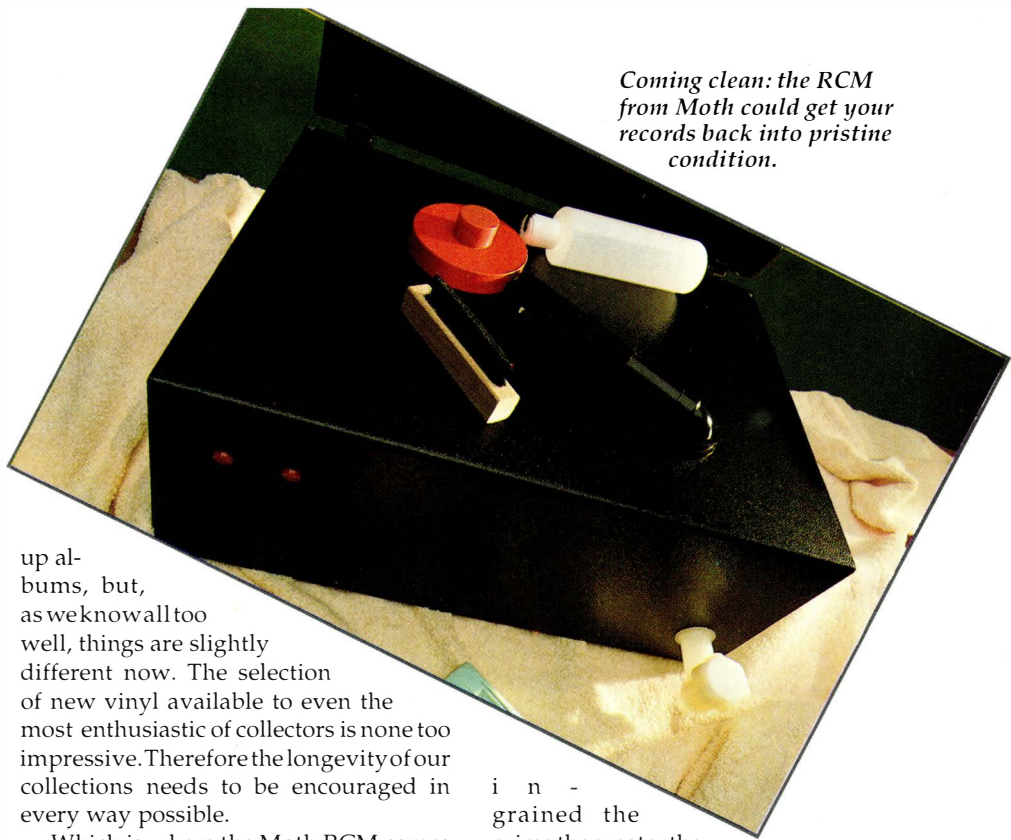
Which is where the Moth RCM comes in. At £250 it's not particularly cheap, costing more than a few record players, but it's also available at a saving of £100 in kit form which seems like a good deal.

The RCM is a pretty straightforward affair. It is composed of a small direct drive platter and screw on clamp, and a slotted tube attached to a pretty powerful vacuum cleaner. These components are housed in a sizable metal cabinet and the protruding elements are covered by a record player style lid. On the front is a tap for draining off the cleaning fluid and a pair of unmarked switches; on the rear is an IEC mains socket. You are also supplied with a carbon fibre filament brush and a bottle for squirting cleaning fluid onto it. You can use any type of proprietary cleaning fluid, but Moth recommends a mixture of Isopropyl alcohol and distilled water, with a couple of drops of photographic surfactant to break up the mold release agent on new records.

The process of cleaning records involves two stages, cleaning and drying. You clamp an LP onto the platter, press one of the switches to get it revolving and use the brush to apply some fluid, after half a dozen or so revolutions, turn off the turntable, flip the record, get it spinning and turn on the vacuum. This is the point where you start to wonder where the ear defenders are. It's not very quiet I'm afraid. However, it does the job, after a dozen or so revolutions the fluid, along with the debris, has been removed and you are left with a very clean looking bit of vinyl.

How much sonic difference this makes depends on a number of factors, but the most influential are the state of the record in the first place and the type of cartridge you are using. Logically enough the more

*Coming clean: the RCM from Moth could get your records back into pristine condition.*



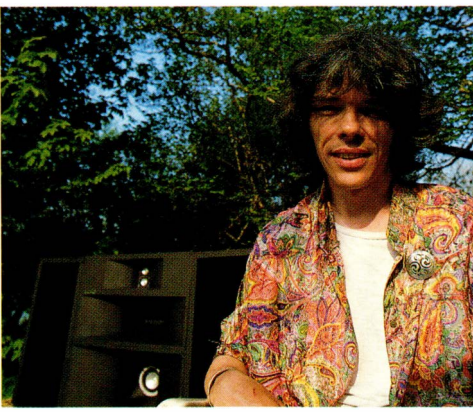
in - grained the grime the greater the difference a good cleaning is going to make, but with some of the cruder styli attached to less expensive cartridges, and for that matter those that track like a leech (ie Shures), the differences can be significant even with quite clean looking discs. My Audio Note *IO IIv* with its very small vdH type 1 stylus doesn't make a big deal out of dirt or scratches, probably because it gets deeper into the groove and cuts through the dirt better than most. Thus it didn't reveal dramatic differences between records that had and hadn't been cleaned. Information retrieval improved subtly and noise became less prominent but I can't say that my musical insight took a quantum leap. However, I'm certain that less sympathetic cartridges would revel in cleaner grooves and come up with a far cleaner sound.

It may well be worth experimenting with different cleaning agents, if they work well when applied by hand, using the machine would probably yield even better results. Once you've cleaned a record it is worth putting it in a new sleeve of the Nagaoka or similar variety. This will keep out the dust and reduce the static that attracts it.

What is just as important as the absolute sonic result is the fact that your records, and for that matter your stylus will last longer if there's no abrasive agent between them as they pass each other — which has got to be worth a few bob if you use an exotic cartridge.

Being a keen secondhand record collector I will be reluctant to give back the Moth RCM and can heartily recommend it to fellow enthusiasts. Vinyl may look pretty dead but its reign is not over yet.





# An open air concert

*High on a Welsh mountainside is a sound that beggars the singing in all the valleys below. Dan Houston visits the home of the Axhorn loudspeaker system.*

**W**e wouldn't have been surprised to have met the Dukes of Hazard, as a cloud of dust rose over the dirt track behind us on the last couple of miles to this month's destination. Various fried and broiled by the M4 during a mid-May heatwave, it felt good to be snaking up a Welsh mountainside on the way to hear some completely different loudspeakers.

But with Teepee valley a few miles to the south and evidence of past hippy convoys in the fields around, the Dukes would have been a crass encounter. Instead, we arrived in a little courtyard of stone farmbuildings and were met by Fred Davies and his wife Mo, a forever green couple who run the little known business of Axhorn loudspeakers and stands.

The Axhorn system is similar to a couple on offer in Japan: Fred could custom-build his colossal concrete horns into your house, but would disguise them so that they disappear into the wall. Everything is covered by an acoustically transparent screen and presto! — purist but invisible hi-fi.

What makes it aspirational is the sound quality, which we found simply stunning — both indoors and out. Cooling off on the shaded mossy slate terrace, Fred explained how 15 years ago he bought this derelict farmhouse right out in the sticks as an ideal place for 'real living'. Real living often includes being snowed in for weeks on end, when he may well find himself skiing into the nearest village for stores. The locals have come to expect Fred the Ski during such periods.

But if the weather sometimes doesn't allow normal social activity, he can always hibernate to music — providing there's enough diesel. The farmhouse is too

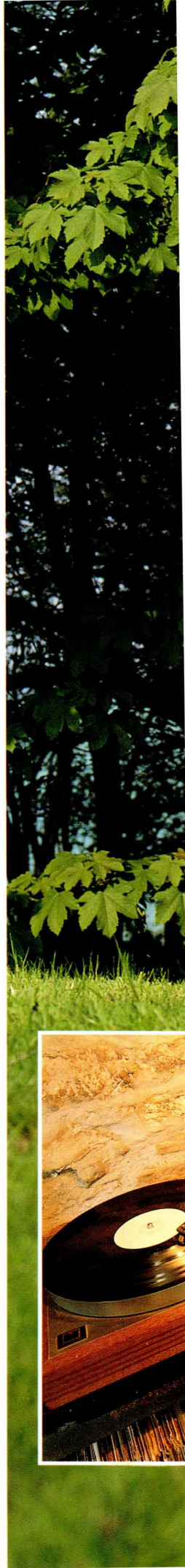
isolated to make it worth linking up to the electricity supply, and Fred reckons using his own generator probably reduces the fuel bills slightly. Plus there is the audiophile bonus of complete freedom from supply spikes and glitches as a nation switches on its kettles after the news.

Fred started out in professional audio, running a disco at the 1970 Isle of Wight Festival, for example. Jimi Hendrix is his musical hero.

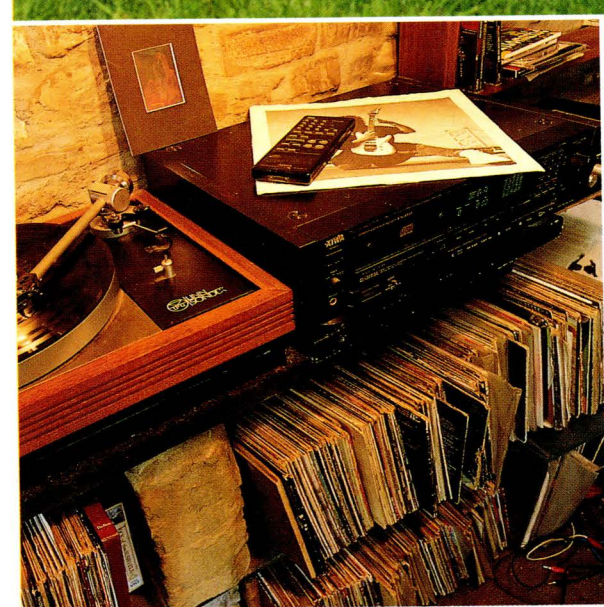
Subsequently he took up a job making radio microphones for Audac in Dorset, one of the pioneers of the technology. Following that, after a spell of Scottish Highlands estate management in the mid-Seventies, he was able to move south and buy this farm with his parents.

By then he was already interested in developing a horn-loaded loudspeaker system, and used his Pro Audio contacts for advice and to check his own theories. He cites Tony Andrews of Turbosound, the late Ronnie Rackham of Tannoy, Roy Hobbs of Lowther and Professor Jack Dinsdale of the respected Cranfield Institute of Technology as directly helping him in the task. Of course much of the development of horns in loudspeakers was done decades ago, and any roll call should also mention the likes of Paul Voigt of Lowther, Rice and Kellogg, Donald Chave (Lowther), RCA's Harry Olson and Harman Kardon's Stewart Heggeman.

Fred describes the development in down to earth terms. He was reading and talking pure acoustic physics on the telephone with enthusiastic engineers, while at the same time converting the existing cowshed into his future living room. Having removed the, uh, deep-lying evidence of bovine habitation, he knocked two holes in







*A Linn LP12 is one of the front ends for Fred Davies' system.*

*Rural splendour in Wales — plus some fairly serious hi-fi.*





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High Fidelity, May 1991.

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the stone walls for windows and the horns' mouths, and dug out the pits which would take the length of the horns under the floor.

It remained unfinished for months: "People came and saw these holes and just thought we were crackers," Fred said. However, by 1986 he had mixed, poured and shaped the concrete for a stereo pair of speakers set into two adjacent walls of his room under picture windows.

## Taking the bull by the horns

Taking away the screens the system looks extremely simple. A single Lowther dual cone unit is positioned top centre in its own wide dispersing horn. Behind, it is rear loaded with two channels taking sound down to the floor level, which then travels in ever (exponentially) widening trenches around and back to the double horn mouths underneath the driver.

"Ideally a speaker horn should be like a post horn — round and straight," Fred says, though he curls his around under the floor for aesthetic reasons. "A horn is just an acoustic amplifier," he continues. "In a normal drive unit you have high pressure and low velocity (of the sound wave), but in a horn you turn that around to high velocity and low pressure which should be easier to listen to. A well-designed horn should sound effortless because the sound wave has been transferred down the horn from this woof! sound at the driver to an aah! sound by the time it reaches your ears.

"You make the size of the horn according to the lowest frequency you want to be able to reproduce," he added, "these are 16 feet long and 16 square feet at the mouth, and there's about a ton of concrete in each. They're quite large because they can go down to 40Hz, but to reproduce signals of 20Hz I'd have had to double the dimensions."

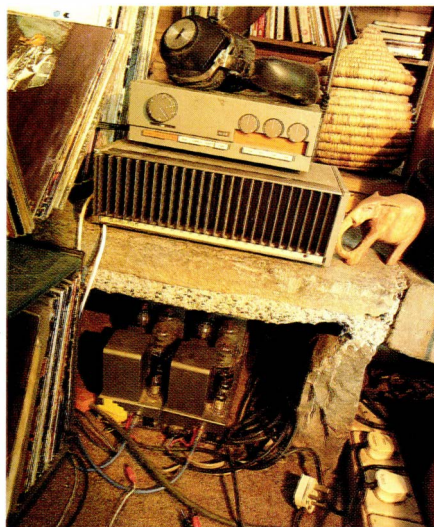
Fred designs his systems according to the room, and would want to position the tweeter according to the height of a seated listener. He admits the listening room is probably too small to hear the sort of soundstage his speakers can produce, but this was nevertheless one of the most effortless and transparent sounds we have heard.

Our host cranked it up and we listened to Enigma's *MCMXCa.D.* on Compact Disc, unable but also unwilling to talk over the music. While the Lowther drivers were showing off their sensitivity and control over the transients, the bass notes came rumbling out of the horns in a way that could get your trouser legs flapping if you stood too close. My usual reservations about horns — that they can be too directional or harsh sounding — disappeared and we began sifting through Fred's record collection.

The speakers are ably complemented by the rest of the hi-fi, which consists of

the Linn *LP12* turntable with *Ittok* tonearm and Audio Technica *OC9* cartridge, amplified by a Hafler valve preamplifier and Quad *II* valve monoblocks. His other source is an Aiwa *XC700* CD player, recently bought because of the increasing scarcity of vinyl.

Sitting next to the valve amplifiers, a second transistorised combination of Quad *33* preamp and *405* stereo power amplifier feed the outdoor speakers. These



*Quads of earth. The II monoblocks and 33/45 combo reside in rustic style.*

sit on pallets and bricks either side of the driveway in front of the house, permanently guarded by a Muscovy duck which has survived many a Christmas! These speakers are a more recent four-way design, made of glass reinforced concrete and finished in 1990.

Sitting on chairs on the grass in front of these four-foot high monsters was like being at an open air concert. Out here there are no room acoustics to affect the sound, of course, but the lack of room reinforcement means that the energy required would leave many conventional box-and-cone designs struggling. "Horns are the best things to use out here because you really need to move air," Fred said.

### The system:

Indoors:	
Linn <i>LP12</i> record player	£789
Linn <i>Ittok</i> tonearm	£560
Audio Technica <i>OC9</i> cartridge	n/a
Aiwa <i>XC700</i> CD player	£180
Hafler preamplifier	n/a
Quad <i>II</i> valve mono power amplifiers	n/a
Axhorn wall/floor speakers	from £9,000

Outdoors:	
Quad <i>33</i> preamplifier	n/a
Quad <i>405</i> stereo power amp	£476
Axhorn speakers	from £10,000

"Of course you could just use a proper PA system with massive amplifiers, but that would be prone to distortion. The horn principle is also valid in amplifying any distortion noise and static, so I've kept electronic filtering down to the minimum. The beauty is that if the horn is accurately designed you can sidestep those problems."

The outdoor speakers are similar to the indoor models, but sound even better. Each uses a pair of Bandor two inch units for mid and treble and a Ted Jordan six inch bass driver, all horn-loaded front and rear, which adds up to a four-way horn system.

"The back horns are the ones doing the exponential work," he explained. "I've used a first order crossover set at 350Hz between the Jordan and Bandor units, that's just a high pass filter with a simple choke for the low pass. Then there is an acoustic crossover between each horn and the drivers. Here the bass horns take everything below 100Hz and go down to 30Hz. The mid-horns take the signal between 350Hz and 1.2kHz with the Bandor units acting as tweeters — they go up to around 22kHz. Of course you have to bring them out in phase with each other but the theory seems to work without any problems."

## Shady character

Indeed it does. This system was simply electrifying. We sat on the grass surrounded by shady trees listening to one of the best hi-fi sounds we had ever heard. The speakers never sounded stretched or lost out in the open air, and the sound had the intimate, clear-cut quality that is the hallmark of high end equipment.

Notwithstanding the fact that one would have to make a trek to hear this system, I was surprised to hear that Fred had only completed a couple of similar installations nearby. Of course price may be a factor; his horn installation would cost around £9,000, and once installed they are there to stay, a fact that may discourage customers, however good the sound quality.

But with some houses now being built with modern communications in mind, it may become more common to buy your home with its speakers already installed. If it happened to be an Axhorn system, you'd be in for a rare treat.

Having come to expect a room to contribute so much to the sound of a hi-fi system, the real buzz here was the experience of listening outdoors. It may seem eccentric, the weather is hardly conducive, and of course most of us have neighbours. But play me *The Age of Gold* Ballet Suite by Shostakovich (preferably Turnabout's 1979 recording with the Seattle Symphony Orchestra) on a summer's evening as the stars come out, and I think I'll have achieved my aspiration.





# All things

*Tokyo's Akihabara is the oriental bazaar of the audio electronics business. Dan Houston and photographer Chris Richardson spent a Saturday there.*

**T**here's nowhere else in the world quite like it. The Akihabara is Tokyo's Electric Town - a Mecca to Mammon and technology, a glitzy, neon-charged enclave where you can buy all things electric, from dishwashers and bugging devices to the most esoteric hi-fi and home entertainment systems.

It's in central Tokyo and occupies an area some 500 by 300 metres. The buildings aren't as high-rise as some of the more modern earthquake-proof developments, but 30 metre high hoardings on top of six storey shops make for imposing enough architecture. Some chains operate several buildings in the same area: we

saw three Rocket stores all selling exactly the same range of goods, two of them opposite each other on the main street, Chuo Dori Avenue, renamed Electric Avenue by the enthusiastic locals. At certain times it is closed to traffic and open for pedestrians only; everyone has seen those 'humanity as plankton' photographs with a river of Japanese filling a street as far as the eye can see. They're taken here where shops stay open until 8.00pm.

The latest technology, which the Japanese turn into finished products before anyone else, can be bought here. Sony's high definition television has been on sale for a year, priced at 2.3 million yen (£10,000). It's compatible with normal signals, but can deliver the stunning HDTV resolution from the few such transmissions being broadcast. Intense competition keeps prices of established technology down to sometimes half of what you may pay in Britain. However, high ground rents make it impossible for Akihabara to compete with other Far Eastern sources on cheaper goods.

Although the area has become a tourist attraction for anyone wanting to buy the latest technology, its name is reminiscent of a quainter, traditionally rural Japan. Translated literally it means 'a field of

autumn leaves'. It's pretty hard to find a single shrub here now, although the shops are lit up like Christmas trees, and neon competes with oxygen as the commonest gas. But the days when pregnant women could stop and buy oxygen from a street standpipe are long past.

## **Bizarre bazaar**

Alongside the comprehensive collection of finished products, Akihabara is also the electronic Canterbury for DIY pilgrims. Several buildings contain a maze of warrens, high tech bazaars, where you can buy tools, microchips, connectors, different grades of phono plugs, capacitors . . . anything. There's just enough room for two people to pass, and the 'shops' — some of them cubicles just four feet wide — exhibit colourful trays of these components. Businessmen who've seen one too many James Bond films can buy the likes of a ballpoint 'pen' with a microphone and mid-distance high sensitivity transmitter built in for industrial espionage — and it works! Some shops seem to sell everything from wire strippers to telephones, while others specialise — at one you can choose between superpowers for your valves; Russian, Chinese or American.



# electric

Every so often one comes across a Shinto shrine — the traders here pray for commercial success as a matter of course. It reminded me of the covered markets of Istanbul, but instead of orange or red spices the trays are full of gold-plated widgetry.

Hitting the daylight after these bizarre bazaars, we headed to one of the famous hi-fi stores, the five storey Yamagiwa, which has a floor for hi-fi, another for camcorders and so on. There are several listening rooms here, a couple plush, others glass-cased where customers could be seen attempting the impossible task of assessing the stereophonics of loudspeakers, turning the volume up to compete with the next 'room'.

The B&O room here features a hi-fidelity telephone (check that out!) and a 5500 system reduced by nearly £1,500 (to £3,100) in a sale. The high-end American names are all here; Infinity, Krell, Apogee, Mark Levinson, McIntosh and so on.

There is also a healthy British presence — more so than other European names — especially from loudspeaker manufacturers. The likes of B&W, Celestion, Rogers and Spendor are all on show. The system playing in the second 'proper' listening room has a Linn turntable, Naim preamplifier with Japanese Epochal power amps and JBL floorstanding speakers.

It was interesting to see how shipping and distribution costs made cheaper equipment comparatively much more expensive. Naim's NAT02 tuner was on sale at just under £1,200, £350 dearer than in the UK, whereas B&W's *Aura* was also £350 more expensive, selling here for £543 compared with £200 in Britain.

In spite of lacking such niceties as a 'single speaker demonstration room', this shop was one of the best we came across. Elsewhere the notion of sitting and listening to equipment in any degree of comfort seemed alien. In one conglomerate building we came across esoteric valve amplification, including Audio Innovations from Britain, being used in one corner of an open plan sales floor. Just feet away from the loudspeakers was a public telephone point, and there were TVs, VCRs and personal stereos for sale on the same floor.

It seemed pointless, especially since it is the subtleties of such systems which allow them to command high prices. But a posse of would-be audiophiles were busy listening to one beautiful recording after another, oblivious of the hustle and bustle around them.

Elsewhere in this series we have seen that serious Japanese audiophiles, includ-



*Top: An audiophile widget and grommet goldmine and below, tube heaven as found in the Audio Professor's den.*

ing heads of companies like Nakamichi or Toei Video, are into valve equipment and analogue-fronted systems. There are several outlets for this equipment - we reported on Shindo Labs, a manufacturer-cum-dealer in issue 97. Now we were to visit The Audio Professor which sells complete and kit amplifiers, catering for a less deep pocketed customer.

The AP is in the middle of Akihabara, on the sixth floor of the Sotokanda building which is free from other hi-fi activity. It's a small shop in just one room, its walls

lined with shelves of components. There's a desk and some test equipment in one corner, while a sofa allows visitors to listen to systems in an area some 12 by 15 feet. At least it's quiet compared to the hectic electrified atmosphere that accompanies most hi-fi decision making in Akihabara. Some soothing uncomplicated jazz creates a pervasively peaceful atmosphere.

While we waited for the Prof' himself to finish explaining a circuit diagram to a customer, I looked through the shelves. They contained a mix of new and old components: ancient bakelite potentiometers, old Mallory capacitors, Ohmite rheostats. Transformers came from the United Transformer Corporation in New York; chokes from Chicago; steel chassis' were indigenous. There were new valves from China, and older types of varying vintage from around the world, the graphics on the thick cardboard packages conjuring up images of the past.

The names are like some memorial roll of honour to an age when the state was far from solid. National Union, Philco, Mazda, Edison Swan, General Electric, Marconi, Kosser and Brimar products chart the thermionic valve's development from practically the time it first saw widespread use in the first world war. Prices averaged around 2,000 yen, or just under £8, but some boxes were still originally priced — a *PEN 25* made by Edison Swan for the British Thompson & Houston company carried a nine shillings tag.

Among the kits sat reconditioned vintage amplifiers, and some extremely dated-looking speakers from Lansing, Tannoy, Radiola, and a pair of Peerless drivers in a locally made Uniques cabinet. At this point my notes contain observations like *Trainspotters' Paradise*, *Home for the Nostalgic*, and *Fix for the*



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Uxbridge has had an extensive refit, giving far better listening facilities and now has four demonstration rooms, it is now also able to demonstrate Home Theatre and Multi-room as well as really good hi-fi.

The third and last evening will be held at our new Chiswick branch in W4, on Tuesday 11th August, which is far more convenient if you live in Central or South London.

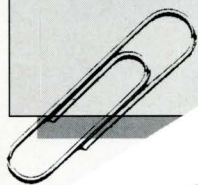
Each evening starts at 7.30pm and lasts for about two hours.

Although they are free and open to everyone, space is limited as entrance is strictly by ticket only please contact either branch as soon as possible.

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Thermionic Junkie.

The Audio Professor is one Chuyu Morikawa, who started his business 15 years ago, but has been involved with valve technology since the post (second) war era, when surplus military stock flooded the market and allowed DIY enthusiasts to take up hi-fi or audio system building as a hobby. Incredibly, he says he doesn't think all that much has changed since then. He was unfazed by the introduction of the transistor in the Sixties, and claims the valve is still a better audio performer than solid state technology.

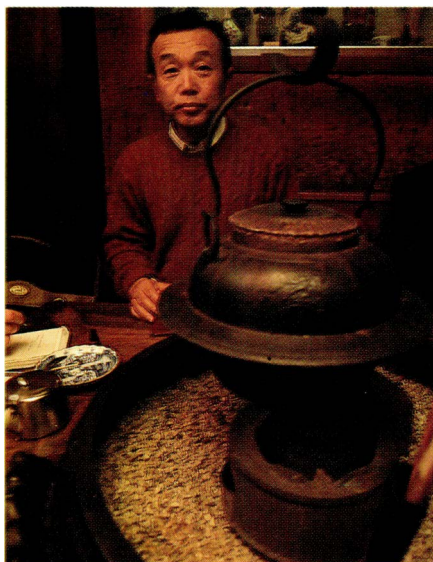
"There are two main things which make a valve technically better than a transistor," he explained between sips of green tea. "First, the velocity at which the signal passes through a valve amplifier is much faster than a transistor, and secondly the frequency response of a valve is much wider." The AP tells me, rather disingenuously, that the valves themselves deliver a much flatter frequency response to 20kHz, whereas a typical transistor starts to drop after about 5kHz. "This can give a valve system more headroom up to 15kHz than a solid state system," he claims.

Although the technology itself is so dated, valve amplifiers have been greatly improved by using better transformers and resistors. The major sonic benefits over solid state are a softer tone and clearer detail to music, with better soundstage. He estimates that around 300,000 audiophiles in Japan agree with him, and the valve has seen a revival among music and hi-fi lovers here which far outstrips that in Europe or the USA.

Aimed especially at valve amplifier users, *Stereo Technique* magazine has just been launched in Japan, while the established *MJ Audio Technology* journal has been running competitions for the best built kits for years, with Morikawa on the panel of judges. He has a factory nearby where his own brand of valve amplifiers are made, and kits of parts selling from £400 to £2,000 are put together. He even winds his own transformers.

Some 80 per cent of the business is in kits, he reveals, which are sold with explanatory diagrams and instructions to customers who have travelled from around the world. "We have people from Korea, Taiwan and Singapore, and also from the USSR (as it was), US and Europe. I run a mail order service as a backup for people who get into trouble. It's very easy to make up a kit amp. All you need is wire cutters/strippers, a screwdriver and soldering iron and you can start."

Morikawa vouches for the DIY approach, saying that it not only cuts costs,



*Top: Valve guru The Audio Professor takes a green tea break and below, the personals line up for your perusal.*

but allows someone to learn and understand about how electronic signal turns into music. He says the majority of his customers are music lovers rather than radio ham types, and that for them 'learning, thinking and building' represent a 'three Rs' of sound reproduction education.

Most of his customers are middle aged, and have been upgrading steadily over the years, but he notes that younger audiophiles are also 'discovering' this yesteryear technology. "For them the valve is something new," he jokes, "And many find that the valve sound goes very well with a CD player. Tubes can sweeten or warm up CD sound."

### Vintage values

While this technology is still winning new customers, Morikawa tells me that the

best valves are the Edisons and Mazdas from the Thirties and Forties. "For these valves there is a finite supply," he admitted, "but I estimate there are enough for another fifty years of use. Many of mine came from the Vintage Wireless Company in Bristol, and I keep in stock around ten per cent of all the vintage valves around. The best new valves are from China, and we buy a lot of these as well."

It doesn't take a mathematical genius to work out that ten per cent of the stock of vintage valves to cater for the large number of tube users means Morikawa must be extremely rich — Ken Shindo had made a similar claim, that he was sitting on £160,000 worth of 300B valves. Both men are in the futures game, based on a finite stock of the most capable (vintage) components, but even so the level of

investment points to a very healthy business. It is limited though, and Morikawa doesn't believe it could support a specialist valve manufacturer able to produce the quality of his vintage tubes. "The fact that the British don't use their valves for their own purposes is very good for me," he adds.

As far as he is concerned his only gamble is relying on audiophiles' continuing use of the moving coil, or electrostatic, loudspeaker. He reckons current speaker technology is ideally suited to valve amplifiers, and nostalgia apart, those who continue to use valves do so because they believe it produces better sound quality than transistorised equipment. Many use vinyl LPs for the same reason, pointing to CD's 16-bit standard as a perennial bottleneck to improving digital audio sound quality. It certainly looks likely enough that the Audio Professor will continue to thrive — and in the heart of the world's most advanced consumer electronics marketplace at that.



Andy Benham turns his

# Getting

**Y**ou are sitting down to peruse your favourite hi-fi magazine, but what is this? CD-I? Isn't that something to do with computers? What's it doing in a hi-fi magazine?

Good question really, and the answer lies in the way you view this latest application of the silver disc.

There are two ways of looking at CD-I, one of which is to view it as a home entertainment system which can also play audio discs, and the other is quite the reverse; for the *CDI 205* could be regarded as a £600 CD player with the best facilities list on the market. After all, we've got used to FTS, custom file, track shuffle and the like. So why balk at a CD player which provides pictures as well?

The front panel of the *CDI 205* has little to lead one to believe that it is any different from the run of the mill CD player. There's a headphone socket, the usual transport control keys, a volume control and an on/off switch.

It's only when you look around the back of the unit that it becomes clear that this something rather different. Here, alongside phono sockets marked *audio out* you will find a *video out*. Or four video outputs, to be more precise, for you can connect the *CDI 205* to your telly via SCART, coaxial, S-VHS or phono lead, depending on your preference.

## Getting the picture

For those of you who are still wondering what CD Interactive is all about, perhaps a succinct description is in order: CD-I is basically CD with pictures. The sort of discs you can play range from plain old audio CDs, to video games, to children's titles and so called 'edutainment' discs such as guided tours of various cities.

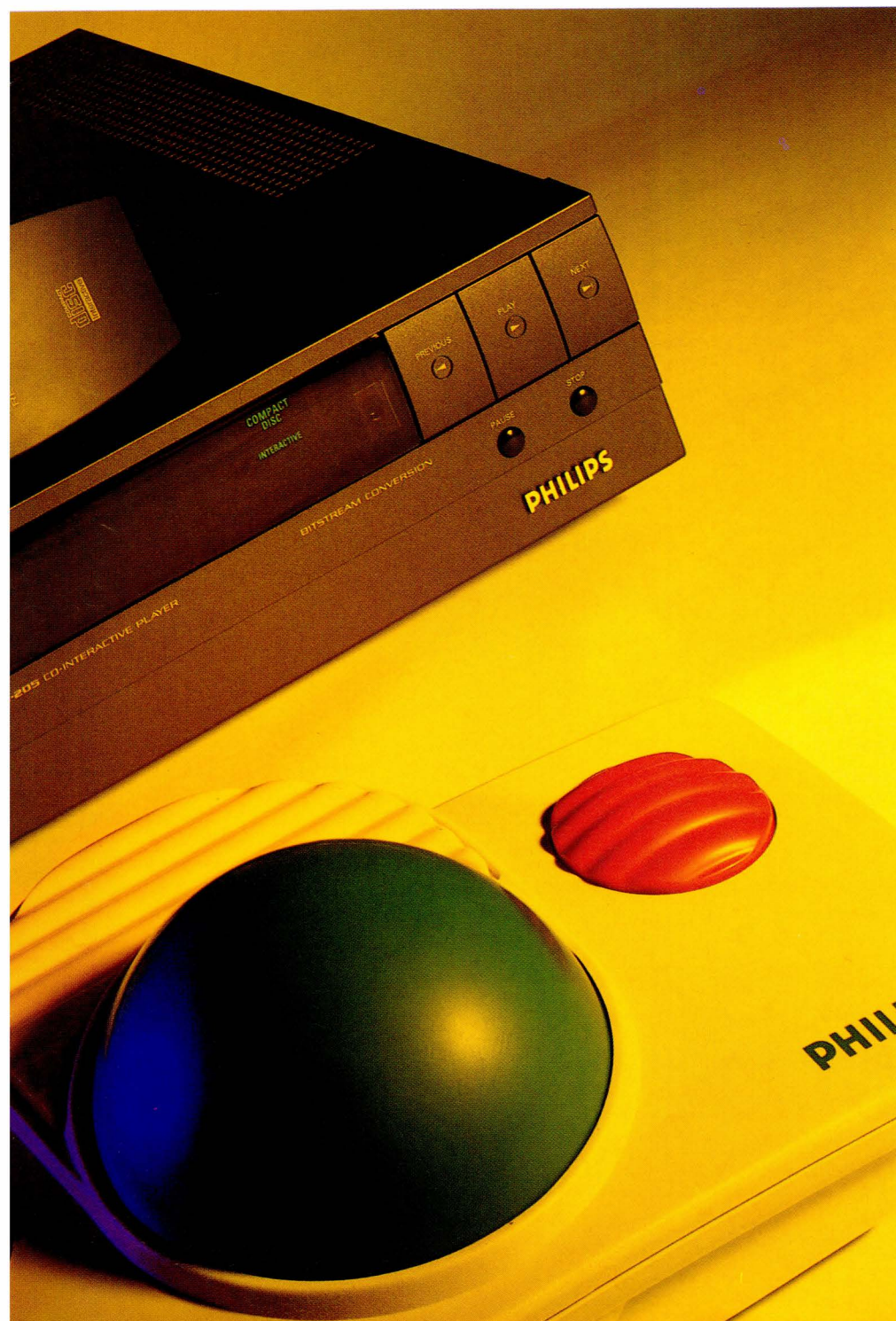
The first machine to go on sale, and the subject of this article, is the Philips *CDI 205*, but Sony, Technics, Sanyo and others also have players on the drawing boards or, indeed, in the shops in America and Japan.





beady eye onto CD-I.

# interactive



Wiring the player into your system couldn't be easier, it just slots into the hole vacated by a conventional CD player and you then run a cable to your TV set in order to watch the pictures. In use the unit will behave exactly like a normal CD player when fed normal CDs. It's only when a disc featuring graphics is inserted that the new facilities start to come into play.

At the time of writing there are 32 CD-I software titles available and Philips provided the lot for the purpose of this review. I also had a couple of CD+G discs to hand, including a JVC demonstration disc I picked up in Japan a couple of years ago and had never been able to play.

Rather cynically, I expected this disc to cause some problems, but it played perfectly giving a selection of lyrics and animated (if rather basic) artwork to accompany the songs on the disc. This is quite useful as there are quite a number of Karaoke discs out there in the CD+G format which both Sony and JVC use for their professional machines.

## Unswamped thing

Playing conventional audio discs, the *CDI 205* proved to be a very able performer, so perhaps Philips' Bitstream DAC hasn't been swamped by all the extra circuitry after all. I'm not going to say too much about sound quality here, as we intend to include the *205* in one of our blind listening sessions later on in the year. But to my ears it sound perfectly OK and certainly good enough to form the heart of a decent audio system.

Still, the main event here definitely involves the CD-I discs themselves. These proved to be something of a curate's egg. Some of the titles are very good indeed, the Time Life photography course being particularly enjoyable. And even though I've seen the golf game more times than I care to remember, it still proved to be extremely entertaining. This particular disc is actually an excellent example of the



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sort of thing CD-I can do. Basically you play a round at the Palm Springs golf course and the game opens with you standing on the tee with your view down the course displayed in the background.

The superimposition of the player and the video background is excellent and the way the player moves around (as you change the direction you wish to hit the ball) is particularly impressive. After you've chosen your club, the direction, and the degree of welly you wish to apply to the ball, the computer whacks it out into the rough or down into the lake and then the commentator proceeds to admonish you for your utter ineptitude, making comments appropriate to the particular degree of trouble you've managed to get yourself into.

Despite losing more balls than the average golf shop sells in a month I found this game quite addictive and with a little practise found myself becoming moderately good at virtual reality golf.

### The lost weekend

I had the machine at home for a long weekend and I ended up playing games far more often than I had expected. But it is with the 'edutainment' software that CD-I really comes into its own. For example, there is an excellent interactive guitar tutor disc scheduled for release later on in the year which I saw demonstrated at the CD-I conference in May. With this you not only see the correct fingering for the chord you want to learn but also get the sheet music and a video of someone play-

ing as you struggle to keep up. And with portable machines (such as the one Sony was showing at the conference) soon to hit the market, discs such as an interactive A-Z become feasible. This is something which you could carry around with you on the tube and use to access information about locations, places of interest to visit, opening times, etc.

The CD-I operating system is simplicity itself and you soon ignore the player and get on with whatever the screen tells you to do.

The so called 'Roller Controller', intended for younger users, also proved to be quite fun and is certainly easier to use than the somewhat counter-intuitive joystick type device included on the infra-red remote control handset.



**Not exactly *au fait* with operating the latest technology, Janet Moorhouse rides the learning curve with CD-I and impales some Norman warhorses.**

A whirlwind tour round the states of America? A few rounds of golf? A visit to Sesame Street? No, the editor wasn't inviting me on a few outlandish press junkets, just leaving me alone for a couple of hours with the Philips CD-I player and 32 pieces of software. Verging on the neurotic side of technophobia, I was obviously slightly perturbed when the door closed. "It is meant to be easy to use, so have a go," was my only reassurance.

A few deep breaths later I selected a disc. A sedate trip around 12 museums of America seemed the perfect opener and I inserted the disc and picked up the remote. As if by advanced technology, the CD-I logo appeared on the screen, followed by a very easy to understand introduction to the disc.

*A Visit to the Smithsonian* gives four different ways of travelling round the museums, and when you find something you wish to view, simply click on it with any one of four action buttons on the handset. A voiceover gives brief details about the exhibit and these can be supplemented by linking with other items or receiving further notes at the click of a button. All very interesting for culture vultures, and I left the disc armed with many new facts about Judy Garland's ruby slippers, Man Ray's portrait

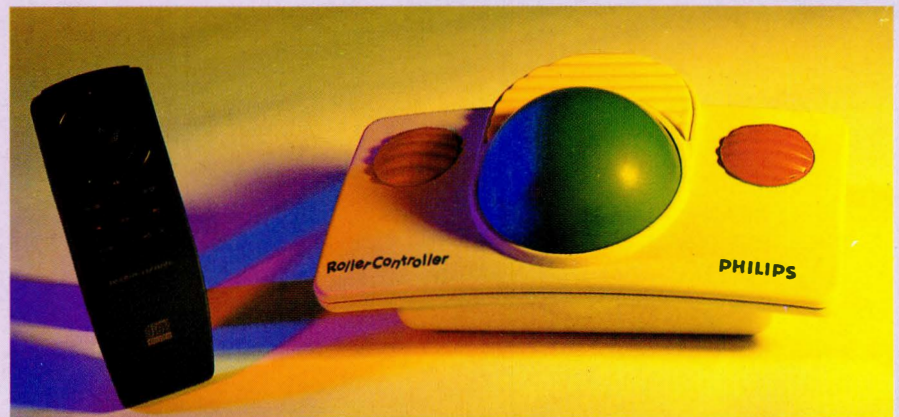
## If she can do it . . .

of Ernest Hemingway and Giacometti's Dog, among others.

Maybe falling off a log isn't so difficult after all, and inspired by this success a surge of confidence gripped me. I had a few games of pinball, played battleships against the computer, took some lessons in 35mm photography with an imaginary camera and had a go at a jigsaw. Time now, surely, to don Saxon armour and battle against the Normans. *Defender of*

games I wished to play. A spot of raiding Saxon castles sounded like my cup of tea, but with my merely average prowess at swordplay I was quickly defeated and sent packing. Sadly I fared little better at the jousting tournament and was sent home in disgrace after stabbing the horse of Brian de Bois-Guilbert.

A second attempt brought better results, and although I wasn't champion,



**Close to hand: manufacturing a colourful 'Roller Controller' alongside the standard remote means that CDI can be activated by fingers of all sizes.**

*the Crown* is an adventure game for ages eight to adult and it kept me entertained for hours.

Choosing one of four personae was fun in itself, and I finally decided to be Wolfric The Wild, who sounds like my kind of chap (average at leadership and swordplay but rather nifty when it comes to jousting). After receiving my orders from Robin of Sherwood to "reunite the darkness of the kingdom" I selected the

my deeds will be remembered.

Unfortunately I didn't have time to visit the home of Bert and Ernie in Sesame Street or take a trip back in time to the Italian Renaissance, but in my all too brief interaction CD-I proved entertaining, informative, easy to operate and fun. With lots more software on the way maybe I'll battle with the laser lords or take a cruise on Noah's ark. Reality seems slightly mundane now.



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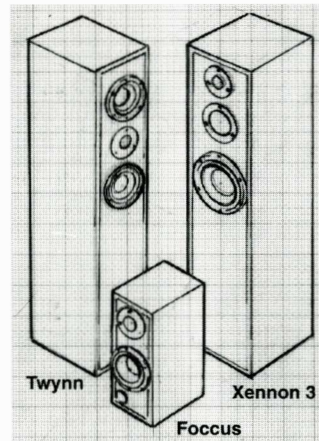
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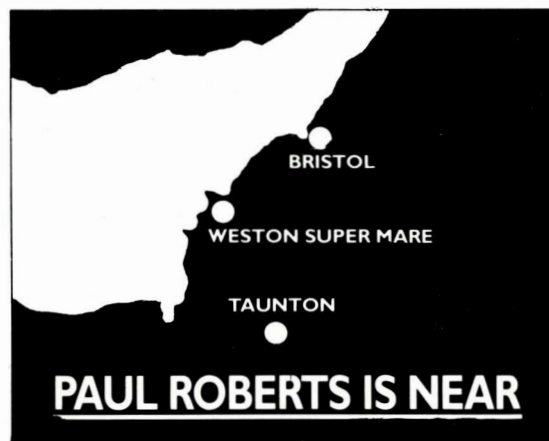


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On the down side, the machine can seem a little slow at times and in some of the software there were long passages that I would love to have skipped over; but it appeared that the only alternatives were to turn the machine off entirely or sit through the whole block.

One of the big points of discussion has been the availability, or otherwise, of full motion video. But in practice this turns out to be a little overblown. Certainly you can have full motion video; you just can't have a full sized screen of it. Thus there are quite a few games which

*Games people play: some of the first wave of CD-I software.*

include video clips taking up a quarter of the screen or so. Full motion video will add an extra dimension to the format, but the fact that it isn't available at the launch isn't actually as big a problem as I imagined.

The multi-million dollar question is will the format catch on? The answer to that must lie with the software and the first 32 titles, while interesting, ain't exactly unmissable. But I think that when

full motion video feature films are available, and music videos are regularly added to audio Compact Discs, then CD-I will stand a very good chance of taking off as the next home entertainment format.

Indeed the player's capability to play audio CDs as well as CD-Is means that the Interactive part of the system can be treated as an added extra and could well become as common as the digital output you'll find on most CD players nowadays.

And that's why you've been reading a review of it in a hi-fi magazine.



## How it all works

What exactly goes on when a CD-I player reads a disc?

Starting with the basic audio CD that everyone knows and loves, the disc itself is divided into tracks with each disc having up to 99 of these. The CD player knows where to find the tracks on the disc because the first thing a player does when a disc is inserted is to read the table of contents (or TOC), which stores the position of the various tracks.

Again sticking with the audio disc for a while, the information on the disc is stored as a series of frames, each frame containing some 588 bits of data. The frames contain the audio data itself as well as error correction and sub-code information. The frames are grouped together into blocks of 98, with a complete block of 98 frames having to be read to recover the associated subcode information. What this means in practice is that a frame comes along 7,350 times a second and that a sub-code information block is read every 98 frames

(75 times a second). As the subcode data is used to give the player information about the associated data frames, it follows that the smallest chunk of data that a player can access is one of the 98 frame blocks, or to put it another way, the smallest step it can make, either backwards or forwards is a 75th of a second.

With a conventional audio-only CD, each of these sectors is the same and only contains audio data. However, with CD-I discs the blocks of data, referred to as sectors, can contain any one of four different types of information, namely audio, mode 1, mode 2 form 1 and mode 2 form 2. The first of these is audio information encoded in exactly the same way as a standard CD. This has been done in order to facilitate a type of disc known as CD-I Ready. This will play on a conventional CD player which will just read the audio data but it also contains an extra CD-I track, a video for example, which can be accessed when the disc is played on a CD-I player.

The second type of data, mode 1, is data in a form accessible by CD-ROM drives while mode 2 data is reserved for the CD-I system. Having the ability to encode mode 1 data gives the CD-I disc compatibility with CD-ROM drives, in much the same way that CD-I Ready discs have limited compatibility with existing CD players.

Mode 2 data is further subdivided into Audio, Video, Data and Empty. Audio in this case refers to a compressed audio data stream, compressed using AD-PCM encoding, which enables the format to store a decent bandwidth signal in far less space than is required for the linear encoding used on a conventional CD. The Video data is self explanatory and the Data flag is used to identify the actual program that tells the CD-I player how to manipulate the various sound and video components that go to make up the CD-I program that the user sees on the screen.



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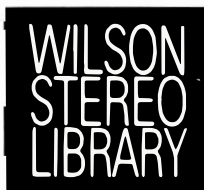
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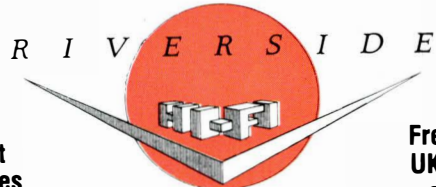
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# 21st Century Fox

I hate to say it, but the grand launch of DCC and Mini Disc this winter is starting to smell of disaster. Despite the recession, the record-buying public and hi-fi fraternity might well have embraced a new digital home recording system. But not two. And especially not two that look equally good and thus are sure to trigger a long, hard standards battle, reminiscent of VHS-versus-Beta. A lot of people still have obsolete Beta VCRs to remind them that the best system does not always win.

*Companies like Philips and Sony seem confident about making a fortune on new recording formats. Barry Fox isn't so sure . . .*

At the Consumer Electronics Show in Chicago, a progress report on DCC, sold with the promise 'ask anything you want to know', turned out to be yet another lengthy rehash of party line publicity for the format. By the time all the Philips and Polygram people had all had their say there was 'only time for a very few questions'. The press left disenchanted.

Sony peeved the press, too. Engineers honoured Sony's promise to show a recording version of Mini Disc. But the unit turned out to be a prototype box, slightly larger than a car stereo and labelled 'professional'.

Otherwise Sony's eagerly anticipated press conference and progress report on MD broke no new ground. To add insult to injury Sony ducked an open question and answer session at the end.

Sony had promised a major announcement of support for MD by Warner Records, but Warner called a private press meet to announce disillusionment with both DCC and MD. Warner is worried that MD will encroach on CD sales. Warner is also upset that there will be no portable DCC units until next year, and fears that the price points set by Philips and Polygram for DCC are too high. It is now agreed that pre-recorded DCCs will cost as much as CDs. The hardware was supposed to be cheap, but is now starting to look more expensive than DAT.

Some record companies wanted higher prices for pre-recorded DCC cassettes; others wanted lower prices to prime the market and deter copying onto blanks.

Rumours have been rife that Philips and DCC partner Matsushita (Panasonic/Technics) were having difficulty making the thin film heads on which the DCC deck relies. Early in 1989 Philips started working with Californian company Seagate (which makes computer disc drives) on DCC heads. Seagate claims to have started making samples in November 1990 and is now mass producing head chips which Philips mounts in Eindhoven. Some of the finished heads are shipped on to Japan, for Matsushita to use.

At a press meeting in London, Volker Vomend of BASF in Germany, said "We have seen samples of DCC tapes from TDK and Matsushita. But none have yet been satisfactory. We have not seen any tape yet from Matsushita that is reliable, on longevity and

runability. It had no back coating. We believe they are now working on back coating".

It is frankly hard to believe that Matsushita is having difficulty making DCC heads and tape. Philips has always said that the tape was simple to make, like videotape. More likely Matsushita is hedging its bets, not putting too much real money into DCC until market forces start to show.

Some tape duplicators want to start with real time copying, to hedge against the expense of high speed equipment.

Despite Sony's fumbles in Chicago, Mini Disc looks less and less like a spoiler for DCC. At a demonstration of the ATRAC compression system in a West London recording studio, Sony played CDs through an encoder-decoder.

A red/blue light was switched as the sound chain switched between direct-from-CD and through ATRAC. Listeners were not told which was which until after listening. Many heard a difference between sounds, as the light switched. But plenty wrongly identified the system, preferring the ATRAC chain to direct CD.

Assuming that Sony can reduce the ATRAC circuits, currently the size of a microwave oven, to a few chips with similar sound, this digs Sony into the hole predicted and feared by Philips.

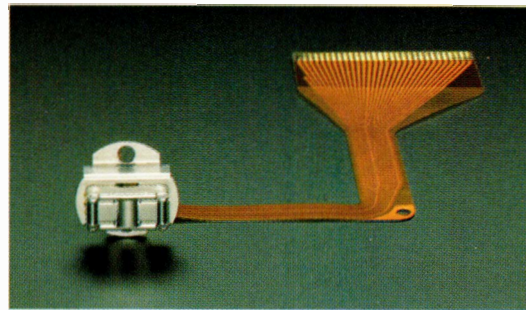
If tiny, recordable MD is virtually indistinguishable from CD, then why buy CD?

Says Alan Phillips of Sony "We are working on technology to enhance CD. We shall position CD as better than MD." The technology is SBM, Super Bit Mapping. Gold plated CDs, costing \$25 (around twice the price of conventional CDs in the US) are cut from 20 bit master tapes with noise shaping to improve the dynamic range. The SBM disc plays on any existing CD player. But previous attempts at selling high price, gold plated CDs (by Mobile Fidelity) have appealed only to a specialist buff market.

CD pressing plants win all ways. If DCC

wins over MD, it is unlikely to affect CD sales. If MD wins over DCC, and makes inroads into the CD market, they convert some CD presses to MD production. If MD and DCC kill each other, they just carry on pressing music CDs. The market will then be open for the launch of recordable CD. It will also be open for the sale of car and portable CD players which (like MD players) can be switched to run at twice normal speed, and feed a buffer memory which copes with jogs.

This scenario might well not bring too many tears to the eyes of those of us who have spent a small fortune on the CD hardware and software, which Philips, Polygram, Sony and CBS, have been selling us for the last ten years.



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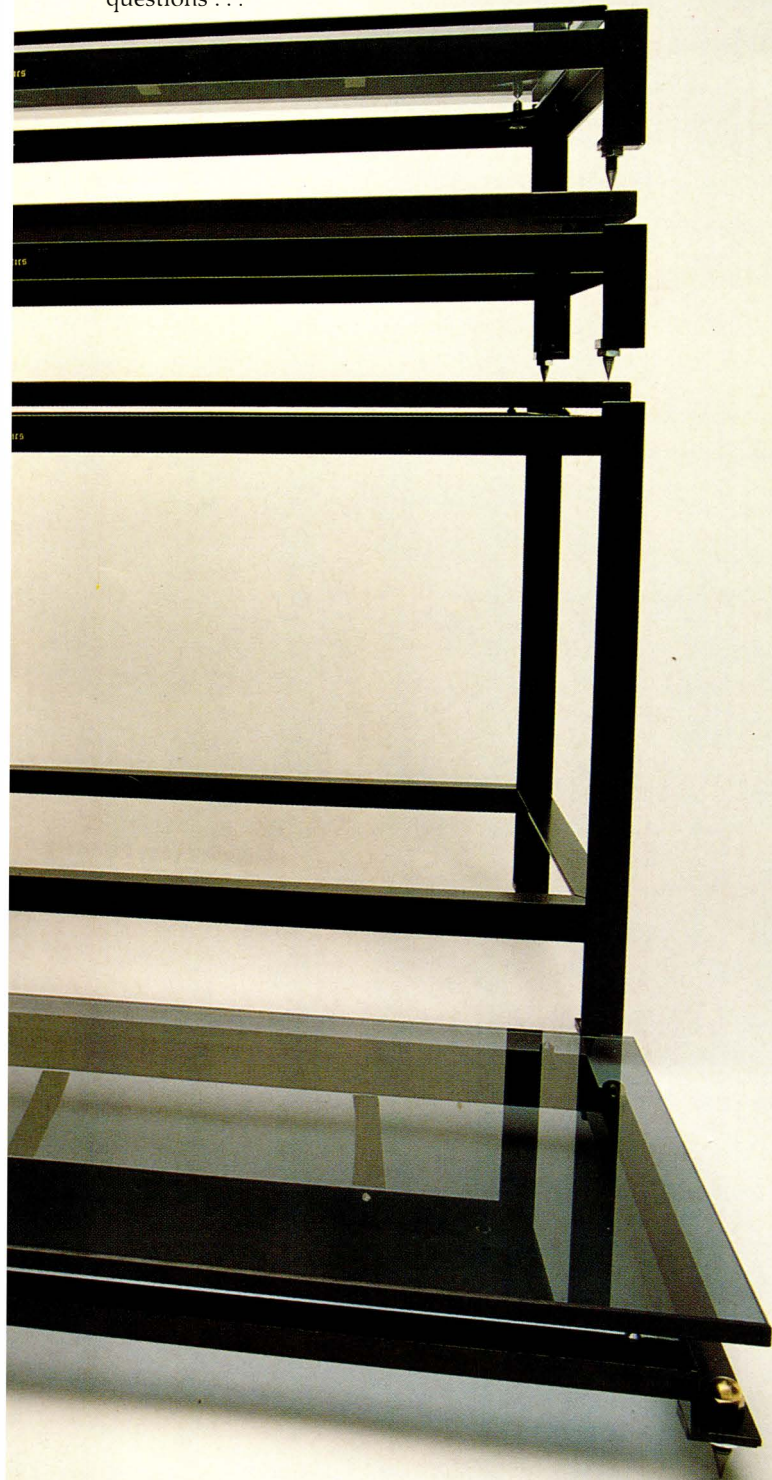
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### The questions

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

1. We review a recording cleaning machine this month. What is it called?
2. What is the name of Fred Davies' loudspeaker company?
3. What does the 'I' in CD-I stand for?
4. Which Japanese city is the Akihabara located in?
5. A frame on a CD-I contains 588 bits of data. How many frames make up a block?
6. What sort of bass drivers are used in Fred Davies' outdoor speakers?





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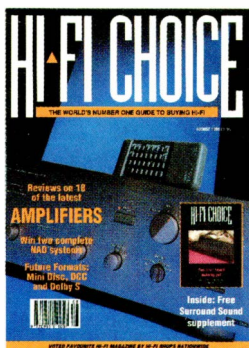
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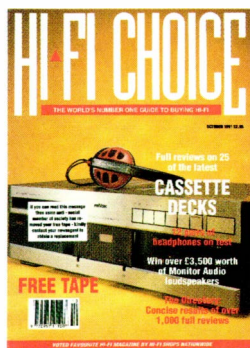
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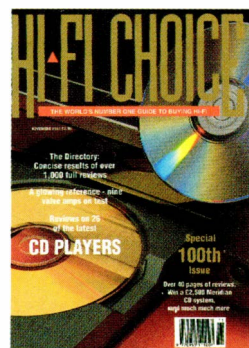
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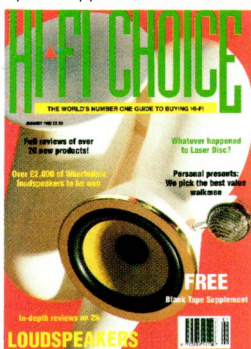
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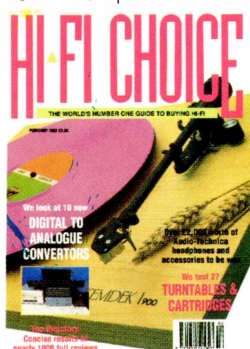
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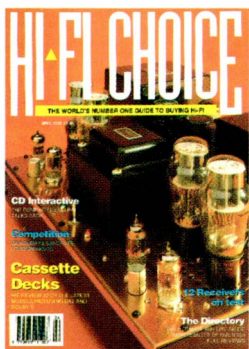
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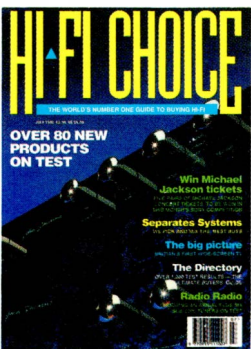
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# Readers Write

## CHOICE ANSWERS

### Preamplification prevarications

I am upgrading my CD based hi-fi system. At the moment it consists of: Aiwa XC-900 CD player, Akai AM65 digital amplifier and Cyrus 782 loudspeakers. I would like to upgrade to either the Meridian 200 transport and 203 DAC or the Teac P500/D500 combination. Which would you recommend?

I have purchased a pair of Denon POA 6600A power amps but need some advice on a preamp to partner them; the DAP-2500 that's made to go with them isn't very impressive.

For budgetary reasons I'll stick with my loudspeakers for the time being and spend any spare funds on interconnects. Do you think this is a good idea, and if so, which wire should I get?  
Mike Golden, Chadderton, Lancs.

*In our books the Meridian 200 transport/DAC combo is significantly better than most of the competition including the Teac 500s, therefore they're what we would recommend.*

*The preamp question is a little less straightforward. For a start you need to decide whether you want to go passive or active.*

*Passive pots in boxes can be exceptionally transparent and impressive but their effectiveness depends on the lengths and type of interconnect used and the other components in the system.*

*Get the Meridians and see if you can borrow a passive pre from a dealer for experimentation. If it works then this is undoubtedly the best and cheapest option. Good examples include the Moth, Audio Innovations and QED. Active preamps are more*

*flexible, but good ones tend to be expensive. Good examples include the Hafler SE-100 (£370), Deltec DSP50S-L (£695) and the rather tasty Michell Argo (£689).*

*Interconnect wise, if you have the cable supplement that came with the July issue you should be able to work out for yourself the best option. There are a lot of good cables in there but the one for you depends on budget and to an extent taste, so check out the supplement.*



Michell Argo; a competitive example of the line preamp genre.

### Mains phase configuration quandry

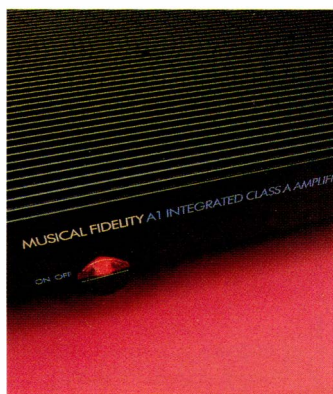
I own a Technics SLPS50 CD player which is connected to my Musical Fidelity B1 with Furukawa FD-II interconnects. I also have an AR EB101 turntable. My speakers are a pair of KEF 102s used with a Kube and Furukawa FS2T14 speaker cable.

The problem is that the mains lead on the CD player is a detachable type with a figure 8 plug. A friend told me that if this lead is the wrong way up it could knock the player out of phase. I went back to the dealer from whom I bought the player and he said this was rubbish. Who's right?

Second, I am going to upgrade my CD player and amplifier soon, the latter to a pre and power amp. What do you suggest? I don't want to spend over £500 on the amp and I'm not sure what to spend on the CD player.  
A Gilmore, Cregagh, Belfast.

*It is possible to connect figure 8 plugs so that the mains is out of phase, and there is a school of thought that says that this affects the sound quality of the unit. Indeed Russ Andrews sells a device for detecting whether you've got it right or not, but in the absence of one of those you'll have to use your ears. The best thing is to experiment, if you can't hear a difference then it's not worth worrying about.*

*Under £500 for a pre/power amp is perhaps a bit ambitious*



*and frankly I would advise you to go for a better integrated amp such as the Pioneer A-400 (£240), Audiolab 8000A (£410) or a Musical Fidelity A1 (£300). Listen to some of these in the context of the CD player you decide on.*

*On that front things are a little more straightforward. You can either go for a top notch one-box player like the Rotel RCD-965BX or one of the better transport/DAC options. Check out the Directory for a fuller picture but the transport that seems impossible to beat at the moment is the Meridian 200 (£895). There are a lot of good DACs around but the established favourites seem to be the Audio Alchemy DDE (£376), Meridian 203 (£510) and Deltec Bigger Bit (£650).*

*One of the first class A integrations, Musical Fidelity's A1 is still a favourite.*

### Breaking in a new system

*Thanks to our local burglars I have the opportunity to upgrade from a Technics system to a superior CD based system.*

*However, I need some help selecting what to get, despite buying magazines and visiting various dealers I am still very confused.*

*I have a budget of £2,500 and am primarily after sound quality. Looks and features are of secondary importance. I have been recommended the following system by a dealer; Meridian 200/203 transport and DAC, Linx Vega pre/power amps and KEF Q60s. I have managed to find reviews of the source and speakers but can't get hold of anything on the amps. Do you have any views on this system, and is it the right choice?  
Alan Tilt, Warley, W Midlands.*

You have been recommended a fundamentally good system. Each of the components is recognised as being competitive in its field and presumably it works well as a whole. However, Linx amplifiers are no longer being made, the brand is owned by Wharfedale but at the moment it's not in use. Therefore, for reasons of long term satisfaction it would not be advisable to buy the amps, which is a pity as they were good products.

Getting back to your future system, you will need another amplifier to go in the system and we would recommend the Audio Note Oto (£1,299) integrated tube amp. Combining this with a pair of efficient loudspeakers like the Q60s (£349), or alternatively some Audio Note AN-Ks (£500) would yield very rewarding results.

There are of course other good amp and loudspeaker combinations around and in some respects it would make sense to go for a different balance price wise. For instance a Pioneer A-400 (£240) with Audio Note AN-Js (£799) would give you greater bandwidth than the former system but less transparency and dynamic subtlety.

I'm afraid that there is no easy answer, if taste and circumstances were less diverse things would be, well, boring.



# Those obscure objects of domestic disharmony

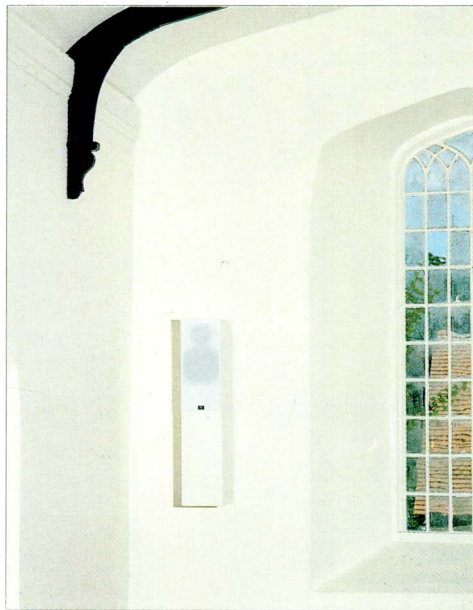
I am a desperate man looking for help. My partner and I are at present looking to buy a house together. Now unless we can find one large enough to have a dedicated hi-fi room our happy life together will end in tears.

I have recently upgraded the front end of my system to a Roksan Xerxes/SME V/Ortofon MC3000 with a

Michell Iso and hope to upgrade my Cyrus 1 to something that glows in the dark from Audio Innovations as soon as I can find a

buyer for one of my arms and a leg. I am quite happy to let my Philips CD303 and Aiwa F606 continue their aging process.

The source of my desperation lies with the speakers. My present Infinity RS2000s on Target stands are the subject of a vicious hate campaign. It's not the speakers themselves that my partner objects to but the fact that they sit on stands, have drive units and are on the



*Camouflage: one man's largely successful attempt at disguising the offending articles proves that it can be done.*

*which there are few easy answers, apart from what the Americans call a den. But they have space.*

*For us Britons, some form of compromise seems inevitable. Here are a few options that are less offensive than others: wall mount floorstanders of the pretty variety which don't stand out too badly (disguising your stands by painting them or covering them with fabric might help; you could cover both speaker and stand with a loose weave fabric); resorting to wall brackets; getting a cabinet maker to build you some beautiful wooden stands; er, painting your speakers and stands so that they blend in with the wall paper.*

*It ain't easy, and perhaps panels would be a good option, though you'll need a fairly hefty tube amp to drive them, and sonically I wouldn't recommend it.*

*Perhaps you'd better persevere in your search for a house with a listening and a living room, it might be the only answer.*

same planet as her. Unless space travel for the masses becomes financially viable in the next year or so my only solution is a compromise, possibly with some form of panel speaker (if they would be sensitive enough for tube amps).

Any suggestions that you might have would be greatly appreciated. Money is no object as I have none.

Gary Kimberly, Reading, Berks.

*Which comes first, domestic bliss or hi-fi? It's one of life's great dilemmas and one for*

## Laid back. Not

I have a standard Voyd turntable with an Audio Note arm, Audio Technica A-7 OC10 cartridge, Musical Fidelity MVT preamp and two P150 power amps, with a pair of Rogers LS7t loudspeakers.

My problem is that the system sounds too bright and thin, almost too refined. What do you suggest? I've heard a lot about Voyd/Audio Innovations/Audio Note systems but I mainly listen to rock music and wonder if they would be suitable?

Do I need to change the tonearm to, say, an SME V? Or is the Voyd not a transistor amp turntable? Please help me. Jonathan Manders, Hereford.

*Have faith and the path will become clear. The most likely source of brightness in your*

*system is the amplifiers and specifically the power amps. Therefore you would be well advised to find a suitable replacement, one of the best options being Audio Innovations Series 1000 monoblocks (£1,500). These 50W tube amps have the power to give you the drive and control you require and they are well suited to the rest of the system. However, they are expensive as well so here are a few alternatives to consider; Denon POA-4400A (£600), Hafler SE-120 (£380) or perhaps a Quad 606 (£635).*

*An SMEV would help if you could afford the silver wired version provided by some dealers. Lastly, the Voyd is not a valve oriented turntable but it does seem to work well with them.*



## Sssibilant cans

I must be a dealer's worst nightmare; I take forever to decide what to buy. Back in 1986, I needed a pair of speakers so after having wasted some very considerable dealer man hours, I settled on a pair of Celestion SL6s, which I thought sounded the best of the bunch.

I recently required a pair of headphones, so four harassed dealers, many magazines and a pair of returned DT911s later, I got a pair of Sennheiser HD560 II Ovations.

After prolonged listening I have found that the Ovations are a lot livelier and have a stronger more expressive treble than my speakers. They do, however, introduce excessive sibilance to the sound and make strings sound coarse, especially compared to my beloved SL6s.

Could it be that my disc players, a rather ancient (well run in?) Philips CD650 and a Pioneer CLD-1450 are full of rough edges which are smoothed by the Celestions? Or is it that headphones, in general, have a sibilant sound? I could replace the CD650 with a gentler bitstream model such as our common favourite the Marantz CD52SE, but am concerned that this might sound too bland on the already marshmallow-like SL6s. Paul Dallas, London SW15.

*You are right, the Sennheiser 560s are a bit unnatural at high frequencies but very open and detailed as you say, probably more so than the Celestions. But, as you suggest, your CD players probably have a slightly edgy presentation that is better highlighted by the cans, therefore a new player such as the Marantz or Rotel RCD-965BX would be a good cure.*

*As to the CD player's performance with the speakers, this depends significantly on the amplifier you are using, which is the most likely cause of the comparative blandness you are experiencing. I would suggest you give your dealer(s) more grief and audition some alternative amplifiers. There are plenty of good options but if you want to cure the marshmallow effect then something like an Audiolab 8000A (£410) or (dare I mention it again?) the plucky little Pioneer A-400 (£240) would do the trick, then again, the Marantz PM-40SE might be a better match.*



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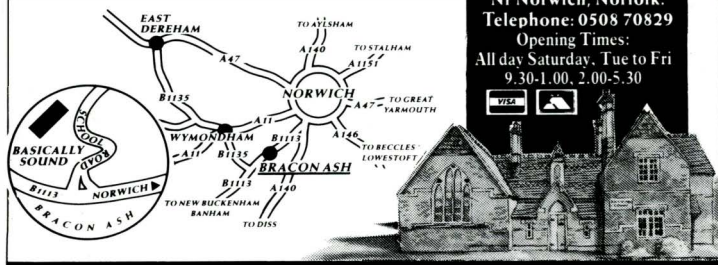


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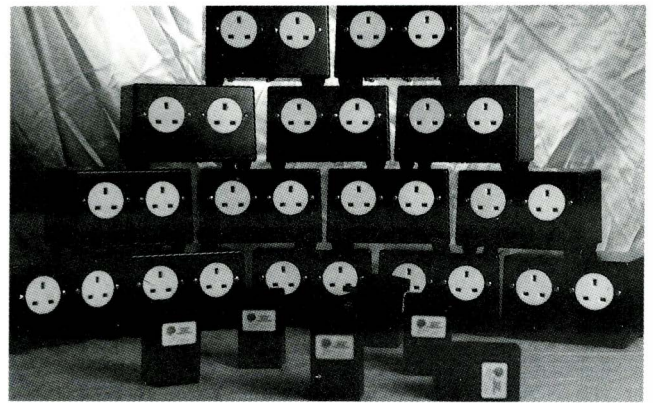
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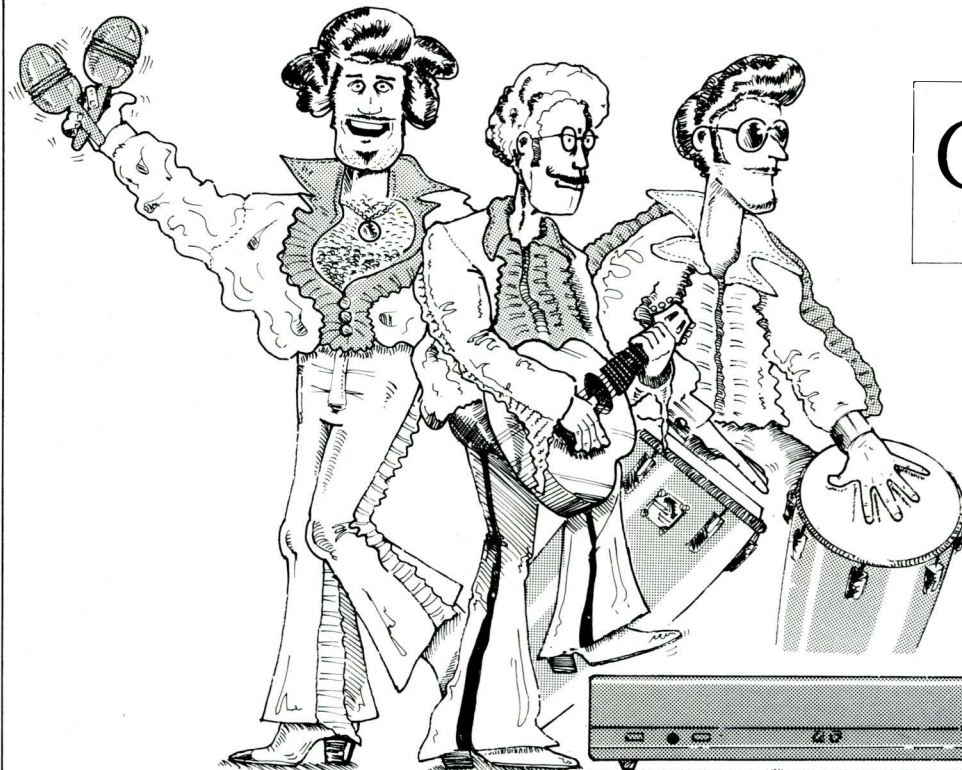


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# Write on . . .

*What do you think about the way things are shaping up in the ever broadening world of audio entertainment? We want to know your views and ideas, so send 'em in and each month we'll award a record token (which should just about cover the price of a CD) to the writer of the most witty or interesting contribution.*

## Two out of four ain't bad

Can anyone explain to me the enormous differences in quality between CD transfers of analogue recordings? When reluctantly buying my first CD player a few months back I bought CD copies of four of my most loved and best known albums to use in comparing machines. These were the Alan Parsons Project's *Turn of a Friendly Card*, Susanne Vega's *Solitude Standing*, Jethro Tull's *Rock Island* and *Big Generator* by Yes. All are superbly dynamic, fresh and well engineered records on LP but the differences between them on CD are amazing.

To start on the plus side the Alan Parsons transfer is superb and a great surprise for one with no great love of CD. There is a slight quality loss on the transfer, but this is tiny. *Solitude Standing* is also pretty well done, although here there is a noticeable loss of tonal depth and bass on the CD.

But the last two are a very different story. The Jethro Tull seems to have had its dynamic range squashed by about 70 per cent turning an enthusiastic and vibrant performance into one



*Revealing the best and the rest on CD. The Arcam Alpha.*

lacking any sense of energy and involvement, and whose boredom is downright contagious. Worst of all, however, is the Yes.

On record this is a truly superb recording. On CD my first reaction was to reach for the Q-tips. It sounds just like a cassette played through very dirty heads. A travesty of a great album. Where are Mobile Fidelity when you

need them?

The equipment I was using to compare the two media was a Linn *Basik* against the Arcam *Alpha I* eventually bought, so no one can say I was giving CD a bad break; and the Alan Parsons transfer shows what can be done. Why isn't it always like this? David Woolliscroft Manchester.

## Enigmatic variations

*I recently purchased the limited edition version of Enigma's MCMXC aD on Compact Disc, which features four extra tracks. The CD has 15 tracks, with the booklet listing these as one to 11 — in Roman numerals, for even more confusion. (The original CD had seven tracks and used index points for the multi-parters.)*

*I have several CDs with incorrect or confusing track listings, and also Pictures at an Exhibition with no track or index points at all (thank you, Telarc).*

*Since even most budget players have index access, it doesn't seem unreasonable to sensibly use it. And getting track listings wrong is inexcusable, given the high cost of CDs.*

*David C Robinson  
Birmingham.*

## First the good news . . .

First, what a splendid idea your pocket guide is (*Hi-Fi Choice* 107, June). The wit and gaiety of it is refreshing after the rather turgid prose in which the technicalities are normally discussed in any field of engineering. I laughed so loudly that my wife enquired what was wrong.

However, I think that the *Which?*-bashing editorial in that same issue is misplaced. I read *Which?* and find that, on the whole, it is sound. Of course, it is a general consumer magazine and cannot possibly compete in depth of investigation with a highly specialised one such as yours. Also, *Which?* buys its test goods in ordinary retail outlets, rather than borrowing them from the manufacturer or importer. It is hardly surprising that they do not keep up to date. But neither do many hi-fi shops, believe me. D J I Garstin Kent.

## Cassette decks grim up north

**I was recently in a position to buy a new cassette deck, purely for home recording, with a budget of £500.**

**After reading many reviews I narrowed down the competition to two machines — the Nakamichi 1.5 and Akai GX95II — which I intended to audition. I**

**contacted eight hi-fi dealers in the North West, all selling both decks. Ideal for a direct comparison, I thought.**

**The problems arose when none of the dealers had an Akai**

**in stock, and the only way I could audition one was to order it (which would involve me paying a deposit and being obliged to buy the deck!). At the same time several dealers told me that the Nakamichi was far superior to the Akai (in terms of sound, build, service history, etc).**

**This kind of attitude by dealers totally removes the opportunity for the consumers to make their own judgement about competing hi-fi products.**

**I then contacted Akai HQ and was informed by an area sales manager that I wouldn't be able to audition a GX95II**

**'north of Birmingham', due to problems in supply and demand.**

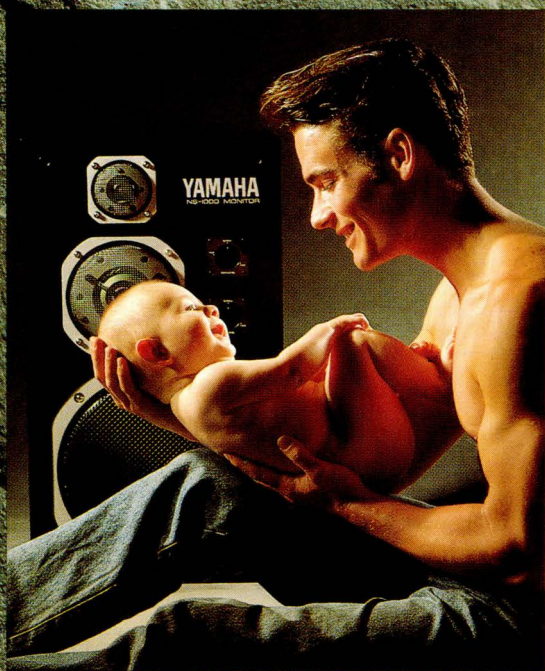
**I eventually auditioned the Nakamichi on its own and found it to be excellent, and have since bought one. I am pleased with my purchase but feel that dealers and suppliers could do more to assist consumers in their choice of hi-fi products.**

**In the back of my mind I am always wondering if the Akai would have been sufficient for my needs, as well as saving me £100!**  
**C Gibbs  
Manchester.**

**Record  
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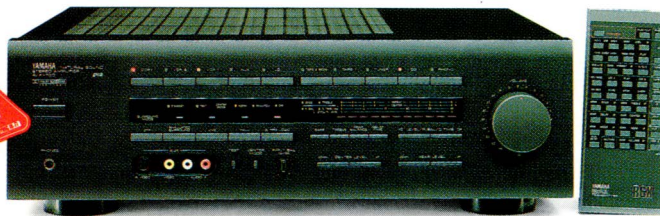
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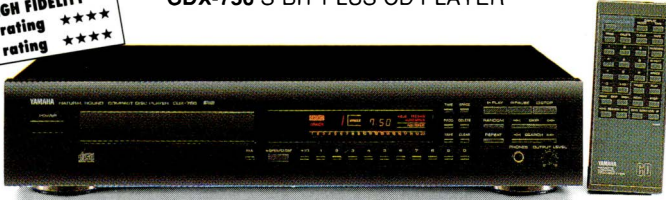
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Sound rating \*\*\*\*\*  
Value rating \*\*\*\*\***

### CDX-750 S-BIT PLUS CD PLAYER



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**WHAT HI FI  
Facilities \*\*\*\*\*  
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### KX-330 STEREO CASSETTE DECK



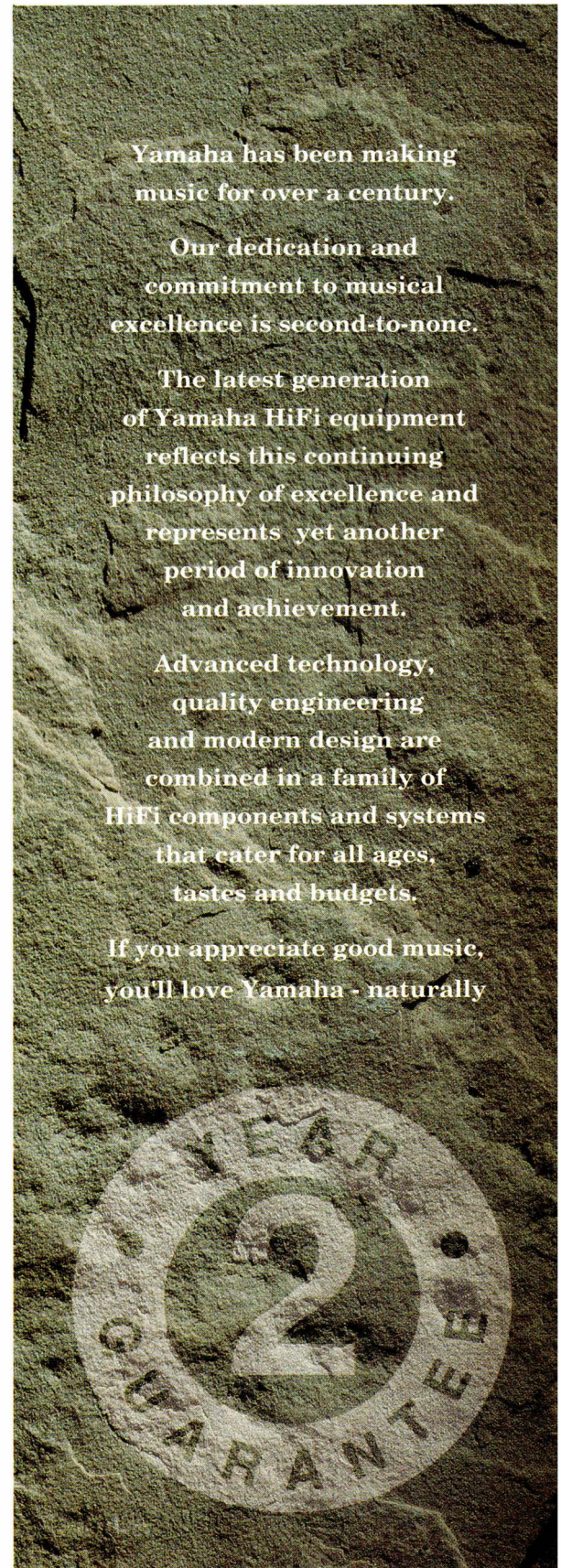
“ Yamaha Cassette Deck engineering continues to set the standard for sound quality and value for money. The KX-330 offers a wealth of features and superior performance at a highly competitive price. ”

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Hi-Fi '89/92



# Choosing and Using . . . Amplifiers

**A**t the heart of every hi-fi system there is an amplifier, the one component that links every other. This is the product that allows you to copy from CD or vinyl onto tape for instance in addition to, and more importantly, providing an interface between source and loudspeaker. A simple task you might think but in reality it is one dominated by extremes, from handling the minute voltages produced by a moving-coil cartridge to levels, say, 100,000 times higher demanded by the inefficient and power hungry loudspeaker.

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

*Obsessed with control or merely seeking power? Let Paul Miller introduce you to the wonderful world of amplifiers.*

Nevertheless the bulk of amplifiers made today are solid-state in design, because these are simply more efficient, flexible and reliable in execution than their valve forefathers. But even here there is a broad canvas of style and design, including the archetypal feature-laden and button-strewn amplifier which continues to dominate the mass market.

Still, you rarely see a graphic equaliser or dubious power display on an amp these days, and a good thing too because these superfluous widgets do nothing to enhance the sound. After all, every bit of extra electronics that processes the audio signal cannot but add a little smudge of its own. And all these smudges, or colourations, add up to obscure the natural colour and vibrancy of the music itself.

It was this sort of thinking that kick-started the specialist amplifier market, minimalist designs devoid of bass and treble controls, loudness contours or even a balance control. Their brief is a simple one with all efforts concentrated on circuitry that's absolutely crucial to the music signal. Circuits like the RIAA stage used to boost and equalise the signal that comes off vinyl disc, line stages for the tuner, tape deck and CD player plus a final built-in power amp to grapple firmly with the speakers.

Anything else is judged unnecessary. Is this the sort of amplifier for you? Well, be honest with yourself, do you really need tone controls or other widgets? If you do then perhaps an imbalance lies within the system itself. Don't buy an amp just to tweak the bass

control, choose one instead that gives you the clout you're after without recourse to an electronic band-aid. It's what system matching is all about.

Once again, this is not to say an amplifier with sensibly tailored tone controls cannot sound respectable. Indeed many popular models include a tone defeat facility in an attempt to offer the best of both worlds. Even the Japanese majors like Pioneer, JVC and Sony are getting in on the act, providing minimalist amplifiers especially for us in the UK!

But whatever their origin all amplifiers must tackle the extremes we mentioned in the opening paragraph. A conventional integrated amplifier has the toughest job because the sensitive MM/MC stage and rugged power amp are both beavering away within the confines of a single case. It's easy to imagine how the dynamic swings in current demanded by the speaker might effect the delicate, low-level signals being offered-up by a phono cartridge.

Preamplifiers separate the job of signal processing (tape and input selection, MM/MC disc equalisation, tone controls and line stages) from the heavy-duty power amp which provides the muscle needed to control the speaker. Each gets on with its allotted task without influencing the other via the common power supplies, earth tracks and casework shared in an integrated amplifier. Pre/power amps do flaunt the promise of higher quality sound but then they occupy a price bracket well above the ordinary integrated product.

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

If it sounds right then it is right, after all you're the one that has to live with the decision, not your dealer. In fact it's easier to damage your speakers by pushing an under-powered amp too hard than blasting out the occasional clean peak from a monster amp. Don't get hooked on power though, because more power does not mean more quality.

So what's all this fuss about peak current? Well, current comes into the equation because a certain number of Amps (or milliamps) are required to maintain the voltage across the speaker load, and the lower the load the more current is demanded for any given power level. Wind up the wick too far and the current runs dry, causing a massive increase in distortion which, in turn, screws up the speaker. If this happens then you can always turn to our loudspeaker issue and track down a replacement!



# Akai AM-95

Akai (UK) Ltd, Unit 12 Haslemere Heathrow Estate, Silver Jubilee Way, The Parkway, Hounslow, Middlesex TW4 6NQ. Tel: (081) 897 6388



**K**icking off this month's amplifier test we have a true beast, just one of a tribe of behemoths that stalk these pages. But even compared to flagship models from JVC, Sony and Pioneer in this issue, the *AM-95* is an utter monster, a vast crate of an amplifier that will easily swamp any unsuspecting shelf or table.

Flanked by a pair of polished wooden cheeks and adorned with a vast array of knobs, switches and buttons, the *AM-95* is not quite as 'new' as Akai might have us believe. Turn way back to issue 68 and spot the difference between this and the older *AM-93*.

Clearly the *AM-95* is based on the same chassis, offering the same range of three tape, three line and MM/MC inputs with independent rec-out, bass/treble tone controls, muting and A/B speaker selection. Once again there's also an on-board DAC, accessible from any of four coaxial and optical inputs.

For the Nineties, however, Akai has opted for a MASH/PWM bitstream DAC in place of the older multi-bit one used before. And that, quite frankly, marks the principal difference between the *AM-93* and *AM-95*. Once again Akai has attempted to shield this RF-noisy circuitry from the remainder of the amp. So why is it then placed immediately alongside the sensitive MM/MC RIAA stage?

## Lab report

Unfortunately all the characteristic quirks of the *AM-93* are alive and well in the *AM-95*. Take the bizarre MC frequency response by way of example, peaking in alarming fashion at 7.8Hz (+3.3dB) before plunging in line with the MM trace.

But when it comes to distortion it's the MM input, once again, that suffers most. Both MM and MC stages are compromised by slew-limiting but only the MM input incurs such a dramatic loss of headroom - from +26.7dB at 1kHz to +15.0dB at 20kHz!

Hence the high 0.16 per cent THD and 2.0 per cent IMD recorded via MM. Compare this with the 0.028 and 0.17 per cent values (respectively) for the MC stage.

Powerwise there's also no change, but though the 110/190W rating is hardly mind-blowing stuff for such a huge amplifier, at least it has the support of a hearty 25.5A. Recalcitrant speakers won't stand a chance against that onslaught!

## Sound quality

This turned-out to be a rather inconsistent performer with a leaner and meaner sound than many in this test, one that was lively yet disjointed. Prokofiev's brass was just too brassy or rasping yet, by way of contrast, the sense of scale, the articulation and weight of Tracy Chapman's CD was very impressive indeed. Real bass, however, was still rather shy.

Meanwhile the sax solo from our jazz CD was sharp and abrupt rather than 'melting' in fluid fashion from the speakers. On the one hand this sharpness tends to encourage a little extra sparkle from the MM input but, equally, it does nothing to improve the resolution of its indistinct bass.

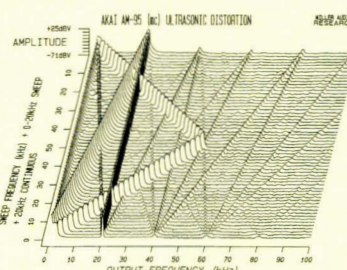
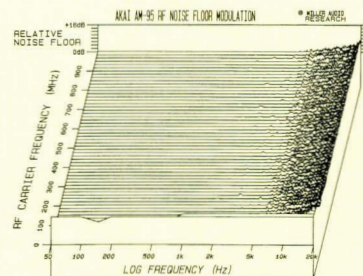
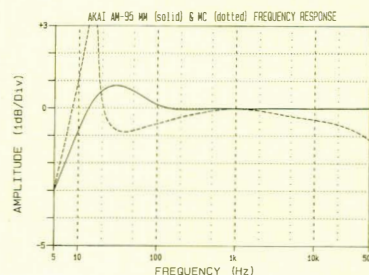
Reaching for the Rachmaninov LP revealed strings that were taut and incisive, building a heightened sense of anticipation along with the woodwind and brass. So it can sound quite immediate, dynamic and lively but can just as easily sound a little too eager, too hard and fast, just 'too hi-fi' in the view of our panel.

## Conclusion

All this lightness, brightness and sparkle is hardly ideal for long-term listening comfort. On the other hand these qualities might come as welcome relief in the dustiest of systems. Nevertheless there are smaller, cheaper and more entertaining amps just around the corner. Try Akai's own *AM-47* for a start!

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output</b>			
8ohms	103.6W	109.7W	112.0W
4ohms	169.0W	190.4W	180.9W
<b>Dynamic Headroom (IHF)+1.05dB (139.6W)</b>			
<b>Peak Current (5msec, 1% THD)</b>	25.5A		
<b>Output Impedance</b>	0.076ohm		
<b>Damping Factor</b>	105.9		
	CD/Aux	MM	MC
<b>Stereo Separation</b>			
(1kHz)	76.1dB	73.4dB	57.5dB
(20kHz)	53.3dB	48.2dB	52.0dB
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.05dB	0.35dB	0.39dB
(-60dBV)	0.29dB	0.14dB	0.10dB
<b>Total Harmonic Dist.</b>			
(0dBW)	-87.9dB	-55.8dB	-71.4dB
(2/3 power)	-90.1dB	-56.0dB	-71.1dB
<b>CCIR Intermod. Dist.</b>			
(0dBW)	-86.5dB	-28.1dB	-49.7dB
(2/3 power)	-87.9dB	-28.0dB	-49.5dB
<b>A-wtd Noise</b>			
(0dBW)	-76.5dB	-75.6dB	-73.2dB
(2/3 power)	-90.9dB	-89.8dB	-76.4dB
<b>Residual noise</b>			
(unwtd)	-78.9dBV	-78.9dBV	-78.9dBV
<b>Input Sensitivity</b>			
(for 0dBW)	11.8mV	156µV	17.7µV
(for full output)	125.7mV	1.60mV	188µV
<b>Disc Overload</b>			
(1kHz)		108.6mV	13.6mV
(20kHz)		282.0mV	133.9mV
(50kHz)		141.5mV	119.5mV
<b>Tape Output/Impedance</b>	8.09V (disc) / 2.33kohm		
<b>Input loading</b>	50kohm/260pF 47kohm/600pF 108ohm		
<b>DC offset, left/right</b>	-3.8mV/+2.8mV		
<b>Retail Price</b>	£620		





# Alphason Apollo

Alphason Designs Ltd, Unit 2, Linstock Way, Wigan Road, Atherton, Lancs M29 0RL. Tel: (0942) 897308



So how does this *Apollo* differ from the one we tested in Issue 92? I asked the man from Alphason. 'Well,' he replied, 'these don't blow up!'. Naturally, what he meant to say was that the integral protection circuit now triggers ahead of its fuses should you become over-zealous with the volume control.

Otherwise this idiosyncratic amplifier retains its original charm, from the stained-ash fascia to the gold-plated phonos and recessed 4mm sockets round the back. Once again Alphason has made provision for five separate line sources, one tape deck plus both MM and MC cartridges. These are distinguished by a further selector which engages a discrete headamp to cope with low-output MCs.

So the *Apollo* is safer, more reliable and no more expensive than it was 18 months ago. But will Alphason finally commit it to the launchpad?

## Lab report

Maybe so, but unfortunately the *Apollo* remains a rather sickly amplifier, in technical terms at least. Its 50W rating has now plunged to 38W, a casualty of its soft-clip protection which allows THD to gradually advance from 0.1 to one per cent over a 30.9 to 37.9W range (1kHz into 8ohm).

Intolower (4ohm) impedances this 'creeping distortion' restricts its rated output to a pathetic 16.8W (or -3.5dB rel to 8ohm) just as it puts a stranglehold on both dynamic headroom (+0.35dB) and available current. High sensitivity speakers, like the Audio Note *Js* employed for our listening, are a must if you're to keep out of trouble.

Meanwhile Alphason has succeeded in bolstering the disc headroom to +22dB and +25.2dB for MM and MC respectively. Nevertheless, premature slew-limiting still results in high 0.47 per cent and 6.3 per cent figures for THD and IMD via MC disc. As a result the 3D plot betrays a forest of com-

plex IM patterns.

Its high RF sensitivity remains unchecked but hum and noise now add up to a substantial -45.6dBV (5.23mV) with 50/100Hz components extending beyond 1kHz on both channels, regardless of input or volume level!

## Sound quality

Likened to a distant bandsaw, Alphason's low-level buzz was clearly audible throughout the quieter interludes of Brahms' *Symphony*, an electronic hash that corrupted the natural acoustic captured by this recording. Corrupted it may have been, but compressed it was not, the remarkably smooth and open ambience of its music prompting one listener to suggest this was a valve rather than solid-state amplifier!

Its treble is certainly very 'dark', an unusual combination of space and smoothness that still manages to preserve a wealth of subtle detail. Alphason's CD input received greatest praise, for though it was softly focused rather than starkly etched, voices still sounded lucid and expressive, so very real and convincing.

The vinyl input proved softer still, its creamy balance smothering Rachmaninov's strings and slowing the natural bounce of the recording. Not poor, they hastened to add, just a little slow, lacking strength in the bass and enthusiasm in the treble.

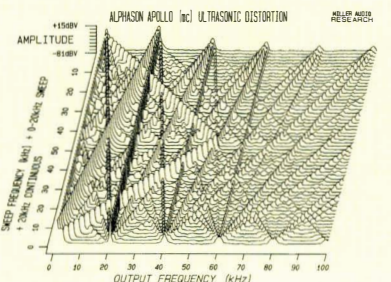
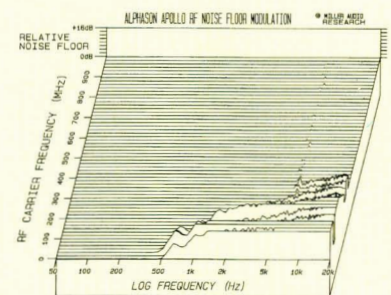
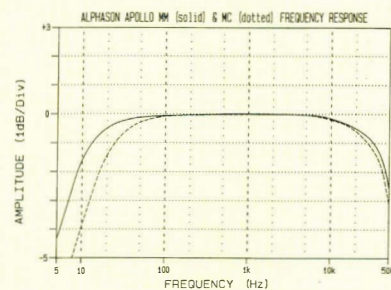
## Conclusion

There is a body of research which suggests that a certain amount of added noise — at the limits of audibility — can be of subjective benefit, encouraging a more open and spacious acoustic for instance.

The question remains whether Alphason can lose the buzz and keep the amp, for without this background drone it would surely have coasted through to a Recommendation. Nevertheless, with this model the company has blown its second bite at the *Choice* bullet.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	37.9W	37.9W	34.0W
4ohms	16.5W	16.8W	16.3W
<b>Dynamic Headroom (IHF)</b>	+0.35dB (41.1W)		
<b>Peak Current (5msec, 1% THD)</b>	2.06A(!)		
<b>Output Impedance</b>	0.019ohm		
<b>Damping Factor</b>	422.1		
	<b>CD/Aux</b>	<b>MM</b>	<b>MC</b>
<b>Stereo Separation</b>			
(1kHz)	81.0dB	73.8dB	72.5dB
(20kHz)	64.9dB	51.7dB	50.7dB
<b>Channel Balance</b>			
(1kHz, -20dBV)	1.03dB	1.02dB	1.05dB
(-60dBV)	1.51dB	1.48dB	1.55dB
<b>Total Harmonic Dist.</b>			
(0dBV)	-75.8dB	-75.3dB	-46.5dB
(2/3 power)	-74.1dB	-74.2dB	-46.3dB
<b>CCIR Intermod. Dist.</b>			
(0dBV)	-80.4dB	-59.7dB	-18.0dB
(2/3 power)	-68.6dB	-57.8dB	-18.0dB
<b>A-wtd Noise</b>			
(0dBV)	-70.0dB	-67.9dB	-65.1dB
(2/3 power)	-82.2dB	-71.3dB	-65.9dB
<b>Residual noise</b>			
(unwtd)	-45.6dBV	-45.6dBV	-45.6dBV
<b>Input Sensitivity</b>			
(for 0dBV)	34.3mV	235µV	33.3µV
(for full output)	213.7mV	1.54mV	221µV
<b>Disc Overload</b>			
(1kHz)		63.3mV	9.06mV
(20kHz)		307.8mV	14.7mV
(50kHz)		278.9mV	15.5mV
<b>Tape Output/Impedance</b>		9.27V (disc) / 939ohm	
<b>Input loading</b>	9.8kohm/80pF	47kohm/220pF	33.2ohm
<b>DC offset, left/right</b>		+8.0mV/+1.8mV	
<b>Retail Price</b>			£300





# Audio Innovations 200

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



**F**rom the makers of 'the worst amplifier in the world' (as *Choice* described the *Series 300* after proclaiming it a Best Buy in issue 63) comes this *200 Series* pre/power combination, capable of sustaining some 12W of beautifully distorted Class A power. 12 Watts? Count yourself lucky, this is generous compared to the performance of some of its amps!

Indeed, unless I'm seriously mistaken, these revamped *200 Series* amplifiers were conceived to fight shy of Audio Innovations' wacko reputation. Up until now its amps have been aimed at a paper-thin niche in the enthusiast market. So here we have a well-meaning attempt to reduce the amplifiers' distortion, improve their frequency response and bolster their output.

Just £350 buys you a fascinating valve preamp, one that's built into a highly distinctive case and able to service up to three line, one tape and either MM or MC phono inputs. An 'isolate' switch enables you to maintain or lift the ground connection. Just experiment for the lowest noise (hum).

Glowing under the cage-like chassis you'll find an ECC83 double-triode which boosts the MM input before it meets a fully passive RIAA network. Audio Innovations has specified goodies like polystyrene caps and Beyschlag metal-film resistors for this network which is followed by a second ECC83 stage and unity-gain cathode-follower (ECC82).

This additional stage is supposed to lower the final output impedance but as it runs directly into a 50kohm plastic-film volume control, I'd say AI is wasting its time. Oh yes,

I nearly forgot. You can opt for an MC input (total cost £439) which includes an extra ECC83 headamp ahead of the main RIAA stage. A rare facility on any valve amplifier, it has to be said.

The same casework serves as home for the matching power amp, now in MkII guise. This is a more user-friendly *Series 200*, now equipped with a modest 15dB of feedback to keep the whole thing stable into a variety of different speaker loads. Three sets of valves are deployed in total, an ECC83 at the input followed by a combined phase-splitter/driver (ECC82) and a pair of pentode-connected EL84s. All humming away in pure Class A.

## Lab report

Audio Innovations use a proprietary brand of output transformer, specified with 6ohm secondaries. This is reflected in my power measurements which hover around the same values into both eight and 4ohm loads. However you'll only squeeze-out the claimed 12W once the conditions are relaxed to permit three per cent THD.

Now the power reads 4.8W/11.8W/10.2W into 8ohm and 9.1W/10.8W/8.7W into 4ohm at 20Hz/1kHz/20kHz respectively. The 2A current rating was also sustained at three rather than one per cent THD.

The RF sensitivity has clearly taken a turn for the worse but closed-loop distortion, meanwhile, is not as catastrophic as I'd anticipated. Indeed, since AI has discovered negative feedback it has stabilised THD at 0.041-0.22 per cent (1W). THD and IMD both climb at higher power levels but the 3D

plot still discloses a series of readily-identifiable patterns. Many of these are very rare multiple-order IM distortions that are also strikingly depicted on the preamp's 3D plot.

It's also nice to see AI having taken the trouble to use the correct resistors and capacitors in their RIAA network. As a result the 200's MM response is positively flat compared to the *Series 300* (see issue 97). A pity then that disc headroom is limited to +23.5dB at 1kHz and +10.5dB at 20kHz while its sensitivity is left at a poor 8.2mV. However, if you're prepared to accept 3 per cent THD then its headroom increases to 495mV (+19.9dB re IEC level) at 20kHz.

The line input and output is unbuffered, meanwhile, so the preamp's output impedance rises from 5kohm to 15kohm over the most commonly used range (-6dB to -30dB). I would guard against long, highly capacitive or resistive interconnects as a result.

## Sound quality

First things first. This combination actually turned-in a fuller and more substantial performance via its MM input. With CD it lacked this impact and prodigious sense of scale for its bass was neither as extended or as well-controlled. Tracy Chapman's *Matters of the Heart* might have sounded drier and tighter than it had with the *Moth* for example, but for all this it was neither as expressive or convincing.

By way of contrast our jazz selection was transformed, 'like another piece of music altogether' remarked our panel as they leaned forward with renewed interest. Here the slightly lazy or, more accurately, the



## TEST RESULTS

languid demeanour of the amp was perfectly suited to the succession of clarinet and assorted brassy (!) solos, each 'breathing' with a sultry effortlessness from the speakers.

We perceived its soundstaging to be broader than usual, drums pitched over to the left and so leaving more room for the various soloists to strut their stuff! Here at least, the 200s were really singing.

So it was to our dismay that the bigger and bolder sound of Prokofiev's *Symphony* was not captured with this same confidence. All the detail was there yet the scale and drama of the piece was represented in miniature. The harmonics, the rich colouring of different instruments were slightly bleached and this, in turn, reduced the expressiveness of the music. Comparing the *Series 200* with either the Moth or Heybrook combinations only served to reinforce these suspicions.

But switch to vinyl and the release of tension, the sudden impact of an orchestra can be quite stunning. In our experience the Rachmaninov LP all but flooded the room with music, music founded on a genuinely substantial bass. Bass is so strong — described in ominous tones as 'dark' — that it occasionally swamped subtler detail.

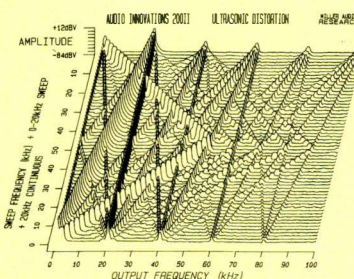
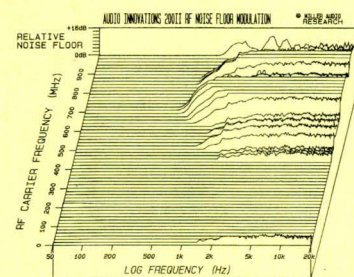
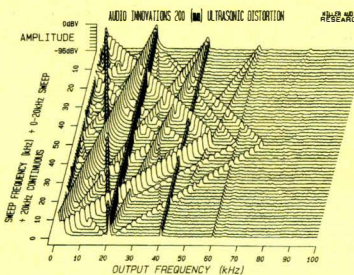
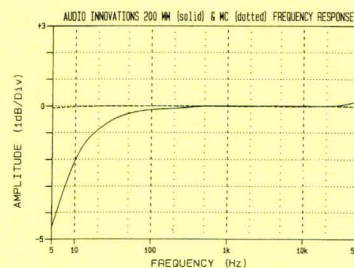
Nevertheless the vibes and sax from Marty Paich's jazz LP were also a little bleached of character, another occasion where any emerging eloquence was thwarted at the last moment.

### Conclusion

This is arguably the least wacky of all Audio Innovations' amplifiers yet, if only to compound the result, it is also the least entertaining. Previous designs have sent my spectrum analyser into intensive care for a week or two but, on the whole, they've always emerged with flying colours from the listening room. Perhaps that's the trouble with this latest *200 Series*, they're simply not coloured enough!

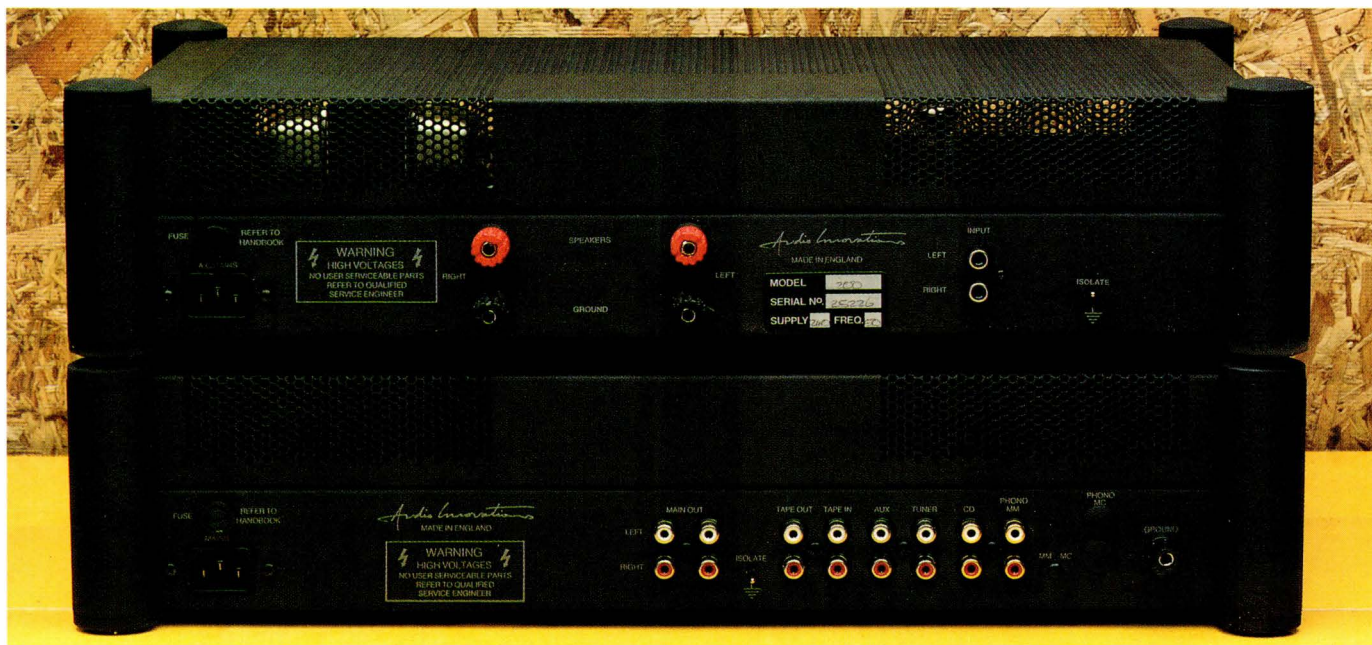
### Preamplifier: Audio Innovations Series 200

	CD	MM
<b>Stereo separation:</b>		
(20Hz)	77.0dB	60.4dB
(1kHz)	44.0dB	44.0dB
(20kHz)	19.6dB	18.5dB
<b>Channel Balance @ 1kHz:</b>		
(0dBV)	0.00dB	0.15dB
(-20dBV)	0.34dB	0.50dB
(-60dBV)	3.22dB	3.37dB
<b>Total Harmonic Dist @ 0dBV:</b>		
(1kHz)	<-110dB	-42.1dB
(20kHz)	<-110dB	-35.6dB
<b>CCIR Intermodulation Distortion</b>	<-110dB	-19.6dB
<b>Noise (A wtd, 20Hz-20kHz)</b>	<-102dB	-75.7dB
<b>Residual noise (unwtd)</b>	-101.3dB	-101.3dB
<b>Input Sensitivity (for 0dBV)</b>	1000mV	8.15mV
<b>Disc overload:</b>		
(1kHz)		74.7mV
(20kHz)		167.8mV
(50kHz)		153.0mV
<b>Input Loading</b>	9.6kohm-50kohm	47kohm/120pF
<b>Preamplifier Output/Impedance</b>	9.17V (disc) /	
	540ohm-15.1kohm	
<b>DC Offset, L/R</b>		-35uV/-32uV
<b>Retail Price</b>		£349

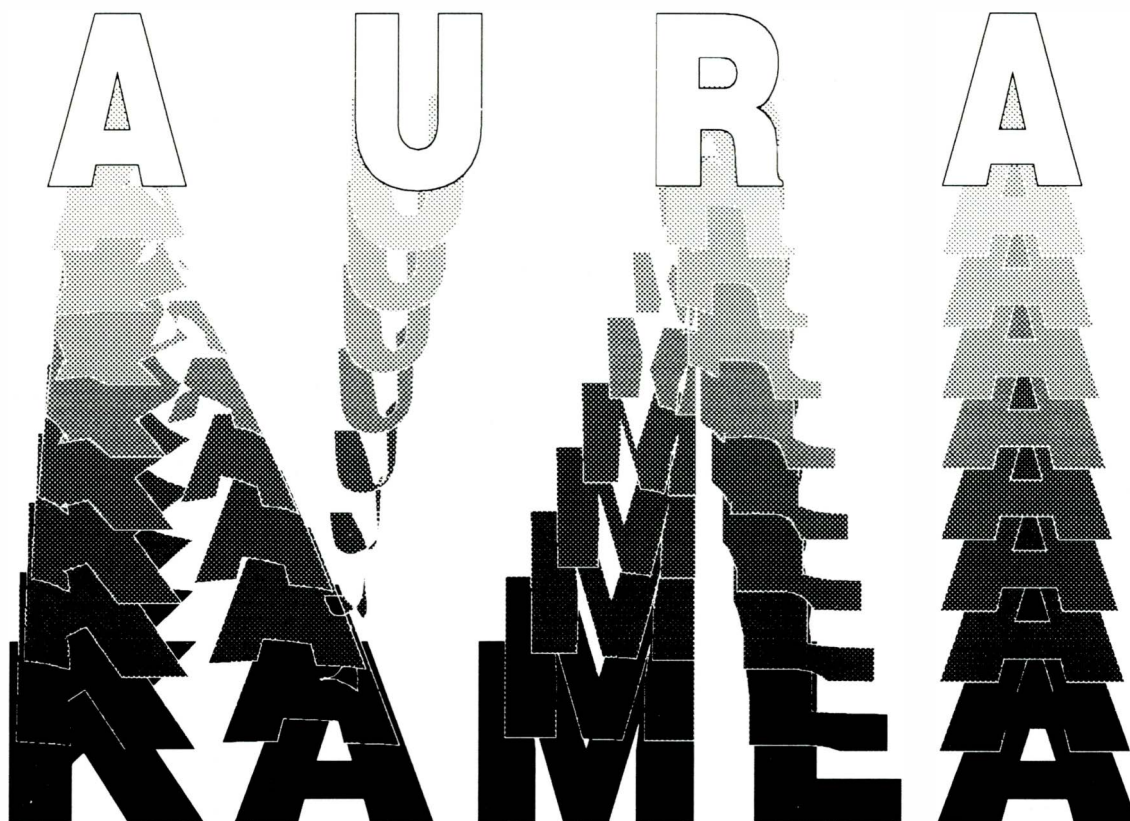


### Power amplifier: Audio Innovations Series 200

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	3.4W	9.7W	7.5W
4ohms	5.0W	9.6W	5.0W
<b>Dynamic Headroom (IHF)</b>	+0.46dB (10.8W)		
<b>Peak Current (5msec, 3% THD)</b>	+2.0A		
<b>Output Impedance</b>	0.737ohm	0.577ohm	0.602ohm
<b>Damping Factor</b>	10.85	13.86	13.30
<b>Stereo Separation</b>			
(0dBW)	86.2dB	81.7dB	68.7dB
<b>Total Harmonic Dist.</b>			
(0dBW)	-53.3dB	-67.8dB	-62.6dB
(2/3 power)	-40.0dB	-56.9dB	-49.4dB
<b>CCIR Intermod. Distortion</b>			
(0dBW)			-69.2dB
(2/3 power)			-58.1dB
<b>A-wtd Noise</b>			
(20Hz-20kHz) 0dBW			-86.2dB
(A wtd, 20Hz-20kHz) 2/3 power			-92.6dB
<b>Residual noise</b>			
(unwtd)			-69.6dB
<b>Input Sensitivity</b>			
(for 0dBW)			109.3mV
(for full output)			349.7mV
<b>Input loading</b>			93kohm/180pF
<b>DC offset, left/right</b>			None
<b>Retail Price</b>			£499







## E V O L U T I O N

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ACOUSTIC RESEARCH : AIR TIGHT : AIWA : AKAI : ALBARRY : ALCHEMIST : ALPHASON : APOLLO  
AUDIO INNOVATIONS : AUDIO TECHNICA : AUDIOSOURCE : AURA : B&W : CARVER : CERWIN VEGA  
CONRAD JOHNSON : COPENHAGEN : FURUKAWA : GOLDRING : HAFLER : INFINITY : JEFF ROWLAND  
JPW : JVC : KEF : KENWOOD : KUZMA : LINX : LYNWOOD : MAXELL : MICROMEGA : MITSUBISHI  
MONSTER : MORDAUNT SHORT : MOTH : NAKAMICHI : ORACLE : ORTOFON : PANASONIC : PIONEER  
PROJECT : QED : REVOLVER : ROTEL : RUARK : SD ACOUSTICS : SENNHEISER : SHARP : SOUND AUDIO  
SOUND ORGANISATION : STANDESIGN : STRAIGHT WIRE : SUPRA : SYSTEMDEK : TARGET : TDK  
TEAC : TECHNICS : THATS : THORENS : TOSHIBA : TREBLE A : TRIANGLE : WHARFEDALE

2 5 1 T o t t e n h a m C o u r t R o a d , L o n d o n , W 1 P 9 D  
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D E M O N S T R A B L Y T H E B E S T H I - F I S H O P I N T O W N





# Aura VA-100 Evolution

Nakamichi B&W (UK) Ltd, Marlborough Road, Lancing, West Sussex. BN15 8TR. Tel: (0903) 750 750



**A**ura delighted everyone a year ago by storming through to a well-deserved Best Buy, but now we hear the VA-50 has evolved into the VA-100. Is this more of the same only better? Well, the sleek-looking VA-100 'Evolution' might share the same casework and range of inputs as its little brother, but the new gold-plated binding posts are a genuine upgrade.

The VA-100 also employs the same MOSFET output stage. But the similarity ends here, for the VA-100 is more of a metamorphosis than an evolution, a re-think that has culminated in a more substantial power supply, a new all-active MM phono stage, low-noise line amp and driver circuit for the MOSFETs.

The internal layout has clearly been kept as symmetrical as possible, all input switching is accomplished with local selectors while popular Signetics op-amps are carefully implemented in both disc and line stages. Local power supply regulation and top-grade passive components only serve to enhance its 'audiophile' appeal.

## Lab report

Great so far but technically, well, it's got a few teething troubles. Perhaps Aura shouldn't have made such fuss about the VA-100's thermal stability because, though it's content dumping some 70-81W into 8ohms, it quickly overheats when driving a 4ohm load.

Instead of the expected power increase, the maximum safe continuous output is just 15.6W/28.9W/21.6W into 4ohm. Any higher and the MOSFETs exceed their safe operating temperature, adopt a non-linear transfer characteristic and THD climbs out of control.

Hence the very low power setting chosen for the 3D plot. On a dynamic basis, however, momentary peaks of 71W/149W/136W (at one per cent THD) are safely delivered into 4ohm at 20Hz/1kHz/20kHz respectively.

This and the minging 10.3A current rating suggest the VA-100 will be happiest with sensitive 8ohm speakers like the Audio Note Js used in all our listening tests. The VA-50 (issue 97) never had these problems because the efficiency of its heatsinking (the base of the amplifier) was matched to its output. But with the introduction of a larger power supply, Aura has simply loaded one end of the scales.

The MM disc stage might also benefit from a little juggling - decreasing its generous 1.95mV sensitivity to bolster the inadequate +21dB headroom.

## Sound quality

Unaware of my fretting, the VA-100 inspired our listeners with its pleasantly clean sound, helped along by a modest rather than excessive degree of bass. CD was preferred for its extra 'get up and go', a gentle fizz that enhanced the pleasing 'breathy' quality of Stansfield's voice.

It was also one of the few to acknowledge the scale and, importantly, the drama of Brahms's *Symphony*, isolating the different strings with a decent sense of perspective. Furthermore it retained this sense of depth and resolution regardless of level and complexity, which is a good sign.

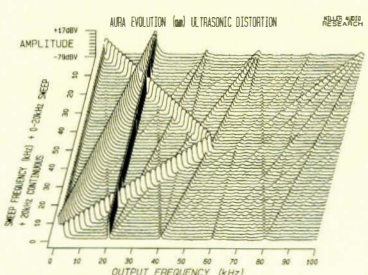
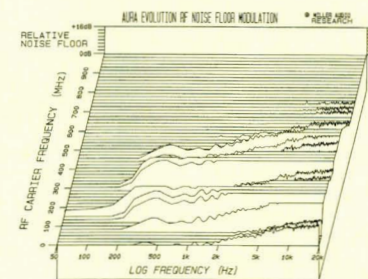
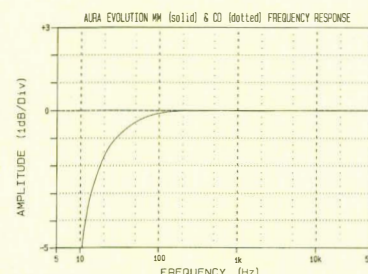
The vinyl input is undoubtedly less thrilling, losing some of the drive and scale we'd enjoyed before. The music was 'nicely laid out' with a good sense of depth but still a little safe or cautious. Their main criticism? Could do with a little extra sparkle, they replied, otherwise it's a good 'un.

## Conclusion

Acquainted with the cheaper 'Black Mirror' price, our listeners voted the VA-100 a 'borderline recommendation'. A view that I'm content to endorse if Aura takes a more realistic view of heatsinking in the future. A classy amp then, but not a significant 'evolution' of the Best Buy VA-50.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	70.2W	80.7W	72.9W
4ohms	15.6W*	28.9W*	21.6W*
<b>Dynamic Headroom (IHF)+1.24dB (107.4W)</b>			
<b>Peak Current (5msec, 1% THD) 10.3A</b>			
<b>Output Impedance</b> 0.057ohm			
<b>Damping Factor</b> 141.3			
	CD/Aux	MM	
<b>Stereo Separation</b>			
(1kHz)	77.5dB	66.0dB	
(20kHz)	49.0dB	46.4dB	
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.54dB	0.55dB	
(-60dBV)	1.54dB	1.55dB	
<b>Total Harmonic Dist.</b>			
(0dBW)	-94.2dB	-95.3dB	
(2/3 power)	-92.6dB	-93.2dB	
<b>CCIR Intermod. Dist.</b>			
(0dBW)	-99.5dB	-87.5dB	
(2/3 power)	-96.1dB	-85.9dB	
<b>A-wtd Noise</b>			
(0dBW)	-78.9dB	-75.3dB	
(2/3 power)	-93.1dB	-79.5dB	
<b>Residual noise</b>			
(unwtd)	-66.5dBV	-66.8dBV	
<b>Input Sensitivity</b>			
(for 0dBW)	28.3mV	219µV	
(for full output)	252.1mV	1.95mV	
<b>Disc Overload</b>			
(1kHz)			56.0mV
(20kHz)			781.6mV
(50kHz)			1612mV
<b>Tape Output/Impedance</b>	7.26V (disc) / 244ohm		
<b>Input loading</b>	47kohm/60pF	65kohm/230pF	
<b>DC offset, left/right</b>		+5.8mV/+2.3mV	
<b>Retail Price</b>			£270 and £300 (Chrome)





# Creek CAS-4140S2

Creek Audio Systems, Rosehall Industrial Estate, Coatbridge Strathclyde, Scotland, ML5 4TF. Tel: (0236) 420199



**T**his amplifier was covered way back in issue 80, so why did Creek choose to re-submit two years later on? Gluttons for punishment or would the TGI group have us believe that the CAS-4140S2 witnessed some significant improvement? Nothing so dramatic I'm afraid, Creek has simply fitted a new toroidal mains transformer and generally tightened up on quality control. Prise open its mediate bonnet and you'll discover the same NE5532-based disc network, internal selector switch and discrete MC headamp. Why Creek can't leave this switch poking out the rear panel is beyond me. After all, that's what everyone else does.

Nevertheless there are subtle changes. All those messy RC compensation poles have been tidied-up, for instance, reducing the gain of the line stage while consolidating any feedback around the power amp. So the '4140S2 is just a little more responsive to your vinyl collection but less sensitive with CD.

## Lab report

Sure enough the MM/MC input sensitivities have jumped from 2.37mV/142µV to 2.09mV/118µV respectively while 327mV rather than 175mV is required for full output via CD. IM distortion is now slightly higher (0.018 per cent) at two-thirds power though, more importantly, the amp's S/N ratio has improved by a good 4-6dB via both CD and MC disc.

That's the good news. The bad news is that both MM and MC disc stages are still plagued by inadequate headroom, just +14.9dB via MM and +9.8dB via MC. Hence the gross -14.5dB and -10.7dB recorded in the THD columns.

Moreover, though the amp retains a 40W rating by the skin of its transistors, there has been a permanent increase in THD at 20kHz of around 0.7-0.9 per cent. This builds to 1.7 per cent prior to clipping, as evidenced by the spray of products on the 3D plot. Clumps

of activity are also revealed on the RF IMD plot at 240, 450 and 850MHz.

## Sound quality

As the last track drifted into silence it was joined by a collective sigh from our panel of listeners. 'At least the phono stage has some body and weight' they intoned 'because the CD input is noticeably more forward'. The line input is certainly predisposed to strings and vocals, often at the expense of accompanying performers.

Refer back to issue 80 and you'll see we identified the '4140S2 as 'training a spotlight of interest on the upper ranges of vocals, strings and percussion, all of which could sound a little urgent, hard and unfor-giving at times.'

Two and a half years later we achieved a remarkable correlation, even if the clarity of the old 4140 was now hostage to a plummy and generally loose quality which blurred its sense of focus.

Tracy Chapman sounded fulsome enough but her voice swam in a peculiarly 'thick' soundstage. This was certainly one of the most coloured amplifiers we had heard in a long time, one that throws its upper-mid forward while failing to grapple with more resonant bass detail. Fragile detail that was once so clearly in its grasp.

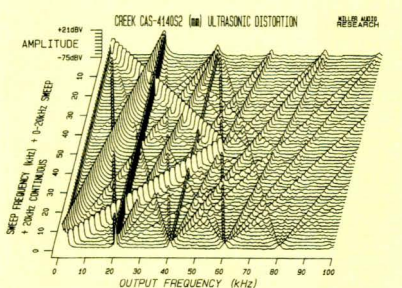
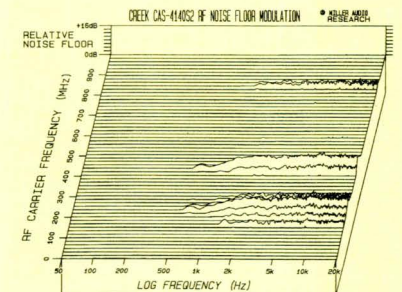
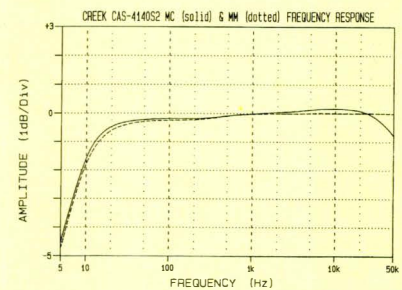
So our listeners were more taken by its MM stage, preferring this input for its rounded balance and tauter bass. Nevertheless, the extra colour, the inherent 'blurring' and loss of subtlety were all too painfully obvious.

## Conclusion

Creek was right, the CAS-4140S2 has changed. Unfortunately it's changed for the worse, a little innocent and well-meaning dabbling that has only succeeded in muddying its sound. As a result this amp is shown off the commercial ballpark to sit unrecommended on the sidelines.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	39.1W	40.5W	40.5W
4ohms	64.0W	68.9W	66.4W*
<b>Dynamic Headroom (IHF)+0.90dB (49.8W)</b>			
<b>Peak Current (5msec, 1% THD)</b>	14.4A		
<b>Output Impedance</b>	0.066ohm		
<b>Damping Factor</b>	121.3		
	<b>CD/Aux</b>	<b>MM</b>	<b>MC</b>
<b>Stereo Separation</b>			
(1kHz)	75.4dB	76.4dB	59.8dB
(20kHz)	50.7dB	68.5dB	64.6dB
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.37dB	0.30dB	0.27dB
(-60dBV)	5.35dB	5.30dB	5.25dB
<b>Total Harmonic Dist.</b>			
(0dBW)	-73.3dB	-14.5dB*	-10.7dB*
(2/3 power)	-72.3dB	-14.5dB*	-10.7dB*
<b>CCIR Intermod. Dist.</b>			
(0dBW)	-74.9dB	-74.0dB	-27.7dB*
(2/3 power)	-69.3dB	-68.7dB	-27.7dB*
<b>A-wtd Noise</b>			
(0dBW)	-91.5dB	-78.8dB	-79.6dB
(2/3 power)	-98.2dB	-79.1dB	-80.2dB
<b>Residual noise</b>			
(unwtd)	-74.3dBV	-74.3dBV	-74.3dBV
<b>Input Sensitivity</b>			
(for 0dBW)	51.2mV	327µV	18.2µV
(for full output)	327.2mV	2.09mV	118µV
<b>Disc Overload</b>			
(1kHz)	27.9mV	1.55mV	
(20kHz)	262.2mV	9.38mV	
(50kHz)	589.3mV	10.2mV	
<b>Tape Output/Impedance</b>	8.84V (disc) / 944ohm		
<b>Input loading</b>	51kohm/20pF	48kohm/180pF	119ohm
<b>DC offset, left/right</b>		-36.8mV/-41.1mV	
<b>Retail Price</b>			£230





# EMF Audio Sequel

EMF Audio, 2A Bellevue Road, Friern Barnet, London N11 3ES. Tel: (081) 368 7887



**H**aving finally been divorced from what was once his own company, Mike Creek has returned to his roots (well his old factory anyway) and set up a new company called EMF Audio. And his first product has been christened, appropriately enough, *The Sequel*.

This is another of those characteristically British, no-frills amplifiers, an elegant black box with little to betray its purpose save a rotary input selector, tape monitor switch, headphone socket and volume control. Up to three line inputs and one tape deck are accommodated while an internal plug-in card is available to service either MM or MC phono cartridges.

This add-on board comes complete with its own power supply regulation and comprises a two-stage part-active, part-passive RIAA equalisation network. Popular Signetics op-amps take pride of place, naturally. Meanwhile all the line inputs are routed directly to the 10kohm volume control which feeds a new, high-gain complementary power amp.

This uses a Class A driver and triple emitter-follower output stage, the idea being to boost the open-loop gain as much as possible to achieve very low distortion and a low output impedance once it's closed-down with feedback.

## Lab report

And if low distortion was the goal, EMF has certainly achieved it, the *Sequel* clocks-up just 0.00045 per cent THD and 0.00037 per cent IMD via the CD input. The -105dB A-wtd noise figure is equally fabulous though its residual noise (-69.5dBV) is a tad high.

Driving lower impedances (4ohm) via the MM input provides greater stress, hence the subtle tracks of distortion evident on the 3D plot. The bold RF resonances visible up to 200MHz on the RF IMD plot could have a greater impact its performance.

The biggest drawback, however, comes in the form of EMF's electronic protection

which is, well, too protective. So the stingy 3.4A current rating is an utter waste of the chunky 225VA mains toroid and 25A TIP35/36 power transistors!

I might add that the MM disc input enjoys very little headroom, just +19.8mV at 1kHz, while at higher frequencies any overload is compounded by premature slewing. A margin of just +14.4dB at 20kHz is inadequate.

## Sound quality

'Clearly a top-flight performer', announced the crew of listeners 'very refined and plenty of intricate detail but perhaps just a little restrained'. So Brahms' *Symphony* ebbed and flowed with a grace lost to the clumsy heavyweights in this survey, the quieter interludes building to what was described as 'a polite climax'. Nevertheless everyone had a thoroughly enjoyable time.

Lisa Stansfield's CD, which can so easily descend into an electronic morass, was impressively resolved on this occasion. Either way, the *Sequel* successfully extricated bass synth lines, strings and percussion that are often concealed. Returning to vinyl brought a loss in bass weight, particularly with our classical LPs, just as the brass and cymbals from Marty Paich's *New York Scene* were marginally less clear than usual.

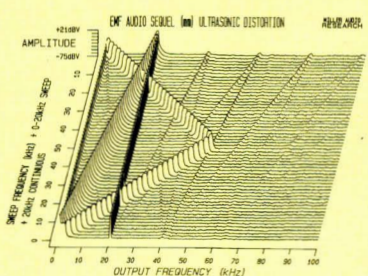
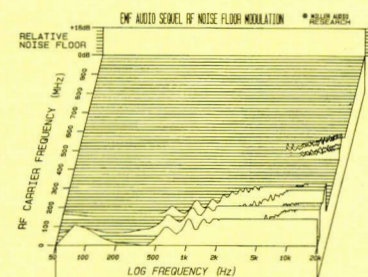
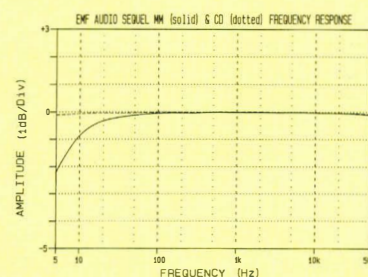
It's hard to criticise the *Sequel* for its technical rendition, yet all our listeners felt that something unidentifiable, something intangible was missing from its music. An elusive quality defined as 'the tingle factor' by one of our more imaginative panelists.

## Conclusion

Whatever the 'tingle factor' is, the *Sequel* is sadly lacking in said department. So though it's not clinical or sterile in its accuracy neither is this amplifier especially believable. There are a few bugs yet to iron-out but the *Sequel* remains a craftsman's product, built with plenty of TLC but still, sadly, rather too expensive for recommendation.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	45.6W	46.7W	47.5W
4ohms	69.6W	76.6W	72.3W
<b>Dynamic Headroom (IHF)+0.94dB (58.0W)</b>			
<b>Peak Current (5msec, 1% THD)</b>	3.4A		
<b>Output Impedance</b>	0.052ohm		
<b>Damping Factor</b>	153.7		
	CD/Aux	MM	
<b>Stereo Separation</b>			
(1kHz)	82.8dB	71.9dB	
(20kHz)	80.3dB	61.6dB	
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.18dB	0.18dB	
(-60dBV)	4.38dB	4.38dB	
<b>Total Harmonic Dist.</b>			
(0dBW)	-103.6dB	-101.4dB	
(2/3 power)	-106.9dB	-104.4dB*	
<b>CCIR Intermod. Dist.</b>			
(0dBW)	-102.5dB	-71.6dB	
(2/3 power)	-98.3dB	-71.3dB	
<b>A-wtd Noise</b>			
(0dBW)	-93.3dB	-79.1dB	
(2/3 power)	-105.4dB	-79.3dB	
<b>Residual noise</b>			
(unwtd)	-69.5dBV	-69.4dBV	
<b>Input Sensitivity</b>			
(for 0dBW)	58.7mV	329µV	
(for full output)	402.7mV	2.35mV	
<b>Disc Overload</b>			
(1kHz)		48.9mV*	
(20kHz)		262.5mV*	
(50kHz)		250.4mV*	
<b>Tape Output/Impedance</b>	8.69V (disc) / 1.029kohm		
<b>Input loading</b>	8.9kohm/50pF 49kohm/120pF		
<b>DC offset, left/right</b>	-0.9mV/-1.5mV		
<b>Retail Price</b>	£349		





# HAS COUNT DRACULA GONE VEGETARIAN?

The people in the record shop were surprised. Despite the intense June sunshine a man had just entered the shop wearing a thick overcoat, hat and sunglasses. Nervously he shuffled over to the racks of CDs and began to pick them up, fiddling with the jewel cases as if for the first time. Other customers looked alarmed as he began muttering about the difficulty of opening the plastic hinged cases, commenting under his breath about the tactile pleasures of handling vinyl records.

Having spent an hour browsing through the stock of compact discs he turned and made his way to the counter, clutching about 15 discs to buy. There staff were bemused to notice that the CDs were mainly old analogue recordings – the AAD type, but that the choice conveyed a keen musical and audiophile taste.

A young lady totalled up his purchase, trying to hide her amusement at the hot and bothered expression facing her from under the wide brim of a dark hat. She took his credit card for payment and put the discs in a bag.

Taking back his card the man thanked her and hurriedly left the shop glancing over his shoulder to make sure no-one had recognised him.

“Who was that, Rosie?” asked the shop owner. “A most extraordinary gent. He looked a bit paranoid, not to say extremely hot... how did he pay! With a credit card? What was his name then?”

When he was told he reeled back in shock, clutching the counter for support.

The stranger in the heavy coat was none other than the most committed analogue audiophile he knew, a man who had railed against the inherently poor performance of CD since it was invented. This was one of his best customers – for vinyl records, especially the older Deccas, EMIs and RCAs. This was Peter Qvortrup.

My analogue street credibility is now completely out of the window!

It gets worse. I needed the CDs for comparative listening to the prototypes of the first two Audio Note digital to analogue converters, did I detect any shocked whispers?

Does it mean that my record collection will be up for sale?

Absolutely not!

But what it does mean is that I will be able to offer the great band of you that have settled for Compact Disc, a couple of DACs, which in my opinion are far closer to real life analogue performance criteria than anything else I have heard, and NO, it is not as good as my Voyd Reference, AN-1s arm and Audio Note lollv cartridge, there is still a yawning gap between the best analogue and anything digital.

This is best exemplified by the commonly accepted fact that CDs made from old analogue master tapes generally sound far better than later digital recordings. Proponents of the digital formats have tried to argue that this is due to the higher quality of the recordings from this period, which in itself is not a very positive argument, as it admits that in one area, at least progress has NOT been made, but their argument is strongly revoked by the fact that most LP versions of digital masters also sound better than their CD counterparts.

The only possible conclusion can be that the less time the signal spends in the digital domain the less degradation it suffers.

Trying to explain this in any other way would be logical fallacy.

With this observation firmly in mind, Guy Adams from Voyd and I have gone about making the most “analogue” digital to analogue converter possible.

Early experiments clearly showed that the multibit technology had considerably greater dynamic potential, better linearity and resolution, when compared to single bit, there is simply less guesswork. I do not believe that it is a coincidence that all the current topnotch converters are 18 or 20 bit, so we are not alone in this observation.

We have settled for the 20 bit Burr-Brown PCM63P chipset with 8 times oversampling, but unlike any of our talented competitors, we have chosen to leave out the semiconductor filtering and incorporate an individually adjusted linear phase filter, and use a no feedback Shunt Regulated Push Pull valve output stage. Much work has been extended into powersupplies to ensure best possible interaction with both the digital and analogue parts of the circuit.

Offering a digital product has been a philosophically difficult decision for a company which is so deeply committed to absolute sonic performance, above all else.

My belief that convenience and absolute quality in sound reproduction are basically incompatible, remains unshaken. Too often inconvenience is disguised as sound quality, when it is not.

What we will be offering by early September, will be two converters, the DAC1 and DAC2, to give them a name, where we will have focused on optimising the dynamic range and phase behaviour of the output from the chosen chipset. In order to achieve this we have used interfase technology which I cannot at this time disclose as it is subject to at least 2 patent applications, copyrights, etc.

The reproduction of CDs using the Audio Note DAC2 is almost completely free from the veil of electronic “noise” that surrounds the start-up and decay of all transients and which gives most music the “glare” and cold hardness that I personally find so objectional from any music, whether in analogue or digital form.

This cleaning-up around transients and blackness of background, is combined with a hitherto un-experienced dynamic range, especially the bass has an elasticity, texture and contrast, which is quite unique. The treble is free from grain and, depending on recording quality, dynamic and clean.

Please note that we have not created a digital “cure-all”, many of the ills that still bug the

reproduction from Compact Disc will still be present with our converters as they are with other’s. Problems much earlier in the recording/reproduction chain still need solving, the main one being the low sampling frequency, and the solution certainly is not data compression.

When all is said and done, I shall still be enjoying my vast record collection, but now, at least, I have a choice between that and a not-so-painful CD reproduction, where the LP is not available.

I only hope that all of you reading this will appreciate that progress is no straight line and that the disrespect that many software manufacturers show towards their longstanding LP customers by forcing everybody to write off their investments in analogue reproduction equipment, by making unavailable the software that is played on it, is morally questionable and is depriving the consumer and the market of a choice, which we should all be allowed regardless of the economic politics of hardware manufacturers and software retailers. Choice is a democratic right in a pluralistic capitalist society, I hope the decision makers in the industry’s leading companies never let that out of their sights.

Audio Note, as a company is committed to exploring any advances that can be made in either format, and whilst I have my personal preference, that will not deter us from making the best from CD.

The DAC1 is projected to cost £499.00 and the DAC2 £899.00, they should both be available in early September.

Meantime, enjoy your music, whatever format you listen to!

**Peter Qvortrup**

**Audio Note Co. Ltd.**

**Brighton**

**Tel: 0273 220511**

**Fax: 0273 731498**



# Harman Kardon HK6850

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



**H**aving just graduated from the big, black and somewhat-less-than-subtle school of hi-fi design, Harman's original *HK6800* (issue 85) has matured into the *HK6850* we find here. Unfortunately, maturity does not always herald improvement. So there's still the same rotary selectors for input, rec-out, tape monitor and speaker switching with a comparable subset of controls for bass, treble, balance, MM/MC cartridge selection and 'phase-correct' loudness.

The tone-defeat facility has been retained but HK's video switching and 'main direct' are replaced by a 'Preamp Bypass' option that routes all line-level signals directly to the volume control and power amp. Decent 4mm connections are provided for two pairs of speakers though, once again, these are mechanically switched on a rear-mounted PCB, hardly ideal when you consider this amp can belt-out some 23A of current!

On a more positive note, HK has at last abandoned the '8ohm' and '4ohm' speaker modes of its older amplifiers in favour of a power supply with fixed primary and secondary windings. Saves cash anyway! Otherwise the HK hallmarks of all-discrete MM/MC disc circuitry and a prodigious Toshiba-based power amp retain pride of place.

## Lab report

It's spot-the-difference time on your favourite hi-fi show . . . a glance at the power figures reveals a lower 101W 8ohm output but one that matches the *HK6800*'s 178-179W into 4ohm. Dynamic output is down from +1.3dB to +0.8dB while the current rating has also been squeezed. Nevertheless, the *HK6850* will still drive a short piece of damp string without complaint.

On the distortion front it's now very much more consistent with power output, increasing from 0.0063 per cent (CD) to 0.014 per cent (MM) to 0.04 per cent (MC). The amp is also more sensitive than before, requiring

just 2mV (MM) and 101µV (MC) to achieve full output. And all this has been achieved without compromising disc headroom. In fact it's increased from +27.4dB to +31.3dB (MM at 1kHz).

## Sound quality

In perfect accord with its stature as an HK 'super-amp', the *HK6850* provided us with an especially deep and powerful sound via its MM phono input. Its bass, in particular, was supremely-defined and one of the strongest in our test, the sort of bass that successfully underpins a marvellous sense of depth and acoustic.

Rachmaninov's *Symphonic Dances*, according to our listeners, all went 'rather well'. The build-up was packed with anticipation, the explosion of brass handled without a murmur of protest while its reverberation sent a palpable shudder through the soundstage. Every instrument was both detailed and tightly focused though a hint of coarseness, a 'tizziness' marred our full appreciation of Marty Paich's jazz LP.

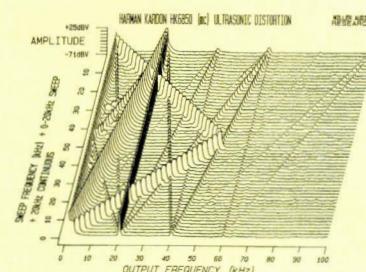
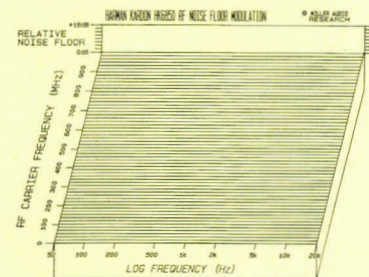
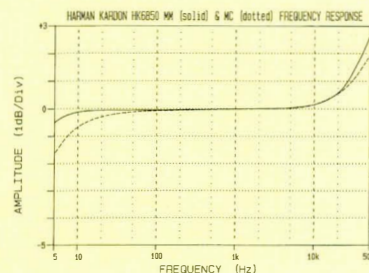
Reverting to CD brought a similarly smooth and clean balance yet one that was evidently less comfortable with busier passages. Most notably, cracks started to appear in the Prokofiev *Symphony*, groups of instruments began to harden-up, become congested and eventually caused its broad acoustic to collapse. A pity, because the amp had made simpler passages sound so delightfully effortless and tidy.

## Conclusion

By juggling the levels of feedback used in the older *HK6800*, Harman has influenced the gain and linearity of this latest version, a simple variation on an established theme. So the *HK6850* retains the confidence and nimbleness of its forebear, a real treat for devotees of vinyl. Regrettably, the jump from £600 to £700 makes the *HK6850* too expensive for Recommendation.

## TEST RESULTS

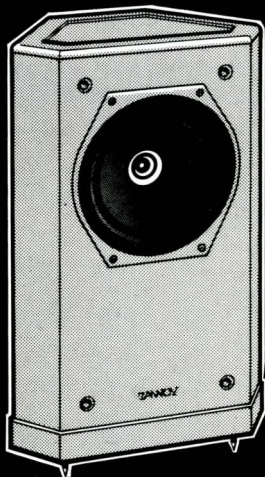
	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output</b>			
8ohms	97.2W	100.5W	102.2W
4ohms	170.3W	178.2W	174.2W
<b>Dynamic Headroom (IHF)</b>	+0.81dB (121.1W)		
<b>Peak Current (5msec, 1% THD)</b>	22.7A		
<b>Output Impedance</b>	0.105ohm		
<b>Damping Factor</b>	76.5		
	CD/Aux	MM	MC
<b>Stereo Separation</b>			
(1kHz)	69.4dB	69.2dB	69.6dB
(20kHz)	44.6dB	43.9dB	44.1dB
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.05dB	0.00dB	0.22dB
(-60dBV)	0.78dB	0.86dB	1.04dB
<b>Total Harmonic Dist.</b>			
(0dBW)	-84.2dB	-77.8dB	-68.3dB
(2/3 power)	-82.2dB	-76.4dB	-68.0dB
<b>CCIR Intermod. Dist.</b>			
(0dBW)	-90.9dB	-87.9dB	-86.1dB
(2/3 power)	-79.1dB	-79.3dB	-77.4dB
<b>A-wtd Noise</b>			
(0dBW)	-76.7dB	-76.1dB	-74.4dB
(2/3 power)	-91.6dB	-83.7dB	-77.8dB
<b>Residual noise</b>			
(unwtd)	-67.2dBV	-67.2dBV	-67.2dBV
<b>Input Sensitivity</b>			
(for 0dBW)	14.6mV	213µV	10.1µV
(for full output)	147.2mV	2.04mV	101µV
<b>Disc Overload</b>			
(1kHz)		182.8mV	8.5mV
(20kHz)		1624mV	78.8mV
(50kHz)		2455mV	138.5mV
<b>Tape Output/Impedance</b>	11.59V (disc) / 3.35kohm		
<b>Input loading</b>	31kohm/270pF 47kohm/120pF 58ohm		
<b>DC offset, left/right</b>	+63mV / +47mV		
<b>Retail Price</b>	£700		





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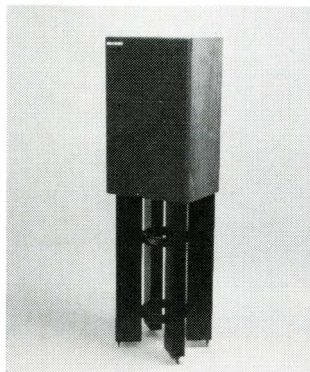
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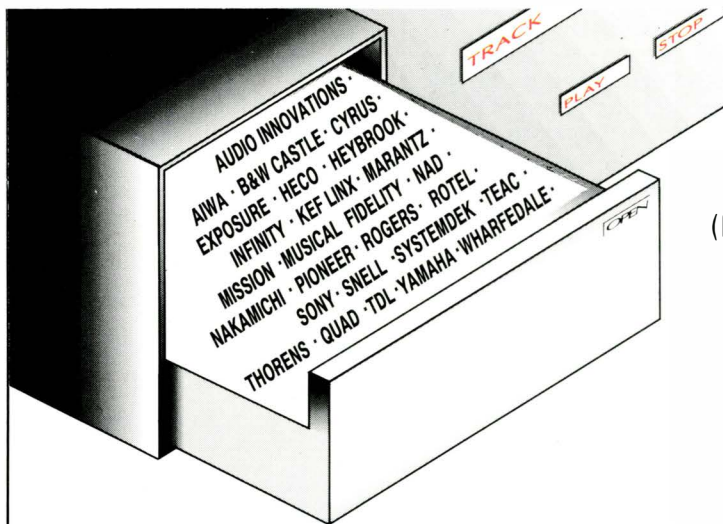
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# Harman Kardon HK6150

Harman Audio, Unit 1B, Mill Street, Slough, Berks  
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**H**aving finally covered every one of its amplifiers over the last five issues, the folks at Harman have kindly obliged us with an entirely new range! Did I say new? Well, perhaps re-decorated might be a more appropriate description.

You see the *HK6150* looks suspiciously like the old *HK6100* (issue 80) in a new matt enclosure with new and rather more elegant rotary controls. And remember, the *HK6100* was little more than a restyled *PM635i* (issue 68) which was, er, heavily based on the older *PM635*. So for the last five years HK has been using what amounts to the same Toshiba-based power amp, discrete line amp and MM phono equalisation section.

Clearly, there are no surprises on the features front. Yep, you're faced with exactly the same complement of CD, tuner, video, tape and MM phono inputs with bass treble, balance and loudness controls. Differences? Well the loudness and power-on buttons are round rather than square on this occasion . . .

## Lab report

Comparing test notes between this and the *HK6100* (issue 80), I'd be forced to conclude that the *HK6150* was a slightly 'cheaper' version. For example, its output suffers more noticeably at the frequency extremes (65W at 20kHz rather than 71W), the maximum available current has been squeezed from 11.4A to 9.1A while IM distortion has leapt from 0.003 to 0.015 per cent at 1W.

This is clear enough from its 3D plot which betrays precisely the same 'character' as the *HK6100*, only more of it!

Figures for noise and input sensitivity are nigh-on identical but the MM stage now suffers from premature slew-limiting which limits headroom to just +21.7dB at 20kHz. It used to be +27.9dB. Then again, HK has re-engineered the MM response with a -3dB point of just 2.5Hz instead of the previous 8Hz. So perhaps the *HK6150* is not just a

cynical re-badging job after all.

## Sound quality

But does the *HK6150* sound like the *HK6100* or *PM635i*? Yes it does, and then some! The rolling, rumbustious bass of Tracy Chapman's *Matters of the Heart* CD was a touch on the dry side this time around, however, the sense of space, the solidity and punch of the music shone through in magnificent form.

Sure, the overall effect is just a little 'dirty' but the sheer enthusiasm of the amp — described in glowing terms as exciting, upbeat and involving by our listeners — just carries the heart and soul of the music across. 'Wouldn't mistake this for a valve amp', they laughed, in response to its very taut, dry bass and mercury-quick dynamics.

I should say the *HK6150* attracted all but momentary criticism for being slightly 'colourless'. Other listeners, by contrast, felt this trait worthy of applause.

Either way, these were qualities retained by the MM phono stage. 'Superb clarity' they stuttered as cymbals crashed across the listening room, brassy, crisp and fresh. Strong bass lines were a little 'hidden' in comparison yet, more importantly, the verve and spirit of Rachmaninov's *Symphony* had returned. So the orchestra might have lost a little weight but the power and expression remained. Marvellous stuff!

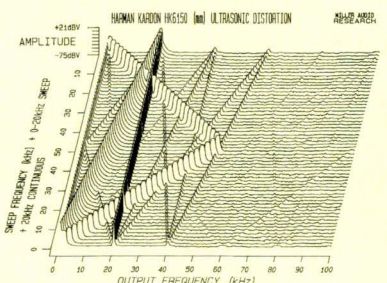
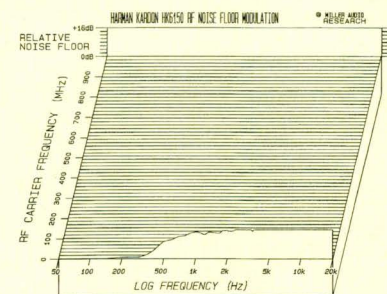
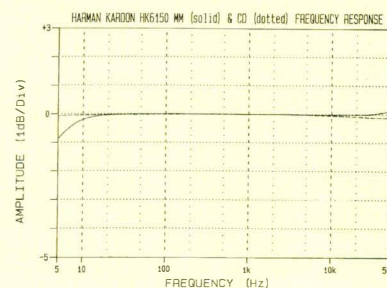
## Conclusion

Informed of the price, our panel were clearly taken aback. 'Absurd' they responded, 'a clear Best Buy!'.

So even if Harman is simply re-hashing the same old amp year after year, it's a ruse that has sustained one Recommendation after another for its budget model. But now, with subtle revisions having hit their mark and a retail price held steady at £160, HK's latest offering gains entrance to the hal-lowed ranks of the 'budget wonders'.

## TEST RESULTS

<b>Maximum Continuous Power Output</b>		
8ohms	44.7W	44.2W
4ohms	64.0W	68.0W
<b>Dynamic Headroom (IHF) +1.05dB (56.3W)</b>		
<b>Peak Current (5msec, 1% THD)</b>	9.05A	
<b>Output Impedance</b>	0.171ohm	
<b>Damping Factor</b>	46.9	
	<b>CD/Aux</b>	<b>MM</b>
<b>Stereo Separation</b>		
(1kHz)	76.5dB	77.9dB
(20kHz)	51.4dB	52.6dB
<b>Channel Balance</b>		
(1kHz, -20dBV)	1.64dB	1.39dB
(-60dBV)	1.24dB	0.73dB
<b>Total Harmonic Dist.</b>		
(0dBW)	-73.6dB	-77.1dB
(2/3 power)	-72.5dB	-72.6dB
<b>CCIR Intermod. Dist.</b>		
(0dBW)	-70.4dB	-71.5dB
(2/3 power)	-71.4dB	-72.8dB
<b>A-wtd Noise</b>		
(0dBW)	-86.4dB	-81.6dB
(2/3 power)	-94.6dB	-84.5dB
<b>Residual noise</b>		
(unwtd)	-74.2dBV	-74.2dBV
<b>Input Sensitivity</b>		
(for 0dBW)	24.1mV	401µV
(for full output)	169.5mV	2.62mV
<b>Disc Overload</b>		
(1kHz)		151.1mV
(20kHz)		608.1mV*
(50kHz)		685.5mV*
<b>Tape Output/Impedance</b>	9.74V (disc)	345ohm
<b>Input loading</b>	29.5kohm/200pF	34.5kohm/100pF
<b>DC offset, left/right</b>	+10.3mV/-4.6mV	
<b>Retail Price</b>		<b>£160</b>





# Heybrook Signature

Heybrook Hi-Fi Ltd, Estover Close, Estover Industrial Estate, Plymouth, Devon PL6 7PL. Tel: (0752) 780311



If at first you don't succeed then try, try and try again. At least this has been Heybrook's approach as its C3/P3 combination met with general disapproval in issues 85 and 104. Third time around and with the launch of the upmarket *Signature* range, Heybrook's perseverance looks to have paid off.

This modular amplifier system is available in several versions to accommodate a range of systems and pockets. Take a deep breath: £649 buys you the basic line-level preamp while another £150 is required for the optional MM/MC phono board. Add £922 for a stereo power amp plus £293 for its outboard 500VA transformer and you've got the combination reviewed here. Monoblock versions are also available.

Each unit, whether preamp, power amp or transformer is built into a matching 'cube'. These have a black fascia, polished wood-effect cheeks and are flanked by side panels of fluted alloy heatsinking. Just like the C3 however, the *Signature* preamp is decorated with input and rec-out selectors for disc, tuner, CD, video and tape sources in addition to separate L/R volume pots that are bound together via a pulley and thread.

Despite this camouflage, the guts are also obviously culled from the C3. Same MM/MC network with its three-stage gain block, passive equalisation and shunt-regulated single-rail power supply and same high impedance input for the MC option. Line

inputs are still routed directly to Heybrook's low impedance volume control, though the output is now buffered via an active stage (from the older C2 preamp) that provides a moderate 6.3dB two times gain.

So the preamp is rather less sensitive to interconnect cabling than before even if the useful range of Heybrook's volume control is still restricted to 40-45dB. Winding clockwise from half past seven to the five o'clock position (full output) represents a change of just 20dB for example!

The *Signature* power amp is basically a P3 in a cube. Mono amplifier 'cards' are bolted onto the left and right heatsinks, employing the same Sanken output transistors as before but exchanging the output fuses for high quality metal-film resistors. This improves its stability into reactive loads but also bumps-up the output impedance.

Heybrook has also lowered the value of the emitter resistors and increased the standing current in both driver and output stages. Component selection has been tightened-up too. All very laudable, so why has the company terminated the power amp with a flying IEC lead? This, Heybrook declare, must be connected to the 45-0-45V AC supply of the outboard transformer.

However, it's quite possible for someone to accidentally plug this IEC lead into the mains supply, sending 240V up two 63V 22,000µF slit-foil electrolytics and a metal-cased rectifier. Following a verbal lashing

from yours truly, Heybrook now appreciates this and a new non-reversible connector will be fitted to all production samples.

## Lab report

Heybrook has increased the headroom of the disc stage from +16.9dB to +30.6dB (or +26.6dB relative to its 7.9mV input sensitivity) by reducing the overall gain. Hence the need for an active line stage by way of compensation.

High-output MMs and MCs can now be enjoyed without fear of the RIAA stage crashing into overload. In fact the *Signature* clocks-up just 0.006-0.019 per cent THD via MM, figures that compare favourably with the 0.064-0.14 per cent suffered by the C3. Heybrook's MC input witnesses a similar improvement even though second order IMD remains fixed at about 0.06 per cent.

So what of the power amp? Well this matches the P3 with its thumping-great 28.3A current delivery and 195W dynamic headroom but the output impedance has increased from 0.057ohm to 0.195ohm. Slight changes to the amp's feedback network have pushed THD from 0.013-0.068 to 0.005-0.018 per cent at 1W while decreasing its sensitivity from 915mV to 1.245V (full output) and adding 3-5dB onto its S/N ratio.

However, the *Signature* is now even more sensitive to broad-band RF noise than the P3, suggesting it could be very, very CD or DAC-dependent.



## TEST RESULTS

### Sound quality

Based on the *C3/P3* they might be, but Heybrook's subtle revisions have done wonders for the palatability of this *Signature* combination. Indeed it was voted the very best sounding of any amplifier in our survey, an accolade prompted by its clarity, its power, its soundstaging and, quite frankly, for the sheer enthusiasm it generated after a long day's toil in the listening room!

Prokofiev's woodwinds, for instance, were so beautifully separated, utterly devoid of any artificial bloom or resonance but possessed of a fine and natural hue.

Percussive detail from Tracy Chapman's CD was sharper, cleaner and seemingly faster than usual just as the accompanying electric bass descended further, plumbing untold depths of bass. Our jazz CD was described as 'slinky', percussion had a nice weight to it while the double bass was so clear 'you could imagine his fingers strolling up and down the neck'.

Vinyl was no anti-climax. Here the amp recovered a fabulous sense of acoustic with tremendous depth and scale. It revealed oodles of space around the sax and strings from Marty Paich's jazz LP without drowning the progression of the music. Neither was it flustered by the power of the vibes, just as the depth and scale of Rachmaninov's *Symphony* thundered across with an easy-going confidence.

### Conclusion

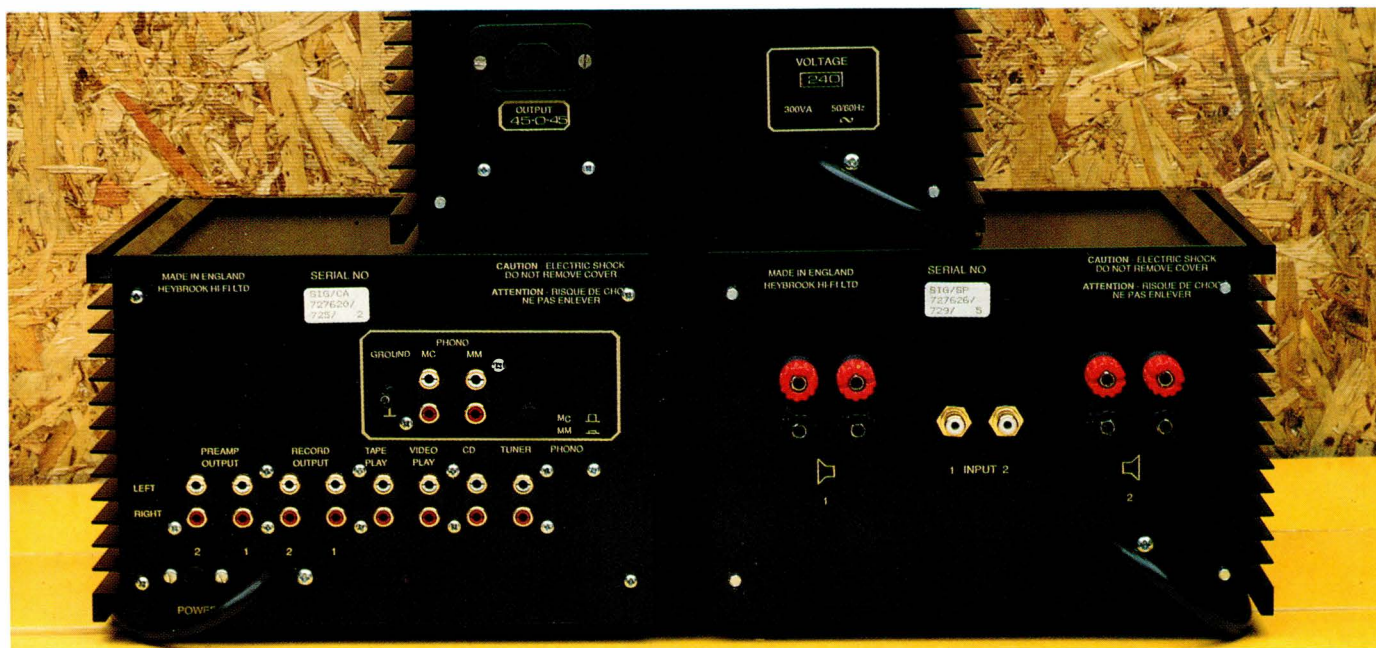
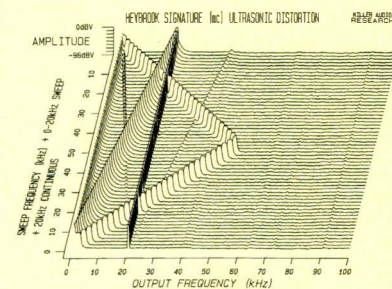
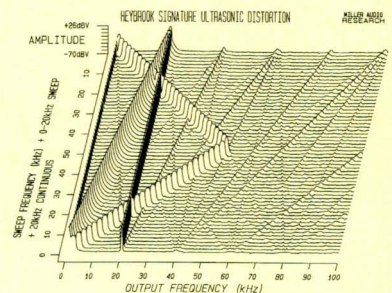
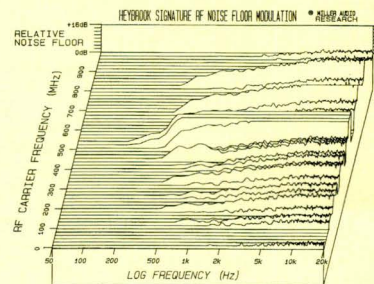
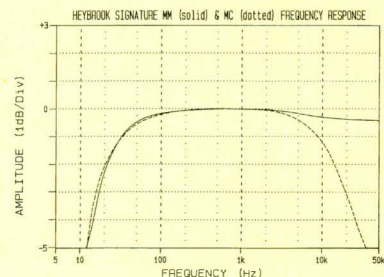
So there always was a great amplifier struggling to break free from Heybrook's *C3/P3* combination! Now, after several false starts, this inherent quality has finally been realised. Great stuff, though I am unable to reconcile the huge gulf in price that exists between the *C3/P3* and *Signature* range. Nevertheless, the subjective improvement was justification enough for our listeners. Assuming Heybrook never supplies a *Signature* power amp with a captive IEC lead, it deserves our heartiest Recommendation.

#### Preamplifier: Heybrook Signature

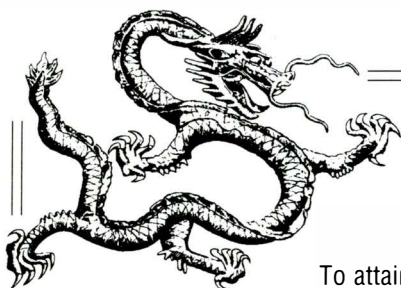
	Aux/CD	MM	MC
<b>Stereoseparation:</b>			
(20Hz)	96.6dB	85.5dB	85.1dB
(1kHz)	94.5dB	94.9dB	97.1dB
(20kHz)	76.3dB	74.0dB	73.7dB
<b>Channel Balance@1kHz:</b>			
(0dBV)	0.04dB	0.09dB	0.09dB
(-20dBV)	0.18dB	0.12dB	0.13dB
(-60dBV)	24.6dB*	24.6dB*	24.6dB*
<b>Total Harmonic Dist @ 0dBV:</b>			
(1kHz)	-111.4dB	-85.1dB	-80.9dB
(20kHz)	-94.2dB	-74.3dB	-67.9dB
<b>CCIR Intermod. Dist.</b> -98.9dB	-74.5dB	-58.8dB	
<b>A-wtd Noise</b>			
(20Hz-20kHz)	-105.9dB	-79.6dB	-74.3dB
<b>Residual noise</b>			
(unwtd)	-106.4dB	-106.3dB	-106.3dB
<b>Input Sensitivity</b>			
(for 0dBV)	482.2mV	7.91mV	758uV
<b>Disc overload:</b>			
(1kHz)	169.2mV	15.9mV	
(20kHz)	1589mV	141.5mV	
(50kHz)	1405mV	134.0mV	
<b>Input Loading</b> 4.2-4.9kohm	50kohm/60pF	4.1kohm	
<b>Preamplifier Output/Impedance</b>	9.49V (disc) / 341ohm		
<b>DC Offset, L/R</b>		-110uV/-140uV	
<b>Retail Price</b>		£649 + £150	

#### Power amplifier: Heybrook Signature

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	142.3W	148.2W	145.7W
4ohms	229.5W	238.7W	234.1W
<b>Dynamic Headroom (IHF)</b> +1.18dB (194.5W)			
<b>Peak Current</b>			
(5msec, 1% THD)	+28.3A		
<b>Output Impedance</b> 0.195ohm	0.208ohm	0.233ohm	
<b>Damping Factor</b> 41.0	38.5	34.3	
<b>Stereo Separation</b>			
(0dBV)	123.0dB	116.5dB	115.0dB
<b>Total Harmonic Dist.</b>			
(0dBV)	-85.1dB	-86.0dB	-74.6dB
(2/3 power)	-66.7dB	-81.4dB	-73.1dB
<b>CCIR Intermod. Distortion</b>			
(0dBV)			-80.2dB
(2/3 power)			-80.7dB
<b>A-wtd Noise</b>			
(20Hz-20kHz) 0dBW			-95.5dB
(20Hz-20kHz) 2/3 power			-113.7dB
<b>Residual noise</b>			
(unwtd)			-82.3dBV
<b>Input Sensitivity</b>			
(for 0dBV)			101.6mV
(for full output)			1245mV
<b>Input loading</b>			33kohm/280pF
<b>DC offset, left/right</b>			+3.4mV/+2.6mV
<b>Retail Price</b>			£922 + £293







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# JVC AX-A342

JVC (UK) Ltd, JVC Business Park, Priestley Way, London NW2 7BA. Tel: (081) 450 3282



**T**ake one AX-A341, spray it a satin black and, by and large, you've got yourself an AX-A342. And the AX-A342, by and large, is little more than a stripped-down version of the AX-A441/442 that we covered in Issue 104. A saving of £40 that costs you an MC phono input and about 20W in power.

But you're still left with a reasonably flexible amp, equipped with independent rec-out and input selection for the two tape, three line and phono inputs plus extra goodies like bass, treble and loudness controls. All of which you may choose to avoid by opting for 'CD Direct'.

It's easy to be facetious of course, but JVC is offering plenty of value-conscious engineering in this budget amp. Engineering that includes an op-amp based RIAA network and a fully discrete high-gain power amplifier.

There are no fancy components to brag about but simple techniques like localised input switching and localised power supply regulation are valuable efforts that should be encouraged.

## Lab report

What can I say? This amp features a frighteningly flat and extraordinarily extended disc response. With a -3dB point of just 0.4Hz it will shake the dust from your speaker cones in tune with every warp in your record collection! Otherwise all is well.

Very well, in fact, judging by the low 0.00071 per cent THD and 0.0005 per cent IMD suffered by the CD input. There's a small increase in IMD through the MM input, matched by a similar increase into lower impedance loads. But as the 3D plot demonstrates, this is hardly significant.

The blank RF IMD plot looks equally impressive, but this is a reflection of the thorough 'scrubbing' provided by its input and output filters and not, unfortunately, any indication of its open-loop linearity

Other wings? Well, it's a long shot but the 9.9A current capability is not over-generous bearing in mind its 121W 4ohm rating. Something nearer 15A would be better placed to service difficult speaker loads.

## Sound quality

'Something of a Jeckyl and Hyde, this amp'. An unusual reaction from the panel made all the more intriguing by its uncanny correlation with remarks made in issue 104. Then our listeners blew very 'hot and cold' about JVC's AX-A441 and now, some five months on, we looked set for a repeat performance.

It sounded positively heavy with our CD selection, its thumping if rather boomy bass tending to muffle both guitar and vocalist. Yet switch to vinyl and the amp takes a back seat, its music becomes plodding, casual and 'pleasantly boring'.

Initially, I have to say, we were quite impressed, engaged by its lively, slightly bright but genuinely dynamic presentation. However the amp quickly 'fell over itself', revealing lead instruments at the expense of subtle backing detail. Take Tracy Chapman's CD, for example, for here it would regularly highlight a single note from the bass guitar and use it to smother both her vocals and percussion.

So while the AX-A342 might sound encouraging in the very short term, it's a sure-fire recipe for disappointment in the days that follow.

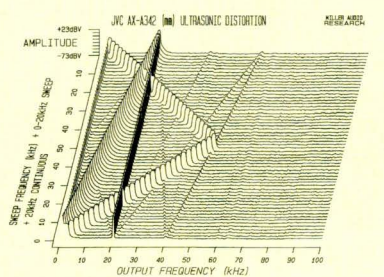
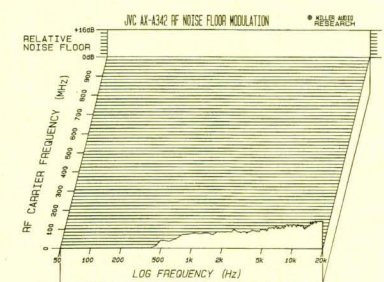
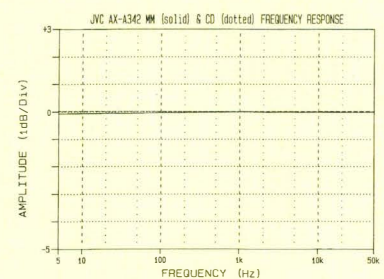
## Conclusion

Remarkable how a breed of like-minded amplifiers can prompt such a consensus of opinion in listening tests spaced months apart. Remarkable but true.

So there we have it, another amp designed to tickle the spectrum analyser but leave us human beings stone cold and unfulfilled. JVC's own AX-A3, which was reviewed back in issue 92, was a much more inspiring model.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	76.5W	77.1W	75.9W
4ohms	115.6W	121.0W	118.8W
<b>Dynamic Headroom (IHF)</b>	+1.27dB (103.3W)		
<b>Peak Current (5msec, 1% THD)</b>	9.9A		
<b>Output Impedance</b>	0.080ohm		
<b>Damping Factor</b>	100.3		
	CD/Aux	MM	
<b>Stereo Separation</b>			
(1kHz)	69.3dB	69.3dB	
(20kHz)	43.4dB	43.5dB	
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.18dB	0.23dB	
(-60dBV)	0.50dB	0.55dB	
<b>Total Harmonic Dist.</b>			
(0dBV)	-102.0dB	-100.7dB	
(2/3 power)	-103.1dB	-100.9dB	
<b>CCIR Intermod. Dist.</b>			
(0dBV)	-99.5dB	-87.9dB	
(2/3 power)	-100.1dB	-90.5dB	
<b>A-wtd Noise</b>			
(0dBV)	-79.1dB	-76.1dB	
(2/3 power)	-94.8dB	-78.1dB	
<b>Residual noise</b>			
(unwtd)	-81.2dBV	-81.1dBV	
<b>Input Sensitivity</b>			
(for 0dBV)	25.1mV	328µV	
(for full output)	221.3mV	2.88mV	
<b>Disc Overload</b>			
(1kHz)		140.5mV	
(20kHz)		1257mV	
(50kHz)		2250mV	
<b>Tape Output/Impedance</b>	10.65V (disc) / 799ohm		
<b>Input loading</b>	39kohm/300pF 48.8kohm/80pF		
<b>DC offset, left/right</b>	-20.4mV / -6.5mV		
<b>Retail Price</b>	£170		







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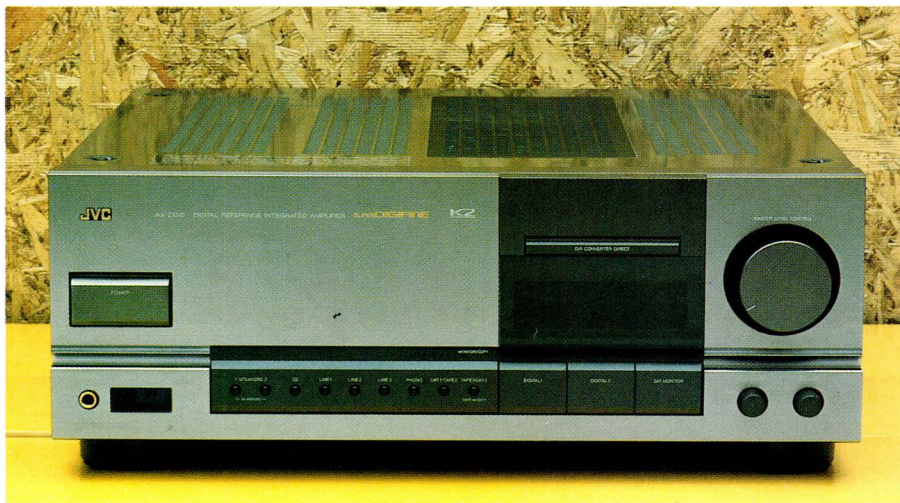
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# JVC AX-Z1010

JVC (UK) Ltd, JVC Business Park, Priestley Way, London NW2 7BA. Tel: (081) 450 3282



This is as close as you're going to get to a minimalist monster, a vast integrated amplifier without the frippery of its rivals. All input, tape monitor and speaker switching is directed via a row of little pimples that underline a cliff of titanium-grey fascia. Internal logic takes over at the business end, a design feature that's enabled JVC to offer a natty remote control.

This duplicates all the input options but adds mastery over the volume control for good measure. But this is only the beginning, for JVC has also equipped the AX-Z1010 with optical and coaxial digital inputs alongside its seven conventional analogue inputs. A wacky back-lit 3D display (it's all done with mirrors) records the incoming sample rate from any DBS, CD or DAT source.

Naturally, all the digital gubbins is electrically shielded and located as far away from the line and phono stages as possible. After being decoded by a Yamaha interface chip all digital signals are re-clocked via the famous 'K2 Interface', a control chip designed by JVC to reduce any random jitter afflicting the datastream.

But where's the PEM bitstream DAC? Instead I found a couple of ancient 16-bit PCM56P DACs (popular some four or five years ago) rigged for 18-bit duty with external 2-bit support chips. All of which hints at the real age of this amplifier.

### Lab report

Nothing to get worked up about, just a fairly 'stiff' power supply (featuring 18,000µF Great Supply electrolytics) that supports a healthy +2.3dB increase from 124W to 212W into 4ohm. Against this, the 19.6A current rating is hardly over-generous.

Distortion follows a set pattern, remaining fairly constant with power output but increasing from 0.0025 per cent via CD to 0.0063 per cent via MM and 0.014 per cent via MC (see 3D plot). All innocuous stuff.

The MM/MC disc stage might stand some improvement in headroom from its current +27.7dB/+26.6dB but any slew-limiting is staved-off well beyond 20kHz. Then there's the ultra-flat MM response, just 3dB down at 0.43Hz!

### Sound quality

Boppy, very boppy. Here's an amplifier that lets you hear what's going on without pulling the music mercilessly apart. Or at least this was the opinion of our listeners after being subjected to similarly-priced monsters from Akai, HK, Sony and Pioneer. Against that background the JVC was one of the few that made Tracy Chapman intelligible just as it revealed a subtle overlay of synth lines routinely buried in Lisa Stansfield's CD.

It combines a sense of scale and weight to build a full, albeit not terribly deep, yet still unuddled sound. Quite simply, what it does it does very well, prompting phrases like 'competent' and 'workmanlike' from the panel. Our orchestral selection sounded as if more effort were put into the playing though, switching to its internal DAC, low-level detail was clearly being traded for extra oomph!

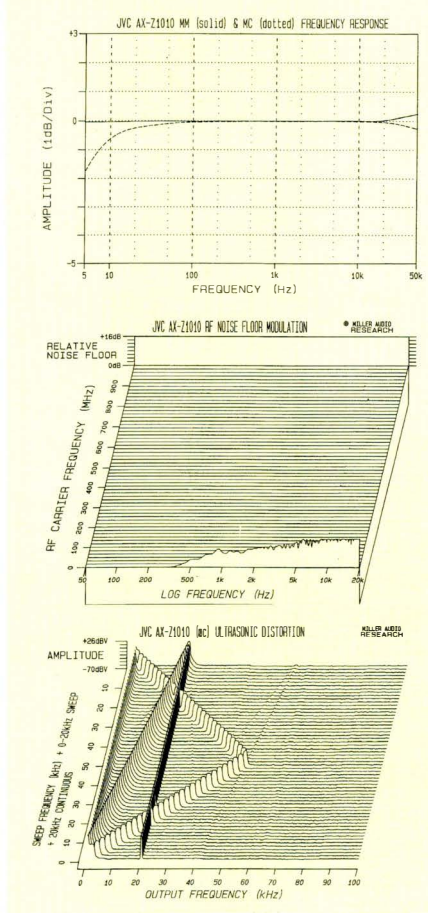
The MM phono input is similarly well-balanced, for now our jazz selection sounded open, fluid and deliciously defined. Brass, for example, was full and ebullient but never hard or scrappy. Furthermore, it captured the scale and momentum of Rachmaninov's *Symphony*, revealing the 'tingle' of triangle and tambourines that had been obscured earlier in the day.

### Conclusion

So its on-board DACs are less than spiffing but JVC's AX-Z1010 remains the most open, easy-going and engaging of the hi-fi behemoths that populate this survey. If you have your heart set on this machismo-style of amplifier, then JVC's titanium terror is the one to bag.

### TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output</b>			
8ohms	119.9W	124.2W	123.0W
4ohms	208.1W	212.4W	210.8W
<b>Dynamic Headroom (IHF)+0.96dB (155.0W)</b>			
<b>Peak Current (5msec, 1% THD) 19.6A</b>			
<b>Output Impedance 0.043ohm</b>			
<b>Damping Factor 187.6</b>			
	CD/Aux	MM	MC
<b>Stereo Separation</b>			
(1kHz)	79.0dB	81.5dB	83.5dB
(20kHz)	53.9dB	54.2dB	54.6dB
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.43dB	0.42dB	0.33dB
(-60dBV)	0.71dB	0.70dB	0.61dB
<b>Total Harmonic Dist.</b>			
(0dBW)	-92.0dB	-83.9dB	-76.4dB
(2/3 power)	-91.6dB	-83.7dB	-76.8dB
<b>CCIR Intermod. Dist.</b>			
(0dBW)	-91.7dB	-80.6dB	-78.4dB
(2/3 power)	-91.0dB	-80.1dB	-79.5dB
<b>A-wtd Noise</b>			
(0dBW)	-82.8dB	-81.9dB	-75.4dB
(2/3 power)	-102.9dB	-90.8dB	-75.7dB
<b>Residual noise (unwtd)</b>	-82.3dBV	-82.3dBV	-82.3dBV
<b>Input Sensitivity (for 0dBW)</b>	30.4mV	382µV	29.3µV
(for full output)	339.8mV	4.26mV	320µV
<b>Disc Overload (1kHz)</b>		120.7mV	10.7mV
(20kHz)		120.5mV	104.5mV
(50kHz)		765mV	166.5mV
<b>Tape Output/Impedance</b>		8.64V (disc) / 902ohm	
<b>Input loading</b>		31kohm/220pF	46kohm/200pF
			465ohm
<b>DC offset, left/right</b>			+1.1mV/+0.6mV
<b>Retail Price</b>			£650





# Kenwood KA-5040R

Trio-Kenwood UK Ltd, Kenwood House, Dwight Road, Watford, Herts WD1 8EB. Tel: (0923) 816 444



**C**onvenience without clutter. This, in a nutshell, is the *KA-5040R*. An amplifier that combines a distinctively sculptured front panel with logic-controlled input selection, subsonic, loudness and muting facilities plus a comprehensive system remote control. So complete mastery over the volume knob, line, tape and phono inputs is available from the comfort of an armchair.

But the convenience stops here. You'll need to get on your feet to distinguish between MM or MC phono cartridges, bypass the tone controls with its Source Direct facility or operate the A/B speaker selector. Indeed the *KA-5040R* is not quite as radical as it first appears.

Look beyond the sophisticated rotary input encoder, the gas-filled selection relays and wacky aesthetics and you'll discover the bare bones of Kenwood's old *KA-5020* (issue 92). Only this hi-tech version, with its fancy remote control, commands a hefty £60 premium.

## Lab report

Just as the *KA-4040R* (issue 104) is an under-specified version of the *KA-4020* (issue 97), so too is this *KA-5040R* reminiscent of a pared-down *KA-5020*. Both exceed their 80W rating, for example, but the revised 5040R power amp falls some 15W short of its forebear at 100W.

Similarly, the 4ohm output has dropped by 0.66dB from 198W to 170W, even though its current delivery remains uncompromised.

Unlike the *KA-4040R*, however, the *5040R* is equipped with relay-fired protection and speaker switching, helping to sustain the low 0.038ohm output impedance. Distortion, meanwhile, has crept-up in the 5040, especially via MM/MC where figures between 0.0035-0.005 per cent are several times higher than those obtained back in issue 92.

Similarly, though the disc responses have not altered (-3dB at 0.85Hz via MM!) the amount of available headroom has reduced from +30dB to +28.3dB at 1kHz. All of which leads me to suspect Kenwood is inadvertently eating-away at the foundation of previous victories.

## Sound quality

A suspicion only reinforced by the indifferent reaction of our listeners. Polite but lacks bite, they muttered, tempering this remark with the suggestion that though it polished all the nasty 'electronic edges' from our pop selection, vocals remained both 'shouty' and coloured, throwing themselves excitedly from the speakers.

There is certainly a superficial clarity to its music but also a rather flattened sense of dynamics which roughened and confused the busier sequences of our Brahms's *Symphony*. Neither did we find salvation in vinyl. Here it was comparably lightweight and unbalanced in favour of squeaky sax and splashy cymbals. All of which can easily lead to a larger-than-life yet curious stifled, hollow performance.

The grand Rachmaninov *Symphony* was simply 'implausible', they remarked, lacking energy, weight and momentum. So here is an amplifier which tries very hard to impress but, in doing so, only succeeds in rendering the enjoyment of music an equal struggle.

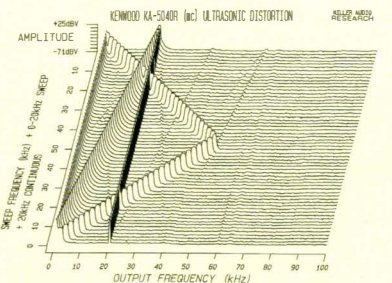
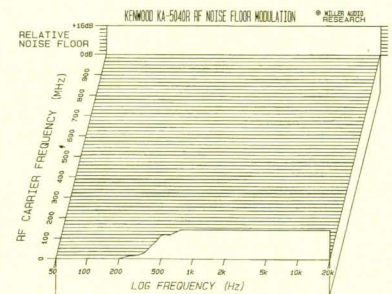
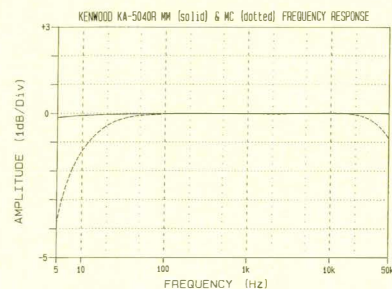
## Conclusion

The *KA-5040R* is superbly engineered and uncommonly flexible with merely a suggestion of weakness in its technical performance. Nevertheless, the *KA-5040R* in common with the *KA-4040R* and much of Kenwood's current CD player range, fails to build upon or even match the subjective prowess of earlier models.

After many years of steady progress Kenwood seems to have slid unwittingly into reverse gear.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	102.5W	99.8W	98.7W
4ohms	174.9W	170.3W	165.1W
<b>Dynamic Headroom (IHF)+1.05dB (127.0W)</b>			
<b>Peak Current (5msec, 1% THD) 10.9A</b>			
<b>Output Impedance</b> 0.038ohm			
<b>Damping Factor</b> 210.7			
	CD/Aux	MM	MC
<b>Stereo Separation</b>			
(1kHz)	60.8dB	60.7dB	57.7dB
(20kHz)	47.6dB	47.0dB	45.2dB
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.19dB	0.32dB	0.34dB
(-60dBV)	0.17dB	0.29dB	0.31dB
<b>Total Harmonic Dist.</b>			
(0dBW)	-96.7dB	-88.8dB	-85.3dB
(2/3 power)	-90.2dB	-86.3dB	-84.6dB
<b>CCIR Intermod. Dist.</b>			
(0dBW)	-95.5dB	-79.7dB	-79.2dB
(2/3 power)	-82.8dB	-77.6dB	-77.9dB
<b>A-wtd Noise</b>			
(0dBW)	-79.7dB	-79.3dB	-74.1dB
(2/3 power)	-96.2dB	-91.2dB	-75.6dB
<b>Residual noise</b>			
(unwtd)	-75.7dBV	-75.7dBV	-75.7dBV
<b>Input Sensitivity</b>			
(for 0dBW)	21.9mV	265µV	21.7µV
(for full output)	220.2mV	2.66mV	218µV
<b>Disc Overload</b>			
(1kHz)		129.5mV	10.8mV
(20kHz)		1184mV	98.3mV
(50kHz)		1795mV	155.9mV
<b>Tape Output/Impedance</b>	10.65V (disc) / 1.47kohm		
<b>Input loading</b>	41kohm/870pF 45kohm/550pF		
	102ohm		
<b>DC offset, left/right</b>	+38.2mV/+41.7mV		
<b>Retail Price</b>	£270		





# Marantz PM-72

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



**H**old onto your hats because Marantz has just announced the launch of two new amplifiers: the *PM-52*, which didn't arrive in time and the *PM-72* which, clearly, did. Both are heralded as 'Audiophile' amplifiers (an ignominious description), benefitting from the joys of Marantz' latest circuit gizmo, Current Conversion Noise Elimination or CCNE for short.

After wading through paragraphs of guff, CCNE turns out to be a very simple modification. Basically the four diodes that form the power supply's bridge rectifier also generate a quantity of high frequency switching noise. And this noise stimulates the natural resonance of the mains transformer (a ruddy great inductor), typically around 20kHz.

Recognising this as a potential problem, Marantz simply damped the resonance with a parallel RC network, the crux of CCNE. So CCNE is an eminently sensible if hardly innovative design feature. A worthwhile 'tweak' but one that's readily swamped by changes in the topology of the power amp, for instance.

Back to the *PM-72*. Apparently it's based on the older *PM-80* minus the Class A option, third tape input and muting facility. Leaving you with a rotary selector for its MM/MC, CD, tuner and aux inputs, a basic rec-out facility, balance, bass/treble tone controls and the ever-dependable 'source direct'. Marantz' screw-down binding posts are nothing short of appalling, I might add.

## Lab report

You might think the *PM-72* actually out-powers the *PM-80* with its 155W/241W rating however, when the chips are down, its less substantial power supply manages a mere 17.9A of current.

The *PM-80* (issue 85) could sustain a colossal 29A and this was reflected in its better load-tolerance at the frequency extremes and lower distortion recorded on the 3D plot.

Otherwise the *PM-72* is a very generously specified amp for the price, one that combines low distortion, low noise, a low output impedance and a range of very useable input sensitivities. Even the MM/MC disc response is sensibly tailored with a -3dB point of 12Hz.

## Sound quality

'It's all there', remarked the panel in typically graphic terms, 'just lacks a bit of excitement'. This sums up the *PM-72*, a very neutral, even-handed and pleasantly detailed amp yet one that lacks the richness, the sense of expression or passion that's conveyed by the most entralling performers.

Competent but rather bland, the sense of drama from Brahms' *Symphony* eluded its grasp. By the same token the drums sounded ponderous rather than 'charged' while the bongos from Chapman's CD had an almost lackadaisical quality, good imaging, a good sense of the drum kit 'being there' but the overall performance was casual rather than stirring.

Listening via the MM input was an equally unfulfilling experience. Marty Paich's jazz LP sounded soft and slow, especially through the bass, while our classical selection lacked the bounce and energy we had heard before. Woodwinds had lost their sweetness, and the bowed bass had lost its depth.

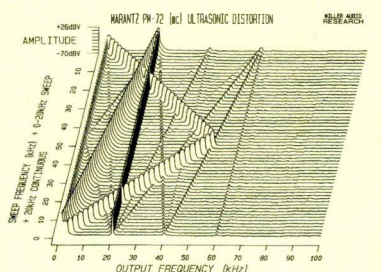
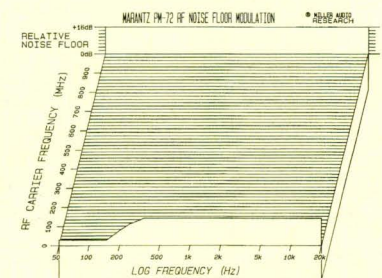
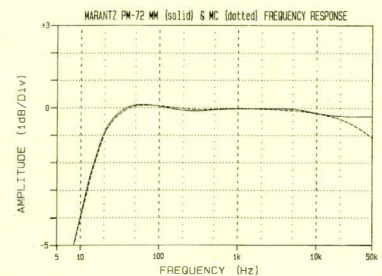
Either way, it is difficult to criticise the *PM-72* in terms of balance or obvious coloration. In fact its imaging is very confident and stable, yet everything has an air of superficiality. Almost as if the amp takes everything too comfortably in its stride.

## Conclusion

Odd this, for the very thing that's missing from the performance of Marantz' *PM-72* is available in abundance from any of its latest CD players. Therefore there's little excuse for what's on offer here: an amp that's technically superb but emotionally sterile.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	152.5W	154.9W	153.4W
4ohms	219.8W	241.0W	228.0W
<b>Dynamic Headroom (IHF)+1.24dB (205.9W)</b>			
<b>Peak Current (5msec, 1% THD) 17.8A</b>			
<b>Output Impedance</b> 0.052ohm			
<b>Damping Factor</b> 153.8			
	<b>CD/Aux</b>	<b>MM</b>	<b>MC</b>
<b>Stereo Separation</b>			
(1kHz)	86.6dB	84.0dB	83.8dB
(20kHz)	67.2dB	63.0dB	62.6dB
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.74dB	0.74dB	0.74dB
(-60dBV)	1.08dB	1.09dB	1.09dB
<b>Total Harmonic Dist.</b>			
(0dBW)	-102.6dB	-101.5dB	-99.8dB
(2/3 power)	-92.8dB	-91.5dB	-92.1dB
<b>CCIR Intermod. Dist.</b>			
(0dBW)	-101.6dB	-88.6dB	-90.5dB
(2/3 power)	-81.2dB	-81.9dB	-81.4dB
<b>A-wtd Noise</b>			
(A wtd, 0dBW)	-84.8dB	-82.4dB	-72.8dB
(2/3 power)	-97.5dB	-90.7dB	-73.3dB
<b>Residual noise</b>			
(unwtd)	-77.4dBV	-77.4dBV	-77.3dBV
<b>Input Sensitivity</b>			
(for 0dBW)	14.2mV	225µV	23.6µV
(for full output)	172.1mV	2.79mV	292µV
<b>Disc Overload</b>			
(1kHz)		161.7mV	17.2mV
(20kHz)		1354mV	167.4mV
(50kHz)		1653mV	277.8mV
<b>Tape Output/Impedance</b>		10.88V (disc) / 452ohm	
<b>Input loading</b> 32kohm/700pF		45kohm/660pF	99ohm
<b>DC offset, left/right</b>		+4.7mV/+5.0mV	
<b>Retail Price</b>			£300







# Moth Series 30

Moth Marketing, 10 Dane Lane, Wilstead, Bedford MK45 3HT.  
Tel: 0234 741152



A few months back I ran a full lab check on Moth's standalone phono preamp, an intriguing design that found JK waxing lyrical in his subsequent review. So, we thought, why not assemble the entire collection of *30-Series* separates and give them a thorough auditioning.

You see this combination is not exactly new but the Moth Group has been, well, a trifle reluctant to show its hand in the past. If only they had more confidence in their own product, for the *30 Series* turns out to be magnificent value.

Every component is built into a sleek alloy case and fronted with a light ash fascia. They are, quite simply, no bigger than they need to be! And every box has its place. The phono unit plus 100VA outboard supply should be located as close to the turntable as possible while the 30W power amp can be positioned down by the speakers.

This leaves Moth's passive controller sitting midway between, though low capacitance interconnects are best suited to its high (<2.5kohm) and variable output impedance. Inside you'll find a custom-built NSF input selector (for four line inputs), a 10kohm Alps volume pot and silver-plated solid-core wiring. Neat.

The active phono unit is equally elegant for here both MM and MC cartridges are accommodated using four discrete operational amplifiers (not all op-amps are ICs remember). The first op-amp acts as a low-noise headamp for MCs, dropping its gain (by increasing local feedback) once an MM cartridge is selected. Passive RIAA equalisation is squeezed between this and the

final op-amp which simply boosts the output by another 10dB or so. Neat again.

To those with an eye for such things, Moth's power amp is obviously descended from the Cambridge *P40* amplifier. But then this isn't really surprising as the entire Moth range has been expertly designed by one Stan Curtis, once the head-honcho of said Cambridge.

It's an equally characteristic design, fronted by a long-tailed pair and complementary cascodes. These act as pre-drivers for the quasi-complementary output stage using (you guessed it) good 'ol Sanyo D1046 transistors. Like previous Cambridge amps this sleek version uses close-tolerance metal-film emitter resistors, bypassed with diodes which take over as the output current starts to pick-up.

The distortion this introduces is apparently compensated by feedback, though I imagine it also contributes to the unique flavour of its sound!

## Lab report

At the risk of repeating myself (see issue 107), Moth's phono preamp offers a combination of very low noise (-80dB, A-wtd) and very low distortion (0.0007 per cent via MM) though its 11.5mV/1.2mV MM/MC input sensitivity is clearly biased in favour of very high-output cartridges! Any difference in the MM/MC response, incidentally, is due to the switched local feedback operating around the first op-amp.

Stereo separation is limited by crosstalk in the passive controller just as its channel balance is hamstrung by the 56dB range of

the accompanying volume control. Furthermore, because this has an unbuffered output both the noise and output impedance (-103dB and 2.5kohm respectively) reach a maximum at the control's -6dB position.

Moth's power amp, meanwhile, achieves its 30W rating by the skin of its semiconductors, the 'loose' power supply regulation being reflected in its substantial +2.5dB dynamic headroom. The 14.5A current reserve is pretty generous too. Noise and distortion are kept at bay though, as you can see from the 3D plot, it's high-order high frequency intermodulation that picks up as the amp is stressed by lower impedance loads.

Of greater potential significance is the gross susceptibility to RF noise from 100MHz to 1GHz! The power amp is likely to be very CD-sensitive, another good reason to use their passive controller which, in tandem with lengths of interconnect, will act as a useful VHF-filter!

## Sound quality

As the first pre/power combination to be auditioned, the impact this *30 Series* had on our listeners was both obvious, immediate and long-lasting. There was now a far greater and deeper level of resolution available from both MM and CD sources without any evident increase in colour or distortion.

The layering of familiar pieces of music was now exceptionally clear, row after row of strings, woodwind and percussion descending into inaudibility as the Prokofiev CD wove its spell. 'For once', our listeners sighed, 'the violins have a realistic sheen'.



## TEST RESULTS

Similarly, the jazz CD now sounded like a relaxed 'big band', the brass 'breathing' with full and impressive dynamics. Nevertheless one listener did point to an extra sharpness or edginess heard with the sax solo, was this new-found detail or was this glassiness?

Either way, the beautiful counterpointing of clarinet and a lone cymbal really brought home the acoustic, the space and atmosphere of this recording. Likewise our pop selection was enjoyed for the unusual sense of delicacy rather than its customarily 'electronic' ambience. Percussion, for example, had a wonderful sense of weight or 'touch' though Tracy Chapman's voice was just a little more 'tortured' than usual!

Introducing Moth's phono preamp into the system might have dulled the enthusiasm of our panel but they still placed it ahead of any integrated offering! Some of the dynamics were lost yet all the fine detail was retained, its music 'detached from the speakers' and filling the room without a hint of harshness or strain. Subjectively it was more powerful than any of our integrated models, enjoying a thoroughly uncommon sense of scale and momentum.

### Conclusion

Here is one potent example of the potential stride in quality available from a well-matched yet sensibly-priced pre/power combination. A collection of four inconspicuous boxes that, at just £589 all told, clearly exceed the performance of the costliest integrated amplifiers in our survey. And, I've no doubt, many more besides.

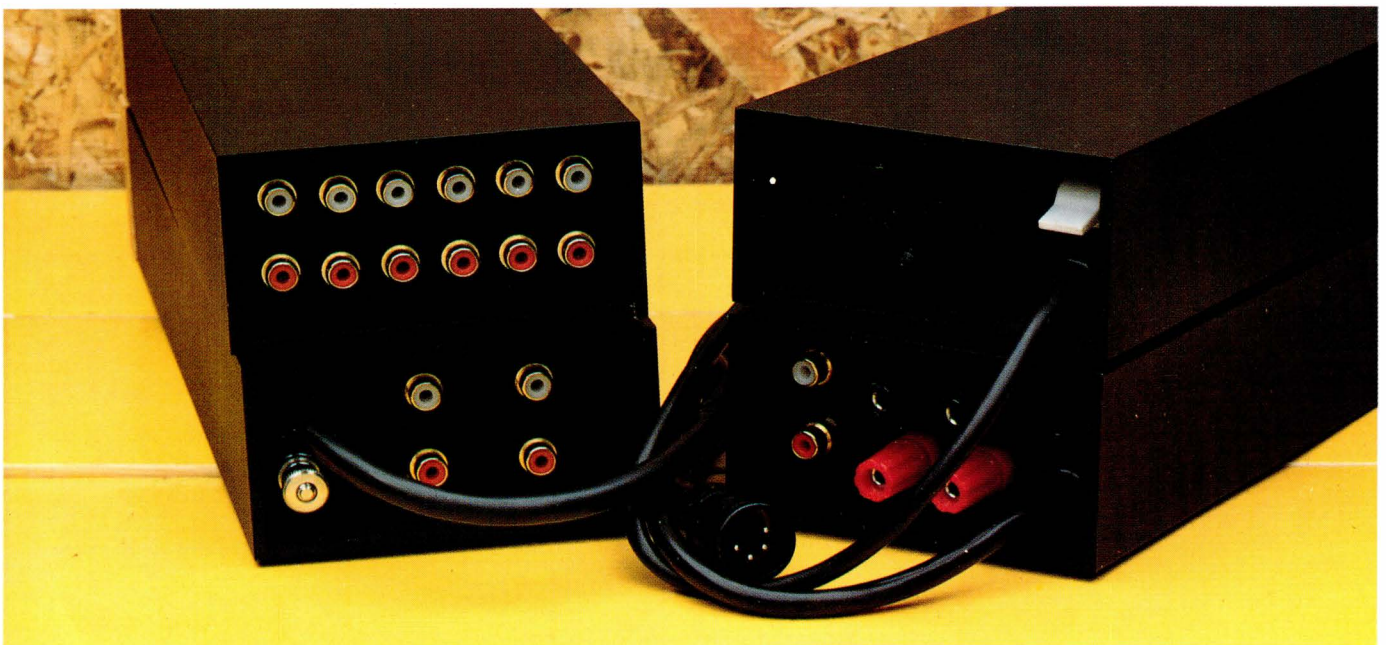
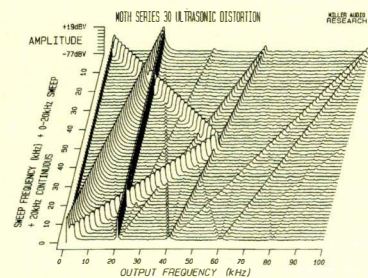
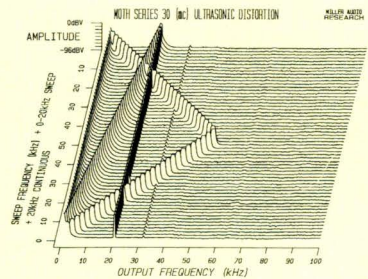
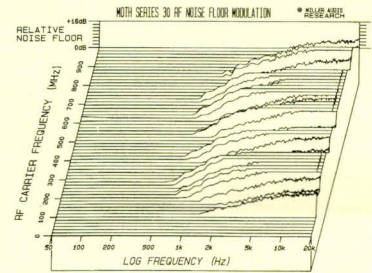
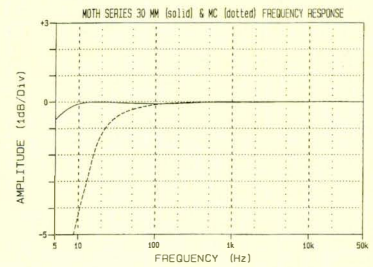
As a four-way combination they clearly earned the admiration of our panel, praise that was rewarded with an unreserved Recommendation. But as the heart of a CD-only system, the *Series 30* passive controller and matching power amp are nothing short of fabulous value. The perfect recipe, in fact, for a Best Buy.

### Preamplifier: Moth Series 30 passive controller + phono stage

	Aux/CD	MM	MC
<b>Stereo separation:</b>			
(20Hz)	113.6dB	94.9dB	95.6dB
(1kHz)	78.8dB	78.8dB	78.8dB
(20kHz)	52.7dB	52.7dB	52.7dB
<b>Channel Balance @ 1kHz:</b>			
(0dBV)	0.00dB	0.15dB	0.22dB
(-20dBV)	0.00dB	0.14dB	0.23dB
(-60dBV)	0.88dB*	1.02dB*	1.11dB*
<b>Total Harmonic Dist @ 0dBV:</b>			
(1kHz)	<-110dB	-103.5dB	-86.8dB
(20kHz)	<-110dB	-96.5dB	-81.6dB
<b>CCIR Intermod. Dist.</b>	<-110dB	-74.1dB	-67.3dB
<b>A-wtd Noise</b>			
(20Hz-20kHz)	<-103dB**	-80.0dB	-77.0dB
<b>Residual noise</b>			
(unwtd)	<-115dBV	-74.5dBV	-73.4dBV
<b>Input Sensitivity</b>			
(for 0dBV)	1000mV	11.5mV	1.18mV
<b>Disc overload:</b>			
(1kHz)		209.4mV	21.6mV
(20kHz)		604.6mV	60.6mV
(50kHz)		529.5mV	56.1mV
<b>Input Loading</b>	9.3kohm/20pF	45kohm/270pF	47ohm
<b>Preamp Output/Impedance</b>	As input	<2.5kohm**	(105ohm)
<b>DC Offset, L/R</b>			As input
<b>Retail Price</b>		£132 + £254	

### Power amplifier: Moth Series 30 power amplifier

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	32.8W	34.7W	32.5W
4ohms	38.1W	43.8W	40.3W
<b>Dynamic Headroom (IHF)</b>	+2.49dB (61.7W)		
<b>Peak Current</b>		+14.5A	
(5msec, 1% THD)			
<b>Output Impedance</b>	0.014ohm	0.017ohm	0.028ohm
<b>Damping Factor</b>	576.7	468.6	286.0
<b>Stereo Separation</b>			
(0dBW)	145.7dB	125.9dB	106.8dB
<b>Total Harmonic Dist.</b>			
(0dBW)	-92.0dB	-95.5dB	-73.2dB
(2/3 power)	-93.9dB	-95.3dB	-74.2dB
<b>CCIR Intermod. Distortion</b>			
(0dBW)			-95.9dB
(2/3 power)			-96.1dB
<b>A-wtd Noise</b>			
(20Hz-20kHz) 0dBW			-93.8dB
(20Hz-20kHz) 2/3 power			-105.7dB
<b>Residual noise</b>			
(unwtd)			-63.4dBV
<b>Input Sensitivity</b>			
(for 0dBW)			103.5mV
(for full output)			613.8mV
<b>Input loading</b>			72kohm/550pF
<b>DC offset, left/right</b>			+42.5mV/+39.2mV
<b>Retail Price</b>			£203



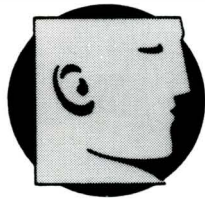


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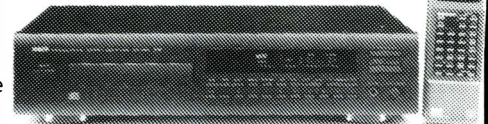
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# NVA AP20

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**B**uilt by Bill and Ben in a 1,800 square foot potting shed on the Watermill Industrial Estate, the NVA AP20 is nothing if not unpretentious. I jest of course, yet NVA remains one of the last bastions of minimalist UK hi-fi, right down to the thoroughly utilitarian and utterly impregnable casework! You'll either love it for its purist ideals or loathe it as an anachronism.

Either way, the AP20 is as accommodating an anachronism as you'll ever find, one that's available with either MM or MC disc stages (but not both) or, alternatively, with neither for just £260. Got that? Good because round the back you'll discover standard phono sockets for the CD, tuner and disc inputs but a 5-pin DIN (aargh!) for the tape loop. Why, I don't know, because there's plenty of room for a couple of extra phonos.

Recessed 4mm sockets are provided for speaker cables, though I'd warn against using high capacitance brands as these might tip the AP20 into instability. High resistance cables, like NVA's LSI, will act as the 'Zobel network' that's missing from its own output stage. Just use our cable booklet as a guide.

## Lab report

NVA has an uncanny knack of designing solid-state amps with tube-like overtones. Weed thinks the whole thing is a real hoot! Ahem. Loose power supply regulation yields a small +1.1dB rise from 35W to 45W into 4ohm but, the flipside, its +2.1dB headroom and +12.8A current rating are very generous. The 0.0065ohm output impedance is equally impressive.

However, slew-limiting restricts its treble output so you'll only get 21W at 20kHz if you're prepared to suffer five per cent THD. Hence the huge 2.3 per cent IM distortion and a 3D plot that comes straight out of Audio Innovations' *Boys Own book of Technical Horrors*.

Meanwhile the huge channel imbalance incurred by the volume control limits its

effective range to no more than 55dB while the MM discresponse has a warming 'bump' at 20-50Hz and an equally warming 1dB treble cut. It's very sensitive for an MM input at 1.75mV (re full output), but headroom is limited to just +20.6dB. The DC offset is too high but the RF result is most gratifying.

## Sound quality

Initially alarmed by the noisy swish-swish of NVA's cermet volume control, our listeners' fears were quickly allayed by the very organised and detailed sound that ensued. Here was an amp that retrieved the airiness and height of Prokofiev's *Symphony* despite its restrained sense of dynamics and decidedly gentle tonal balance.

Nevertheless instruments like the woodwinds, rich in character, were faithfully represented, enmeshed in an equally deep and uncluttered soundstage. Otherwise this hint of softness, this velvety texture only mollified what were described as the 'digital excesses' of our pop selection. So cymbals and strings lost the hard and edgy qualities that had been heard earlier in the day, traded for an altogether sweeter hue.

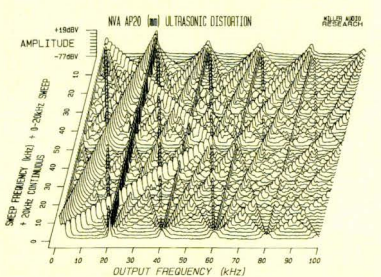
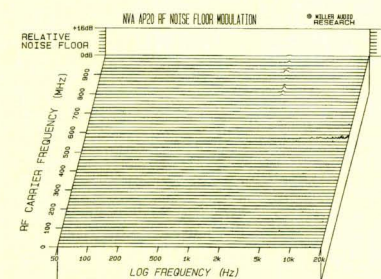
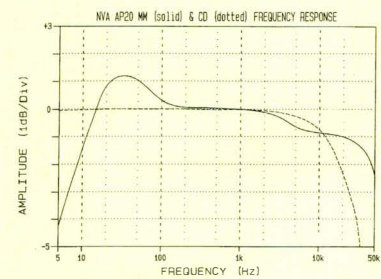
Vinyl was described as euphonic, an easy-going presentation but one that lacked the openness and finer detail revealed via CD. Bass, in particular, lacks the resolution, the weight and impact that is available on-tap with the CD input.

## Conclusion

As a CD-only amplifier, the AP20 has the ability to reproduce a stunning variety of tonal colours and musical styles, lacking only what our listeners insisted on describing as 'grunt'. Stick with sensible low/medium resistance, low-capacitance cable and a pair of sensitive speakers and you too will discover the unforced and delightfully natural performance of NVA's AP20.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	32.5W	35.0W	6.8W*
4ohms	39.1W	44.9W	10.8W*
<b>Dynamic Headroom (IHF) +2.09dB (56.6W)</b>			
<b>Peak Current (5msec, 1% THD) +12.8A</b>			
<b>Output Impedance 0.0065ohm</b>			
<b>Damping Factor 1238.5</b>			
	<b>CD/Aux</b>	<b>MM</b>	
<b>Stereo Separation</b>			
(1kHz)	81.4dB	78.0dB	
(20kHz)	64.8dB	57.9dB	
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.49dB	0.52dB	
(-60dBV)	>50dB	>50dB**	
<b>Total Harmonic Dist.</b>			
(0dBW)	-60.7dB	-64.2dB	
(2/3 power)	-71.4dB	-70.9dB	
<b>CCIR Intermod. Dist.</b>			
(0dBW)	-62.5dB	-63.3dB	
(2/3 power)	-26.6dB	-26.1dB	
<b>A-wtd Noise</b>			
(0dBW)	-87.2dB	-84.3dB	
(2/3 power)	-98.8dB	-87.0dB	
<b>Residual noise</b>			
(unwtd)	-78.6dBV	-78.6dBV	
<b>Input Sensitivity</b>			
(for 0dBW)	72.6mV	291µV	
(for full output)	431.3mV	1.75mV	
<b>Disc Overload</b>			
(1kHz)		53.8mV	
(20kHz)		492.9mV	
(50kHz)		805mV	
<b>Tape Output/Impedance</b>	11.4V (disc) / 9.5ohm		
<b>Input loading</b>	9kohm/40pF 47kohm/20pF		
<b>DC offset, left/right</b>	+55.8mV/+43.5mV		
<b>Retail Price</b>			£260 and £290

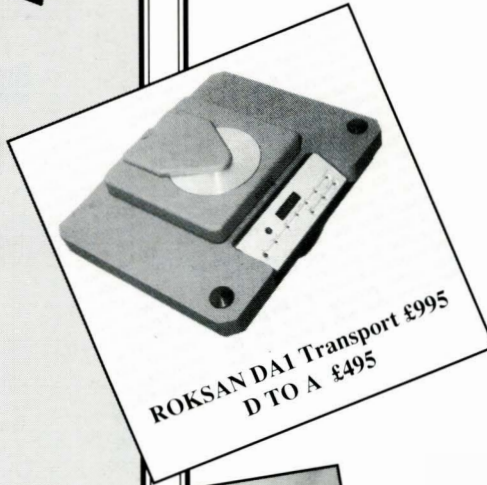




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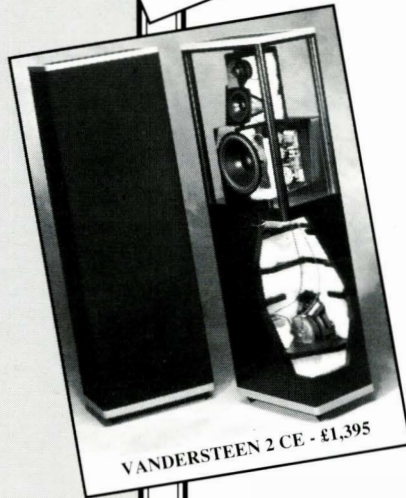
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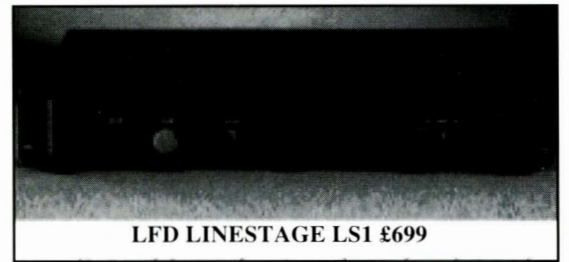
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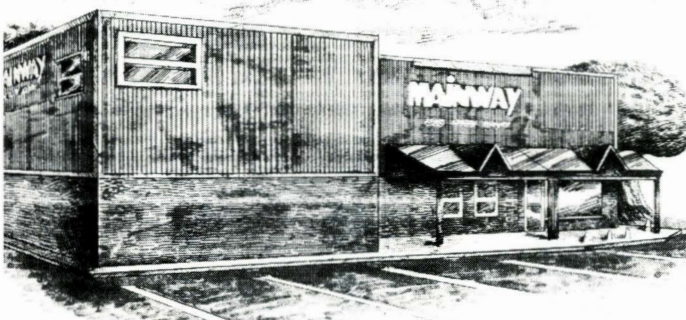
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# Philips FA-930

Philips Electrical Ltd, City House, 420-430 London Road, Croydon, Surrey CR9 3QR. Tel: (081) 689 2166



**N**estling at the heart of Philips' up-and-coming 900 Series is this extremely flexible, and competitively-priced, integrated amp. It's called the FA-930 and comes complete with a very stylish system remote control, a natty handset that has dominion over a huge range of matching separates once they're all linked via Philips' ESI BUS.

ESI stands for Enhanced System Intelligence, a line of communication that runs between other 900 Series products including a tuner, tape deck, VCR, CD player(s) and even a TV set. So independent rec-out and input selection is possible manually, via a rotary dial, or through its remote control which also governs the volume knob, A/B speaker selection, mute and standby facilities.

As you can see from our picture, Philips has made a determined attempt to break from the traditional mould. Look a little closer and you might just see its 'Digital' logo. This refers to a variety of digital inputs marked for LD, DBS, CD and DCC sources. A Mini Disc input is conspicuous for its absence!

However, this is no more than a switching facility for direct-digital recording - the FA-930 does NOT include on-board DACs.

## Lab report

Let's get the trivial stuff sorted first because the FA-930 only has one major blight. It's phase-inverting (so do experiment with those red/black speaker cables) while the channel balance, noise and input sensitivities are all fine. Philips' MM response is sensibly tailored, RF activity is low but (gripe alert) the DC offset is too high at -90mV.

In-band distortion seems low enough at 0.0018-0.007 per cent but, as the 3D plot highlights, there's a smattering of high-order rubbish littering the ultrasonic region. This leads me onto the major gripe.

Taking a leaf from the design books of Proton (issue 80) and NAD (issue 68), Philips

has also developed a power amp that switches from 30 to 50V rails under dynamic conditions. High-speed diodes activate an extra set of Motorola power transistors to supplement the existing complementary pair, a ruse that should momentarily increase the 8ohm output from 100W to around 300W (a nominal +4.8dB boost).

In practice, however, Philips' weedy power supply will only sustain a dynamic output of just 144W (+1.6dB) which is no more than I'd expect from any conventional amplifier! The ineffectual 9.5A current rating and poor 20Hz/20kHz power figures give the game away!

## Sound quality

Following hard on the heels of one or two ghastly heavyweights, our session with the FA-930 was quite promising. The amp turns out to be a detailed, busy and clean-sounding performer, if one that lacks a little welly in the bass department.

Via the MM input, too, the amp reflected a light rather than heavy balance, its bass very 'tuneful' but lacking in power and impact. Nevertheless this was one of the few amps to reveal the menace of Brahms' *Symphony*, isolating the strings for a little 'special treatment'.

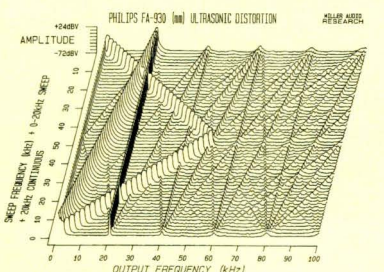
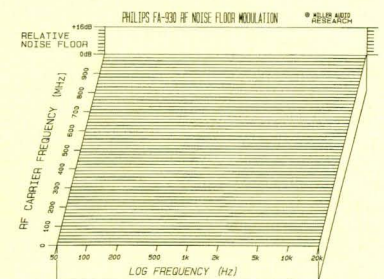
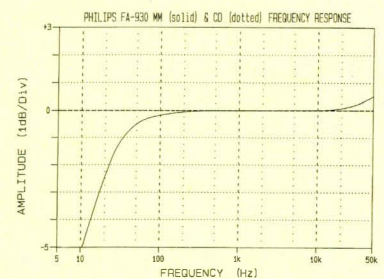
Meanwhile our pop vocals were just tinged with brightness, not so much sibilant but sharp and lucid. Nevertheless the sense of integration and delicate poise of its music made everyone want to listen. And that, in view of the drab performance offered by many this month, was no mean feat.

## Conclusion

Damned by faint praise? Let's just say our panel reacted with equanimity rather than feverish enthusiasm. Nevertheless pitched in direct conflict with Kenwood's *KA-5040R* it is the flexible Philips that emerges victorious, the nerve-centre of a fledgling DCC-based system perhaps?

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	91.9W	99.4W	91.9W
4ohms	113.4W	136.9W	118.8W
<b>Dynamic Headroom (IHF)+1.62dB (144.4W)</b>			
<b>Peak Current (5msec, 1% THD)</b>	9.5A		
<b>Output Impedance</b>	0.099ohm		
<b>Damping Factor</b>	80.3		
<b>Stereo Separation</b>	<b>CD/Aux</b>	<b>MM</b>	
(1kHz)	68.3dB	68.2dB	
(20kHz)	47.8dB	47.4dB	
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.56dB	0.82dB	
(-60dBV)	0.53dB	0.29dB	
<b>Total Harmonic Dist.</b>			
(0dBW)	-95.0dB	-88.9dB	
(2/3 power)	-86.7dB	-82.8dB	
<b>CCIR Intermod. Dist.</b>			
(0dBW)	-98.6dB	-94.0dB	
(2/3 power)	-95.8dB	-91.5dB	
<b>A-wtd Noise</b>			
(0dBW)	-80.7dB	-78.8dB	
(2/3 power)	-96.2dB	-82.7dB	
<b>Residual noise</b>			
(unwtd)	-66.5dBV	-66.6dBV	
<b>Input Sensitivity</b>			
(for 0dBW)	17.6mV	278µV	
(for full output)	176.8mV	2.78mV	
<b>Disc Overload</b>			
(1kHz)		131.5mV	
(20kHz)		1109mV	
(50kHz)		2355mV	
<b>Tape Output/Impedance</b>	8.32V (disc) / 326ohm		
<b>Input loading</b>	36kohm/450pF 44.7kohm/360pF		
<b>DC offset, left/right</b>	-91.3mV / -78.3mV		
<b>Retail Price</b>	£200		





# Pioneer A-676

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



From the people that brought us the legendary A-400 comes the A-676 Reference Stereo Amplifier. Ought to be pretty good then! Funnily enough, once you wade past the bass, treble, balance and loudness controls, the MM/MC phono selector with subsonic filter option, the independent rec-out and input selection and speaker switching facilities (puff puff) you're left with a rather uninspiring piece of kit.

Not that the A-676 is bereft of good intentions. Take Pioneer's 'Direct Connection II' which ensures that all input and rec-out selections are achieved using local switches near the back panel. Even the volume control is positioned midway down the amp to reduce track lengths.

Then there's the 'Clean Ground System' which finds both the mains transformer and honeycombed heatsinking insulated from the main chassis but electrically grounded at a common point in the power supply. The idea is to reduce noise circulating in the metal chassis, noise caused by capacitive-coupling between the power transistors and heatsink as well as the transformer core and its windings.

Techniques that are also incorporated in the A-300 and A-400, I might add. But the A-676 is not a big A-400 with knobs on, simply a return to the old school of heavyweight mass-market engineering.

## Lab report

Cast an eye over the figures and nothing leaps out as 'unusual'. Plenty of juice from a decently low output impedance, very low noise (-90.3dB, A-wtd) from a slightly insensitive MM disc input and plenty of headroom to accommodate high-output cartridges. Distortion is low too, typically 0.0056 per cent via CD and very consistent with respect to power. Or is it?

Look again at the Ultrasonic Distortion plot and you'll discover its linearity changes

quite markedly with temperature. The 3D plot takes some four or five minutes to accumulate during which time the amp is 'cooking' at two-thirds power into 4ohm.

And as it heats up there is a clear reduction in all odd-order crossover-like mechanisms. Take the third harmonic track at 60kHz as an example, or the third order IM products radiating out from the 20kHz tone as another. Even the second order IM products from the second harmonic at 40kHz are influenced. But how will all this influence its sound quality?

## Sound quality

'I'd get more excitement cutting my toenails' remarked one listener in response to the even-handed but generally lacklustre performance that drifted past our ears. Apparently this amplifier loses bass lines with casual regularity. Take the plucked bass from Brahms's *Symphonias* as an example, for though the instrument had an obvious 'presence' it lacked both weight and focus.

Tracy Chapman also began promisingly enough but the deep bass rhythm became progressively more strained as the complexity of the song mounted note by note. Here dynamics, space and fine detail were all traded for a crude increase in level.

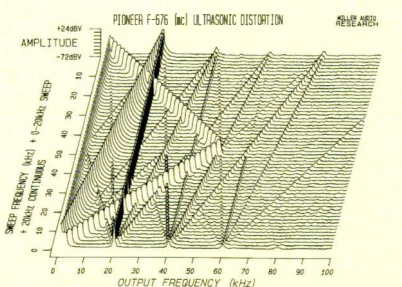
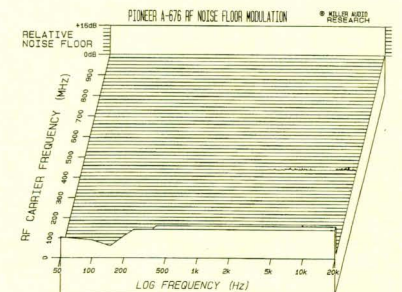
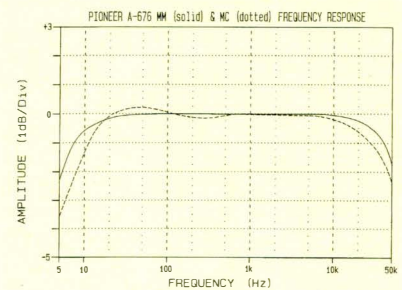
In its defence, the A-676's balance is both fairly even and also very consistent from input to input. So though the amp is not off-putting in a bold or aggressive fashion, it's the sheer indifference of its music that disenchanting our listeners.

## Conclusion

Described by our panel as a 'mineral water amplifier', the A-676 certainly offers very little flavour to tickle the palate. A pity really, because there's no earthly reason why Pioneer could not beef-up the A-400 into something equally special but simply more powerful. So how about an A-600 for next season?

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	94.8W	97.7W	96.3W
4ohms	148.1W	155.6W	150.7W
<b>Dynamic Headroom (IHF)+1.20dB (128.8W)</b>			
<b>Peak Current (5msec, 1% THD) 20.0A</b>			
<b>Output Impedance</b> 0.070ohm			
<b>Damping Factor</b> 114.1			
	CD/Aux	MM	MC
<b>Stereo Separation</b>			
(1kHz)	73.2dB	73.2dB	72.8dB
(20kHz)	48.8dB	48.9dB	48.3dB
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.10dB	0.05dB	0.02dB
(-60dBV)	1.75dB	1.68dB	1.64dB
<b>Total Harmonic Dist.</b>			
(0dBW)	-85.2dB	-77.4dB	-75.7dB
(2/3 power)	-84.8dB	-79.1dB	-75.7dB
<b>CCIR Intermod. Dist.</b>			
(0dBW)	-84.1dB	-80.3dB	-79.3dB
(2/3 power)	-91.1dB	-82.4dB	-83.6dB
<b>A-wtd Noise</b>			
(0dBW)	-80.0dB	-79.5dB	-72.8dB
(2/3 power)	-96.1dB	-90.3dB	-73.9dB
<b>Residual noise</b>			
(unwtd)	-80.3dBV	-79.9dBV	-79.9dBV
<b>Input Sensitivity</b>			
(for 0dBW)	18.9mV	327µV	25.3µV
(for full output)	187.4mV	3.24mV	250µV
<b>Disc Overload</b>			
(1kHz)		248.9mV	19.3mV
(20kHz)		747.9mV	58.2mV
(50kHz)		713.5mV	67.5mV
<b>Tape Output/Impedance</b>	14.25V (disc) / 2.42kohm		
<b>Input loading</b>	67kohm/1.9nF 56kohm/230pF		
			103ohm
<b>DC offset, left/right</b>		-53.8mV/-49.3mV	
<b>Retail Price</b>			<b>£280</b>





# Pioneer A-777

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



So the A-676 is not meaty enough for you, huh? Then feast your eyes on its bigger brother, the 39lb A-777. This monstrous amp offers a similarly copious range of facilities for three tape decks, three line sources and both MM or MC cartridges. It has the same chunky binding posts around the back with local relay switching and full electronic protection for up to two pairs of speakers.

In addition there's a -20dB muting facility plus the option to power-down the MM/MC phono circuit. Pioneer claims this reduces unwanted noise when listening to alternative sources like CD or tape, for example.

Other sources of noise are defeated by Pioneer's Direct Connection II and Clean Ground techniques while its two mains transformers are screened within a pair of huge, cast alloy blocks. You'll find a truss, supplied gratis, in the packing . . .

In terms of topology, however, there is little difference between the A-676 and A-777. Both employ similar power amp 'cards' for left and right channels with transistors matched for their 'complementary non-linearities'. The A-777 simply uses two pairs of devices per channel with higher quality and higher-rated components throughout.

## Lab report

Thumping great mains transformers and a pair of 22,000µF electrolytics are firmly behind the 22.2A available from this amp, a figure that puts the A-777 in the same ballpark as competing behemoths from Sony, Akai and JVC. The MM/MC responses bear more than a passing resemblance to those of the A-676 while its mix of sensitivities between line, MM and MC are also comparable. Still plenty of headroom (+33.7dB) via MM, I'm glad to see.

Same response to RF noise in the low-MHz region too, though the spread of closed-loop distortions are clearly better managed. In this case the 3D plot shows a consistent

third order difference IM product from the MC input which, in the absence of other distortions, is equally bizarre! Second order IMD as the test table and 3D plot show, is significantly lower.

But what of the novel on/off feature designed to shut-down the MM/MC stage? Well, disabling the phono supply has no influence over THD on the CD input but it does improve the S/N ratio by 0.7dB, a small but a repeatable improvement. Give that man a peanut.

## Sound quality

And another one bites the dust . . . yet another crate of an amplifier that disappointed our listeners with its sluggish delivery, congested midband and what was described in fatigued terms as a 'general boringness'. Unwarranted abuse on the part of the panel? Not really, the listeners were simply taken aback by the stunning indifference of its music, an indifference shared by so many of its over-sized brethren.

But back to the music. Tracy Chapman, in common with Lisa Stansfield, Mary Black and our other 'pop references', sounded uncharacteristically slow and heavy, the music struggling through a sea of subjective treacle. Brahms plodded in similar fashion, the *Symphony* lacking speed and attack.

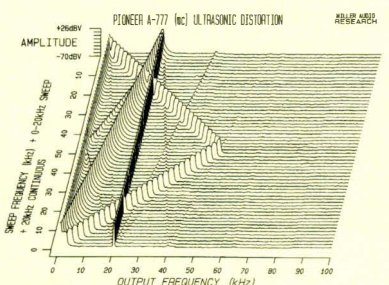
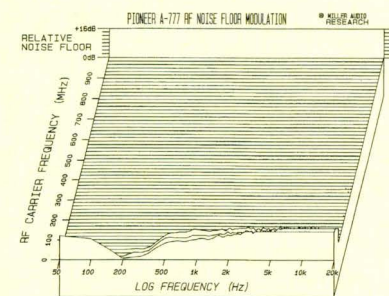
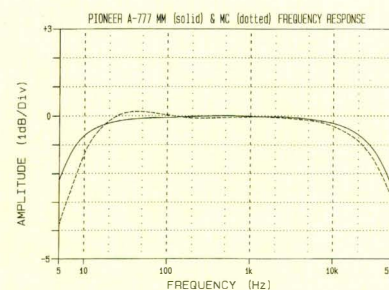
'It has weight, but is oh so ponderous' they bemoaned. Strings, by contrast, were wiry instead of vibrant and full, a reaction duplicated once the MM input was pressed into service. And when time came to spin the Marty Paich LP, our panel likened his jazz sax to a copper kettle.

## Conclusion

Informed of its price, our panel retorted with choice phrases like 'you're kidding'. And no, they didn't think it under-priced. A very disappointing product then, especially from a company like Pioneer who has already proved capable of far greater things.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output</b>			
8ohms	118.7W	120.7W	119.2W
4ohms	191.4W	198.0W	189.0W
<b>Dynamic Headroom (IHF)</b>	+1.37dB (165.5W)		
<b>Peak Current (5msec, 1% THD)</b>	22.2A		
<b>Output Impedance</b>	0.064ohm		
<b>Damping Factor</b>	125.0		
	CD/Aux	MM	MC
<b>Stereo Separation</b>			
(1kHz)	78.2dB	79.5dB	80.1dB
(20kHz)	63.2dB	63.9dB	64.2dB
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.49dB	0.48dB	0.41dB
(-60dBV)	1.10dB	1.11dB	1.02dB
<b>Total Harmonic Dist.</b>			
(0dBW)	-84.7dB	-76.7dB	-75.7dB
(2/3 power)	-87.1dB	-79.8dB	-76.2dB
<b>CCIR Intermod. Dist.</b>			
(0dBW)	-77.9dB	-88.4dB	-81.5dB
(2/3 power)	-81.1dB	-88.0dB	-85.0dB
<b>A-wtd Noise</b>			
(0dBW)	-78.6dB	-78.0dB	-72.5dB
(2/3 power)	-97.0dB	-91.0dB	-74.0dB
<b>Residual noise</b>			
(unwtd)	-78.4dBV	-78.1dBV	-78.1dBV
<b>Input Sensitivity</b>			
(for 0dBW)	16.7mV	289µV	21.9µV
(for full output)	185.1mV	3.17mV	241µV
<b>Disc Overload</b>			
(1kHz)		241.1mV	18.6mV
(20kHz)		751.6mV	58.8mV
(50kHz)		715.5mV	68.9mV
<b>Tape Output Impedance</b>	13.89V (disc) / 2.54kohm		
<b>Input loading</b>	70kohm/2.5nF 55kohm/250pF 103ohm		
<b>DC offset, left/right</b>	-42.5mV/-43.9mV		
<b>Retail Price</b>	£400		





# Rotel RC-980BX/RB-980BX

Gamepath, 25 Heathfield, Stacey Bushes, Milton Keynes MK12 6HR.  
Tel: (0908) 317 707



There comes a time in every enthusiast's life when the craving for a pre/power combination cannot be ignored. The yearning for greater flexibility, for the advantage of short speaker leads and all-round improved performance are potent incentives. But it's the primordial lust for speaker-cremating power that will switch our rabid enthusiast onto this top pre/power combo from Rotel!

Superficially, the RC-980BX preamp and RB-980BX power amp look little different from the '960BX combination we reviewed in issue 104. So why does the RC-980BX cost an extra £125, especially as it's bereft of Rotel's usual bass/treble tone controls?

Quality is the key. Quality of design and choice of components. Take the screened toroidal mains transformer and Nichicon 'Great Supply' reservoir caps, for example, plus the two pairs of regulators feeding both the MM/MC phono and line stages. Even the Rubicon BGF and Panasonic HF regulator electrolytics have been chosen 'by ear'.

Yet the design of the disc stage follows the pattern I've already described in more detail on page 73 in the review of the RA-940BX. Only here Rotel has exchanged its cartridge-loading and HF equalisation caps for superior Wima polypropylene's. The line stage is all brand spanking new, however. Out go the Signetics and in come a pair of Analogue Devices AD711 op-amps, all decoupled with tasty BGF and polypropylene capacitors.

The RB-980BX is equally distinct. For this beastly Rotel has drafted-in Michi-style circuitry from the dual-differential input to the

banks of complementary Sanken power transistors. It's what Rotel calls its push-pull 'Balanced Design Concept', nice idea, yet ditching the ever-reliable Sanyo transistors might well have been a fatal mistake.

Otherwise the RB-980BX is a model of robust engineering. There's a single mains toroid but the amp is dual-mono from here onwards, including dual rectifiers and two pairs of slit-foil 10,000µF electrolytics. A true star-earth layout with reinforced track links rather than internal wiring also marks a departure from previous designs.

## Lab report

Tipping the scales at 143W into 8ohm and 250W into 4ohm (a +2.4dB increase), Rotel's RB-980BX just nudges ahead of Heybrook's *Signature* in the power stakes. It also has a 'stiffer' power supply, the improved regulation holding up very well into low impedances but restricting dynamic gains to just +0.86dB. Current-wise, this is the first amp I've measured to bust the 30A barrier, though Heybrook and Sumo (issue 80) have come pretty close!

The output impedance is a fabulous 0.005ohm (20Hz) while distortion is typically quite low (better than 0.006 per cent). In fact the 3D plot looks very similar to that obtained with the RB-960BX (issue 104). The RC-980BX preamp, by contrast, is as clean as a whistle, registering an incredible 0.00033 per cent at 1kHz via the CD input.

Figures for noise, especially the residual hum, are equally impressive on both pre and power amps while the latter is remarkably free of RF IMD. Remarkably free, that is, for

a Rotel power amp which traditionally shows great clusters of RF resonances. Is this a reflection of the new Sanken output stage, the Wima/BGF input caps or the Michi topology as a whole?

The RC-980BX has fewer surprises, even the MM/MC response matches that of other 900BX amps with an extended -3dB point of 3.5Hz. Localised input selection keeps stereo separation at a wide 87-91dB (1kHz) and 66-67dB (20kHz) while the close-tolerance volume pot holds its channel balance to within 1dB over a full 60dB range. The line/disc input sensitivities, +30.8dB headroom (MM) and 47kohm/100ohm input loading are equally predictable, textbook results.

## Sound quality

Here was one pre/power combination that, for a variety of reasons, did not mark a significant improvement over our better integrated amplifiers. Indeed the HK6150 and the NVA AP20 were both voted ahead for the sheer department and involvement of their sound. Moth's combination simply left it for dust, despite the Rotel having a massive power advantage.

This it uses to develop a grand sense of scale, a 'big all-round sound'. Yet this is a thin sound, thin not in balance but in quality, refinement and detail. Thin in a way that provoked our listeners to describe it as 'a large cloud of music with little substance to back it up'.

Its bass, by way of example, is certainly very full but rather emphatic, introducing an annoying persistence all through Tracy Chapman's CD. Each note from the bass



## TEST RESULTS

guitar hung over-long, a droning quality that started to mask both her voice and other accompanying instruments. One listener likened the effect to a 'room boom'.

Not all was doom and gloom however, for its generous and open presentation maintained a fine sense of space around the saxophones, clarinet and piano from our jazz CD. A pity then that its soft imaging made it difficult to distinguish the 'physical' presence of one instrument from another. So tonal colours were clear enough but the stereo effect was not.

Switching to vinyl was no less disappointing an experience for here the combo was criticised for its remorseless presentation. The music simply 'came at us', they complained, led by a forward midband and lacking the sort of refinement we'd come to expect from a Rotel amplifier. Quite frankly, those listeners who customarily recognise a Rotel at 50 paces were baffled to learn of its origin.

For instance, there was a glare, a sandiness about Rachmaninov's percussion and strings that we'd never heard with any previous Rotel amp. Normally they'd sound so very quiet, smooth and refined while sustaining a typically exuberant string tone. Here, once again, the magic was sadly diluted.

### Conclusion

Lashings of power then, at what must seem a very reasonable price. I've certainly no argument with that, indeed I'll remind you that by bridging the power amp you can create a 350-400W monoblock monster! It's just a pity that the trend towards more sensitive speakers obviates the need for such a surfeit of watts.

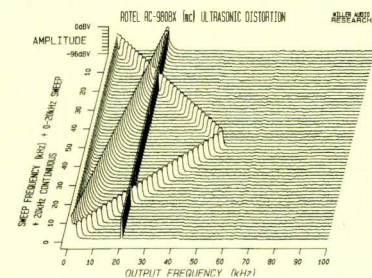
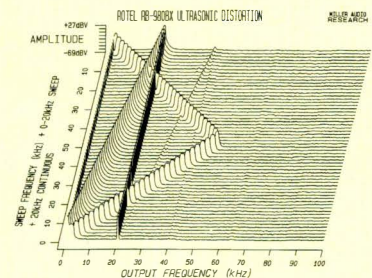
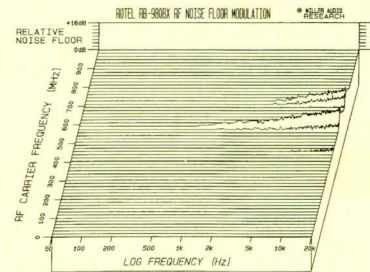
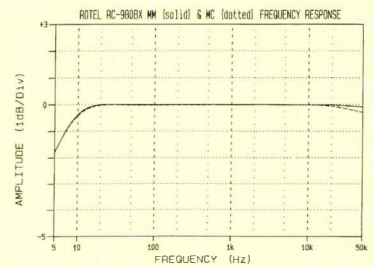
But it is their indifferent subjective performance that, likely as not, will prove the biggest stumbling block. Rated at little more than 'middling', this '980BX combo is a genuine disappointment: so much potential yet so sparsely realised.

### Preamplifier: Rotel RC-980BX

Aux/CD	MM	MC
<b>Stereo separation:</b>		
(20Hz)	>95dB	89.9dB
(1kHz)	91.3dB	87.3dB
(20kHz)	67.0dB	65.8dB
<b>Channel Balance @ 1kHz:</b>		
(0dBV)	0.01dB	0.03dB
(-20dBV)	0.16dB	0.18dB
(-60dBV)	0.90dB	0.93dB
<b>Total Harmonic Dist @ 0dBV:</b>		
(1kHz)	-109.5dB	-104.8dB
(20kHz)	-92.8dB	-94.7dB
<b>CCIR Intermod. Dist. -103.5dB</b>	-85.5dB	-80.6dB
<b>A-wtd Noise</b>		
(20Hz-20kHz)	-96.6dB	-80.3dB
<b>Residual noise</b>		
(unwtd)	-95.4dBV	-95.6dBV
<b>Input Sensitivity</b>		
(for 0dBV)	148.3mV	211µV
<b>Disc overload:</b>		
(1kHz)	172.5mV	16.0mV
(20kHz)	1600mV	150.1mV
(50kHz)	1753mV	165.7mV
<b>Input Loading</b>	46kohm/60pF	47kohm/120pF
<b>Preamp Output/Impedance</b>	11.18V (disc) /	
		106.9ohm
<b>DC Offset, L/R</b>		None
<b>Retail Price</b>		£275

### Power amplifier: Rotel RB-980BX

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	134.9W	143.2W	142.3W
4ohms	230.6W	249.6W	252.0W
<b>Dynamic Headroom (IHF)</b>	+0.86dB (174.4W)		
<b>Peak Current (5msec, 1% THD)</b>	+32.6A (!)		
<b>Output Impedance</b>	0.0051ohm	0.0050ohm	0.010ohm
<b>Damping Factor</b>	1561.8	1613.9	785.6
<b>Stereo Separation</b>			
(0dBW)	130.8dB	104.4dB	79.4dB
<b>Total Harmonic Dist.</b>			
(0dBW)	-85.4dB	-93.9dB	-85.1dB
(2/3 power)	-85.3dB	-102.4dB	-84.0dB
<b>CCIR Intermod. Distortion</b>			
(0dBW)			-90.6dB
(2/3 power)			-96.8dB
<b>A-wtd Noise</b>			
(20Hz-20kHz) 0dBW			-99.9dB
(20Hz-20kHz) 2/3 power			-118.0dB
<b>Residual noise</b>			
(unwtd)			-87.2dBV
<b>Input Sensitivity</b>			
(for 0dBW)			88.3mV
(for full output)			1065mV
<b>Input loading</b>			33.3kohm/120pF
<b>DC offset, left/right</b>			+9.3mV/-13.5mV
<b>Retail Price</b>			£400





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DM600	149.99	15 metres Audio Quest solid core flat cable rec £1.99 mtr
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DM630	599.99	AIWA ADF410 cassette deck
DM640	799.99	Pioneer F449L tuner
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MS310	79.99	—
MS5.10	119.99	15 metres Audio Quest solid core flat cable rec £1.99 mtr
MS5.20	149.99	20 metres Audio Quest solid core flat cable rec £1.99 mtr
MS5.30	199.99	Sennheiser HD480II headphones
MS5.40	299.99	AIWA XT003 tuner
MS5.50	399.99	TEAC CDP200 CD
CLASSIC 20	399.99	Beyer DT990 headphones
CLASSIC 40	599.99	Pioneer A300 amplifier

**MISSION**

760i	119.99	15 metres Audio Quest solid core flat cable rec £1.99 mtr
761	149.99	15 metres QED 200 flat cable rec £1.99 mtr
761i	169.99	Sennheiser HD450II headphones
762	229.99	Sennheiser HD480II headphones
763	349.99	TEAC V510 cassette deck
764 ex demo	299.99	—
764i	449.99	Beyer DT990 headphones
765i	599.99	AIWA ADF410 cassette deck

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410	99.99	—
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MODEL	PRICE	FREE GIFT GIVEAWAY
<b>AIWA</b>		
ADF410	99.99	12 TDK SA90 cassettes
ADF810	199.99	Sennheiser HD40II headphones

**PIONEER**

CT676	249.99	Sennheiser HD480 Classic headphones
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**SONY**

TCK420	99.99	—
TCK520	179.99	Sennheiser HD450II headphones
TCK570	169.99	—
TCK677ES	249.99	Sennheiser HD480 Classic headphones
TCK870ES	349.99	Sennheiser HD520II headphones
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TCWR870	299.99	Sennheiser HD480 Classic headphones

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V5000	299.99	TEAC TX3000 tuner
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**AMPLIFIERS**

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<b>AURA/B&amp;W</b>		
VA40	109.99	—
<b>PIONEER</b>		
A300	159.99	Sennheiser HD450II headphones
A400	239.99	Sennheiser HD480 Classic headphones
A676	279.99	Sennheiser HD480 Classic headphones
<b>SONY</b>		
TAF170	84.99	—
TAF420	169.99	—
TAF440	199.99	Sennheiser HD450II headphones
TAF540	249.99	Sennheiser HD480II headphones
TAF670ES	399.99	Mission 760i loudspeakers
TAF770ES	599.99	Mission 761 loudspeakers
TAF730ES	299.99	—
TAAV670	649.99	Mission 760i loudspeakers
TAE1000ESD	1299.99	2x pairs of B&W solid loudspeakers
2x TAN55ES	—	—
Surround kit	—	—

**TEAC**

AX1000	99.99	—
AX5000	229.99	Sennheiser HD480 Classic headphones

**TECHNICS**

SUZ220	89.99	—
SUZ320	125.99	—
SUVX500	147.99	—
SUVX600	174.99	—
SUVX700	219.99	—
SUVX800	419.99	—

**TURNTABLES**

MODEL	PRICE	FREE GIFT GIVEAWAY
<b>TECHNICS</b>		
SLBD20	85.99	—
SLBD22	99.99	—
SLDD33	112.99	—
SLOD33	139.99	—
SL1210 MkII	289.99	—

**TUNERS**

MODEL	PRICE	FREE GIFT GIVEAWAY
<b>AIWA</b>		
XT003	79.99	—
<b>PIONEER</b>		
F449L	149.99	Sennheiser HD480 Classic headphones
F757	279.99	Pioneer A300 amplifier

**SONY**

STS170	84.99	—
STS370	149.99	QED Pig Gold phono-plug lead
STS570ES	219.99	Sennheiser HD480II headphones
STS770ES	299.99	Sennheiser HD480 Classic headphones

**TEAC**

TX3000	69.99	—
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**TECHNICS**

STS610	89.99	—
STG470	119.99	—
STG570	155.99	—
STG70	199.99	—
STG90	279.99	—

**CD PLAYERS**

MODEL	PRICE	FREE GIFT GIVEAWAY
<b>AIWA</b>		
XC700	179.99	£30.00 worth of CD's of your choice
<b>PIONEER</b>		
PD7700	249.99	Sennheiser HD480 Classic headphones
PD8700	299.99	Mission 760i loudspeakers
PD9700	399.99	Pioneer A300 amplifier

**SONY**

CDP491	115.99	—
CDP397	139.99	£20 worth of CD's of your choice
CDP497	159.99	£25 worth of CD's of your choice
CDP597	179.99	£30 worth of CD's of your choice
CDP797	199.99	£30 worth of CD's of your choice
CDPX222ES	299.99	Sennheiser HD480 Classic headphones
CDPX339ES	449.99	Sony WMF2078 sports Walkman/radio rec £122.99

**TEAC**

CDP200	99.99	—
CDP3100	119.99	—
CDP4500	249.99	Sennheiser HD480 Classic headphones
P500	649.99	With D500 together. 14" Sony colour TV
D500	329.99	See P500

**TECHNICS**

SLPG400	154.99	—
SLPG500	174.99	—
SLPG320	129.99	—
SLPG420	159.99	£15 worth of CD's of your choice
SLPG520	199.99	£20 worth of CD's of your choice
SLPS620	229.99	£30 worth of CD's of your choice
SLPS700	229.99	—
SLPS900	299.99	—

**MISSION**

DAD5	299.99	Sennheiser HD480 Classic headphones
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**SYSTEMS**

AMP	CD	SPKRS	PRICE	FREE GIFT GIVEAWAY
AURA A40	TEAC CDP200	Wharfedale Diamond IV	299.99	Speaker cable interconnects
Pioneer A300	Pioneer PD8700	Mission 760i	399.99	Speaker cable interconnects
Pioneer A400	Pioneer PD9700	Mission 760i	499.99	Speaker cable interconnects
Sony TAF540	Pioneer PD9700	B&W DM610	599.99	Speaker cable interconnects

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# Rotel RA-940BX

Gamepath, 25 Heathfield, Stacey Bushes, Milton Keynes MK12 6HR. Tel: (0908) 317 707



For nigh-on a decade, Rotel had kept its 800 Series amplifiers ticking over with steady but often rather subtle improvements. But now, with the introduction of the 900 Series, we are at last witnessing fundamental changes to their topology and technical performance.

From the outside then, the RA-940BX shares the same satin-black livery, elegant centralised volume control and new bass/treble tone controls that are a feature of the new range.

Importantly, Rotel has retained the ever-green Sanyo-based power amp but, here at least, you'll find that all associated high-current areas are reinforced with copper 'bus-bars' that stand proud of the PCB. Judging by the size of its toroidal mains transformer and slit-foil electrolytics, I'd say this was a wise move!

Otherwise Rotel has opted for a new MM/MC disc input culled, by all accounts, from the ashes of a Michi preamplifier. Two transistors and a bi-FET op-amp form the initial MM/MC gain stage with part-passive, part-active RIAA equalisation being performed around the traditional Signetics chip.

## Lab report

These TL071 bi-FETs are certainly a departure for Rotel as is the revised MM/MC RIAA curve which, in common with other 900 Series BX amps, shuns the IEC-recommended bass cut for a more extended response. The -3dB point is now 3.25Hz instead of 10Hz.

Compared to the RA-840BX4 (issue 80) there's virtually no change in THD (typically 0.01 per cent at 1W rising to 0.028 per cent) though the A-wtd S/N ratio has witnessed a great improvement on all save the MM input. Here noise has increased from -84.7dB to -79.8dB.

Meanwhile the amp has become very much more susceptible to RF interference (see RF IMD plot). It might also seem more

sensitive (just 184mV for full output via CD) though this is simply a reflection of the 940's lower power rating, achieving 53W/88W instead of the 840's 63W/102W. The reservoir of supporting current is just as substantial, however, at 17.5A!

## Sound quality

This was one of a select group of amplifiers chosen as a 'common thread' across many days of listening. But far from acting as a reference point, the RA-940BX simply prompted a divergence of opinion from one day to the next. Other amps, such as the HK6150, inspired a wholly consistent reaction I hasten to add.

Here's the RA-940BX at its best: From the word go this group of listeners were, as they put it, 'listening'. The amp generated a marvellous sense of involvement, exploring the scale of Brahms' *Symphony* and releasing the full drama of the piece without blowing it out of proportion.

Our classical selection was rarely handled with greater poise, whether via CD or vinyl. Yet the likes of Tracy Chapman or Lisa Stansfield could seem a tad lightweight - 'great vocal diction and subtle detailing but no raunchy bass', the panel bemoaned.

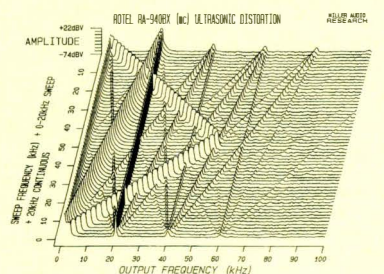
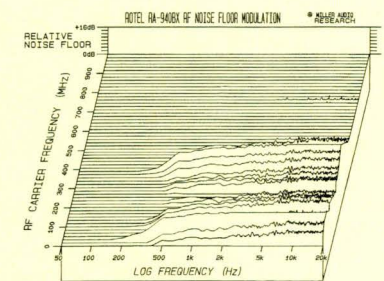
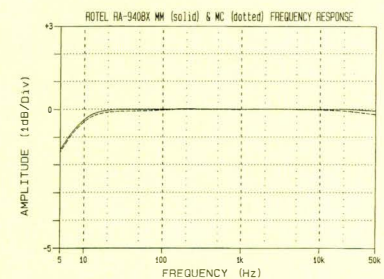
Two further groups of listeners had other ideas: 'quite a lot of grumbly bass' they began 'but also rather shouty and congested when the entire string section gets going'. Our pop CDs sounded much fuller but also very controlled on this occasion, almost as if the music were being 'trivialised'.

## Conclusion

Once again we find Rotel sparking more than a hint of controversy. So the RA-940BX is either 'very vivid, involving and musical' or 'slightly recessed, flat and lacking dynamics'. Take your pick. I can only confirm this variation in its performance, a consequence of random RF IMD perhaps? Let's recommend it and pass the buck to you!

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	49.2W	53.2W	50.9W
4ohms	79.2W	88.4W	85.6W
<b>Dynamic Headroom (IHF)</b>	+0.67dB (62.0W)		
<b>Peak Current (5msec, 1% THD)</b>	17.5A		
<b>Output Impedance</b>	0.039ohm		
<b>Damping Factor</b>	201.6		
	CD/Aux	MM	MC
<b>Stereo Separation</b>			
(1kHz)	79.1dB	79.1dB	78.7dB
(20kHz)	55.2dB	54.8dB	54.2dB
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.30dB	0.31dB	0.35dB
(-60dBV)	4.27dB	4.28dB	4.33dB
<b>Total Harmonic Dist.</b>			
(0dBV)	-80.3dB	-80.1dB	-80.4dB
(2/3 power)	-70.9dB	-70.9dB	-70.7dB
<b>CCIR Intermod. Dist.</b>			
(0dBV)	-77.5dB	-75.3dB	-74.8dB
(2/3 power)	-71.4dB	-71.0dB	-70.7dB
<b>A-wtd Noise</b>			
(0dBV)	-80.4dB	-77.5dB	-74.4dB
(2/3 power)	-95.8dB	-79.8dB	-75.8dB
<b>Residual noise</b>			
(unwtd)	-64.8dBV	-64.7dBV	-64.7dBV
<b>Input Sensitivity</b>			
(for 0dBV)	26.4mV	404µV	37.4µV
(for full output)	184.4mV	2.97mV	274µV
<b>Disc Overload</b>			
(1kHz)		174.3mV	16.0mV
(20kHz)		1622mV	141mV
(50kHz)		1849mV	166mV
<b>Tap Output/Impedance</b>	11.36V (disc) / 1.14kohm		
<b>Input loading</b>	48kohm/100pF 47kohm/120pF 99.7ohm		
<b>DC offset, left/right</b>	-31.8mV/-24.9mV		
<b>Retail Price</b>	£250		





# Sony TA-F670ES

Sony UK Ltd, Sony House, South Street, Staines, Middlesex TW18 4PF. Tel: (0784) 467 000



Those of you looking for reliable, heavyweight engineering will always find a haven with Sony. So it is with the *TA-F670ES*: a straightforward, no-nonsense beast of an amp. The internal circuitry, including Sony's low-noise MC headamp, is almost entirely discrete and features such backbones of technology as 'Super Legato Linear' (SLL) and 'Spontaneous Twin Drive' (STD).

STD is a genuinely valuable technique whereby both voltage and output (power) stages are fed from wholly independent power supplies. This limits any unwanted coupling that might otherwise occur between the high-current Sanken power amp and the lower-level phono and NEC-based voltage amps.

The merit of SLL, by contrast, is less certain even if the idea has proved very popular with any number of mass-market offerings. It involves the manipulation of output bias current to avoid crossover distortion at both high frequencies and low levels. I'm rather more convinced by Sony's back-to-basics theme, like the localised input switching for tape, line and MM/MC phono sources, the re-positioned volume control and relay-fired speaker selection.

Hidden beneath a retractable flap you've extra features like tone and balance control, stereo/mono mode, subsonic filtering and a 'direct' input. All of which ensures the *TA-F670ES* is flexible but not daunting.

## Lab report

It is also stunningly powerful, capable of sustaining some 205W into 4ohm with a healthy 22.5A of speaker-cooking current in reserve. The extended disc response will also give some woofers a fright. Its MM input, for example, has a +0.9dB peak at 0.5Hz followed by a sharp -3dB roll-off to 0.3Hz!

The 3D plot confirms its low (typically 0.0016 per cent) distortion. However, and

checked and double-checked this, for some unknown reason distortion increases with level via the MM input (and quite markedly so, from 0.0011 per cent at 1W to 0.017 per cent at two-thirds power).

Otherwise the low -92dB A-wtd noise via MM disc, the moderate 3.7mV sensitivity and +29.2dB headroom are quite unaffected. The MC stage might benefit from tickling-up, however, as a +25.5dB margin is hardly lavish.

## Sound quality

A fast, clean and sharp-sounding amplifier, by all accounts, though one that takes a little time to limber-up. Once thoroughly warmed-through it still lacks the palpable weight of Rotel's *RA-940BX*, for example, yet easily succeeds in teasing subtle strands from within the music. The gentle brushwork from Tracy Chapman's CD sounded especially crisp without being weighed down by the bass guitar, a 'peach' they declared.

Meanwhile the strings from Brahms's *Symphony* had body, depth and definition even if the momentum of the orchestra as a whole was a little suspect. Nevertheless, as our panel was quick to add, the music was still wonderfully open, detailed and free of muddling.

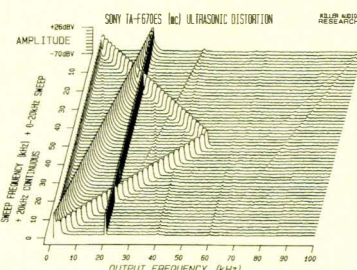
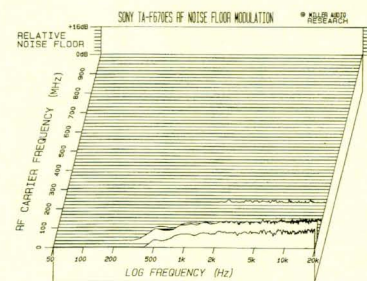
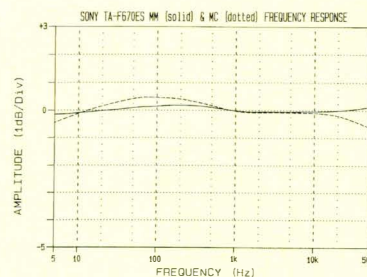
Hopping from CD to MM brought an equally cheerful reaction, its clear, fresh and light sound less affected by any leanness. Neither, they countered, was it as 'rosy' or coloured as the Rotel! Instead the amp cultivated a decent sense of space, making room for the delightfully rasping quality of woodwind and strings from our Rachmaninov LP.

## Conclusion

A fine result for what is essentially an off-the-shelf Sony amplifier: nothing fancy but it puts up a damn good show. Good enough, in fact, to come within a silicon wafer of formal recommendation.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	133.8W	132.5W	130.1W
4ohms	205.9W	204.5W	197.4W
<b>Dynamic Headroom (IHF) +1.16dB (173.2W)</b>			
<b>Peak Current (5msec, 1% THD) 22.5A</b>			
<b>Output Impedance 0.076ohm</b>			
<b>Damping Factor 105.9</b>			
	CD/Aux	MM	MC
<b>Stereo Separation</b>			
(1kHz)	70.7dB	69.5dB	68.4dB
(20kHz)	46.7dB	44.8dB	43.7dB
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.91dB	0.97dB	1.03dB
(-60dBV)	1.09dB	1.15dB	1.22dB
<b>Total Harmonic Dist.</b>			
(0dBW)	-99.3dB	-99.5dB	-95.4dB
(2/3 power)	-101.8dB	-75.5dB	-97.0dB
<b>CCIR Intermod. Dist.</b>			
(0dBW)	-98.6dB	-78.3dB	-77.6dB
(2/3 power)	-101.6dB	-78.7dB	-77.5dB
<b>A-wtd Noise</b>			
(0dBW)	-82.3dB	-80.6dB	-75.7dB
(2/3 power)	-98.8dB	-91.6dB	-77.4dB
<b>Residual noise (unwtd)</b>			
	-76.3dBV	-76.4dBV	-76.2dBV
<b>Input Sensitivity</b>			
(for 0dBW)	18.3mV	325µV	21.2µV
(for full output)	211.5mV	3.71mV	242µV
<b>Disc Overload</b>			
(1kHz)		144.0mV	9.4mV
(20kHz)		1390mV	95.6mV
(50kHz)		1995mV	150.1mV
<b>Tape Output/Impedance</b>		8.25V (disc) / 1.95kohm	
<b>Input loading</b>		10kohm/3.3nF	44kohm/200pF
<b>DC offset, left/right</b>			+11.5mV/-1.2mV
<b>Retail Price</b>			£400





# Sony TA-F770ES

Sony UK Ltd, Sony House, South Street, Staines, Middlesex TW18 4PF. Tel: (0784) 467 000



This 44lb mammoth of an amplifier is more than a beefed-up *TA-F670ES*. Much more. Sure enough it has the same pull-down flap to conceal various peripheral facilities like tone, balance, speaker switching, rec-out selection, MM/MC cartridge loading and direct or source input modes. It even features Spontaneous Twin Drive and Super Legato Linear circuit techniques. And it's built onto a traditional mineral-loaded Gibraltar chassis.

Otherwise the *TA-F770ES* is a unique proposition!

For a start it's compatible with Sony's *RM-S703* system remote. This gives you armchair access to the motorised volume control and the three tape, three line and phono input selectors. Instead of opting for pure CMOS-switching for input selection, Sony uses the logic to control a high-quality motorised selector that's mounted hard up against the rear panel. Now that's tasty!

Ancillary connections, like the adaptor loop (for a graphic or surround sound decoder), the direct input and pre-out facilities must be addressed manually, by the way. Meanwhile Sony has chosen a new breed of high-speed MOSFET power transistors for the main output stage, a feature the *TA-F770ES* has in common with an increasing number of top-line Japanese amplifiers.

Liberal biasing also means the beast will run fairly warm, though I can't imagine anyone shoe-horning the *'770ES* into a poorly ventilated rack system!

## Lab report

Powerwise this is no sluggard, almost matching the bipolar *TA-F670ES* watt-for-watt across the audioband. But the *TA-F770ES* has a slender advantage, its massive OFC-wound mains transformer and 18,000µF 'beer can' electrolytics wielding some 23.8A of current at only one per cent distortion. Sufficient to thrash any 'difficult' speaker into line.

Clearly, the *'770ES* has an, er, unusual MC response even though the MM trace (-3dB at 1.6Hz) mimics that of the *'670ES*. At two-thirds output, however, distortion is much lower, just 0.00059 per cent via MM. Yet the 3D plot reveals how harmonic and IM distortion both pick-up at very high frequencies, note the clear second and third harmonics at 40kHz and 60kHz.

Oh yes, Sony's 3ohm and 40ohm MC options don't refer to the load, by the way, but actually refer to the source impedance of the cartridge itself. The practical load values are 100ohm and 1kohm respectively.

## Sound quality

What the *TA-F670ES* might lose in impact is more than redressed by the droning bass of its bigger brother. Prompting little but antipathy, the *'770ES* was described by our listeners as 'a bag of marshmallows and nails'.

An amplifier that combines a grumbling bass with a splashy and often very sibilant top end. This is a 'big sounding' amplifier yet one that lacks any true sense of dynamics or direction, the power is there but it's aimless.

We were equally uninspired by the sound of our vinyl selection. Here there was an obvious accentuation of surface noise that tied-in with a similar increase in vocal sibilance.

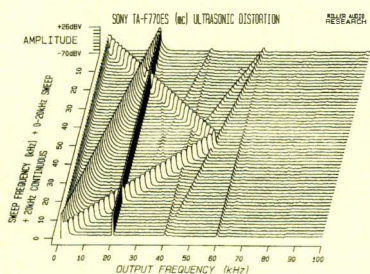
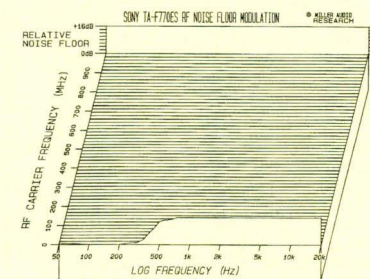
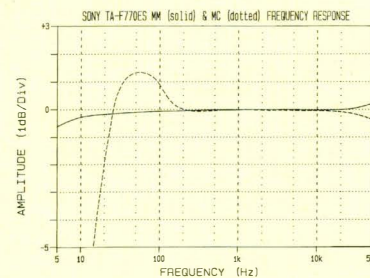
Our jazz selection was bland rather than aggressive, 'difficult to hear anything but the lead instruments' muttered one listener before he nodded off.

## Conclusion

For a £200 premium over the *TA-F670ES*, this button-happy behemoth offers little significant gain in power while simultaneously slipping a few notches in sound quality. In other words, too big for its own good and a poor ambassador for the art of hi-tech amplifier design.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output</b>			
8ohms	126.5W	125.3W	123.8W
4ohms	208.4W	203.5W	200.2W
<b>Dynamic Headroom (IHF)</b>	+1.09dB (161.1W)		
<b>Peak Current (5msec, 1% THD)</b>	23.8A		
<b>Output Impedance</b>	0.097ohm		
<b>Damping Factor</b>	82.9		
	<b>CD/Aux</b>	<b>MM</b>	<b>MC</b>
<b>Stereo Separation</b>			
(1kHz)	75.8dB	75.3dB	75.5dB
(20kHz)	50.1dB	50.3dB	50.5dB
<b>Channel Balance</b>			
(1kHz, -20dBV)	0.40dB	0.36dB	0.35dB
(-60dBV)	0.29dB	0.27dB	0.27dB
<b>Total Harmonic Dist.</b>			
(0dBV)	-98.9dB	-97.8dB	-96.3dB
(2/3 power)	-105.4dB	-104.6dB	-95.8dB
<b>CCIR Intermod. Dist.</b>			
(0dBV)	-99.4dB	-81.9dB	-79.5dB
(2/3 power)	-105.8dB	-81.5dB	-79.9dB
<b>A-wtd Noise</b>			
(0dBV)	-82.5dB	-82.3dB	-75.6dB
(2/3 power)	-98.1dB	-92.0dB	-76.3dB
<b>Residual noise</b>			
(unwtd)	-72.1dBV	-72.0dBV	-71.9dBV
<b>Input Sensitivity</b>			
(for 0dBV)	15.3mV	252µV	16.3µV
(for full output)	170.3mV	2.79mV	167µV
<b>Disc Overload</b>			
(1kHz)		158.8mV	10.3mV
(20kHz)		1247mV	81.9mV
(50kHz)		1395mV	103.5mV
<b>Tape Output/Impedance</b>	9.77V (disc) / 1.24kohm		
<b>Input loading</b>	21kohm/220pF 47kohm/360pF 960 & 99ohm		
<b>DC offset, left/right</b>	+6.9mV/+3.6mV		
<b>Retail Price</b>	£600		





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# Technics SU-VZ220

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



Our last amplifiers issue saw Technics doing rather well with the £200 *SU-VX600*. Unfortunately, although the *SU-VZ220* is only half its price, it's rather less than half the amplifier. Let me explain.

You see the *SU-VX600* is something of an experiment to extract the fullest potential from Technics' proprietary Class AA amp system. It's similar to Quad's *405* and *606* in many ways, isolating a very linear voltage amp from the speaker using a bridge network while separate current dumpers maintain the power. But at just £100, good 'ol Class AA has given way to an altogether more mundane 'New Class A' hybrid IC.

From the outside the bronze-coloured alloy fascia looks busy enough. You've a choice of three line, tape and MM phono inputs, mono/stereo mode, loudness and bass/treble tone controls. But only the latter are avoided by recourse to 'Source Direct'. Round the back you'll find double sets of speaker binding posts, though these are positioned inconveniently close to the 240V mains inlet.

Meanwhile the insides are an object lesson in cost-over-engineering. The phono equalisation circuit and support components for the integrated power amp each occupy no more than two square inches. And there are just two op-amps, one for the RIAA section, the other for the tone controls.

## Lab report

At this knock-down price you cannot expect localised input selection or relay speaker switching. So long track lengths inevitably mean a poor-ish 66-67dB channel separation at 1kHz plus a high 0.17ohm output impedance. Neither is the thought of 9.2A surging down a copper PCB track one I'd entertain for too long!

Still, the *SU-VZ220* meets its 30W specification with good grace, while filter networks on both its inputs and outputs ensure not a whiff of RF IMD is recorded. This

doesn't mean RF IMD is not occurring, just that we can't see it! The other 3D plot highlights the preponderance of simple second and third order distortion mechanisms emanating from the hybrid power amp, rather than the MM disc stage.

The latter is a textbook design with plenty of headroom (+31.9dB), low noise (-79dB, A-wtd) and an appropriate 3.1mV input sensitivity. The MM response might look a trifle 'wobbly' but it's sensibly tailored at both frequency extremes.

## Sound quality

A strange one, the listeners muttered, for with Brahms's *Symphony* it had sounded thick and syrupy and then, with our pop selection, it had reverted to a thin, splashy and relentless style of presentation.

Listening to Tracy Chapman was a peculiar experience, there was plenty of attack and, superficially, plenty of detail, yet it was virtually impossible to understand a word she was saying! Weird, especially as the amp was neither obviously compressed nor muddled, individual instruments just seemed to tumble over one another in the struggle to make themselves heard.

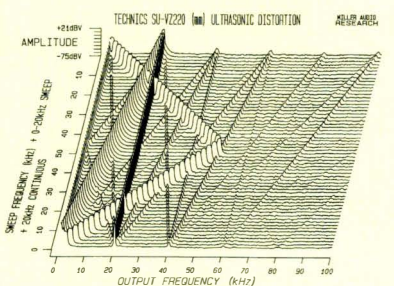
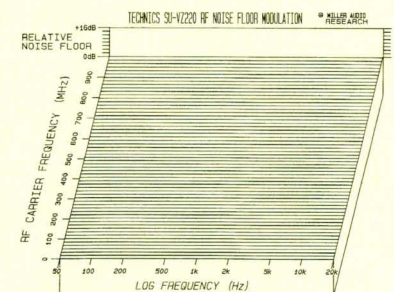
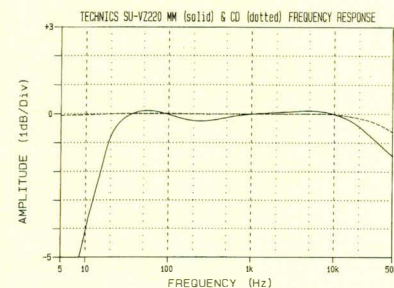
Lisa Stansfield was more articulate but then her CD is an all-round sharper recording, a feature magnified by the *SU-VZ220* with its heavy-handed cymbals and undue emphasis of vocal sibilance. Escaping from CD to vinyl brought about a generally smoother but softer balance, one that lacked precision and fine detail even if its soundstaging was actually quite impressive. A directionless amp if ever there was one.

## Conclusion

With its up-front and sharply etched personality, the *SU-VZ220* is designed to give the impression of detail. In practice however, it's all 'edges' without the body and integration to back it up. A pocket money amp to be sure, but not the stuff of high-fidelity.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output,</b>			
8ohms	43.7W	50.4W	50.2W
4ohms	54.0W	67.2W	64.0W
<b>Dynamic Headroom (IHF)</b>	+1.06dB (64.3W)		
<b>Peak Current (5msec, 1% THD)</b>	9.2A		
<b>Output Impedance</b>	0.166ohm		
<b>Damping Factor</b>	48.1		
	<b>CD/Aux</b>	<b>MM</b>	
<b>Stereo Separation</b>			
(1kHz)		67.3dB	66.8dB
20kHz)		51.3dB	48.1dB
<b>Channel Balance</b>			
(1kHz, -20dBV)		0.24dB	0.57dB
(-60dBV)		1.52dB	1.85dB
<b>Total Harmonic Dist.</b>			
(0dBW)		-78.6dB	-78.8dB
(2/3 power)		-74.9dB	-76.1dB
<b>CCIR Intermod. Dist.</b>			
(0dBW)		-76.9dB	-76.6dB
(2/3 power)		-72.6dB	-72.2dB
<b>A-wtd Noise</b>			
(0dBW)		-80.2dB	-78.8dB
(2/3 power)		-93.4dB	-82.8dB
<b>Residual noise</b>			
(unwtd)		-72.8dBV	-72.8dBV
<b>Input Sensitivity</b>			
(for 0dBW)		24.4mV	432µV
(for full output)		174.2mV	3.07mV
<b>Disc Overload</b>			
(1kHz)			195.9mV
(20kHz)			1586mV
(50kHz)			2223mV
<b>Tape Output/Impedance</b>	10.79V (disc) / 2.017kohm		
<b>Input loading</b>	41kohm/360pF 41kohm/130pF		
<b>DC offset, left/right</b>	-10.7mV/-3.6mV		
<b>Retail Price</b>	<b>£100</b>		





# Tech Talk

In keeping with the *Choice* rationale, each of the amplifiers was auditioned under blind conditions at precisely matched listening levels, consistent between CD and phono inputs from amp to amp. Therefore any apparent change in 'loudness' is a direct consequence of changes in balance or presentation peculiar to the amplifier itself.

The equipment included a Pink Triangle *TOO/SME Series IV/vdH MC Two* (analogue) and a Teac *P-10/Deltec PDM2* combination (digital). Audio Note *AN-J* speakers were pressed into service for the group listening sessions together with Silver Sounds *16/2* cabling (although manufacturer's own-brand cables were also used if so instructed).

## Measurement Programe

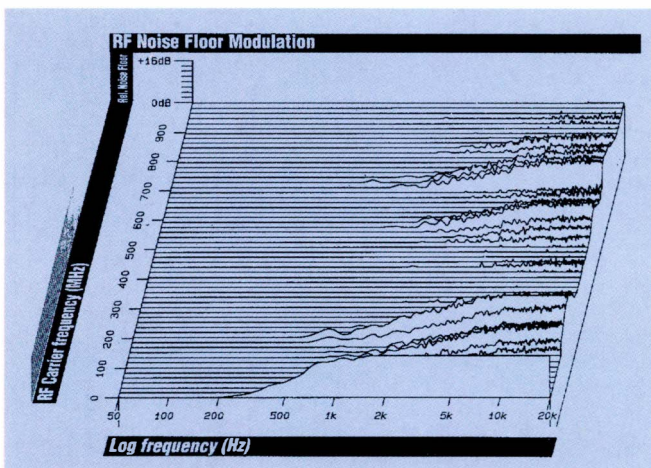
The test program includes both standard IHF A202 measurements together with more advanced techniques made available by the IEEE-controlled digital test equipment currently employed in the laboratory.

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

## Power Output, Dynamic Headroom and Peak Current

Quoted in good old fashioned Watts, this refers to the maximum output voltage of the amplifier into eight and 4ohm loads, one channel driven to one per cent THD. The IHF A202 dynamic headroom test employs a gated 1kHz signal, with 20-cycles on and 480 cycles off, and refers to a maximum of one per cent THD into an 8ohm load relative to the continuous power available into that same load.

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



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

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

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

## Broad-Band Radio Frequency Intermodulation Test

In general terms this revolutionary test — presented at an AES lecture — reveals just how sensitive an amplifier is to spurious radio frequency (RF) noise, whether introduced directly or indirectly.

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

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

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

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

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

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

The vertical or y-axis gives an indication of relative amplitude and is scaled in steps of 2dB over a



maximum range of +16dB.

Clearly, any demodulated RF noise that causes a change in the noise floor greater than 16dB will give rise to a plateau effect on the plot. This situation is clear enough on the example plot which demonstrates an amplifier's undue sensitivity to RF noise centred on bands at 140, 200, 575, 730 and 850MHz.

If an amplifier were singularly insensitivity to RF noise then this plot of relative change would appear as a series of straight, unperturbed lines.

### Ultrasonic Distortion Test

Revised some 18 months ago, this is a particularly revealing test that highlights the interaction of high and moderate-level signals in the context of harmonic and intermodulation distortions (called 'routes' in the text) caused by such mechanisms as slew-limiting or the progressive reduction of feedback, the latter revealing an increase in open-loop non-linearities.

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

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

This is one reason why I place such store in disc overload margins (which generally fall relative to the excess gain required with increasing frequency) and why such measurements are now taken as high as 50kHz. That aside, certain of these ultrasonic distortions will introduce IM products within the audio band of the amplifier - a point of particular interest with disc stages whereupon the IM routes will actually increase in level with decreasing frequency as a function of the RIAA characteristic.

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

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

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

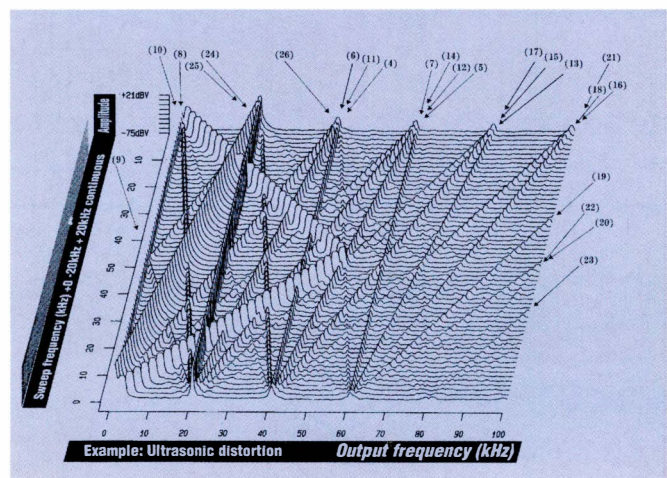
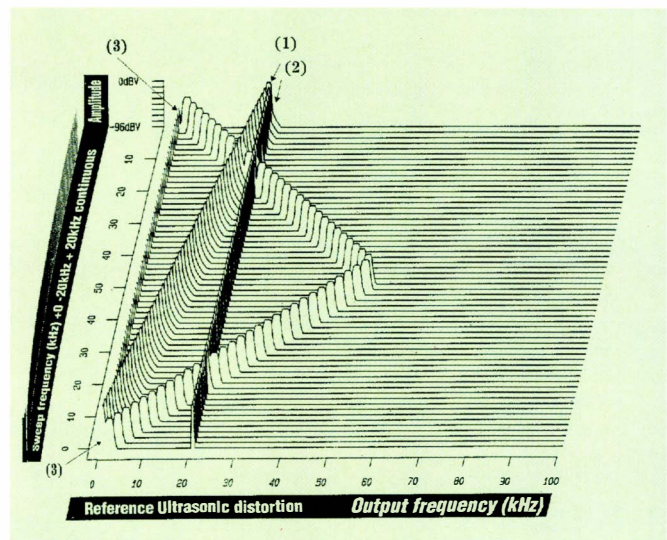
Of course there are the interactions between (3) and (1) and (2) to consider. Three summation IM routes are clearly visible:  $F_{0-50k-0} + F_{0-20k}$  (24),  $F_{0-50k-0} + F_{20k}$  (25) and  $F_{0-50k-0} + F_{0-20k} + F_{20k}$  (26)!

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

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

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

Taken together, the two plots give more insight than ever before into the potential sound quality of an amplifier.



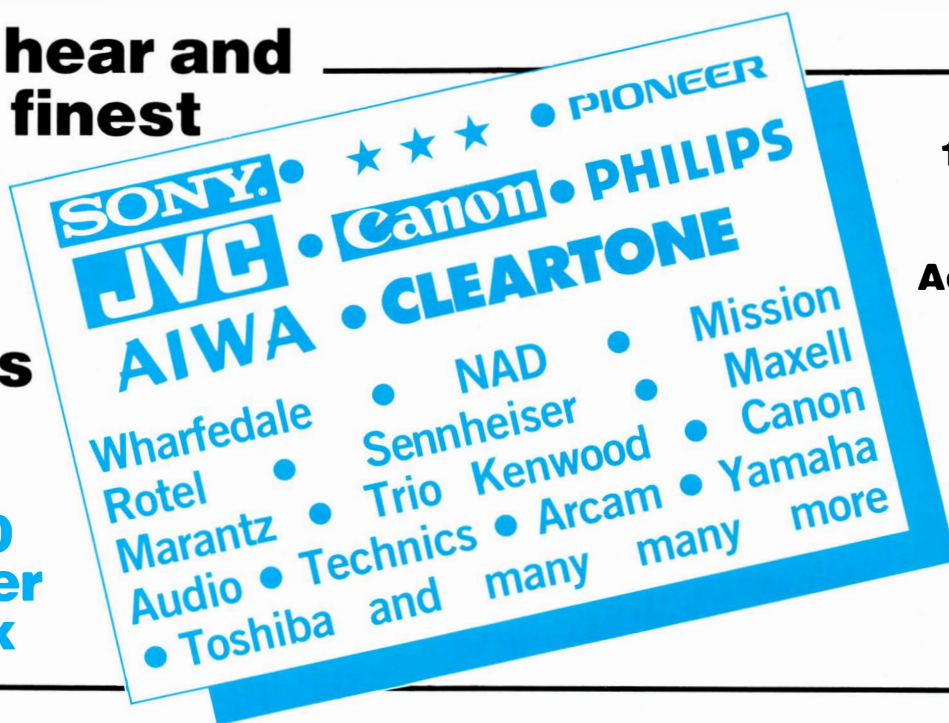


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# Conclusions, Best Buys & Recommendations

**D**ue to the sheer scope of these amplifier tests we often uncover hidden themes running beneath the surface, individual groups of amplifiers vying against one another for supremacy over very small facets of the market. And so it is here in the battle of the behemoths, that select group of immense integrations that are hoping to service a minute and declining area of the hi-fi scene.

These vast crates are traditionally festooned with a forest of facilities, many adding an on-board DAC to an already comprehensive repertoire. But just who buys these darn things? In truth it's not the beleaguered UK enthusiast but the German and US markets with their love of all things Brobdingnagian. Basically, the bigger it is and the more widgets it harbours the better. Hence the Akai AM-95, Pioneer A-676 and A-

*Which ones made the grade? Paul Miller collects his thoughts and sums up the outcome of this month's amplitude.*

777, the Sony TA-F770ES and Harman Kardon HK6850.

Amplifiers that did nothing to rouse the enthusiasm of our seasoned listeners yet will undoubtedly be welcomed with open arms by our friends abroad. And why not? After all it is the UK market that's the odd one out and, on a global scale, a drop in the teacup compared to the Continental and US scene.

Of course, just because an amp is unnecessarily over-engineered this is no reason to overlook it. Do so and you'll miss the odd treat like JVC's AX-Z1010, a huge but hardly grotesque amplifier that delivers an equally big and friendly sound, one that emphasises the drama and ebullience of the music but escapes the hard and scrappy overtones of its competitors.

Amplifiers like the new FA-930 from Philips are equally hi-tech and just as flexible, but they won't occupy several acres of carpet. This is a good buy for £200 though its sound is less charismatic than its stylised packaging. Just a very busy, detailed but clean-sounding amp that looks set to act as anchorman for the forthcoming 900 Series separates. Rotel's RA-940BX is less accommodating and also less consistent in its subjective performance. Indeed it caused our panel real problems, sounding truly magnificent one day and listless the next. So, if only for the good times, it's well worth seeking out!

By way of contrast, amps like the Aura VA-100 and NVA AP20 are minimalist in the extreme. All the engineering is biased solely in favour of sound quality - no bass/treble tone controls or even independent rec-out selection. Just input switching, a volume control and, in Aura's case, the facility for quick and easy bi-wiring. Funnily enough, both amplifiers elicited a similar reaction from our panel, each being preferred

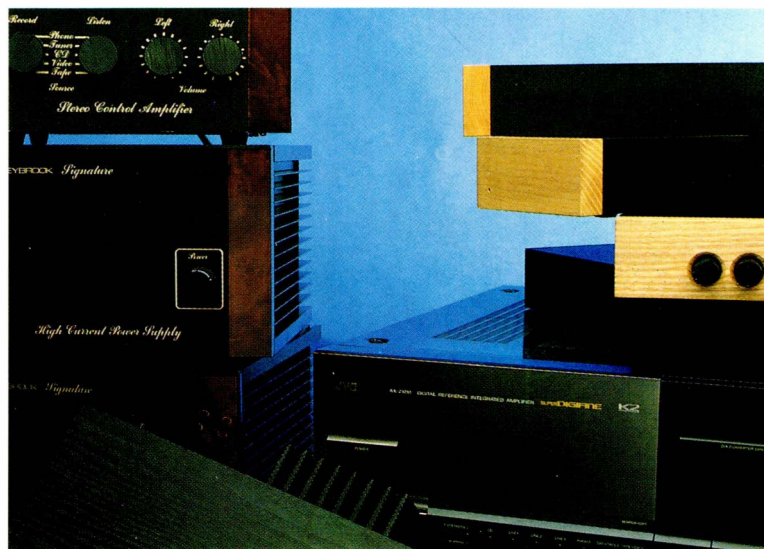
for the extra get up and go, the command and detail available from their CD inputs. Neither amp is aggravated by bright or 'difficult' recordings but neither do they compromise the freshness of subtle treble detail. Both, however, come complete with a unique set of technical foibles!

Those of our readers with de-ep pockets might care to sign-on for a set of *Signatures*. These are Heybrook's latest pre/power range, a modular system with various power amp/power supply options. And, despite leaning heavily on the unfortunate C3/P3, the *Signatures* are a cracking combination. So good in fact that our panel voted them 'the best in the test', their enthusiasm stemming from the extra clarity, the sheer depth of detail and raw emotion that was sucked from our collection of CDs and LPs.

Moth's Series 30 combination was almost as engaging via CD where its relaxed but never lazy presentation led to a rich and weighty sound with a sense of momentum and dynamics that belied its nominal 30W specification. Of course with insensitive speakers it could be a different story. Nevertheless, choose wisely and the passive controller/Series 30 power amp combo are virtually unbeatable at the price.

Talking of price I've left the best news to last. And it goes something like this: Harman Kardon has trimmed the manufacture of its HK6100, transplanted it into a new case, called it the HK6150 and gotten away with a Best Buy!

I can't find any evidence that HK has actually attempted to uprate the specification of this beer-budget amp yet, in session after session, the exciting, up-beat and thoroughly involving sound had our listeners buying for more. So it's a little rough about the edges but nothing can disguise the youthful enthusiasm, the commitment and energy that lies behind its music. Steal one tomorrow.







**SEVENOAKS HI-FI & VIDEO**

This advertisement is valid until at least 31st August 1992.

## Display, Demonstrations and After Sales

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

## SUGGESTED SYSTEMS

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

SPEAKERS	Widale Delta 30.2 JPW Sonata (V) M/Short 3.10 Celestion DL4 II Gale GS210	Celestion 3 JPW Sonata (W) W/Dale Diamond 4 Royd A7 Tannoy 603 Mission 760i Goodmans maxim III	Nad 8225e Celestion 5 B&W DM600 Kel K120 Tannoy 605 Moni/Audio One	Moni/Audio P7 Heybrook Solo Mission 761i	Tannoy 607 B&W DM610 A/Research M1 Celestion 7 Widale 505.2	Castle Warwick Mission 762 Rogers LS2A-2 JPW AP3 Kel 140	Castle Durham Heybrook HB1/3 Tannoy 609	Rogers LS4A-2 B&W DM620 Heybrook HB100 Kel 160	
AMPS	Marantz PM30 NAD 3020i Rotel RA 920AX	264.95	280.95	308.95	324.95	344.95	364.95	384.95	424.95
	Kenwood KA3020	272.95	287.95	315.95	331.95	351.95	371.95	391.95	431.95
	Nad 3225 PE Marantz PM30SE	280.95	295.95	323.95	339.95	359.95	379.95	399.95	439.95
	Rotel RA 930AX Pioneer A300 Dual CV 5600	288.95	303.95	331.95	347.95	375.95	387.95	407.95	447.95
	Technics SUV500K	295.95	311.95	339.95	355.95	379.95	399.95	419.95	455.95
	Nad 3240PE Technics SUV600K	319.95	335.95	363.95	379.95	399.95	423.95	443.95	479.95
	Sony TAF540E	343.95	359.95	387.95	403.95	423.95	443.95	463.95	503.95
	Marantz PM40SE Yamaha AX550	351.95	367.95	395.95	411.95	431.95	451.95	471.95	511.95

## FREE

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

2 CD's FREE with all CD based systems

### Options

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

#### CD Players

- Aiwa XC300
- Aiwa XC700
- Denon DCD480
- Denon DCD590
- Denon DCD580
- Denon DCD660
- Denon DCD690
- Denon DCD890
- Denon DCD1290
- Kenwood DP3040
- Marantz CD42

- Add £29
- Add £79
- Add £49
- Add £69
- Add £79
- Add £99
- Add £169
- Add £229
- Add £79
- Add £69

- Marantz CD52
- Marantz CD52SE
- Marantz CD72
- NAD 5420
- NAD 5425
- NAD 5440
- Philips CD604
- Philips CD634
- Philips CD850 Mk II
- Pioneer PD4700
- Pioneer PD5700

- Add £99
- Add £179
- Add £199
- Add £299
- Add £79
- Add £99
- Add £199
- Add £19
- Add £59
- Add £199
- Add £29
- Add £49

- Pioneer PD6700
- Pioneer PD7700
- Pioneer PD8700
- Rotel RCDB95AX
- Technics SLPG320AK
- Technics SLPG420AK
- Technics SLPG520AK
- Technics SLPG620AK
- Technics SLPS700AK
- Technics SLPS900AK
- Sony CDP397
- Sony CDP497

- Add £69
- Add £149
- Add £199
- Add £159
- Add £39
- Add £59
- Add £99
- Add £129
- Add £169
- Add £249
- Add £39
- Add £59

#### Turtables

- Dual CS415
- Dual CS503.2
- Dual CS505.4
- Rotel RP855
- Thorens TD280II
- Systemdek IX900 (+ choice of arm)

- Add £99
- Add £0
- Add £49
- Add £79
- Add £99
- Add £89
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- Arcam Delta 60 £519.95
- Arcam Delta 90.2 £519.95
- Arcam Delta 120 £199.95
- Arcam Delta 110S £269.95
- Arcam Delta 110 £429.95
- Aura VA50 £399.95
- Aura VA100 £629.95
- Audiolab 8000A/91 £569.95
- Audiolab 8000C/91 £249.95
- Audiolab 8000M (each) £299.95
- Audiolab 8000P/91 £379.95
- Cyrus One II P.O.A. £139.95
- Cyrus Two II £169.95
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- Denon PMA350 £239.95
- Denon PMA 860 £529.95
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- Exposure EXP7 £174.95
- Exposure EXP8TD £139.95
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- Marantz PM 30SE £279.95
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- Quad 306 £329.95
- Quad 606 £189.95
- Rotel RA920AX £349.95
- Rotel RA930AX £159.95
- Rotel RA960BX £274.95
- Rotel RA960BX £179.95
- Rotel RB960BX £229.95
- Rotel RC960BX £169.95
- Rotel RC980BX £199.95
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- Sony TAF540E £259.95
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- Technics SUV700K £179.95
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- Celestion 100 £199.95
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- Aiwa XC700 £649.95 (FD)
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- Arcam Delta 170.3 £419.95 (FD)
- Arcam Alpha CD £359.95
- Arcam Black Box III £429.95
- Arcam CD3 £369.95
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- Deltec Biggie Bit £195.95
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- Denon DCD660 £159.95
- Denon DCD960 £269.95
- Denon DCD1290 £199.95
- Denon DCD590 £549.95
- Denon DCD890 £399.95
- Denon DCD1290 £399.95
- Denon DCD42 £119.95
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- Marantz CD62 £299.95
- Marantz CD72 £399.95
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- Nad 5425 £149.95 (FD)
- Nad 5440 £179.95 (FD)
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- Philips CD618 £149.95
- Philips CD624 £299.95
- Philips CD634 £299.95
- Philips CD850 I £369.95
- Philips CD850 II £369.95
- Philips CD920 £329.95
- Philips CD940 £329.95
- Philips CD940 £329.95
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- Rotel RCD965BX £199.95 (FD)
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- Sony CDP197 £649.95
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- Teac P10 £269.95
- Teac P10 £269.95
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- Technics SLPS900K £349.95
- Technics SLPG20 £159.95 (FD)
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- Denon DCD1290 £199.95
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- Denon DCD1290 £399.95
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- Rotel RCD965BX £199.95 (FD)
- Sony CDP497 £149.95 (FD)
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- Teac P10 £269.95
- Teac P10 £269.95
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- Technics SLPS700K £349.95
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**SEVENOAKS HI-FI & VIDEO**

This advertisement is valid until at least 31st August 1992.

## Display, Demonstrations and After Sales

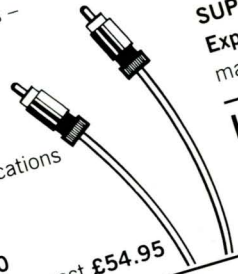
Unlike many of our competitors, all products (subject to availability) are on display and may be auditioned in dedicated listening rooms in any of our branches. Our helpful staff enjoy to assist you through the product choices that lie ahead. Our Sevenoaks service dept is one of the largest and best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

## GETTING IT TOGETHER

And keeping things that way ie accessories, stands, interconnects, and other necessities of hi-fi life. (a small selection from our large stocks)

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- Audioquest Comprehensive range of superb interconnects - ideal for Arcam and British gear.
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- Partington rigidly welded steel supports
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- Target Very large range available - phone for prices



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- Target Industry standard steel/wood racks
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- TT5 5 shelf spiked equipment rack **£138.00**
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- PES3 3 shelf rack expandable to 5 shelves **£121.95**



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Stands, interconnects and cable affect the performance of your hi fi, yet many people regard them as afterthoughts. So we make you, this offer. If you buy a quality stand or interconnect from us and you dont think your sound has improved, return it in 'as new' condition and we'll refund your money in full.

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- Audioquest Unique figure 4 construction.
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- Type 4 Special spiralled conductors - **£4.20 mtr**
- Furukawa high purity multi strand cables.
- FST14 an evenly balanced cable **£5.75 mtr**
- FST20P Ideal for arduous loads & bi-amping **£8.95 mtr**
- Rotel good general purpose cables
- SUPRA 4 Stranded ideal for long runs **£3.25 mtr**
- Exposure cable-system dependent, but can sound marvellous used properly **£2.95 mtr**

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- HD540II** Reference quality at an affordable price **£99.95**
- HD480 classic**. New version of an all time great **£59.95**
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- ATH611** punchy dynamic sound **£49.95**
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We sell a huge number of essential and useful accessories - tape, switching boxes for sources and CDs, record, tape, CD and stylus cleaners of many kinds - all too numerous to mention. If you have a particular requirement, ask us, we probably have the solution.

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Marantz PM40SE	£379.95	£389.95	£409.95	£419.95	£439.95	£459.95	£485.95	£500.95	
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NAD 3225PE	£324.95	£334.95	£354.95	£365.95	£385.95	£399.95	£420.95	£442.92	
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Rotel RA930AX	£316.95	£326.95	£346.95	£355.95	£378.95	£395.95	£413.95	£433.95	
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<b>AMPLIFIERS</b>									
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Kenwood KA3020	£129.95	Philips CD618	POA	Systemdek 11X900	£348.00	NAD 1000	Was £179.95, Now £149.95	NAD 1200	Was £289.95, Now £219.95
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Marantz PM50	£229.95	Yamaha CDX550E	£199.95	<b>SPEAKERS</b>					
Marantz FM80	£399.95	<b>CASSETTE DECKS</b>				Bose Stocked	POA	Denon DCC660, 860 & 960	REDUCED TO CLEAR
Marantz SM60	£499.90	Aiwa ADWX 777	POA	Aiwa ADW888	POA	Boston HD Series Stocked	POA	Hitachi DA-004	Was £229.00, Now £109.95
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NAD 3225PE	£149.95	Aiwa ADF 810	POA	Aiwa ADF 410	£99.95	B&W DM610	VERY SPECIAL POA	Hitachi DA-009	Special
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Rotel RA920AX	£169.95	Kenwood KX9010	£399.95	Marantz SD40	POA	Celestion SL700	£1349.49	Philips CD620	£149.95
Rotel RA930AX	POA	Marantz SD40	POA	Marantz SD62	POA	Cervin Vega	stocked	Philips CD620	£149.95
Rotel RA960BX	POA	Marantz SD315	£179.90	Marantz SD315	£179.90	Infinity RS Series	POA	Philips CD620	£149.95
Rotel RA980BX	POA	NAD 100	£299.95	Marantz SD315	£179.90	Jamo Pro. 200/300/400	POA	Philips CD620	£149.95
Rotel RC960AX	£275.00	NAD100	£299.95	Marantz SD315	£179.90	JBL L162	£599.95	Philips CD620	£149.95
Rotel RC980BX	£350.00	Nakamichi CASS. DECK 1, 1.5 & 2.	POA	Teac CDX620	£199.95	JBL PPS20	POA	REDUCED TO CLEAR	£99.95
Rotel RB980BX	£350.00	Pioneer Stocked	POA	Technics Stocked	POA	JBL XE 1	£109.95	REDUCED TO CLEAR	£99.95
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Sony TAF 440E	£199.99	Rotel RD945AX	£149.95	Technics Stocked	POA	Pro 3	£199.95	Aiwa ADF400, 500, 600, 700	POA
Sony TAF 540E	£199.95	Rotel RD965AX	£199.95	Teac TCX530R	£299.99	JPW Minim	£79.95	Denon DRM400	£89.95
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Yamaha DSP CINEMA RANGE	POA	Technics Stocked	POA	<b>RECEIVERS</b>					
Denon TU260L	£109.95	Yamaha KX260	£149.95	Denon DRA 335	£229.95	Mission 761i	£189.90	Hitachi DRV7 (Si.V.)	POA
Denon TU560	£149.95	Yamaha KX360	£179.95	Kenwood KR-V7030	£299.95	Mission 761i	£189.90	Hitachi DE17	£89.00
Denon TU660L	£179.95	Yamaha KX650	£249.95	Kenwood KR-V7030	£299.95	Mission 762	£229.90	Marantz SD45 Mk2	Was £299.95, Now £219.95
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Kenwood KT2030	£129.95	Aiwa NSX-D7	REDUCED TO CLEAR	Kenwood M855G	POA	KEF C Series	POA	Sony TCW R670	Was £179.95, Now £145.00
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Marantz ST50L	£179.90	Kenwood M45G	POA	Kenwood M55G	POA	Monitor Audio M7	£179.95	Yamaha CX250, KX300, KX430	REDUCED TO CLEAR
NAD 4225	£159.95	Kenwood M55G	POA	Kenwood M855G	POA	Monitor Audio M5	£219.95	<b>CD PLAYERS</b>	
NAD4100	£209.95	Kenwood UD70	POA	Kenwood UD90	POA	Mordaunt Short MS310	REDUCED TO CLEAR	Aiwa CDX700	£179.95
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Teac TX3000	£299.00	<b>CD PLAYERS</b>				Rogers LS2A-2	£209.00	Denon DCD990	REDUCED TO CLEAR
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Technics ST610	£99.95	Aiwa D-287CD	REDUCED TO CLEAR	Kenwood M55G	POA	Rogers LS4A-2	£289.00	Denon DCD990	REDUCED TO CLEAR
Yamaha TX350L	£109.95	Kenwood M24CDS	REDUCED TO CLEAR	Kenwood UD70	POA	Rogers LS6A-2	£349.00	Denon DCD990	REDUCED TO CLEAR
Yamaha TX550	£179.95	Kenwood M45G	POA	Kenwood UD90	POA	Tannoy 605	£159.99	Denon DCD1290	£329.99
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Denon DCD480	£149.99	Kenwood UD70	POA	Wharfedale Diamond IV	£119.90	Wharfedale Diamond IV	£119.90		
Denon DCD580	£179.99	Pioneer Stocked	POA	<b>CLEARANCE COLUMN</b>					
Denon DCD660	REDUCED TO CLEAR	SONY SYSTEMS	POA	Arcam III	Was £149.99, Now £99.99	<b>LOUDSPEAKERS</b>			
Denon DCD860	REDUCED TO CLEAR	Sony MHC2600	REDUCED TO CLEAR	B&W DM560 Walnut/Black inc speaker stands	£159.90	B&W DM570 & B&W DM580	POA	* All systems include speaker cable	
Denon DCD980	T.B.A.	<b>RECEIVERS</b>				B&W DM570 & B&W DM580	POA	* Free cartridge with turntable	
Denon DCD990	REDUCED TO CLEAR	Denon DRA 335	£229.95	Kenwood KR-V7030	£299.95	Boston HD Series Stocked	POA	* Complete system purchases include headphones	
Denon DCD1290	REDUCED TO CLEAR	Kenwood KR-V7030	£299.95	Kenwood M855G	POA	B&W DM610	VERY SPECIAL POA	* 5 Free cassette with Cassette Decks	
		NAD 7225PE	£249.95	Kenwood M855G	POA	B&W DM 620	POA	* System purchases within London Area include free installation	
		NAD 7240PE	£299.95	Kenwood M855G	POA	Celestion III	£115.00	* Please add £5 postage & packing on single item purchases	
		NAD 7250PE	£529.95	Kenwood M855G	POA	Celestion DL8i	£185.00		
		NAD 7020i	REDUCED TO CLEAR	Kenwood M855G	POA	Celestion DL12i	£349.95		
		Rotel RX850	REDUCED TO CLEAR	Kenwood M855G	POA	Celestion SL65i	£409.00		
				Kenwood M855G	POA	Celestion SL600Si	£820.00		
				Kenwood M855G	POA	Celestion SL700	£1349.49		



# Choosing and Using . . . Tuners

**R**umours of the demise of FM as a hi-fi medium are in some ways exaggerated; in other ways, sadly, not. Live concert broadcasts can often be in very high quality sound, and Radio 3 maintains a high standard most of the time in music broadcasting, as does Radio 4 in speech (a recent live opera relay from New York reminded me just how lucky we are in this country. Compressed? A real steam-hammer job). On the other hand, many stations pander unscrupulously to the lowest possible

*Out of the blue and into the black. Richard Black describes how you can pluck music from a clear sky with the help of a high fidelity tuner.*

common denominator at almost all times by applying gruesome levels of signal compression in an effort to be the loudest legal station on the car or factory radio dial. It was pointed out to me recently that the Optimod compressor (the current favourite) can compress music to give an average-to-peak ratio of 4dB, which is less dynamic than pure white noise.

But assuming you sometimes enjoy listening to those stations which do at least make an attempt at broadcasting quality sound, you will find there is just as much scope for enhancing your listening pleasure by selecting the right tuner as there is in choosing amplifiers or speakers to suit your needs and tastes. And of course, once you have bought the tuner, the 'software' is free and unlimited, perhaps even 24 hours a day if it isn't classical music you seek.

Like most hi-fi components, tuners have to contend with some variables which are to an extent beyond the manufacturer's control. Speakers, for instance, have to work in a real room; tuners have to work in real reception conditions. These can vary enormously, from the house of a friend of mine which has line-of-sight to a 120kW transmitter barely seven miles away, where one can receive noise-free stereo with a damp bootlace dangling off the tuner, to areas where an outdoor aerial is essential for any sort of stereo reception at all. Then again, in some areas there is a real possibility of interference between stations on nearby frequency allocations. It is worth mentioning in this context that during the time I was reviewing these tuners I was able to conduct a real-life interference test due to the presence on 91.6MHz of the local pirate station ('Happens to be the station like Genesis, the station with the necessary roughness'), running a completely out-of-order 200 per cent peak modulation (that's +/-150kHz) only 300kHz away from Radio 3, with a transmitter that can hardly be a mile from my house. All the tuners passed the test.

Rejecting the attentions of nearby stations is the job of the tuner, but ensuring that there is enough wanted signal for the tuner to work with, and that it is at least reasonably clean, requires a suitable aerial. (Generally, for 'suitable', read 'outdoor'.) The indoor T-aerial usually supplied free with tuners is not much use, and a proper three element rooftop aerial will improve on it very noticeably in almost every case. If you live in a poor reception area you may need something really big, but most people can get by happily with five or seven element units at most.

Aerials aren't very expensive, with a simple three element coming in at perhaps £60-£100 including installation, depending on the trickiness of the job. Include this as part of your tuner budget from the start, and if you are in a difficult area I would certainly recommend allotting at least as much money to the aerial as to the tuner. If an outdoor aerial is impossible, mount an indoor one as high as possible and make sure it is fully extended and pointing the right way (which way? Set it by ear). For more information on choosing an aerial, see last month's feature *Making the most of radio*.

Assuming you have a good aerial, tuner selection basically depends on finding the model with the features you want (AM reception, for instance) and a sound that suits you. But note that the usual criteria get turned round. Don't assume that the tuner which sounds best when fed with a good signal will also be best under poor conditions. Features like switchable IF bandwidth and high blend become important, and it is often found that tuners which sound a bit flat and compressed with a good signal sound barely worse with a poor one, while those which are open and image well are prone to irritating whistles and distortions with a poor RF input. If possible, 'try before you buy', but because you can't always expect that option with cheaper hi-fi equipment I have made some reference to likely performance under adverse conditions in the conclusions to these reviews.

## Netting a tuner

Every tuner covered in this review project tunes digitally, with frequency selection in discrete steps (50kHz, or 10kHz for those tuners which offer 'fine tuning'), set by reference to an accurate quartz oscillator. Theoretically, analogue tuners can still offer some advantages in sound quality due to their potentially lower RF noise and infinitely variable frequency setting, but in practice there is not much advantage, and digital tuners with their preset station capability score on convenience and, these days, on cost. Most of the tuners also cover AM, but the standard is poor; if you want good AM reception, buy a decent scanner or 'communications receiver', and use a long wire or large loop aerial.



# Ariston Maxim Tuner

Ariston Acoustics Ltd, Freeport, Prestwick International Airport, Ayrshire, Scotland KA9 2TA. Tel: (0292) 76933.



Visually, the basic proportions of this tuner seem very reasonable, but the positioning of the preset buttons, and the absence of any labelling at all on them, looks decidedly off kilter to my eye. The screen printed labels referring to the function buttons are not printed quite on centre, and on firing up the tuner one finds that various LEDs are ill matched in intensity. There is also no indication of whether one is in manual or automatic tuning mode.

Still, there is no faulting the basic standard of construction. The heavy case is made of thick sheet steel, and inside it the circuits are very neatly laid out on high quality double-sided print boards, complete with full ground plane on the RF/audio board. The actual RF input stage is a bought-in unit from Alps, while stereo decoding is carried out by two mysteriously painted-over ICs (probably something standard, there's little enough choice!). The audio output stage shows evidence of audiophile component selection, complete with relay muting. An Ariston system remote control can be used with the *Maxim Tuner*, although it is not supplied as standard (it is, however, standard with the Ariston CD player). I just wish Ariston had used the normal coaxial male connector instead of the fitted female.

## Lab report

With test results fairly similar to many other tuners, the *Maxim* shows no obvious pointers to its subjective superiority. However, the relatively high level of second harmonic distortion rings warning bells; that sort of level of second harmonic is frequently perceived as an improvement in sound quality (don't believe it? Checks the specs of a few popular valve amps). Still, if that's the reason behind the *Maxim's* popularity it's a pretty innocuous sort of transgression.

Intermodulation artefacts are no higher in level than with most, and the frequency response is as flat as any — in fact very

extended in the bass, a useful attribute in any hi-fi. Stereo separation holds up well in the treble, of which the slightly less advantageous corollary is rather poor alternate channel selectivity. However, the *Maxim* passed the real-life 'adjacent pirate station' test, so no real problem there.

## Sound quality

Having tested an earlier *Maxim* tuner with rather sad results, I was interested to put this revised offering before the unwitting listening panel. In the event, it was probably the best liked overall of the batch. The strongest criticism levelled at it was of slight bass-lightness, but this was offset by good bass control, and elsewhere results were very good.

The Bach violin concerto showed up the *Maxim's* smooth but open sound to advantage, with good imaging of the simply-miked orchestra. Cymbals in the jazz excerpt were clear and sharp with clean and natural decay, and the timbre of solo piano was very realistic.

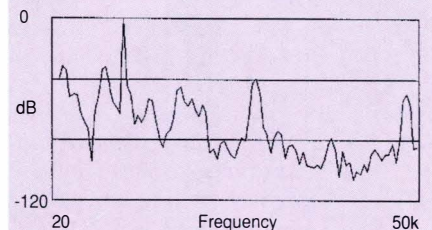
The sound when fed from a real broadcast was virtually of the same standard, with good imaging, realistic dynamics and a full frequency range. Importantly, it preserved the scale of a large orchestra, an area where many tuners fail to impress. Complex music is no problem for the *Maxim*, while solo instruments retain their distinctive sound largely intact. Interfering whistles and intermodulations are kept to quite a low level, not quite the lowest ever but adequate for enjoyable listening.

## Conclusion

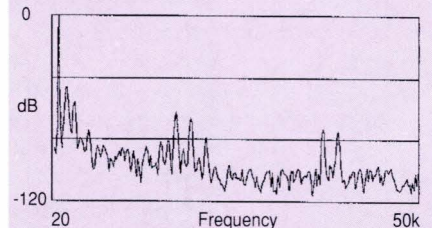
Beefs about its appearance aside, the Ariston *Maxim Tuner* seems to do the business very well, and its battleship construction should help ensure a long life for it. Taking everything into consideration, its price does not seem unduly high, and Recommendation is in order.

## TEST RESULTS

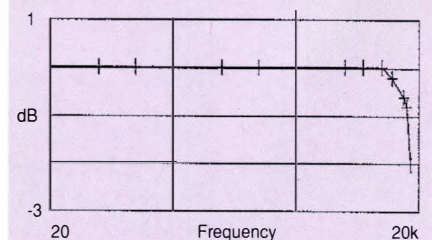
Muting threshold	3 $\mu$ V
Sensitivity	
50dB S/N (mono)	6 $\mu$ V
50dB S/N (stereo)	25 $\mu$ V
65dB S/N (stereo)	140 $\mu$ V
Ultimate S/N ratio	
mono	76dB
stereo	73dB
Stereo Separation	
20Hz	36dB
1kHz	38dB
15kHz	30dB
Harmonic distortion	
1kHz, 100% mod., stereo	0.5%
19kHz pilot level	-56dB
38kHz subcarrier level	-80dB
Alternate channel selectivity	46dB
Second channel rejection ratio	62dB
10 x IF rejection	>80dB
AM rejection ratio	52dB
Maximum output (100% modulation, 1kHz)	1.1V
Typical retail price	£299



Distortion with 10kHz signal at 100% modulation



Distortion with 1kHz signal at 100% modulation



FM x AM o  
Frequency response



# Aura TU-50

Nakamichi B&W (UK) Ltd, Marlborough Road, Lancing, West Sussex. BN15 8TR. Tel: (0903) 750 750



**S**ussex-based Aura has made quite a name for itself as a manufacturer of reasonably priced hi-fi which is nevertheless well designed, well built and visually attractive, and looking at the *TU-50* one can see why.

Behind the smart, glossy front panel lies a very neatly constructed tuner which, despite its use of many standard parts (Alps RF head and decoder and control ICs from Hitachi, Sanyo and Toshiba) has obviously been the subject of audiophile deliberations. All the resistors are metal film types (lower noise than the carbon film more commonly used in tuners) and nearly all the small value capacitors are plastic film rather than the ceramic types which, even in RF circuits, can have an effect on sound quality. The board is also clearly labelled, thus making servicing (in the unlikely event it should be required) a very simple job.

If I have a criticism of the appearance, it is that the front panel LEDs are excessively bright and not quite uniform, and the labelling is in very small lettering made even harder to read by the dazzling LEDs. The main frequency display is much more gentle on the eye, and includes 'Tune' and 'Stereo' indicators. There is no signal strength indication of any kind; indeed the tuner is featureless beyond its 16 presets and a mono switch, but then that's as many features as I can recall using in any number of years. Tuning is slow, especially in scan mode, which takes over a minute and a half to cover the scale.

## Lab report

Measurements on the *TU-50* turned up a set of results quite similar to most of the other tuners in the batch. I did notice, however, that the crosstalk signal, while fairly low in level, is badly distorted, about 25 per cent of mainly second and third harmonics. The possibility that this is related to the poor imaging seems quite real, especially as I

have encountered something similar in the past with amplifiers. Sensitivity is a little below par, but not enough to make any real difference in practice, especially as ultimate S/N is as good as most. RF interference rejection is fair.

## Sound quality

Surprisingly, perhaps, given Aura's reputation, the panel was not too impressed by this tuner. Criticisms centred on its imaging, which was found lacking in all the music selections played.

It seemed to fare best in the first track (Bach violin concerto), where it portrayed a lifelike orchestra, but in the Victoria and Miles Davis excerpts it constricted the soundstage, even though its basic tonal quality was quite open and free. Solo piano was not well focused. However, the imaging clearly worried some listeners less than others, one panelist enjoying the tuner principally for its tonal quality.

This finding on imaging was confirmed on listening to live broadcasts, with the *TU-50* tending towards the two dimensional and flat sounding. A degree of woodenness seemed to afflict orchestras and bands, making front-to-back and side-to-side information less clear and generally reducing communication, although the tonal balance never seemed to be anything but natural.

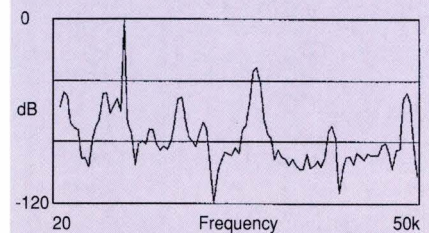
In a lively jazz number, the cymbals and drums had good snap and realistic decay, but the band still seemed smaller than with other tuners. Bass is generally good, and always well controlled.

## Conclusion

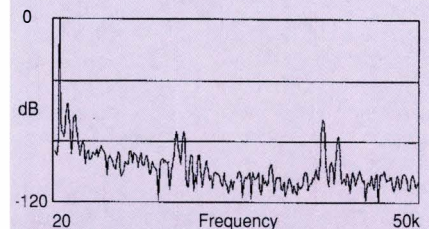
This seems like a potentially very good tuner which didn't quite make it. If the imaging could be improved, the rest of the *TU-50*'s performance would appear to offer very good sound overall. As it stands, it falls just short of the standard required for formal Recommendation.

## TEST RESULTS

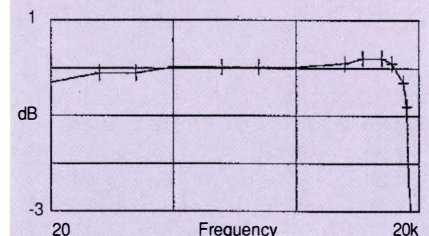
Muting threshold	8 $\mu$ V
<b>Sensitivity</b>	
50dB S/N (mono)	6 $\mu$ V
50dB S/N (stereo)	32 $\mu$ V
65dB S/N (stereo)	160 $\mu$ V
<b>Ultimate S/N ratio</b>	
mono	76dB
stereo	72dB
<b>Stereo Separation</b>	
20Hz	33dB
1kHz	38dB
15kHz	28dB
<b>Harmonic distortion</b>	
1kHz, 100% mod., stereo	0.3%
<b>19kHz pilot level</b>	-65dB
<b>38kHz subcarrier level</b>	-70dB
<b>Alternate channel selectivity</b>	45dB
<b>Second channel rejection ratio</b>	62dB
<b>10 x IF rejection</b>	>80dB
<b>AM rejection ratio</b>	45dB
<b>Maximum output</b>	
(100% modulation, 1kHz)	820mV
<b>Typical retail price</b>	£230



Distortion with 10kHz signal at 100% modulation



Distortion with 1kHz signal at 100% modulation

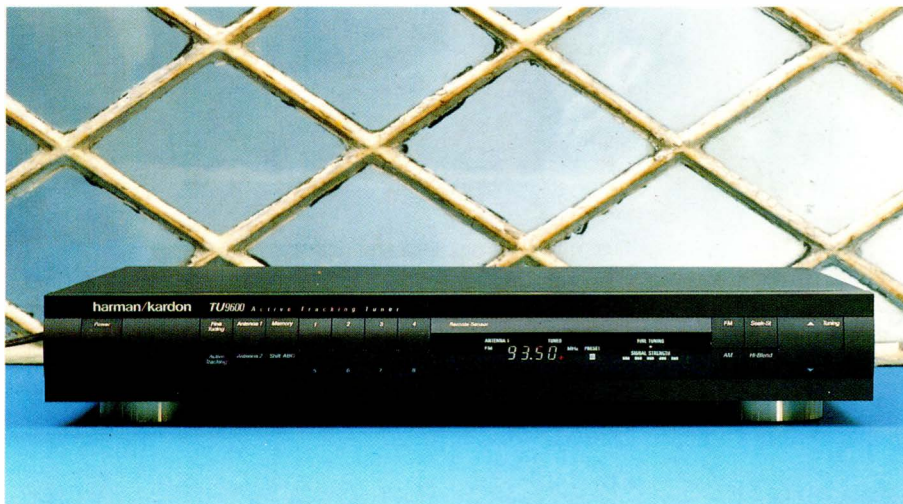


FM x AM o  
Frequency response



# Harman Kardon TU9600

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



This is the top model in Harman Kardon's current range of tuners. It shares with the 9400 its 24 presets, FM and MW bands, switchable high blend and a crude signal strength meter, adding to this a remote control, a second antenna input, fine tuning and 'Active Tracking' — essentially a narrow IF mode.

There are two ways of fine tuning the TU9600; it has a half-step tuning mode not mentioned in the manual, plus an 'official' fine tune capability, enabled when Active Tracking is on. This should make it quite versatile at avoiding interfering signals.

Inside the case, a Mitsumi front end feeds a fairly complex IF circuit, stereo decoder and audio output, all built up from industry standard parts. As on the other tuners in the range, the front panel is of plastic but looks smart and seems robust.

## Lab report

Considering the good subjective results, it was disappointing to find several rather serious measured weaknesses in the TU9600's performance. I should point out that some of these fly in the face of Harman Kardon's published data on the tuner, but a second sample was checked and found to be generally very similar. Distortion, for one thing, is higher than expected, and around 0.5 per cent of mostly low harmonics probably accounts for the 'enhanced' dynamics. That's not very harmful in itself but when, as in this case, it is accompanied by rather a lot of cross-modulation products with 19kHz pilot and 38kHz subcarrier tones it is undesirable. Especially as different amplifiers (and different listeners) can react very differently to modest amounts of high audio and near ultrasonic products like these. Channel separation proved very poor (22dB) on one sample, though better on the other.

In addition, the Active Tracking feature seems unable to cope with full modulation, giving some very nasty unsymmetric clip-

ping (audible, as I checked on a couple of listeners) at high levels, worsening further when fine tuning is used to tweak the tuner away from an interfering signal. This makes the value of the features dubious at best.

## Sound quality

With locally generated RF or a good signal from the aerial, the TU9600 gave a good account of itself in front of the listening panel. Bass was especially praised for its weight and impact, and definition of instruments in thickly-scored music was also good. Stereo imaging was fair, though not especially detailed.

In the unaccompanied choral track, the voices came across as rather hard and edgy, a comment that was echoed in the observation that the Bach excerpt was a bit harsh. Solo piano developed some fuzziness on high notes, although only sufficient to show in good recordings. Perhaps the most interesting comment came when I switched from the tuner to the CD player that was feeding it via the FM generator; one panelist (imagining I was doing the reverse) remarked that the dynamics had been really squashed. In other words, the TU9600 appears to enhance dynamic range!

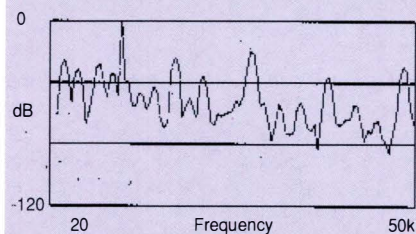
With real broadcasts the generally positive picture endured, undisturbed by any noticeable interference. Perhaps detail was not quite as clear as can be, but it was always fairly well preserved. AM performance, apart from some chestiness, was easily the best of this batch, with remarkably clear treble and very low levels of interference.

## Conclusion

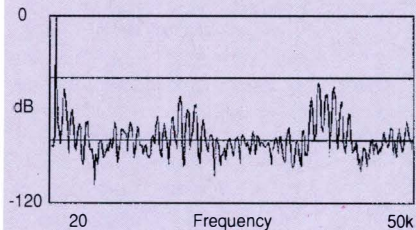
If you are guaranteed good radio signals, the TU9600 will turn in quite a good subjective performance, though not necessarily a class leader. That, plus some significant measured flaws, leaves it out of the running for recommendation.

## TEST RESULTS

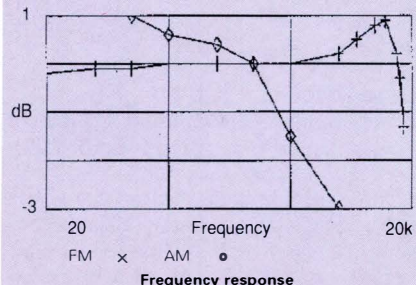
Muting threshold	13 $\mu$ V
<b>Sensitivity</b>	
50dB S/N (mono)	6 $\mu$ V
50dB S/N (stereo)	42 $\mu$ V
65dB S/N (stereo)	95 $\mu$ V
<b>Ultimate S/N ratio</b>	
mono	76dB
stereo	71dB
<b>Stereo Separation</b>	
20Hz	35dB
1kHz	34dB
15kHz	19dB
<b>Harmonic distortion</b>	
1kHz, 100% mod., stereo	0.5%
<b>19kHz pilot level</b>	-52dB
<b>38kHz subcarrier level</b>	-59dB
<b>Alternate channel selectivity</b>	80dB
<b>Second channel rejection ratio</b>	>80dB
<b>10 x IF rejection</b>	>80dB
<b>AM rejection ratio</b>	58dB
<b>Maximum output</b> (100% modulation, 1kHz)	2.9V
<b>Typical retail price</b>	£299



Distortion with 10kHz signal at 100% modulation



Distortion with 1kHz signal at 100% modulation



Frequency response



# Nakamichi Tuner 2

Nakamichi B&W (UK) Ltd, Marlborough Road, Lancing, West Sussex. BN15 8TR. Tel: (0903) 750 750



**N**akamichi has certainly done a neat job with the aesthetics of *Tuner 2*. Disguising the power switch as a decorative moulding is rather clever, and the whole front panel is symmetrical with tastefully rounded edges. I don't actually like it, but it is well done. It had better be, since in terms of features and internal circuitry, value for money looks pretty slim. Apart from an extra ceramic filter (four fitted here), the *Tuner 2* bears a remarkable internal resemblance to one or two tuners reviewed here at around half its price, including for instance the Harman/Kardon *TU9200*.

That's not to say that there is anything wrong with the Mitsumi RF front end, the IF, or the Sanyo IC-based decoding circuits, but it looks rather as if Nakamichi is packaging a cheap tuner in an expensive box. Given that it doesn't even offer AM reception, where, if not on cosmetics, has the money gone?

At least ergonomics are good, thanks to the rotary switches for tuning and preset station selection. Seek tuning is reasonably speedy, while the five-segment signal strength meter is, as so often, over-optimistic in lighting up fully at only 130µV. A system remote control can be connected with the lead supplied.

## Lab report

As for measurements, only intermodulation of the 10kHz test tone seems alarming, showing leakthrough of 28kHz at only around -20dB (bear in mind that a L+R signal of 10kHz contains no components except 10kHz and the 19kHz pilot, so there should be no sidebands centred on 38kHz at all). Harmonic distortion in the tuner is low and largely harmless, around 0.2 per cent of third harmonic.

Sensitivity is fine and ultimate S/N ratio much like most other modern tuners. The frequency response is pretty close to flat, the very slight HF roll-off perhaps being just audible. High frequency crosstalk seems a

little high, and while testing low frequency crosstalk I noticed the strange result that full modulation on both channels at LF (below 30Hz) overloads the tuner's output, although one channel at a time is OK. Interference rejection is very good, even without engaging the narrow IF mode.

## Sound quality

The *Tuner 2*'s price seems a little less disconcerting in view of the listening panel's generally positive reaction. Following on from the Denon *TU-660L*, it seemed to have wider bandwidth in treble and bass, better balance and a warmer sound.

This tuner was definitely felt to be pleasant to listen to, and gave the impression of being able to go loud quite happily. In the jazz track, drums had less impact than with some other models, but the music was more interesting to listen to. Bass definition could perhaps have been better, but that was a small criticism.

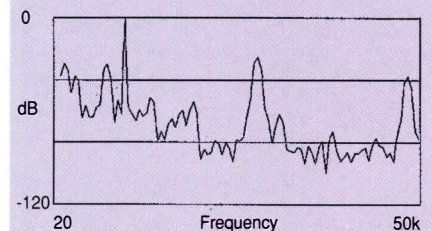
Listening off air was also on the whole an agreeable experience, although the *Tuner 2* was perhaps not quite so clearly superior here. It was quite free of interference and presented a believable balance, but there was some squashing of the stereo image, especially front-to-back. Then again, it reproduced more impact than most of the other tuners tested, and proved itself quite adept at coping with thick orchestration without smudging everything together. It just sounded a little two-dimensional at times. Speech reproduction, a good test of coloration, was good.

## Conclusion

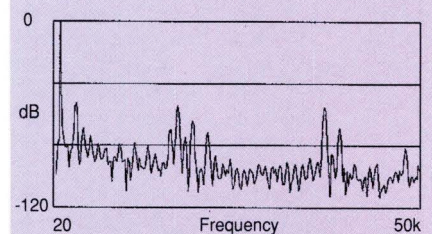
Listening and lab tests almost answer the point about value for money; almost. The test results are pretty good but they are not exceptional. Subjectively the same seems to apply, and the sum of features, audible performance and lab results doesn't quite make a £350 Recommendation.

## TEST RESULTS

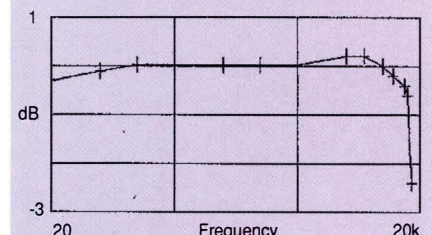
Muting threshold	16µV
<b>Sensitivity</b>	
50dB S/N (mono)	4µV
50dB S/N (stereo)	28µV
65dB S/N (stereo)	100µV
<b>Ultimate S/N ratio</b>	
mono	77dB
stereo	72dB
<b>Stereo Separation</b>	
20Hz	43dB
1kHz	46dB
15kHz	24dB
<b>Harmonic distortion</b>	
1kHz, 100% mod., stereo	0.2%
<b>19kHz pilot level</b>	-59dB
<b>38kHz subcarrier level</b>	-65dB
<b>Alternate channel selectivity</b>	>-80dB
<b>Second channel rejection ratio</b>	72dB
<b>10 x IF rejection</b>	>-80dB
<b>AM rejection ratio</b>	57dB
<b>Maximum output</b> (100% modulation, 1kHz)	920mV
<b>Typical retail price</b>	£350



Distortion with 10kHz signal at 100% modulation



Distortion with 1kHz signal at 100% modulation



Frequency response



# Sony ST-S570ES

Sony UK Ltd, Sony House, South Street, Staines, Middlesex TW18 4PF. Tel: (0784) 467 000



**R**DS is only one of this tuner's battery of features, which encompass practically everything on the ergonomics front plus several on the RF side. If the RDS display of station name is not available, one can enter a station name into memory, or the excellent dot-matrix display can be made to display signal strength in dB (not very accurate, but never mind) in addition to the usefully scaled bargraph. Said display can be set to show all relevant information or just station name or frequency, and can be dimmed.

Other features include switchable RF input attenuation, switchable IF bandwidth, both AM bands, 30 presets, and a real, heavy, tuning knob which can spin through half the FM band in one flick of the wrist - nice! All in all, enough to bring out the gadget freak even in this hair-shirt-inclined reviewer.

Internally, a few of Sony's own ICs mingle with standard units from Sanyo and an Alps RF front end. All perfectly unremarkable, really; the clever RDS bits are concealed on the control circuit board behind the front panel. Construction is quite solid, with a good quality aluminium front panel.

## Lab report

Lab measurements on the *S570ES* show no obvious flaws in its design. About the only parameter that one might query is the rising treble; 1dB at 10kHz is generally clearly audible as extra brightness.

This appears to contradict the subjective finding that the tuner is on the dull side, but that is doubtless due to the overall muddle in the sound.

Distortion is creditably low, although it climbs rather rapidly when there is significant stereo information (the crosstalk signal is distorted to about 12 per cent). Rejection of various forms of RF interference is good, and in narrow IF mode improves still further. The results gleaned from the listening tests

(see below) would seem to be due to relatively subtle factors.

## Sound quality

Although it possesses a good feeling of tonal naturalness and is quite free of whistles and other obvious nasties, this Sony shows evidence of the sacrifices necessary to pack in so many features. Chiefly, it has a homogenising effect on the music signal, tending to muddle textures and reduce the impact of both dynamic variations and frequency extremes.

Bass sounds weak and treble dull; dynamics seem compressed.

The listening panel found this tuner most successful, ironically, in the most difficult track, the Victoria choral piece. Here, its difficulty in sorting out the strands was less obvious, while the timbre of the voices was quite well preserved.

However, in orchestral music it fared much less well, and in lively jazz tracks it took quite a lot of the fun away, with bass lines becoming slack and uninviting. A particularly fine piano recording turned into something that could have been recorded by any disillusioned sound engineer on an off day.

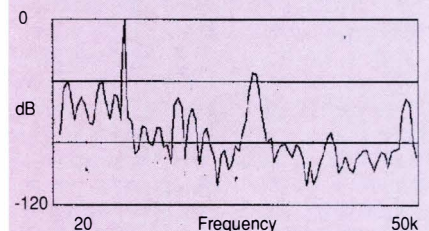
Performance with real broadcasts is at least 'safe', in that interference and multipath distortion are kept under control, but the overall sound is still very confused. Speech is reproduced realistically, with no evidence of added boom or spit, which is a point in the tuner's favour. AM performance is average.

## Conclusion

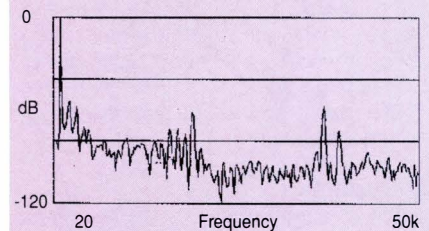
As far as features are concerned, this is one of the most heavily loaded tuners at its price and clearly will appeal to many on that basis alone. But you don't need to read a review to find out what features are on offer, and in subjective terms the *S570ES* doesn't turn in a sufficiently impressive performance for Recommendation.

## TEST RESULTS

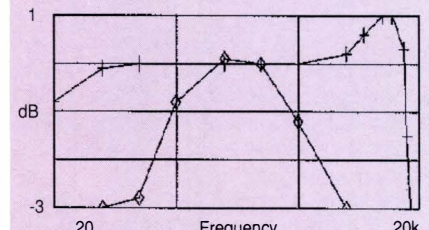
Muting threshold	12µV
Sensitivity	
50dB S/N (mono)	4µV
50dB S/N (stereo)	36µV
65dB S/N (stereo)	140µV
Ultimate S/N ratio	
mono	77dB
stereo	73dB
Stereo Separation	
20Hz	33dB
1kHz	31dB
15kHz	27dB
Harmonic distortion	
1kHz, 100% mod., stereo	0.12%
19kHz pilot level	-62dB
38kHz subcarrier level	-72dB
Alternate channel selectivity	71dB
Second channel rejection ratio	68dB
10 x IF rejection	>80dB
AM rejection ratio	53dB
Maximum output	
(100% modulation, 1kHz)	840mV
Typical retail price	£200



Distortion with 10kHz signal at 100% modulation



Distortion with 1kHz signal at 100% modulation

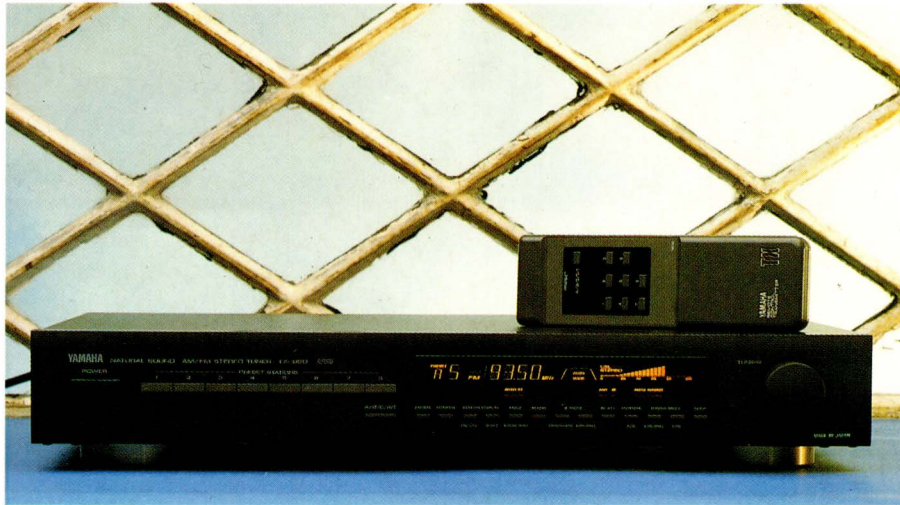


Frequency response  
FM x AM o



# Yamaha TX-950

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



Yamaha's top tuner, the *TX-950* sports the full range of functions one has come to expect on £200-odd tuners of Japanese origin; FM and AM (MW only) bands, up to 40 presets, switchable IF bandwidth, manual or automatic tuning, fine tuning, signal strength meter (a particularly useful one, in this case, fully lit only at 10mV input), two antenna inputs and high blend. Tuning is by a rotary knob, much more convenient and faster than up/down buttons, and scan tuning is gratifyingly speedy, too. A remote control capable only of selecting preset channels is available as an option.

Several technological marvels are claimed to enhance the *TX-950*'s performance, including the 'Computer Servo Lock Tuning System', which allows the tuner to work in either Phase-Locked Loop mode or servo mode, depending on signal strength. This astonished me with its ability to track a signal as I shifted the generator frequency right out of the FM band, a clever capability but not one of much practical use.

Yamaha has apparently designed its own RF front end for this tuner, an unusually complex-looking affair entirely enclosed in a large screening can. This is followed by the 'Absolute Linear Phase IF Amplifier', again quite a complex circuit realised with discrete transistors. The rest of the unit looks pretty much par for the course. I found the LCD display pleasant to look at, but slightly confusing from some viewing angles in bright light. The preset station memory can also store the station name (entered by using the tuning knob), in which case the maximum number of presets is 24.

## Lab report

As for bench tests, these showed up nothing disturbing. In-band distortion is low, in fact probably even lower than I can accurately measure, although there is still plenty of breakthrough of ultrasonic intermodula-

tion products in the presence of high frequency audio signals. Sensitivity and interference rejection are fine, even without employing the narrow IF setting. High frequency channel separation falls off a little, but generally performance is indicative of careful and thorough design.

## Sound quality

In the panel listening tests, this one divided opinion quite sharply. One listener declared it his favourite, on account of its 'natural sound' (his very words! — as printed on the tuner's front panel, indeed) and its ability to bring out all the parts of a musical structure with clarity, while another listener found it 'too civilised' and very uninvolved. Speech, however, was undoubtedly very good, free from plumminess and excess sibilance. A third panelist expressed the opinion that the unit had a reasonable balance of virtues in its performance.

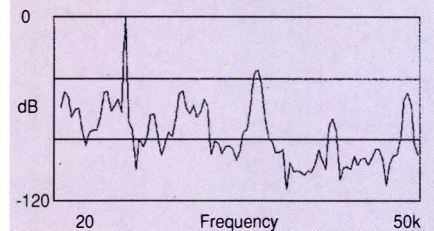
Listening to real broadcasts, I felt that the *TX-950* was one of the best tuners in the batch, having a lifelike tonal balance, good freedom from audible distortion and rather more life than one would necessarily expect in a mid-price tuner. It could perhaps have been slightly more open sounding, and its stereo imaging was not quite first rate, but it is a tuner I could happily listen to, with any kind of programme. On AM its performance was fair, with only moderate bass-heaviness and reasonable clarity, while keeping interference and whistles to quite a low level.

## Conclusion

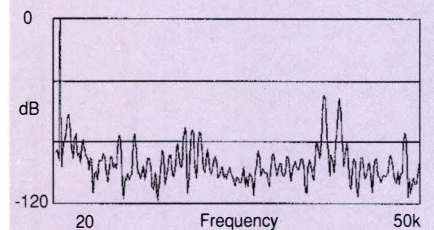
Notwithstanding some reservations from the listening panel, this tuner made a good enough impression under both 'ideal' and real reception conditions to warrant Recommendation. Its many features only add to its good value, and if you think the civilised sound may not suit you, get round to your dealer and check it out.

## TEST RESULTS

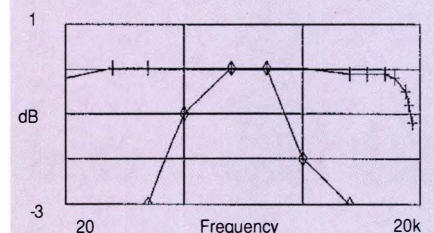
Muting threshold	1µV
Sensitivity	
50dB S/N (mono)	3µV
50dB S/N (stereo)	25µV
65dB S/N (stereo)	105µV
Ultimate S/N ratio	
mono	78dB
stereo	73dB
Stereo Separation	
20Hz	38dB
1kHz	45dB
15kHz	23dB
Harmonic distortion	
1kHz, 100% mod., stereo	0.07%
19kHz pilot level	-50dB
38kHz subcarrier level	-63dB
Alternate channel selectivity	65dB
Second channel rejection ratio	>80dB
10 x IF rejection	>80dB
AM rejection ratio	65dB
Maximum output	
(100% modulation, 1kHz)	760mV
Typical retail price	£260



Distortion with 10kHz signal at 100% modulation



Distortion with 1kHz signal at 100% modulation



Frequency response



Putting the performance back into your music

Stop Press! Absolute Sounds demonstration days 22nd, 23rd July. Audio Research, Krell, Theta, Sonus Faber, Apogee, Book now to avoid disappointment, hosted by Riccardo Frasso. *(Note: The original image contains a misspelling of the name as 'Frassovici', which has been corrected.)*

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 Sony ES/Yama  
 Yamaha/Revox  
 Magnepan Incorporated/Acoustic Energy/De  
 Acoustic Energy  
 Mission Cyrus/Marantz/Nakan  
 Mission Cyrus/Marantz/Nakamichi/  
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 Creek/Celestion/Sound Organisation/Koetsu/  
 Celestion/Sound Organisation/Koetsu/SME/Ak  
 Sound Organisations  
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 SME/Akai (video)/AKG/Beyer Dynamic/Audio  
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 Ion Systems/Arcam/Rotel/Royd/Sony ES/Yamaha/Revox/Magnepan Incc  
 Sony ES/Yama  
 Magnepan Incorporated/Acoustic Energy/De  
 Acoustic Energy/Danon/Epos/Heybrook/Miss  
 Mission Cyrus/Marantz/Nakan  
 Mission Cyrus/Marantz/Nakamichi/Sonus Faber  
 Nakamichi/Sonus Faber/Onkyo/Ortofon  
 Onkyo/Ortofon/Mordaunt Short/Mantra/Radford/Tascam  
 Mordaunt Short/Mantra/Radford/Tascam  
 Creek/Celestion/Sound Organisation/  
 Tascam/Creek/Celestion/Sound Organisation/  
 Creek/Celestion/Sound Organisation/Koetsu/  
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# Conclusions, Best Buys & Recommendations

Looking back over the tuners represented in these reviews, I find that I, and the listening panel, have made some quite similar observations about several of them. Even more, I have turned up several very similar-looking sets of test results. This is hardly coincidence, more a reflection of the fact that, more than with any other type of hi-fi equipment, budget and mid-price tuners are to a large extent designed around the integrated circuits available for the various circuit functions, and when

*Name that tuner. Richard Black summarises the results of our special two part review project, and lists the models which came out on top.*

no IC is available, around ready-made circuit modules or application-note circuits.

Still, there is plenty of scope for getting things 'right or wrong', as witnessed by the clear preferences shown by the listening panel for some models over others. Even the alignment of a particular unit before it leaves the factory can have a profound effect on its sound, and although this is usually done pretty well these days, I can recall having to return a receiver a few years ago because it simply didn't pick up FM radio at all, due to misalignment.

A quick word on tuner selection for those without the option of a decent outdoor aerial. On the basis of a check at low signal levels and with weak received stations, I would not recommend the Ariston, Aura, Harman/Kardon, or Nakamichi models; good though they may be, they haven't really been designed for that sort of duty. The remaining tuners are better suited, with the Pioneer and Yamaha models scoring highest for listenability as the signal strength fades away. The Akai also does quite well in that department, while the NAD, Denon and Rotel keep up a reasonable semblance of fidelity under moderately adverse conditions.

Starting with the cheapest Recommendation, and the cheapest tuner in the batch, the £150 Rotel RT-930AX is a good, honest budget tuner. It suffers to some extent from compression of the sound and a bit of roughness in the treble, but not sufficiently to become uncomfortable. Its RF performance is good, and in moderate to good reception conditions the sound is all that one can reasonably expect at the price. Not outstanding, but certainly Recommendable.

Next up the price scale is NAD's unassuming 4225. The extra £10 over the Rotel buys fewer features (no LW) but quite a lot of extra sound. The 4225 still has discernible flaws, notably some treble grain and midrange coloration on voices, but they are relatively

minor and more than counterbalanced by its clear bass, good impact and free, open quality. It also proved adept at suppressing the irritating whistles that can afflict tuners in slightly suboptimum reception conditions, and overall struck me as being one of the most enjoyable tuners in the batch. It has one measured problem in susceptibility to 106.7MHz interference, but at present there isn't much of that around. All things considered, it seems the obvious sole candidate for a Best Buy in this collection.

A year ago Denon's budget TU-260L made an excellent impression on a *Choice* listening panel, but this time the TU-660L (£190) failed to repeat the trick. However, the criticisms made of it — principally of brightness, lumpy bass and a feeling of remoteness from the music — were somewhat offset by its performance with a real broadcast, which showed it to be highly competent at capturing the RF, just rather limited in its skill at handling the audio. The remote control included as standard weighs in Denon's favour in the balance of value. Overall, then, a cautious Recommendation; especially, perhaps, for certain 'difficult' RF locations.

At £200, the Pioneer F-676 offers an extensive set of features and internal design that appears to be largely based on Pioneer's own homework, rather than a simple 'building block' job made from standard ICs. This has paid off in improved measured performance and a good, detailed sound. It seems to be on the bright side of neutral, but this is not always apparent. Bass is clear, midrange and treble are generally very lifelike, and imaging is good too. Clearly one for Recommendation.

Yamaha, like Pioneer, makes extensive use of its own ICs in its tuners, and this enables the TX-950 (£260) to offer a very wide range of features. More to the point in the present context, it also offers a very refined and natural sound, with a good balance of virtues, backed up by a good technical performance, especially in respect of in-band distortion. The negative reaction of one panel member towards this tuner only highlights the importance of matching the equipment to the listener's taste, and in no way reduces the TX-950's worthiness for Recommendation.

Finally, the Ariston *Maxim Tuner*, at £299, is the dearest Recommendation. Visually it is the most striking of the batch — in the wrong sense, unfortunately. Still, it turned out a performance sufficiently improved over the others to justify its price, its particular area of excellence being music for large and dense forces, where it loses remarkably little scale and impact; quite some feat for a tuner. If its bass seems at times a little shy, it is nevertheless always well controlled and clean, and the treble is very natural. A realistic 'audiophile on a budget' product, this should suit the serious radio listener well.



# Choice Offers

Our Mail Order Section this month features, among the old favourites such as Furakawa interconnects, some great new accessories to help improve the performance of your system. We've been reviewing some new and interesting products and have selected some that we thought you should know about.

## Goldring Magic Record Cleaner

This is a kit consisting of a double sided velvet brush and spray on Goldring Magic record rejuvenating fluid.

Unlike some other record cleaning potions this one makes old grubby records sound smoother and less gritty, reducing surface noise quite significantly. For best results use with the Mk10 brush.

**£11.95** ref: **A13**

## The Purifier

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

The clamps will accept single or multiple cables of up to half an inch in diameter and can be used on both signal and mains cables. The main benefit is a general cleansing of a system's sound allowing finer resolution of low level detail.

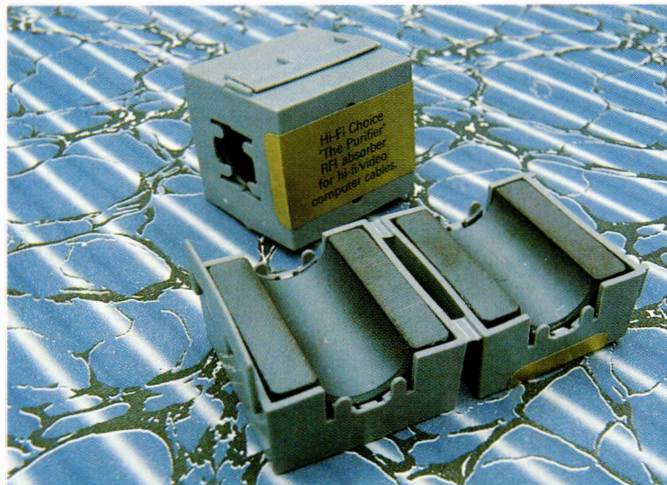
They can be particularly beneficial for digital interconnections.

**£16.90 per pair** ref: **A14**

## Nagaoka Anti-Static Record Sleeves no.102

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

The sleeves keep records dust free and eliminate static, but



are of course hampered if the record isn't cleaned before it's stored. No great sound quality claims but in these days of disappearing vinyl it pays to take care of what you've got, after all there may never be a format to beat it!

**£6.99** ref: **A15**

## Mk 10 Carbon Fibre Brush with Velvet Pad

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 tool after use.

**£9.99** ref: **A8**

## System Cleaning Kit 1

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

**£15.99** ref: **A9**

## Milty Work Mat

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

It is covered in 1mm long tentacles which gently grip the

disc so that it can be cleaned without moving about or rotating.

The nature of the material ensures that no static is induced and dirt falls between the tentacles. It's a real boon to disc cleaning and makes using cleaning brushes and solutions completely painless.

**£7.99** ref: **A16**

## Kontak cleaning solution

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

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

**£19.90** ref: **A17**

## Newnes Audio and Hi-Fi Engineer's pocket book (second edition)

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

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

If you really want to know what makes your CD player tick and aren't afraid of the odd wiring diagram or equation this is the book for you.

**£10.95** ref: **A18**

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

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

The need for understanding in digital audio is too wide and the subject is too interdisciplinary for that. As you can imagine this is a

Improve the sound of your system for a mere £15

Ever wondered why some people get taken seriously in hi-fi shops while others are given the run around? Wonder no more. The answer to all your hi-fi problems is the *Hi-Fi Choice* sweatshirt. Tastefully printed in red and black on grey, as well as being this year's most crucial fashion accessory, it will also readily identify you as a reader of *Britain's fastest growing hi-fi magazine*. You'll almost certainly be taken more seriously and end up with a better system – and all for a mere £15. We can supply the shirts in two different sizes – Large and Extra Large.





comprehensive tome that covers all aspects of digital technology including disc drives, rotary and stationary head recorders and even interconnects. It is a must for anyone wanting to get fully acquainted with the subject.

£49.50 ref: A19

**Technics Auto Compact Disc Cleaner**

The Technics *RP-CL300* is a powered wet/dry CD cleaner that can be run off batteries or the mains.

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

£39.95 ref: A20

**Audio Technica CD lens cleaner AT-6078**

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

Rather than fumbling about with cotton buds we would suggest you employ an Audio Technica CD lens cleaner. This is a standard size disc with a set of eight tiny brushes set into it, to use just apply a drop of cleaning fluid on one of the brushes, place the disc in your player and press play.

Ten seconds later, hey presto, a clean laser assembly, and cleaner sound from your CDs as a result.

£16.95 ref: A21

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.

**Furukawa FS-2F09 PCOCC speaker cable**

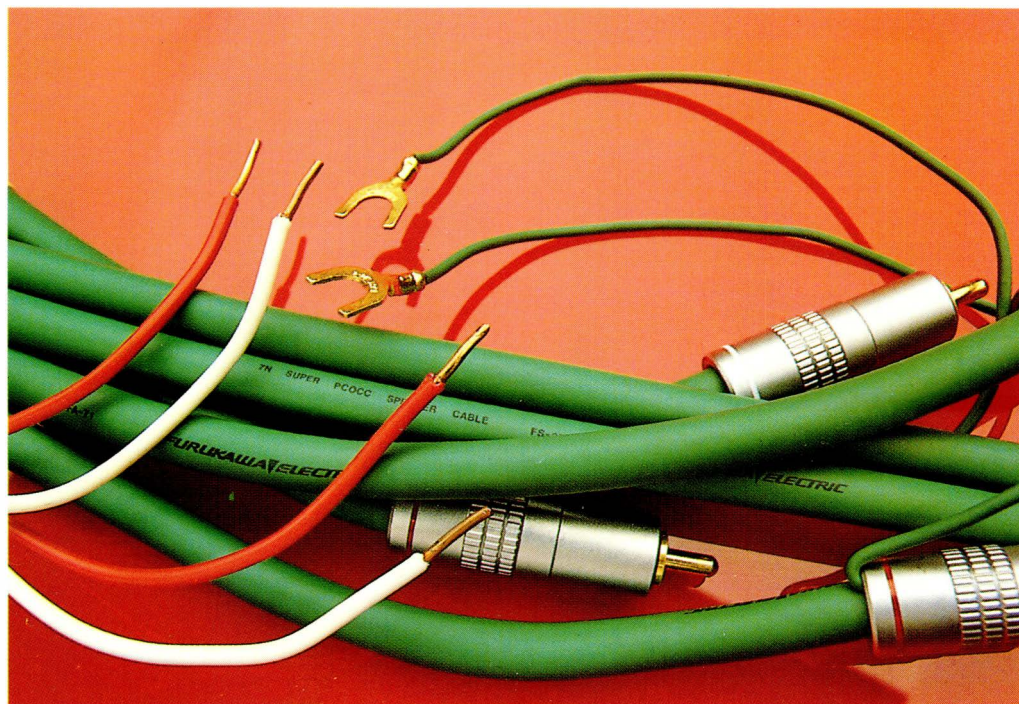
Two 0.09mm square drawn PCOCC strands are contained in a neat, flat, flexible PVC insulation.

The *FS-2F09* is highly regarded by audiophiles around the world.

**Furukawa FS-2T30F Evencap speaker cable**

PCOCC speaker cable consisting of two 3mm square drawn PCOCC rope lay strands.

*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**

*PCOCC* cable consisting of two twisted 2mm<sup>2</sup> 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.

**Furukawa FS-2T35P PCOCC speaker cable**

Produced from six concentric laid conductors in a rope lay this large cable has a low DC resistance and a larger occupation area for the skin effect, therefore bass is larger and treble is even sweeter.

**Furukawa FS2T55F Evencap speaker cable**

*FS-2T55F* is a 5.5mm 2 rope lay cable of similar construction to the *FS2T30F*.

Interconnects

We have a variety of interconnects on offer, all sourced from the respected Japanese specialist Furukawa.

**The FA21 Series balanced analogue interconnect cables**

The *FA21 Series* of analogue interconnects is supplied in matched pairs employing the Furukawa all PCOCC RCA plug with a flying earth or ground lead.

These interconnect cables are recommended for the connection of analogue devices where RCA sockets are provided. They can introduce a wide stereo image with good depth and height.

**Furukawa FD-11 Series balanced digital coaxial interconnects**

These 75ohm interconnects consist of a PC-OCC central conductor, double insulated with high density and air foamed polyethylene for high mechanical isolation. They are recommended for the interface between CD transports and DACs.

**Furukawa FA11S Series balanced analogue interconnect cables**

This interconnects is supplied in matched pairs employing the Furukawa hermetically sealed all PCOCC RCA phono plug with a flying earth or ground lead.

The cable's 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.





# Audiophile Recordings

We are pleased to be able to offer a selection of records from the world famous Reference label. Guaranteed to get the very best from your system these recordings have been selected for the merits of the performance as well as their outstanding sound quality.

## Prof Johnson's Astounding Sound Show: Sampler.

Orchestral Fanfare - Red Norvo Quintet - Cal Arts Ensemble - Richard Morris - Organ - Susan Mc Donald, Harp - Kronos Quartet - David Rosenthal, Tubulung.

A perennial audiophile favourite, this sampler of Prof Johnson's early work shows what Reference can do with a wide variety of musical and sonic experiences.

Includes the only known recording of an unusual tuned mallet instrument, the Tubulung. Guaranteed to give your playback system a royal wringing out!

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

Music by America's best loved composer, *The Appalachian Spring Suite* is presented in its original version for 13 instruments. Also included is the world premiere recording of Copland's orchestration of eight of his Emily Dickinson songs.

This recording was a Grammy Award nominee in 1987. The CD version also contains *An Outdoor Overture*.

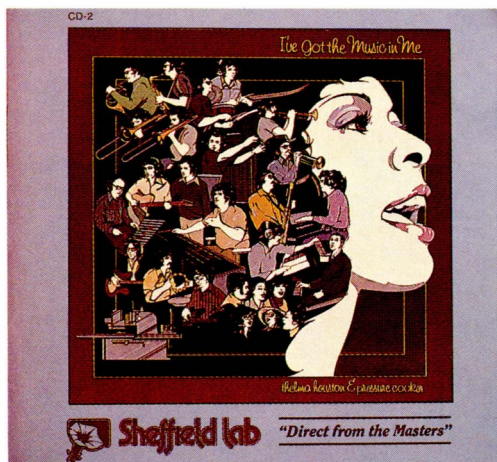
**Walker & Garson:** *Reflections. Portrait of a friend - Love - First song - Ethereal - Yearnings - Pied piper - The park - Magic spell - You're one of a kind - Reflections - Reason.*

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

**Helicon Ensemble:** *Vivaldi/Bach Vivaldi: Sinfonia in C-Trio Sonata in G minor - Double Concerto in E-Flat. Bach: Trio Sonata in C - Double Concerto in D minor.* (Compact Disc also contains *Prelude in C*)

Albert Fuller conducts from the harpsichord a varied original instrument ensemble in works featuring two solo violins, including the great *Double Concerto* by Bach and three rare, ingratiating works by Vivaldi.

Featured solo artists are Japp



Schroeder, Stanley Richie and Linda Quan.

Recorded at the John Harms Centre for the Performing Arts in Englewood, New Jersey. CD also has Bach's *Prelude in C*.

**Walton:** *Facade Suite.*

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

An instrumental from Walton's whimsical *Facade* in the composer's original scoring makes a perfect vehicle for these brilliant musicians. A chamber version of *Till Eulenspiegel* and the seldom heard pieces of Scriabin and Nielsen complete this engaging programme.

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

Canada's finest original-instrument Baroque ensemble plays familiar favourites with outstanding scholarship and musical panache. Note the Pachelbel *Canon* with its seldom heard companion piece, both to the composer's instrumentation. Strings, oboes, recorder and harpsichord offer delightful music recorded in a vaulted ceiling stone church.

**Stravinsky:** *L'Histoire.*

**Stravinsky:** *L'Histoire du soldat suite. Blackwood: Capriccio Espagnol.* Chicago Pro Musica.

Stravinsky's landmark composition for a mixed ensemble of seven. Grammy winning performances.

**Respighi:** *Church Windows.* Keith Clark, Pacific Symphony Orchestra.

This grandiose work, scored for full symphony orchestra, pipe organ and tam-tam, has at last been given its due, musically and sonically, in this celebrated recording. *Church Windows* quite literally pushes to the theoretical limit the dynamic range it is possible to reproduce at home.

The CD also contains Respighi's rare mini concerto *Poema Autunnale* with the violinist Ruggiero Ricci.

**Marni Nixon:** *Marni Nixon sings Gershwin. Summertime - Let's call the whole thing off - Someone to watch over me - I've got a crush on you - But not for me - The real American folk song - Nice work if you can get it - Embraceable you.*

Marni Nixon's impeccable intonation and diction bring a welcome elegance to these songs which are perhaps too often jazzed up. By beautifully singing what Gershwin wrote, stylishly accompanied by Lincoln Mayorga's piano, Miss Nixon brings new insights to these immortal songs.

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



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

Smoky night club arrangements set the stage for some unforgettable singing.

**Dick Hyam:** *Dick Hyam Plays Fats Waller. Ain't misbehavin' - Keepin' out of mischief now - African ripples - Honeysuckle rose - Willow tree - Stealin' apples - I've got a feeling I'm falling - Handful of keys - My fate is in your hands - Jitterbug waltz - Squeeze me.*

The world's first direct-to-CD on RR-33DCD. A technological and musical triumph, a true landmark in recording history. RR-33DCD (listed as Ref CD87 on the order form) is available as a deluxe numbered limited edition.

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

No recording tape of any kind was used, nor was the digital bitstream corrupted at any stage by copying manipulation or editing.

The digits generated at the recording session are the very digits on the finished Compact Disc. Also on ordinary CD and LP.

**Michael Garson:** *Serendipity. Lady - Autumn leaves - I should care - Spirit of play - Trio blues -*



## My romance

With illustrious sidemen Stanley Clarke (bass). Gary Herbig (sax), Peter Sparague (guitar) and fellow Free Flight members Jim Walker and Jim Laceyfield, Michael Garson has put together a tasty program of exciting mainstream acoustic jazz. Recorded by Prof Johnson in a real concert space, *Serendipity* represents an alternative, non-studio approach to jazz recording. A long standing favourite for audio demo, the CD contains two extra tracks.

## Star of Wonder:

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

Festive music for the holiday season by an outstanding professional chorus, recorded in San Francisco's St Ignatius Church.

The spine tingling acoustics are ideal for this program and *Star of Wonder* contains the full range of Christmas music: imaginative arrangements of traditional carols, renaissance motets and dramatic 20th century compositions.

The CD contains three extra tracks.

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

This is widely considered to be the recording of this magical work. The Utah Symphony Orchestra, playing in Salt Lake City's Symphonic Hall, gives a world class performance, and the excellent recording captures it in its entirety.

The CD contains two versions of the explosive finale, one with standard orchestral bells, and another with digitally recorded church bells.

The 2-disc 45RPM LP set contains two copies of *March To The Scaffold* and *Dreams Of A Witches Sabbath*.

**Nojima:** *Nojima plays Liszt. Sonata in B minor - Mephisto Waltz - La Campanella - Harmonies du Soir - Feux Follets.*

The recipient of more rave reviews than any piano recording in recent memory, this is truly one for the history books.

Japan's most celebrated concert pianist won the Silver Medal at the Van Cliburn competition. Connoisseurs of great piano playing will treasure this recording, which has also been acclaimed for its outstanding sonic realism

**Chicago Pro Musica:** *Weill, Varese, Bowles and Martinu. Threepenny Opera suite - Octandre - Music for a farce - La Revue de Cuisine.*

Chicago Pro Musica gives brilliant performances of four magnificent 20th Century works. Kurt Weill's pungent suite for wind, brass and percussion is the centrepiece.

Featuring the first stereo recording of a rare piece by Paul Bowles, best known as the author of *The Sheltering Sky* but also a distinguished composer for the stage.

Martinu's Parisian ballet from the 1920s contains the steamiest of tangos and a mad Charleston.

**Eileen Farrell:** *Rogers & Hart. I could write a book - I wish I were in love again - Wait till I see him - I didn't know what time it was - Love me tonight - Nobody's heart - It never entered my mind - Mountain greenery - Sing for your supper - Can't you do a friend a favour - Lover - My heart stood still - Little girl blue - You're nearer.*

A wide ranging survey including many great standards and more than a few rarities. Farrell's affinity for the songs of this era is undisputed.

Beautifully sung as her earlier pop recordings were, these new performances reveal an added dimension to the Farrell art - total involvement with the lyrics. And what lyrics! A must for admirers of Lorenz Hart.

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

Here is the eagerly awaited sequel to Nojima's first American recording, featuring some of his most renowned specialities.

*Gaspard de la Nuit* is the pianist's Everest, attempted by only a few. *The Miroirs* are a distillation of Ravel's impressionist style, requiring a totally different technique. The Nojima performances are incandescent.

**Opus 3 test record 1:** Depth of image.

Produced with the idea of analysing hi-fi systems and their ability to reproduce depth of image. This is Opus 3's best selling recording. It contains the work of a broad cross section of the label's recording artists.

**Opus 3 test record 2:** Timbre.

Timbre or tonal accuracy is a crucial area of performance for audio equipment, this disc is composed of tracks designed to show up the timbral strengths of the components its played through. A good recording of interesting and diverse music.

**Opus 3 test record 3:** Dynamics.

Another compilation on the Swedish Opus 3 label, with musical extracts carefully chosen

to illustrate what is meant by musical dynamics with comprehensive liner notes to show you what you should be listening for. How good is your hi-fi system?

**Opus 3 test record 4:** Depth of image, Timbre, Dynamics.

In this fourth recording in the test series Opus has linked together the three concepts as a basis for completely evaluating audio equipment. Test record 4 like the first three contains a selection of illustrated music from our catalogue - mostly from the more recent recordings.

## Thelma Houston & Pressure

**Cooker:** *I've got the music in me.*

*I've got the music in me - To know you is to love you - Don't misunderstand - Got to get you into my life - plus four instrumental tracks.*

One of Sheffield Labs' most famous recordings. The original direct cut has been out of print for many years and is now highly collectable - but the recording sessions were of course taped, and this issue will still blow your socks off!

## Eileen Farrell: Sings Arlen.

*Let's fall in love - Out of this world - I wonder what became of me - I've got the world on a string - Like a straw in the wind - Down with love - Happiness is a thing called Joe - A woman's prerogative - Come rain or come shine - Little drops of rain - Over the rainbow - When the sun comes out - As long as I live - My shining hour - Last night when we were young.*

Farrell worked often with Harold Arlen, and has long been identified with his music: it was an Arlen tune that gave the title to the first of four albums of pop songs she made in the sixties, *I've got a right to sing the blues*.

This definitive new collection is graced with music notes and personal remembrances by Gene Lees.

**Jim Brock:** *Tropic affair Pass a grill - Ladies of the Clubash - Tropic affair - Anya - Quo qui's groove - Side walk - Palm palm girls - O vazio.*

Vibrant, steamy and sensual, this contemporary instrumental jazz contains more than a touch of the tropics.

Renowned percussionist Jim Brock has recorded and toured with such diverse musical talents as Dave Valentin, Janis Ian and Scott Cossu.

Brock's dynamic ten-piece band, production by legendary Don Dixon, and prof. Johnson's magical live to two-track studio sonics result in a soundstage of such three-dimensionality, you can step inside the music. Enjoy

a vacation without leaving home with tropic affair!

**Eileen Farrell:** Sings Johnny Mercer  
*Skylark - I remember you - Early Autumn - Laura - I thought about you - Too marvelous for words - and more.*

Arranged by Manny Albam and Loonis McGlohan, this album includes rarities and favourites from the vast catalogue of America's most poetic and prolific lyricist.

**Eileen Farrell:** *It's over I get the blues when it rains - How about me? - Easy to remember - Gone with the wind - I remember April - And more* memorable tear jerkers.

Arranged and conducted by Robert Farnon, this album gives Farrell the opportunity to demonstrate her considerable skills, in touching songs of lost love. These great laments respond eloquently to the lush Farnon treatment.

## NEW RELEASES

### Robert Farnon conducts the Royal Philharmonic Orchestra:

Film music and other works  
*Suite from Captain Horatio Hornblower - Lake in the woods - Canadian impressions - A la Claire fontaine - and more.*

The Royal Philharmonic Orchestra, conducted by the composer, Robert Farnon at the Town hall, Watford.

The recording session that *Hi-Fi Choice* contributor Richard Black wrote about in the February issue (103), produced by the legendary Prof Keith Johnson using both analogue and digital tape recorders to produce the finest results for LP and CD.

This has the traditional Reference Recordings virtues of wide bandwidth and dynamic range and an unusual degree of clarity, due in no small part to the simplicity of the recording equipment.

### Malcolm Arnold: Conducts the London Philharmonic Orchestra.

*A Sussex overture - Bechus - Dandi Pratt - The smoke - Anniversary overture - The fair field - Flourish for orchestra - The Commonwealth Christmas overture.*

On this very latest Reference recording the London Philharmonic Orchestra is conducted by the composer, Malcolm Arnold, at the Town hall, Watford.

This Keith Johnson production includes first recordings of Britain's leading living composer's lesser known works.



## Record and CD PriceTable

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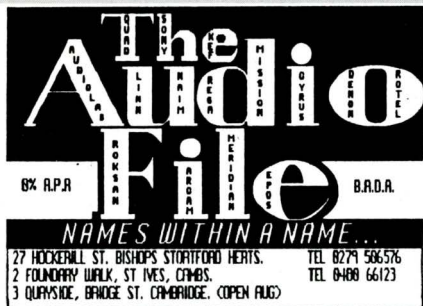
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# Dealer Guide

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**SOUND STYLE**  
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**The Sound Organisation (York)**  
2B Gillygate, York YO3 7EQ.  
Telephone: 0904 627108  
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## WANTED

**WANTED - VINTAGE VALVE HI-FI**  
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Valves: list available.  
Turntables: Thorens, TD124 & TD 224, Garrard 301.  
Pickup Arms & Heads: Decca FFSS, SME 3012 etc.  
Loudspeakers: Tannoy 15" - Monitors and ILLZ, Wharfedale Airedale, Western Electronics.  
Illustrated 22 page "Wanted List" available upon request.  
Buyer collects in areas on a regular basis.  
**The Vintage Wireless Company Ltd., Tudor House, Cossham Street, Mangotsfield, Bristol, BS17 3EN. Tel: (0272) 565472. Fax: (0272) 575442**

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4. The copy for the inclusion in the August issue must reach the Hi-Fi Choice office by 20th June.

## AERIAL INSTALLERS

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For other members please phone 081 902 8998

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Gramophone House  
Station Road Cullercoats North Shields NE30 4PQ

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Tel: 0273 461579

**ALSO AT**  
**HORSHAM - 0403 211801**  
**HAYWARDS HEATH - 0444 441114**  
**EASTBOURNE - 0323 39543**



# The Choice Dealer Directory

Choosing a good hi-fi dealer is the most vital step in acquiring the system that is right for you. This unique directory gives full information on dealers in your area.

## AVON

AUDIO EXCELLENCE, 65 Park Street, Bristol. (0272) 264975.  
Great Hi-Fi carefully selected and demonstrated by friendly enthusiastic staff. Closed Mon. **BADA**  
PAUL GREEN HI-FI LTD, Kensington Showrooms, London Road, Bath. (0225) 316197. Linn, Musical Fidelity, Krell, A&R, Creek, Rogers, Quad, Cust. car park. Best selection in the West. **BADA**  
RADFORD HI-FI, 52-54 Gloucester Rd, Bristol. (0272) 428247 Choose from a huge selection of the world's leading hi-fi manufacturers in one of our 3 modern dem rooms. Expert advice and personal service guarantee your total satisfaction. FREE home trial, FREE installation. Visa, Access credit facilities. 9-5.30 Mon-Sat. **BADA**  
RADFORD HI-FI, 4 Merchant St, Broadmead, Bristol. (0272) 294183. One dem lounge. 9.30-6 Mon-Sat. Other details as above. **BADA**  
RADFORD HI-FI, 12 James St West, Bath. (0225) 446245. All details as Gloucester Road shop above. **BADA**  
V AUDIO, 36 Druid Hill, Stoke Bishop, Bristol B59 1EJ. (0272) 686005 ATC, Acoustic Energy, Ruark, AVI, Exposure, Dahlquist, Threshold, Pink Triangle, Wadia. Demos by appt only, home trial facilities, free installation, service facilities.

## BEDFORDSHIRE

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. Noappt. nec. Home trial. Free install. Service dept. Access & Visa. Tue-Sat 10-6.

## BERKSHIRE

B&B HI-FI, 11-12 Market Place, Reading, Berkshire, RG1 2EG. (0734) 583730. Aiwa, Denon, Kenwood, Mission, NAD, Panasonic, Pioneer, Rotel, Sony, Technics. Free installation, Service dept. Access, Visa, Credit Facilities including interest free credit subject to status. 9.30-5.30, Sat 9-5.30. Also at: Bracknell, Maidenhead, High Wycombe, Newbury.  
NEWBURY AUDIO, 2 Weavers Walk, Northbrooke St, Newbury, Berkshire RG13 1A1 (0635) 33929. 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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## BUCKINGHAMSHIRE

AUDIO INSIGHT LTD, 53 Wolverton Rd, Stony Stratford, Milton Keynes. (0908) 561551. Arcam, Audioblab, Heybrook, Ion, Linn, Meridian, Quad and more. Access, Visa, Finance, Dem. Room etc.  
TECHNOSOUND, 7 Granville Square, Willen Centre, Milton Keynes (0908) 604949. Bang & Olufsen, Denon, Rotel, Technics, Yamaha and enthusiast Hi-Fi. Also at Luton and Dunstable.

## CAMBRIDGESHIRE

AUDIO FILE, 2 Foundry Walk, Market Hill, St. Ives, Cambridgeshire. (0480) 66123. Linn, Naim, Rega, Quad, Cyrus, Arcam, Musical Fidelity. 9.30am-6pm 6 days. 0% Credit. **BADA**  
CAMBRIDGE HI-FI, 1-3 Hawthorn Way, Chesterton, Cambs, CB4 1AT (0223) 67773. Mission-Cyrus, Rotel, Kenwood, Pioneer, Manicore, Revolver, Ariston, I.T.L., KEF, Meridian, Technics, Ruark, Monitor Audio. Single speaker dem. room. Tues-Sat 9.30-5.30 closed Mon. Free installation. Service Dept. Visa, Access, Credit facilities. **BADA**  
HI-FI COMPANY, 42 Cowgate, Peterborough, Cambs. PE1 1NA. (0733) 341755. Pioneer, Technics, Yamaha, Rotel, NAD, Denon, Arcam, Audioblab, Mission, Kef. No appts necessary, home trial facilities, free install (if necessary), service dept. Access, Visa, Amex, Switch. Open 6 days 10-5.30  
STEVE BOXSHALL AUDIO, 41 Victoria Rd, Cambridge CB4 3BW. (0223) 68305. 10-6 - 6 days. 3 dem rooms, home trial, appts. preferred. Free installation and service dept. Access, Visa & credit. **BADA**  
UNIVERSITY AUDIO, 1-2 Peas Hill, Cambridge (0223) 354237. Roksan, Quads, Meridian, Arcam, Musical Fidelity, Marantz, ATC, Pioneer, Yamaha, Infinity. 2 dems, 1 single speaker. Home trial, free install, Service Dept. Visa, Access, Amex, Credit. 9-5.30.

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ASTON AUDIO, 4 West St, Alderley Edge. (0625) 582704. Wide range of specialist audio, interest free credit. Visa, Access. Home trial. **BADA**  
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PHILIP DOOLEY, 106 Mill St, Macclesfield, Cheshire SK11 6NR. (0625) 423158. Marantz, Trio-Kenwood, Pioneer, Aiwa, Cambridge Audio, Teac, B&W Loudspeakers, Celestion, Rogers, Tannoy. No apt necessary, home trial facilities, free install, service dept. Visa, Access, Lombard Tricity. Open 9-6pm, Wed 9-1pm. **BADA**  
PETER MARTIN HI-FI, 4 Duke St, Congleton (0260 273206), 1 Stanley St, Leek (0533 383780), Celestion, Creek, Musical Fidelity, Pink Triangle, Rotel, Ruark, Sony, Systemdek, Tannoy, Teac, Technics. 2 Demo Rooms, No appts nec, Home trial, Free install, Service dept.. Access, Visa, Combarb Tricity. Open 4-5.30, 6 days a week. **BADA**  
PETERS HI-FI, 4 St Michaels Squ., Grosvenor Precinct, Chester. (0244) 322063/319392. Linn, Arcam, Technics, Sony, Marantz, Dual, Denon, Tannoy, Wharfedale, Quad. 2single spker dem rooms, no appts nec., free installation, service dept. Access, Visa, Amex, Peters credit chargecard Mon-Sat 9-5.30. **BADA**  
SWIFT OF WILMSLOW, 4-8 St Annes Parade, Wilmslow. (0625) 526213. Arcam, Denon, Kenwood, Musical Fidelity, Marantz, NAD, Cambridge. 2 dem rooms. Tues-Sat 9.15-6pm. No pressure! **BADA**

## CLEVELAND

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

## CORNWALL

ART OF MUSIC, Near Launceston, Cornwall. (0566) 86649. Cary, Chessell, Diamond Acoustics, Forsell, Linn, Reference, Magnum, Dynalab, Magnum Reference, Silverlink Cable, Shinon. Dem studio appointments necessary, home trial facilities, & free installation. Open 7 days **BADA**  
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## CUMBRIA

HL ELLIOT, 29 Lowther Str, Whitehaven, Cumbria CA28 7DJ. (0946) 693671. Quad, B&w, Rotel, Aiwa, JVC, Kef, Celestion, Infinity, Marantz, Bose, Canon. No appts necessary, home trial, free install, service dept. Access & Visa, credit terms arranged. Mon-sat 9.30-5.30pm closed Wed. **BADA**  
PETER TYSON, 6 Abbey St, Carlisle, Cumbria CA3 8TX. "Cumbria's premiere hi-fi centre". Part exchange welcome. (0228) 46756. Linn, Musical Fidelity, Cyrus, Marantz, Denon, Philips, Nakamichi, Technics, Pioneer, Creek & more. Dem room. Demos without obligation. Home trial. Free Install. In-house service dept. Visa, Access, HP. 9-5.30.

## DERBYSHIRE

ACTIVE AUDIO LTD, 12 Osmaston Rd, The Spot, Derby. (0332) 380385/385185. Arcam, Ariston, Celestion, Denon, Exposure, Kef, Kef Reference, Cyrus, Marantz, Revox, Rotel, Rogers, etc. Account and credit cards. Ring for opening times and free 'Fact Pack'. The only BADA member in Derbyshire. **BADA**

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RADFORD HI-FI, 107 Cornwall St, Plymouth. (0752) 226011. 2 dem rooms. Other details as above. **BADA**  
RADFORD HI-FI, 28 Cowick St, St Thomas, Exeter. (0392) 218895. All details as Torquay shop above. **BADA**  
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SUTTONS HI-FI, 18 Westover Road, Bournemouth. 0202 555512. Linn, Arcam, Mission, Quad, Audioblab, Rotel, Yamaha, Denon, etc. 2 Single Speaker Listening Rooms, Home Demonstrations, Free Installations. Mon-Sat 9-5.30. Call for details. **BADA**

## ESSEX

AUDIO T, Gants Hill, 442-444 Cranbrook Rd, Gants Hill, Ilford, Essex IG2 6LL. Tel: 081 518 0915 Fax 081 554 8463. Great Hi-Fi from Linn, Arcam, Denon, Meridian, B&O, Mission/Cyrus, Rotel, Yamaha & many more. Tues-Sat 10-6. Wed till 8pm. 2 single spker dem rooms. Free del. & instal. **BADA**  
1ST AND FOREMOST HI-FI CENTRE, 49-55 North Station Road, Colchester, Essex CO1 1RQ. Tel: (0206) 549842. Fax: (0206) 762900. Tlx: 987873 SAIDG. Trio Kenwood, JVC, Akai, Aiwa, Sony, Pioneer, Technics, Nakamichi, Panasonic, Revox, etc. Home trial, free installation. Service dept. Instant credit available + all credit cards accepted. Mon to Sat 9am-6pm. **BADA**  
AUDIO T, 442/4 Cranbrook Rd, Gants Hill, Ilford. (081) 518 0915. Mon-Sat, 10-6. Two dem rooms. Access, Visa. Sony Hi-Fi News Best Dealer '86 & '88 (National) **BADA**  
BRENTWOOD MUSIC & HI-FI CENTRE, 2 Ingrave Rd, Brentwood, (0277) 221210. Alphason, Denon, Marantz, Quad, DNM, Rock/Glastonbury, E.A.R., Exposure, Kelvin Labs, Rotel, plus many more. Dem facilities, home trial, evening appts. (high end). Home installations. System problem diagnosis. Mon-Sat 9.30-5.30 (Thurs from 10am, Sat from 9am). Credit facilities, Access, Visa, Hi-Fi Markets Chargecard. Service facilities. **BADA**  
LYON AUDIO, 16 Peartree Business Centre, Peartree Road, Stanway, Colchester, Essex CO3 5JN. (0206) 560259. Mission, Cyrus, Arcam, Denon, Rotel, JPW, KEF, Rogers, Quad. Dem facilities. Mon-Sat 9-6. Installations. Access, Visa, Instant credit. Service dept **BADA**  
RAYLEIGH HI-FI, 44a High Street, Rayleigh, Essex. (0268) 779762/747571. 216 Moulsham St, On-the-Parkway, Chelmsford. (0245) 265245. 132-134 London Road, Southend-on-Sea. (0702) 435255. A&R, Creek, Cyrus, Denon, Epos, Ion, Linn, Mission, Naim, Quad, Rega, Roksan, Rotel, Royd. 0% finance. **BADA**  
THOMSONS, 2 High Street, Great Baddow, Chelmsford, Essex. Tel: (0245) 71465, Fax 0245 77528. JVC, Kenwood, Mitsubishi, Toshiba, Tannoy, Mordaunt-Short, Wharfedale, Philips, Audio-Visual dealer. Home trial. Free installation. Service dept. Access, Visa, HP. Open 9-1, 25.30 Mon-Sat. Open 9-1 Wed.



# The Choice Dealer Directory

## GLOUCESTERSHIRE

AUDIO EXCELLENCE, 58 Bristol Road, Gloucester. (0452) 300046. Great Hi-Fi carefully selected and demonstrated by friendly and enthusiastic staff. Closed Mon. **100%**

AUDIOT, 40-42 Albion St, Cheltenham, Glos. GL52 2RQ. (0242) 583960, Fax (0242) 226435. Great hi-fi from Linn, Arcam, Denon, Meridian, Audiobab, Mission/Cyrus, Rotel, Sony and many more. Mon-Fri 10-6pm. Sat 9.30-5.30. Single spker dem room. Free del. and instal. **100%**

HUTCHINSONS, 295-297 High Str, Cheltenham, Glos. GL50 3HL. (0242) 573012. Pioneer reference point, Technics, Dual, NAD, JWharfedale, Celestion, Marantz, Aiwa, Kenwood, Sennheiser. No appts necessary, free install, service dept. Instant credit up to £1000. Open Mon-Sat 9.15-5.30. R LEWIS & CO Ltd, 45 High Str, Stroud, Gloucestershire GL5 1AW. (0453) 762485/9. Bang & Olufsen, Denon, Dual, Mission, Mordaunt-Short, Pioneer, Sony, Technics, Yamaha, Celestion etc. In store dems, free install, service dept. Access, visa. Open 8.30-5pm 6 days. **100%**

## HAMPSHIRE

AUDIO I, 4 Feathers Lane, Basingstoke, Hants RG21 1AS. (0256) 24311, Fax (0256) 24430. Great hi-fi from Linn, Arcam, Denon, Meridian, Mission/Cyrus, Rotel, Sony and many more. Mon-Sat 9.30-5.30pm, closed Wed. Single spker dem room. Free del. and instal. **100%**

HAMILTON ELECTRONICS, 35 London Rd, Southampton, Tel: 0703 228622/3 Fax: 0703 332141. Hi-Fi and Surrounding Sound Specialists. Harman Kardon, Marantz, Denon, B&W, Quad, Aiwa, Technics, JBL, Heco. No appts nec. Home trial facilities, Free Install, Service Department. Open 9-5:15pm Mon-Sat. Access and Visa. HAMPSHIRE AUDIO LTD, 2-12 Hursley Rd, Chandlers Ford. (0703) 252827/265232. Quality CD and analogue agencies. 5 dem studios. Large free car park. **100%**

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. **100%**

TRU-FI SOUND & VISION, 10-12 Grosvenor Road, Aldershot, Hants. Tel/Fax: (0252) 26390/332424. Aiwa, Audio Technica, B&W, Nakamichi, Mission, Mordaunt-Short, Nagaoka, Sony, Technics. Dem fac. Free install. Service dept. 0% finance. Access, Visa. Mon-Sat 9.30-6. **100%**

## HEREFORDSHIRE

ENGLISH AUDIO, 95 Whitecross Road, Hereford HR4 0DG. (0432) 355081. Musical Fidelity, Arcam, Pink Triangle, Denon, Marantz, Mission-Cyrus, Audio Innovations, Rotel, NAD, Nakamichi, TDL, and others. Single Speaker Dem room. Home trial. Free install. Service dept. Access, Visa, Credit arranged. Open Mon-Sat 10am-6pm. **100%**

GOSPEL MUSIC AUDIO, 32A High St Kington, Herefordshire. (0544) 230254. New Shop open: Castle Video, 1 Spa Centre, Station Crescent, Llandrindod Wells (0587 824 0200) Alphason, Alison, Revolver, Luxman, Yamaha, QED, Audio Systemline, Wharfedale, Jamo, Micromega., No appts nec., home trial facilities, service dept. -5.30-evening dems. **100%**

## HERTFORDSHIRE

ACOUSTIC ARTS LTD, 101 St Albans Rd, Watford, Herts. (0923) 245250 Fax (0923) 230798 Absolute Sounds, Acoustic Energy, Audiobab, Denon, Marantz, Meridian, Quad, Ref Imports, TDL., Teak, Tues-Sat 9.30-6:00 **100%**

BANG & OLUFSEN CENTRE - HI-WAY HI-FI (MARLOWES) Ltd, Unit 32, Marlowes, Hemel Hempstead. (0442) 235755, Fax: (0442) 231825. Stockist also of Kenwood, Pioneer, Technics, Yamaha, Aiwa, JVC, Bose, Heybrook, Wharfedale, Sony, etc **100%**

RADLETT AUDIO, 141 Watling Street, Radlett, Hertfordshire, WD7 7NQ. (0923) 856497. Mark Levinson, Proceed, PRO AC, Magnepan, Albarry, Martin Logan, Tube Technology, Audiobab, Rotel, Rega. Home trial facilities, Free Install, Service Dept. Visa, Access 9-5:30 Mon-Fri 10-5:30 Sat **100%**

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. **100%**

THE AUDIO FILE, 27 Hockerill St, Bishops Stortford, Herts CM23 2DW. (0279) 506576. 9.30-5.30 6 days. Dealer Of The Year 1988/89. Linn, Naim, Rega, Quad, Cyrus, Arcam, Musical Fidelity. 0% credit. **100%**

## NORTH HUMBERSIDE

JUST AUDIO, 2A Foston Lane, North Frodingham, Driffield. Tel 0262 488700, call for details.

SUPERFI, 4 Dock Str, Queens Gardens Hull, HU1 3DL. (0482) 24051. See main entry under Nottinghamshire for full details. **100%**

## KENT

CANTERBURY HI-FI, 50 Burgate, Canterbury, Kent. (0227) 765 315 B&W, Denon, Kenwood, Cerwin-Vega, Yamaha, Technica, Rogers, Musical Fidelity, Sony, NAD. No appointments necessary. Free Installation. Service Dept. Access and Visa. Mon-Sat 9-5:30 **100%**

JOHN MARLEY HI-FI CENTRES, 2 Station Rd, West Canterbury. (0227) 769329. Also at Dover - (0304) 207562. Arcam, B&W, Heybrook, Infinity, JPW, Pro-Ac, Pioneer, Rotel, Tannoy, Technics. Dem and home trail fac. Mon-Sat 9-5:30 closed Thurs. Free install. Credit to £1,000. Access, Visa, Credit charge. Service dept. **100%**

KIMBERLEY HI-FI, 193 Broadway, Bexleyheath, Kent. (081) 304 3272. Pioneer, Technics, Kenwood, Denon, NAD, Aiwa, Tannoy, Mission, Wharfedale, Castle. Separate dem room, no appt nec. Free installation. Service Dept. Instant credit facilities. 9.30-5.30. No early closing. **100%**

PANATEC SOUND & VISION CENTRE, 83b High Str, Gillingham. (0634) 5731141 B&W, Bose, Dual, Kenwood, Marantz, Pioneer, Philips, Sony, Tannoy, Technics. Dem room facilities. 0% credit, Service Dept. Free Installation. Pioneer Reference Point Dealer. **100%**

PANATEC SOUND & VISION, 17 Week Str, Maidstone. (0622) 661488 See above for details. **100%**

PHOTOCRAFT HI-FI, 40 High St, Ashford (0233) 624441. No.1 in Kent for Linn, Naim, Rega, Roksan, Exposure, Onix, Epos, Royd, Creek. But before you choose equipment choose where to buy it. Dem room, appts necessary. Home trial and free installation. Visa, Access, Bada Chargecard. 9-5.30 mon-Fri (Wed & Sat to 5 only). Service Dept. **100%**

VOLUME ONE, 41 Upper Wickham Lane, Welling, 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. **100%**

V J HI-FI, 29 Guildhall St, Folkestone. (0303) 56860. Mon-Sat 9-6. NAD, Yamaha, Marantz, Cambridge Audio, Denon, Kenwood, Rogers, Dual, Musical Fidelity, Quad, Dem and home trial facilities, free install, credit to £1000. Amex, Diners, Visa, Access. Service dept. **100%**

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. **100%**

## LANCASHIRE

NORMAN AUDIO, 216 Church Street, Blackpool FY1 3PT. 0253 295661. For details see Preston branch entry ( below). Open 9-5.30, Closed Wed. **100%**

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. **100%**

ROMERS HI-FI CENTRE, 94-96 High Street, Rishton, Blackburn, Lancs, BB1 4LQ. **100%**

Tel: 0254 887799. Musical Fidelity, Technics, Pioneer, Marantz, Revox, Tannoy, Celestion, Sony, Panasonic, Mission. Single Speaker Dem Room. Also wired for pro logic. No appts nec. Home trial fac by arrangement. Free Install, Service Dept. Access, Visa, Switch, Interest free on selected products. Open 9-5:30 Wed 9-1:00 **100%**

## LEICESTERSHIRE

MAYS HI-FI, 27/33 Churchgate, Leicester. LE1 3AL. (0533) 625625. Sony, Technics, Denon, Kenwood, Pioneer (Reference Point) Philips, B&W, Tannoy, Mission/Cyrus, Dual, Listening room, free install, service dept. Full range of credit facilities. Open Mon-Sat 9-5:30 Thurs 9-1:30 THE LEICESTER HI-FI CO, 6 Silver Walk, St. Martins Square, Leicester LE1 5EW. Tel: (0533) 539753. Fax: (0533) 626097. Acoustic Energy, Arcam, Marantz, Micromega, Mission/Cyrus, Musical Fidelity, Nakamichi, Meridian, Rogers, Roksan, "and oodles more". 2 dem rooms, home trial arranged, free install, service dept. Credit facilities. Access, Visa, Diners, Amex. 6 days 9.30-5.30. Bada member. **100%**

SOUND ADVICE, The Factory, Duke St, Loughborough LE11 1ED. (0509) 218254. Mission Cyrus, Rega, Naim, Linn, Meridian, Yamaha, Rotel, Arcam, Nakamichi, JPW. 3 demonstration areas, no appts necessary, free installation, service department. Lombard credit charge, Access, Visa. Mon-Fri 9.30-6.00, Sat 9.30-5.30. **100%**

## LINCOLNSHIRE

BOSTON HI FI CENTRE, 65a Wide Bargate, John Adams Way, Boston, Lincs PE21 6SG. (0205) 365477. Quad, Nakamichi, Arcam, Marantz, NAD, Castle, JPW, Rogers, etc. Separate demo studio. Home trial. Free installation. Access, Visa. Tues - Sat 9-5 pm. **100%**

STAMFORD HI-FI CENTRE, 9 Red Lion Square, Stamford, Lincs PE9 2AJ. (0780) 62128. Pioneer, Technics, Cyrus-Mission, Rotel, NAD, Yamaha, Kenwood, Marantz, Quad, plus all major speaker manufacturers. **100%**

Expert advice, comparator demonstrations, on two floors, part exchange Hi-Fi purchased for cash. No appointments necessary, home trial facilities, free installation, service department. Mastercard, Visa & credit charge, finance available. Mon-Sat 9-5.30pm, closed Thursdays. SUPERFI, 271A High Str, Lincoln LN2 1JG. (0522) 520265. See main entry under Nottinghamshire for full details. **100%**

## LONDON

ANALOG AUDIO, 849 High Road, London N12. (081) 445 3267. Cambridge, Denon, Rotel, Yamaha, Marantz, Wharfedale, Teac, Mordaunt-Short, Cerwin Vega, Nad. Free install. Service Dept. Instant credit up to £1000. Visa & Access. 9.30-6 6 days. **100%**

AUDIOT, 190 West End Lane, West Hampstead, London NW6 1SQ. (071) 794 7848, Fax (071) 431 3570. Great hi-fi from Linn, Arcam, Denon, Meridian, Mission/Cyrus, Rotel, Proac, Micromega, Yamaha and many more. Tue-Sat 10-6pm. 2 single spker dem room. Free del. and instal. **100%**

BILLY VEE SOUND SYSTEMS, 248 Lee High Road, London SE13. (081) 318 5755. Arcam, Linn, Naim, Quad, etc. 2 dem rooms. Int. free credit. Access, Visa. Closed Thurs. **100%**

CORNFLAKE SHOP, 37 Windmill St (just off Tottenham Court Rd), London W1. (071) 631 0472. Mon-Sat 10-7. Rega, Roksan, Naim, Monitor Audio, Koetsu, Marantz, Yamaha, SME, DNM, Epos. 3 dem rooms. Del and instal. service. Credit facilities, Access, Visa. **100%**

COVENT GARDEN RECORDS, 84 Charing Cross Road, London WC2 H0JA. (071) 379 7427, Fax (071) 836 1345. London's premier digital audio centre, single speaker dem rooms, appointments suggested, installation service available, service department. All major credit cards accepted. Mon-Sat 10am-7.30pm. 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. **100%**

DEANS, 283 Edgeware Road, London W2 1BB. TEL (071) 402 666, FAX (071) 724 2135. Aiwa, B&W, Dual, Harman Kardon, JBL, JVC, Kenwood, Marantz, Pioneer, Technics. Mail order, fast efficient delivery, all goods dispatched same day. Service department. Guarantees on all products. All major credit cards accepted. Open 6 days to 6pm, Thurs till 8pm. **100%**

GRAHAMS HI-FI, Canonbury Yard, 190a New North Rd, London N1 7BS. (071) 226 5500. Winner Sony/HFN Greater London Dealer Award 1986-1989-1990. Linn, Naim, Rega, etc. £400-£3000-£13,000 **100%**

HI-FI COMPONENTS, 84 Battersea Rise, London, SW11 1EH. Tel: 071 2231 110. Tannoy, Kenwood, Rotel, NAD, QED & Wharfedale, Dual, Shure, Ortofon, Celestion. Appts nec, Service Dept. Access, Visa, Diners, Amex, Open 10-6 Closed Wed. **100%**

KJ WEST ONE, 26 New Cavendish St, London W1M 7LH. (071) 486 8262/63. Fax (071) 487 3452. Arcam, Audio Alchemy, Audio Lab, Audio Research, Croit, Deltac, Epos, Marantz, Meridian, Mission, Musical Fidelity, Pink Triangle, Roksan. Appts nec. Home trial. Free installation. Service dept. Major credit cards. Mon-Sat 10-6pm. (Late night Thur till 7pm). **100%**

MUSICAL IMAGES LTD. -- See under Middlesex & full page advert in the Product Directory **100%**

THE LISTENING ROOMS, 161 Old Brompton Rd, London SW5 0LJ. Tel (071) 244 7750/59, Fax (071) 370 0192. Linn, Epos, Quad, Arcam, Musical Fidelity, Meridian, Rogers, Acoustic Energy, Audiobab, Pink Triangle, etc. -See main advertisement-. Two dem rooms, appointments preferred, home trial facilities, free installation, service department. Visa, Access, Amex, Full credit facilities, including interest free. Mon-Sat 10-6. **100%**

NICHOLLS HI-FI, 430-434 Lee High Rd, Lewisham, London, SE12 8RW. 081 852 5780. Sony, Technics, Harman, JBL, MordauntShort, Kenwood, Panasonic, Haller, Sūmo, B&W. Demo facilities, no appt. nec. Home trial facilities, Free Install. Service Dept, Credit available, Access, Visa. Open 9:30-6 Mon-Sat, Thurs 9:30-1pm. **100%**

SOUND ORGANISATION LONDON, 4 Pickfords Wharf, Clink St, London, SE1 9DG. (071) 4032255. Linn, Rega, Roksan, Micromega, Radford, Rotel, Nakamichi, Onix, Creek, Naim, Exposure, Royd, Heybrook, Epos. Installing 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 **100%**

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. **100%**

STUDIO 99, 79-81 Fairfax Road, Swiss Cottage, 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. **100%**

SUPERFI, 2-4 Camden High Street, Camden, NW1 0JH (071) 388 1300. See main entry under Notts for full details. **100%**

UXBRIDGE AUDIO - CHISWICK, 109 Chiswick High Road, Chiswick, W4 2ED (081) 742 3444 Fax (081) 742 3295. 2 Demo Rooms, Installations, 2 Year Guarantee, 7 day exchange. Major credit cards, Tues - Sat 10 - 6. See Middx entry for brands stocked. **100%**

VOLUME ONE, 41 Upper Wickham Lane, Welling. (081) 304 4622. For full details see entry under Kent. **100%**

ZEBRA, 18-24 Brighton Road, South Croydon CR2 6AA. 081 688 2093 Mission, Pioneer, NAD, Rotel, Marantz, KEF, Tanoy, Celestion, Sony, Technics, and large range of AV equipment. Single speaker & comparator demo in a more casual environment. Service department. Mon-Sat 9.30-6.00. Access, Visa & instant credit up to £1000 subject to status. **100%**



# The Choice Dealer Directory

## 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, Licenced credit brokers up to £1000 instant credit. 10.00-5.30 Tues, Weds, Sat. 10.00-7 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\*\*\*\*

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 HIFIDELITY, 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

AUDIO T, 159a Chase Side, Enfield, Middx EN2 0PW. (081) 367 3132, Fax (081) 367 1638. Great hi-fi from Linn, Arcam, Denon, Linn, Mission/Cyrus, Philips, Rotel, Yamaha, and many more. Tue-Sat 10-6pm. 2 single spker dem rooms. Free del. and instal.

HARROW AUDIO, 27 Springfield Rd, Harrow. (081) 863 0938. Mon-Sat 9.30-5.30. A&R, Audiolab, Cyrus, Denon, Epos, Monitor Audio, Musical Fidelity, Nakamichi, Quad, Rotel, Tannoy, Thorens, Yamaha. etc.

MUSICAL IMAGES LTD. 173 Station Rd, Edgeware (081) 952 5535, fax (081) 951 5864 and 45 High St, Hounslow. Tel (081) 569 5802, fax (081) 569 6353. Most brands available - see full page advert in Product Directory. Interest free credit available, ask for details. Demo Room, Repairs & Service, Mail Order facilities.

RIVERSIDE HI-FI LTD, 422 Richmond Road, East Twickenham, Middlesex TW1 2EB. Tel. (081) 892 7613. Fax (081) 892 7749. A.R., Arcam, Audio Innovations, Castle, Dual, Denon, KEF, Luxman, Michell, Musical Fidelity, Micromega, Marantz, Nakamichi, Rotel, Spendor, Systemdek, Tannoy, Yamaha. One demo room, in-car demo for car hi-fi systems. Appts not always necessary. Home trial facilities. Free installation, service dept. Lombard Tricity, Access, Visa, Amex, Diners Club. Mon-Sat 9.30-6, Thurs, Fri 9.30-7

SIGHT N SOUND, The Treaty Centre, Hounslow, Middlesex TW3 1ES. 081 572 5418, fax 081 572 5417. Sony, Kenwood, Finlux, Toshiba, Philips, Sanyo, Grundig, Pioneer, Technics, Akai. No appts nec, free intall, service dept. Access & Visa, financing available. 9-6pm Mon-Sat.

UXBRIDGE AUDIO, 278 High St, Uxbridge, Middx UB8 1LZ. (0895) 230 404, Fax (0895) 273 626. Acoustic Energy, Arcam, Ariston, Audiolab, Castle, Creek, Cyrus, Denon, Epos, Exposure, Heybrook, Ion, JPW, Kef, Linn, Marantz, Meridian, Michell, Mission, MA, NAD, Naim, Nakamichi, QED, Quad, Revolver, Revox, Rotel, Rogers, Royd, Ruark, Stax, Tannoy, Thorens, Wharfedale. 2 dem rooms. Installations. 2 yr guarantee. 7 day exchange. Service dept. Access, Amex, Diners, Visa. Mon-Sat 10-6. Closed Wednesday

## MERSEYSIDE

W. A. BRADY & SON, 401 Smithdown Rd, Liverpool L15 3JJ. (051) 733 6859. "Largest choice of specialist Hi-Fi in N.W. £100-£20K". All credit cards. 3 dem rooms. Closed Monday.

IN CONCERT HI-FI, 144 Seaview Road, Wallasey, Wirral, Merseyside. (051) 630 5055. Denon, Kenwood, QED, Pioneer, Spica, Shan Acoustics, Systemdek, Musical Fidelity, Audio Dimensions, Voyd. Single speaker dem. room. Home trial, free installation. 10-6 - closed Mon. Access, Visa.

P & A AUDIO (BIRKDALE) LTD 31 Liverpool Road, Birkdale, Southport (0704) 68373. Arcam, Cambridge, Creek, Denon, Michell, Mission/Cyrus, Mordaunt-Short, NAD, Pink Triangle, QED, Revolver, Rogers, Rotel, Royd, Tannoy. 3 Single speaker demo rooms and Naim surround sound dem room. Free delivery, installation (Merseyside) Service dept, Mon-Sat 9-5.30 Half day Tues, Access, Visa, Lombard

PETERS HI-FI, 11 St Werburgh Squ., Grange precinct, Berkenhead. (051) 647 5626. 9-5.30 closed Thurs. See Cheshire branch for full details.

PETERS HI-FI, 8 High St, Bromborough, Wirral. (051) 334 1874/2825. 9-5.30 6 days. See Cheshire branch for full details.

## WEST MIDLANDS

AMADAEUS SOUND & VISION, 10 Boldmere Road, Sutton Coldfield, West Midlands Tel (021) 354 2311. Arcam, Audio Innovations, B&O, Carver, Castle, QED, Wharfedale, Yamaha, Cambridge Audio, Halfer Single Speaker demo, appts preferred, service available, installations, B&O link install, home trials. Access, Visa, interest free credit available subject to status. 9.30-6pm 6 days

FRANK HARVEY HI-FI EXCELLENCE, 163 Medieval Spon Street, Coventry (0203) 525200. All major agencies, Free inst. Service dept. Part ex. 3 dem rooms. Mon-Sat 9.30-5.30. Wed til 8pm

GRIFFIN AUDIO LTD, 94 Bristol Street, Birmingham. (021) 692 1359/ (021) 622 2230. Arcam, Castle, Cyrus, Denon, Linn, Marantz, Naim, Quad, Rega, Rotel. Tues-Sat 10-6.

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.

MUSIC MATTERS, 351 Hagley Road, Edgbaston, Birmingham B17 8DL. (021) 429 2811. Roksan, Nakamichi, Arcam, Audiolab, Musical Fidelity, Mission/Cyrus, Meridian, KEF, Monitor Audio, Pink Triangle. 2 single speaker luxury demo rooms. Appts nec, home trial facilities, free installation, service dept. Access, Visa, instant credit up to £1000, interest free credit available. Tue-Thur 10.30-6, Fri 10.30-8, Sat 10-5.30.

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

## NORFOLK

BASICALLY SOUND, The Old School, School Rd, Bracon Ash, Norwich NR14 8HE. (0508) 70829. Arcam, Linn, Naim, Denon, Spendor, Exposure, Audio Technica, Creek, Rega, Epos, etc. 2 comprehensive dem rooms. Home trial. Free installation. Visa, Access, HP facilities. Tues-Sat 9.30-1, 2-5.30.

MARTINS HI-FI, 5 High Street, Kings Lynn. (0553) 761683. Est. 1968

MARTINS HI-FI, 85/91 Ber Street, Norwich. (0603) 627010. Est. 1968.

## NORTHAMPTONSHIRE

AUDIO CRAFT 23-25 Derrigate, Northampton, NN1 1TY. Tel: 0604 36291 Bang & Oulfsen, Kenwood, Technics, Marantz, Celestion, Mordaunt-Short. No appts nec, Free Install, Service Dept. Open Mon-Sat 9-5.30pm

CLASSIC HI-FI + VIDEO, School Lane, Kettering, Northants. (0536) 515766. Rotel, Musical Fidelity, Wharfedale, Yamaha, JBL, Cyrus, Nad, Pioneer, Marantz, Kenwood, Kef, Celestion, and many more. Home trial, free instal., service dept. Access, Visa, credit facs. 9.30-5.30pm.

## NOTTINGHAMSHIRE

CHANTRY AUDIO, Chantry Walk, 18a Eldon Street, Tuxford, Nr Newark, Notts NG22 0LH. (0777) 870372. Pink Triangle, Deltec, Rotel, SD Acoustics, Ruark, NVA, Michell, Ion Systems, Croft Acoustics, Kelvin Labs, and much more. 2 dem rooms. Home trial, free installation. Access, Visa & credit facilities and mail order. Mon-Fri 9-30-5.30pm Sat 9.30-5.30. Sun & evenings home dem by appt.

DEFINITIVE AUDIO, (0602) 813562. For a carefully considered approach to building a true hi-fidelity audio system with components derived from the following manufacturers: Audio Innovations, Snell, Wadia, Micromega, Deltec, Voyd, Systemdek, SME, Revox, Audionote, Ortofon, Pioneer. Demos by appt. Please phone for further details. Installation free of charge. Mon-Sat 10-7pm, Closed Wed a.m.

NOTTINGHAM HI-FI CENTRE, 120-122 Alfreton Road, Nottingham (0602) 786919. Over 25 years experience, superb demo rooms, extensive range, free parking. Mon-Sat 9-5.30.

PETER ELLIS AUDIO, 29 Kirkgate Newark, Nottingham, NG24 1AD (0636 704571) Quad, Castle, Arcam, QED, Sugden, Tannoy, Thorens, Marantz, Denon, Teac. Demo Room. Free Install, Service Department Access, Visa, Mon-Sat 9-5.30 Close at 1:00pm on Thursday.

SUPERFI, 15 Market Str, Nottingham NG1 6HY. (0602) 412137. Kenwood, Technics, Denon, Aiwa, Rotel, Wharfedale, Mission, Marantz, NAD-Celestion, and many more. 2 single speaker dem rooms. Free install on systems, service dept. Access & Visa, Amex. Open 9-5.30, 6 days.

## OXFORDSHIRE

ASTLEY AUDIO LTD, 3 Marketplace, Wallingford. (0491) 39305/34349. Technics, Panasonic, Pioneer, Kenwood, Sony, Yamaha, Denon, Dual, Mission, Tannoy. Home trial, free installation. Service dept. Access, Visa, Amex, Diners. Instant credit. Tue-Fri 9-5.30, Sat 9-5. Records & CDs stocked

AUDIO T, 19 Old High St, Headington, Oxford OX3 9HS. (0865) 65961, Fax (0865) 60415. Great hi-fi from Linn, Arcam, Denon, Meridian, Mission/Cyrus, Rotel, Yamaha, B&O and many more. Tue-Fri 10-6pm, Sat 9.30-5.30. 2 single spker demo rooms, A/V dept. free del. & instal

OXFORD AUDIO CONSULTANTS LTD, Cantay Hse, Park End Street, Oxford OX1 1JE. (0865) 790879 fax (0865) 791665. NAD, Rotel, Musical Fidelity, Pioneer, Marantz, Rogers, TDL, Thorens, Audio Research, Proceed 2 Demo rooms. Service Dept, Home trial and free installation. Instant credit, Access, Amex, Visa. 10-6 Mon-Sat.

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 10-6 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.

MID-SHROPSHIRE AUDIO, 4 Holland Court, Dawley, Telford TF4 2EX. (0952) 630172. Audio Innovations, Marantz (inc Music Link), Denon, Tannoy, Ortofon, Pink Triangle, Ion Systems, Systemdek, Ruark, Monitor Audio etc. 2 dem rooms. Home trial, service dept. Instant credit up to £1000 Access, Visa, Amex.

## SOMERSET

MIKE MANNING AUDIO, 110 Middle Street, Yeovil, Somerset BA20 1NE. (0935) 79361, Fax (0935) 32923, Mobile (0850) 325965. Linn, Naim, Roksan, Pink Triangle, A+R (Arcam), ION, NAD, Pioneer, Rotel, Denon, etc. Dedicated listening lounge, for relaxed and unpressured demonstrations. Appts not usually nec. but best to phone first. Home trial facilities on request, free installation, service department. Instant credit, Access & Visa, etc. 9-5.30 closed Mondays.

## STAFFORDSHIRE

ACTIVE AUDIO, 29 Market Street, Tamworth, Staffordshire. (0827) 53355. Arcam, Ariston, Celestion, Denon, Exposure, 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 Fact Pack.

ACTIVE AUDIO, 95 Stafford Street, Hanley, Stoke-on-Trent. (0782) 214994. Arcam, Ariston, Celestion, Cyrus, Denon, Exposure, 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

GRANGE HI-FI LTD, 153 Branston Rd, Burton-on-Trent, Staffordshire DE14 3DQ. (0283) 33655 Audio Innovations, Arcam, Castle, Denon, Pink Triangle, Rotel, Rogers, Systemdek, SME, Quad, Voyd. Dem fac, appts nec on Sat, Free Install. Service dept Access, Visa. 9.00-5.30pm. Closed Mon & Wed aft, open until 7.00pm Thursdays. Closed for lunch 12.00-12.30.

MUSICAL APPROACH, Unit 7, Woodings Yard, Bailey 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.

AUDIO IMAGES LTD, 7 All Saints Road, Pake Field, South Lowestoft, Suffolk, NR33 0JL. (0502 582853) Arcam, Quad, Triangle, Rotel, Denon,



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Rothwell, Michell, Finlux, Meridian, JPW. Separate Demo room No appointments, Home trial facilities, free install, service dept. Open 10:00-6:00 Tues-Sat 10:00-7:00pm Fridays.

AVALON AUDIO VISION, 12 St Margarets Plain, Ipswich, Suffolk, Tel: 0473 281922. Pioneer, Mission/Cyrus, NAD, Rotel, Yamaha, Marantz, KEF, Mordaunt-Short, Mitsubishi, Wharfedale. Single Speaker Demonstration Room. No appts nec, Home trial fac, Free Install, Service Dept. Full HP fac, Interest Free Credit available on most components, Part exchange. Open 9:30-6:00 Mon-Sat.

## SURREY

AUDIO SOUTH, 24 (The Woolmead) East Str, Farnham, Surrey GU9 7TT (0252) 714555 Audio Innovations, Audio Note, Deltrec, Yamaha, Cary, JPW, Marantz, Rotel, Snell, Voyd. Dem room and evening appointments available. Home trial facilities. Free installation. Access, Visa. 10.30-6 Mon-Sat. Closed Tuesday.

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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 Str, Cranleigh GU6 8AU. (0483)268185. Michell (amplification & decks), Marantz, Ariston, Ortofon, AME, Sumo, Proac, Jamo, Origin Live, Kiseki. Demo room, appts preferred, home trial facilities, free install, service dept. Access, Visa. Open 9-5.30 Mon-Sat

SPALDINGS HI-FI, 352-4 Lower Addiscombe Rd, Croydon, Surrey. (081) 654 1231/2040. 3 dem rooms and home dem. Free installation, credit. Mon-Sat 9-6. Tuesto 8. Closed Wed. Service dept. **BADA**

SURBITON PARK RADIO, 48 Surbiton Rd, Kingston-Upon-Thames, Surrey (081) 546 5549. Quad, Castle, Dual, Denon, Kenwood, Rotel, Pioneer, QED, B&W, Tannoy. Demo facilities. Access, Visa. 9.30-5.00 Tues-Sat. Service dept.

SURREY HI-FI, 45 High Street, Godstone, Surrey RH9 8LS. (0883) 744755. Parking, easy access - just 2 mins off junction 6, M25. Quad, TDL, Nakamichi, KEF, Thorens, Rotel, Marantz, Denon, Michell, Tannoy, JPW. Single speaker demo room. Demonstration by appointment, free installation, service dept. Access, Visa, Mastercard. 0% Credit. Open 9-6, closed Wed

TRU-FI SOUND AND VISION, 2 Central Parade, Redhill, Surrey. (0737) 767404/766128, Aiwa, Audio Technica, B&W, Nakamichi, Mission, Mordaunt-Short, Nakoaka, Sony, Technics. Dem. facilities. Free installation. Service dept. 0% finance. Access, Visa. Mon-Sat 9.30-6.

TRU-FI SOUND & VISION, 10 Church Street, Leatherhead, Surrey. (0372) 378780. Sony, Technics, Panasonic, Mitsubishi, Ferguson, Aiwa, Pioneer, Sanyo, B&W, Mission. Free installation. Credit facilities. Access, Visa. 9.15-5.30 Mon-Sat. Closed Wed. Service dept.

UNILET HI-FI, 35 High Street, New Malden, Surrey KT3 4BY. (081) 942 9567. Kef, Mission, Musical Fidelity, NAD, Nakomichi, Quad, Rotel, Tannoy, Demos. Amex, Access, Visa, etc.

ZEBRA 18-24 Brighton Road, South Croydon CR2 6AA. 081 688 2093. See main entry under London

## SUSSEX (EAST)

THE POWERPLANT, 66 Upper North Street, Brighton BN1 3FL. (0273) 775978. Roksan, Musical Fidelity, Onix, Marantz, Rotel, Yamaha, Bryston, Tannoy, Monitor Audio, JPW, etc. Comfortable single speaker demonstration rooms. No appts. nec. Home trial facilities, free install. Service dept. Credit facilities available on request. Mon-Sat 10-1.00, 2.00-6pm

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AUDIO DESIGNS, 26 High Street, East Grinstead, W. Sussex RH19 3AS 0342 314569. Linn, Naim, Alphason, Arcam, Rotel, NAD, B&W, Quad, Tannoy, Thorens, TEAC, etc. Very comfortable listening room. No appts nec., Home trial facilities, free installation, service dept. Access/Visa. 9:30-6:00 Mon-Sat, late Tue till 8pm

BOWERS & WILKINS LTD, 1 Becket Buildings, Little Hampton Rd, Worthing. (0903) 64141. B&W, Nakamichi, Castle, Denon, Dual, JVC, Mordaunt Short, Philips, Quad, Sony, Technics. 3 dem rooms. Mon-Sat 9-5.30, Wed 9-1pm. Home trial facilities, free install. Credit to £1000, Access, Visa. Service dept. \*

CHICHESTER HI-FI, 7 St. Pancras, Chichester, W. Sussex PO19 1SJ. Tel: (0243) 776402. Linn, Naim, Rega, Creek, Nakomichi, A&R, Denon, Roksan etc. Tues-Sat, 10-1, 2-5, 15 (closed Mon). **BADA**

## TYNE & WEAR

BILL HUTCHINSON LTD, 87A Clayton Street, Newcastle-Upon-Tyne. Tel: (091) 2303600. A.R. Aiwa, Denon, Dual, JVC, Mission, Mordaunt Short, Omar, Technics, Yamaha, etc. Demo facilities. Free Install, Service Department, Instant Credit, Access, Visa, Mon-Sat. Late Tue till 8pm

NEWCASTLE HI-FI, 153 Kenton Road, Gosforth, Newcastle-Upon-Tyne NE3 4NQ. (091) 285 7179. Linn, Arcam, Creek, Marantz, JPW, NAD, Denon, Ruark, Custom Design, Aiwa, etc. 2 single speaker demonstration rooms. Installation, delivery, 2yr guarantee on all products. Access, Visa. 10-5.30 Tue-Sat.

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## WARWICKSHIRE

NAAM HI-FI VISION, 78 Lower Precinct, Coventry CV1 1DX. (0203) 632086. Technics, Pioneer, Kenwood, AR, Akai, Aiwa, Panasonic, Toshiba, Wharfedale, KEF. Demo facilities. Access, Visa, Amex, Lombard Tricity credit charge. 9.00-6.00 Mon-Sat.

## WILTSHIRE

AUDIO T, 60 Fleet St, Swindon, Wilts. SN1 1RA. (0793) 538222, Fax (0793) 487260. Great hi-fi from Linn, Denon, Meridian, Mission/Cyrus, Rotel, Sony, Yamaha and many more. Tue-Sat 9.30-5.30. Single spker dem room, free del. and instal. **BADA**

## WORCESTERSHIRE

WEST MIDLANDS AUDIO, 158 Ombersley Road, Worcester WR3 7HA. (0905) 58046. Linn, Naim, Rega, Absolute Sounds, Meridian, Arcam, Ion Systems, Roksan. 3 dem rooms for budget & high end audio. Appointments necessary. Free installation. Service Dept. Access, Visa, Amex, Diners, Lombard/Hitachi. Mon-Fri 9.30-8.30 by appt Sat 9-5.30.

## YORKSHIRE (NORTH)

SCARBOROUGH HI-FI CENTRE, 53 Dean Road, Scarborough, N. Yorks YO12 7SN. (0723) 374547. Aura, B&W, Mission, Quad, NAD, Oxford, Alphason, Rogers, Nakamichi, Ruark, Voyd. Dem room, appointment preferred. Home trial facilities. Free installation. Service dept. Access/Visa/Credit charge/£1,000 instant credit/Amex/Diners. 10-6 Tues to Sat

HARROGATE HI-FI CENTRE, 15 Commercial Street, Harrogate, N. Yorks

HG1 1UB. (0423) 504274. Aura, B&W, Mission, Quad, NAD, Oxford, Alphason, Rogers, Nakamichi, Ruark, Voyd. Dem room, appointment preferred. Home trial facilities. Free installation. Service Department Access/Visa/Credit charge/£1,000 instant credit/Amex/Diners. 10-6 Tuesday to Saturday.

SOUND ORGANISATION YORK, 2b Gillygate, York YO3 7EQ. Tel: (0904) 627108. Linn, Meridian, Micromega, Naim, Rega, Roksan, Arcam, Mission, Denon, Epos, Rotel. 2 single speaker dem rooms. Appts preferred. Home trial. Free installation. Service dept. Credit facilities on

request. Access, Visa. 10am-5:30pm Tues-Sat. Sony dealer. Award nominated '86,' 87,' 88 **BADA**

VICKERS HI-FI, 24 Gillygate, York. (0904) 629659. Audiolab, Harman-Kardon, Marantz, Musical Fidelity, Pink Triangle, Quad, Systemdek, Tannoy, Technics, & lots more. 3 demonstration studios (2 by appointment) superb showrooms, 2 year guarantee on all hi-fi products. Appts as above, home trial facilities, free installation, service department. Qualified and experienced staff, over 20 years experience. 12 months interest free credit. 10.30-5.30 Mon-Sat.

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HI-FI STUDIO, Sunnyfields, Doncaster. (0302) 781387. Heybrook, Monitor audio, Art Audio, TDL, Michell, Sugden, Acoustic Energy, Alphason, Teac, Dual. Listening room dems. Home trial. Free installation. Licensed credit broker. 2 yr guarantee on all equipment. Service available. Access, Visa. 10-8pm 6 days. Phone for further info & FREE fact pack.

## YORKSHIRE (WEST)

AUDIO PROJECTS, 45 Headingley Lane, Leeds. (0532) 304565. A&R, Audiolab, Creek, Heybrook, Linn, Musical Fidelity, Naim, Quad, Rega, etc. Tues-Fri 9.30-6, Sat 2.30-5.30 **BADA**

CLEARTONE (Formerly Erricks), Rawson Square, Bradford, (Near John St Market), (0274) 309266. A&R, Linn, Quad, Exposure, Nakamichi, Mission, Denon, Kenwood. Private demo rooms, no appt nec, home trial facilities, free installation, service dept. Access, Visa, licenced credit broker. Mon-Sat 9-5.30 (Tue 10-5.30). **BADA**

DOUG BRADY HI-FI, The Forge Cottage, 19 Crossgate, Otley, West Yorkshire LS21 1AA. (0943) 467689. Naim, Arcam, Rotel, Pink Triangle, Meridian, Epos, Castle. Two dem rooms, free install, service. Access/Visa. Open 10-6pm Tues-Sat. **BADA**

ERIC WILEY, 85 Beancroft Rd, Castleford. (0977)553066/556774. Arcam Audio, Cambridge Audio, Celestion, Kenwood, Marantz, NAD, Pioneer Reference Piont, Rotel, Technics, Quad. Car audio specialists. Demo facilities. No appts nec. Access, Visa, Lombard tricity credit charge. Mon-Sat 9-5.30, closed Wed.

HUDDERSFIELD HI-FI CENTRE, 4 Cross Church St, Huddersfield. (0484) 544668. B&W, Kenwood, Denon, Dual, Arcam, Musical Fidelity, Quad, NVA, Audio Lab, Philips, Mission, etc. Dem facilities - appointment reqd. Mon-Sat 9-5.30, Thurs 9-8. Closed Wed. Free installation, credit facilities. Access, Visa

IMAGE HI-FI, 17 The Springs, Wakefield, WF1 1QE. (0924) 200272. Arcam, Linn, Meridian, Mission, Quad, Rotel, Etc. 2 Listening Rooms. Free Parking, DeL & Instal Mon-Sat 9.30 5.30 pm **BADA**

IMAGE HI-FI, 8-10 St Annes Road, Headingley, Leeds, L56 3NK (0532 789374) Arcam, Linn, Meridian, Mission, Quad, Rotel, Etc. 3 Listening Rooms. Free Dem & Instal. Mon-Sat 9.30 - 6.00pm **BADA**

## Northern Ireland

### ARMAGH

LYRIC HI-FI, 84 Bridge Street, Portadown, Armagh, N. Ireland. (0762) 358059. Linn, Naim, Rega, Arcam, Denon, Rotel, Musical Fidelity, Revex, Mission, Akai, Panasonic, etc. Mon-Sat 10am-6pm. **BADA**

### BELFAST

LYRIC HI-FI, 163 Stranmills Road, Belfast. (0232) 381 296. Linn, Naim, Rega, Arcam, Denon, Rotel, Musical Fidelity, Revex, Mission etc. Mon-Sat 10-6, Late night Thurs. **BADA**

HI-FI EXPERIENCE, 47-49 Fountain Str, Belfast BT1 5EB. (0232) 249117 Quad, Musical Fidelity, Denon, NAD, Rotel, Pioneer, Kenwood, Mission, Tannoy, B&W. No appts necessary home trial facilities, free install, service dept. Credit facilities available. Open 9-5.30, late night Thurs 9pm



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ASTONAUDIO, Unit 8, Kings Road Shopping Centre, Kings Road, Belfast  
Tel: 0232 402220. Akai, Technics, JVC, Mitsubishi, Samsung, Toshiba,  
Panasonic, and many more. Demos available, Open Mon-Fri 10-8pm Sat  
10-5pm.

## LONDONDERRY

ZEUS AUDIO, 23a Kingsgate Str, Colrairie, BT52 4LB. (0265) 56634  
Marantz, Mission Cyrus, Aiwa, Akia, Alphason, Sony, Pink Tri, Celestion,  
Rotel. Open Mon-Sat 10-5.30, Closed Thurs. BADA

## Ireland

### DUBLIN

LAFAYETTE HI-FI, 50 Wellington Quay, Dublin, Tel: 353177 0443.  
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Vega. No appts nec, Free Install. Unique trade in service. Credit Cards  
welcome. Open 10-6 6 days a week.

## Scotland

### EDINBURGH

BILL HUTCHINSON Ltd, 43 Clarke St, Edinburgh. (031) 667 2877. AR,  
Aiwa, Denon, Dual, JVC, Mission, Mordaunt-Short, Omar, Technics,  
Yamaha etc. Dem facilities. Mon-Sat 10-6. Free installation, instant credit.  
Access, Visa. Service dept.

### GLASGOW

BILL HUTCHINSON Ltd, 43 Hope Street, Glasgow. (041) 248 2857. A.R.,  
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Yamaha etc. Dem facilities. Mon-Sat 10-6. Free installation, instant  
credit. Access, Visa. Service dept

STEREO STEREO, 278 St. Vincent St, Glasgow G2 5RL. (041) 248 4079  
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Sat 10-6. Interest free credit.  
BADA

## GRAMPIAN

HOLBURN HI FI Ltd, 441 Holburn St, Aberdeen (0224) 585713. Arcam,  
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Linn, M.A., Marantz, Meridian, Mission Cyrus, M.S., NAD, Nakamichi,  
Pioneer, QED, Quad, Revox, Rogers, Rotel, Ruark, Tannoy, Technics,  
Wharfedale, Yamaha. 9.30-5.30 Mon-Sat.  
BADA

## ROSS-SHIRE

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Celestion, Bose, Infinity. All equipment ready for demonstration. No appt  
nec, free installation, service dept. Mon-Sat 9-5.30

W.M. COUPAR, 33 Reform Street, Dundee, Tayside, (0382) 29588. Bang &  
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Research, JBL. No appointment necessary, free installation, service department.  
All demonstration systems wired through a demonstration comparator. Licensed  
credit broker, Access, Visa. Monday-Saturday 9.00 am-5.30.

## Wales

### CLWYD

ELECTRO TRADER, 19 Colwyn Crescent, Rhos On Sea, Colwyn Bay, Clwyd  
(0492) 48932. Ariston, Arcam, B&W, Heco, Infinity, Onkyo, Rotel, Tannoy,  
TDL, Yamaha etc. Dem room. Appts preferred. Home trial. Free installation.  
Access, Visa, American Express, Diners. 9.30-1.00, 2.00-5.30 Mon-Sat.

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364 500. Arcam, B&W, Marantz, Mission, NAD, Quad, Rega, Rotel,  
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nec, home trial fac, Free install, Service Dept. Access, Visa. 9:30-5:30  
closed Weds PM

## SOUTH GLAMORGAN

AUDIO EXCELLENCE, 134 Crwys Road, Cardiff. (0222) 228565. Great Hi  
Fi carefully selected and demonstrated by friendly, enthusiastic staff.  
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## WEST GLAMORGAN

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carefully selected and demonstrated by friendly, enthusiastic staff. Closed  
Mon. BADA

## GWYNEDD

I & H GRIFFITHS & SONS, 313 High St, Bangor LL57 1YA. (0248) 370655  
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appts nec, home trial facilities, free installation, service dept. Access, Visa,  
Lombard credit charge. Mon-Sat 9-5.30, Wed 9-1. Audio Visual Specialists

PETERS HI-FI, Victoria Buildings, Mostyn Ave., Craig-y-don, Llandudno.  
(0492) 876788. 1 single spker dem room. Open 9-5.30, closed Wed. See  
Cheshire branch for full details.

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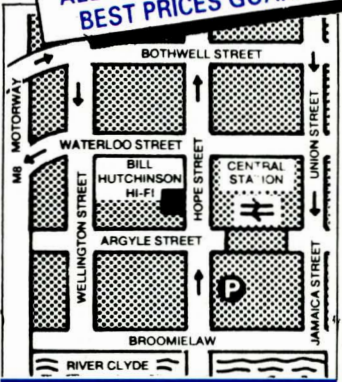


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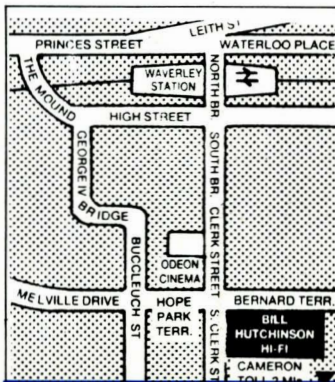
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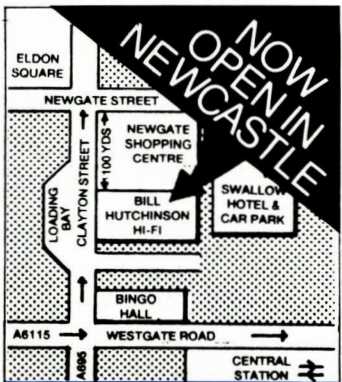
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# The Directory

The ultimate buyer's guide with comprehensive information on every currently available product tested by *Hi-Fi Choice*.

Including test summaries covering

**Amplifiers**

**Cables**

**Cassette decks**

**CD players**

**DACs**

**Equipment supports**

**Loudspeakers**

**Personal stereos**

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**Turntables**

And much, much more



# The Directory

The *Hi-Fi Choice Directory* was conceived as a reference guide to all the audio products reviewed by *Choice* that are currently available. The products are split into suitable categories, each with its own introduction containing information about the product type and its applications. They are particularly relevant to the uninitiated first time buyer and help sort out the order of priorities when buying a piece of equipment.

Each product along with its current retail price is placed in its respective category in alphabetical order. The prices of the products are updated on a regular basis, although it should be noted that our value rating are based on the product's price at the time of review.

The next column contains the ratings for the standard achieved in laboratory and listening tests, with the exception of certain product groups where lab tests were not carried out. One important point to remember is that they cannot be used to compare products from different categories — for example, a cassette deck rated 'excellent' in sound quality will not usually offer the same standard of fidelity as a similarly rated turntable or CD player (unless you can get hold of first generation copies of the master tape!).

The Comments column contains a potted summary based on the original review, emphasising the

salient points of a product's character and sonic performance. The space available doesn't allow for great detail but in the 20 or so words we have attempted to put across the essence of the review, in some cases using quotes from the review itself. Obviously, important information on compatibility or auxiliary equipment used in the test cannot be included, and we would advise you to refer to the original review for this, of which more later. Please note that these comments are those of the reviewer and not, as is the case with some magazines, those of the manufacturer.

The next column varies from category to category but is usually either features or specifications, the former being facilities available on a cassette deck or amplifier or the type of drive system on a turntable.

Specifications vary with product type but usually relate to suitability or capability. For instance, in the case of arm matching, figures are given with the cartridges, which tie in with the mass figures for the tonearms themselves, making it easier to avoid compliance/mass mismatches.

Perhaps the most influential letters in the *Directory* are those found in the Value column, the Rs and BBs denoting the Recommended and Best Buy ratings that are appended to products we consider 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. Please note that an expensive Recommended product will nearly always sound better than a cheap Best Buy. An ideal situation would be to choose suitably priced Best Buy or Recommended products from relevant categories and create a Best Buy system, but, due to the variety in tonal balance that exists in much audio equipment, system building is unfortunately not quite that simple.

These ratings make a useful guideline for shortlisting components, but only experiencing the actual combination will tell you whether it works for you.

The final column contains a reference to the issue of *Hi-Fi Choice* which featured the complete review. If you wish to get a better idea of a product by reading the complete review it is possible to order a copy (if still in print) through our back issues department. Every *Choice* issue contains a Back Issues page for this purpose.

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## SYSTEM BUILDING

Pre-packaged one-make systems have been commercially very successful, with advantages like cosmetic consistency, competitive pricing, and (assumed) technical compatibility. However, despite the mass market clout of the consumer electronics giants, the hi-fi tradition of specialised separate components seems to be as strong as ever, and certainly represents the route taken by those who place sound quality first.

The first step in putting together a system is to decide which sources you require. There are now three different prerecorded music media competing for the affection of the hi-fi user, and to go for all three will either cost a lot of money or involve substantial compromises in the sound quality of each. For this reason many separate purchasers may start with just one source, adding others or a tuner when funds permit.

Cassette has never really challenged vinyl's superior quality,

but it's a multiple role format, offering 'go anywhere' flexibility, a useful recording capability, plus a broad catalogue of prerecorded music cassette material. As a hi-fi medium cassette suffers from prerecorded material which has been improving but is still patchy in quality and can usually be bettered by a home recording. There is also the worry that a tape made on a specific machine usually plays best on that machine, which may cause aggravation when upgrading a few years hence.

CD is the relative newcomer but in the last decade it has come to dominate the market. The sound quality remains controversial, hailed as near perfect by its fans but derided by vinyl freaks. It is probably fairest to say that CD is fine for the majority of listeners, but may not suit everyone. Certainly the lack of background noise and deterioration are major strengths.

The advent of two box audiophile players has certainly

helped to gain better acceptance for the format and unless you are prepared to spend a substantial sum, CD arguably offers the best performance in terms of sound per pound. Players are now exceptionally cheap, having been reduced dramatically since the format was launched, however, the prices of the discs remains extortionate.

Choosing the components of a system is only part of the task of getting the system as a whole working as well as possible. Both components and loudspeakers benefit to a surprising degree from proper support in the form of stands that enable them to give their best performance, whether floor-standing or wall mounted.

The loudspeakers are most critical of placement, because it is their job to create the stereo image, and it will be impossible to do this if the sound from each is not roughly similar at the listening position. Each loudspeaker should operate in a simi-

lar immediate acoustic environment, unencumbered by other furnishings and structure, and a similar distance from listeners, nearby walls, and corners. Some loudspeakers are designed to operate close to a rear wall, others a metre or so out into the room, but all loudspeakers benefit from rigid support

The key to getting the best results from a separate system lies in finding an experienced and skilled dealer in the first place, one who takes the trouble to find out what you really want and then demonstrates some likely alternatives.

The *Directory* has been compiled as a guide in the sense that you should use the information in it to make a shortlist of equipment and then audition it before taking the plunge. Tastes inevitably differ and it's unwise to buy purely on the basis of our recommendation, as dealers are the most experienced people around when it comes to making systems work as a whole.



## AMPLIFIERS

The amplifier sits at the heart of the system, processing the outputs from all the various music sources as necessary and then driving the loudspeakers. These two (quite separate) functions are integrated into a single box at the low-to-middle price points; separated pre- and power amplifiers become increasingly common as one moves upmarket. At the upper end of the specialist market, valve amplifiers provide a popular alternative to the transistor types amongst enthusiasts.

There is a substantial difference between specialist (sound quality oriented) amplifiers and the consumer electronics style models. The

former are bleakly simple, avoiding all unnecessary features to provide the most direct signal path in the interests of best sound quality. The latter range from models with just basic tone controls and tape recorder switching, to those with elaborate facilities such as graphic equalisers, remote control (including volume), surround sound options etc. etc.

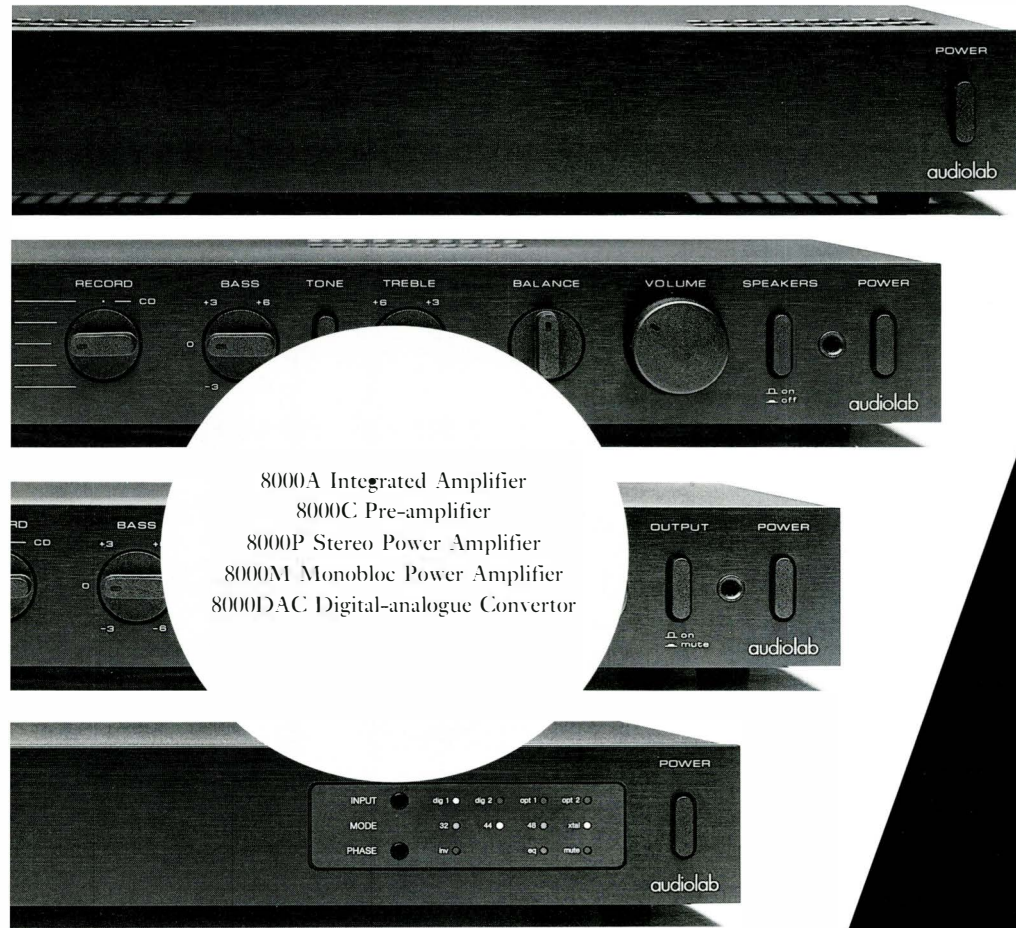
Lab measurement provides some useful data, particularly in regard to an amplifier's ability to drive a wide range of different types of loudspeakers, but this is only obliquely related to sound quality. We also include our measured power output (RMS, 8ohm load, 1 channel

driven) – but again, paradoxically, this doesn't necessarily correspond to the loudness capability of the amplifier, which has as much to do with the elegance of the overload characteristics within a given system (valve amplifiers invariably sound more powerful than their rating would suggest). The listing of features provides some indication to the complexity of an amplifier: many users prefer to retain the option of tone controls to 'shape' the overall sound according to taste; many others have found living without tone controls surprisingly easy, with additional benefits in terms of transparency.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Acoustic Research A05</b> £200	Good + Good +	Capitalises on the strengths of the A-03 and A-07 but escapes the ignominy of their deficiencies. The amp for all AR-based systems	67W, 2 tape, 3 line and both MM/MC inputs. Tone defeat	R	97
<b>Acoustic Research A07</b> £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
<b>Aiwa XA-006</b> £135	Good Average	Competent enough performer with plenty of facilities. A gutsy sound though one that's rougher via CD than MM.	67W, MM and 5 line i/p's plus independent rec out.		92
<b>Akai AM-47</b> £200	Very Good Good +	Something of a surprise from Akai: a made-for-Germany amp with plenty of widgets and an unexpectedly sharp, open and detailed sound. Looks ghastly but sounds strainfree.	104W, 3 tape, 4 line and MM disc inputs. 4mm speaker outlets.	R	104
<b>Akai AM-52</b> £230	Average + Average -	Basically equipped, this amplifier offers a comfortable but hardly over-detailed sound	95W, MM/MC disc, 5 line inputs, loudness		74
<b>Akai AM-65B</b> £299	Good Average	On-board 18-Bit DAC's actually give better sound than standard CD inputs! Punchy via MM disc	101W, MM, 6 line, digital inputs		80
<b>Akai AM-93</b> £550	Average Average -	Unfortunately Akai's on-board D/A convertors were less successful than its conventional analogue CD input.	112W, coax and optical dig inputs. MM/MC		68
<b>Akai AM-95</b> £620	Average Average -	A revamped version of the older AM-93 with newer onboard bitstream DACs. Its sound is just too eager, however	110W, 3 tape, 3 line, MM/MC plus coax/opt digital inputs		109
<b>Albarré PP1</b> £400-£500	Average Good +	Available with or without various MM/MC disc options, the 'basic' PP1 has an attractively warm, earthy sound. The budget MM stage needs some further work, however.	48W, 4 inputs with extra gain available for low-level sources	R	104
<b>Alphason Apollo</b> £295	Average - Average +	A year and a half later and Alphason's Apollo is still beset with technical problems. This sample buzzed like a distant bandsaw	38W, 5 line, tape and MM/MC inputs. Solid wood fascia		109
<b>Amadeus Gold</b> £360	Average - Good	There is some indication of instability but otherwise sounds very rich, warm and musical. High-ish IMD	56W, MM/MC plug-in cards, 3 line R inputs	R	74
<b>Amadeus Silver</b> £270	Average - Good	Limited headroom via disc but still offers a sweet, lush sound. Limited current delivery	37W, MM/MC, 3 line inputs	R	80
<b>Aragon 4004</b> £1795	Good Good	Despite its imposing bulk, the Aragon is something of a softy at heart. It can deliver oodles of power but its musical presentation is more laid-back	231W power amp		72
<b>Arcam Alpha 3</b> £200	Good Average	After the enthusiastic reception earned by the older Alpha 2 the generally lacklustre and bland sound offered on this occasion met with (unexpected) disapproval.	53W, 3 line, tape and MM disc inputs. Direct option		104
<b>Arcam Delta 110/120</b> £720/£520	Good+ Good	Overall performance is limited by the power amp - in isolation the PDM-preamp offers a remarkably open and detailed sound, particularly in 'digital' mode.	112W power amp, MM/MC + four line inputs + coax/opt digital inp	R/-	92
<b>Arcam Delta 60</b> £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
<b>Arcam Delta 90.2</b> £410	Average + Average +	Dark but slightly dead or conservative sounding version of the original Delta 90. Improved disc stage	73W, MM/MC, 4 line inputs, tone bypass, bi-wire	R	74
<b>Art Audio Quintet</b> £725	Average Very Good	Switchable triode/ultralinear output stage. There's 15W and 15W, but in triode mode these are 15 of the sweetest watts around. Surprisingly gutsy	15/25W, variable feedback	R	100
<b>Audio Innovations Series 1000</b> 2nd Audio Amp	Poor Excellent	This valve combination offers awesome dynamic range with superb transparency and power to match. Compatibility with other brands is unpredictable	15W, MM, 6 inputs, monoblocks	R	63
<b>Audio Innovations Series 200</b> £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
<b>Audio Innovations Series 200</b> £349/£499	Poor + Good	Recently updated, this pre/power combo turns-in a fuller and more substantial performance via MM rather than CD. Otherwise its sound can seem slightly bleached and lacking expression.	10W, 3 line, 1 tape and MM or MC inputs. 'Isolate' switch		109
<b>Audio Innovations Series 300II</b> £500	Poor Good +	Under-powered and over-distorted yet capable of realising an open and captivatingly expressive sound. Sensitive speakers are a must	9W(!) integrated valve amp with tape, 3 line and MM disc inputs	R	97
<b>Audio Note Ongaku</b> £34,000	n/a Excellent	An out and out audiophile product, a single ended, zero negative feedback, triode, line level integrated amp. Probably the best amplifier in the world!	6 line inputs, 27W	R	Coll '90
<b>Audiolab 8000A</b> £410	Very Good Very Good	Recent mods have cured the slightly glassy treble, replacing it with a smoother but richer and more solid style of music making	81W, 3 tape, 4 line and both MM/MC inputs. Tone defeat	R	97
<b>Audiolab 8000C/8000P</b> £375/£545	Very Good Good	Audiolab has revamped its pre/power combo though the very distinctive almost stark neutrality that results will not appeal to all listeners. Good value engineering, nevertheless	157W pow amp + bi-wire outputs. 3 Tape, 4 line + MM/MC on preamp		97
<b>Audion CD-1</b> £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
<b>Aura VA-100 Evolution</b> £270 and £300	Average - Good +	This beefed-up VA50 might overheat when driving insensitive, low-impedance speakers but was applauded for its sense of scale and daram via CD	81W, 4 line, 1 tape and MM inputs. Bi-wire outputs	R	109
<b>Aura VA-40</b> £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
<b>Aura VA-50</b> £200	Good Very Good	Superficially similar to the cheaper VA-40 but with much more of the old MA-80's magic! Great sound from a slimline package	65W, one tape, 4 line and MM only. New tape monitor switch	BB	97
<b>Beard 506</b> £1195	Good + Good +	A versatile valve preamp the bass sounded lively if a touch softened, while the treble was detailed but lacked a little sparkle and air.	4 inputs MM/MC		50
<b>Beard Audio CA35/P35mkII</b> £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
<b>Beard M70</b> £1995 pair	Good Good +	A substantial British monoblock power amplifier, but not a great deal more impressive than the P35 at half the price	70W		50
<b>Bryston 0.5B/2B</b> £695/£695	Very Good Good	Very rugged Canadian pre/power combo that sounds cool, confident and punchy. Headamp available to suit MC cartridges	65W, MM and 4 line sources, overload LEDs on power amp	R	74
<b>Bryston 12B/4B</b> £1295/£1395	Good + Good	Bryston's massive 4B power amp stood out as the backbone of this combo, the preamp sounding a trifle unbalanced between MM and MC inputs	a 272W, bridgeable to 800W. 6 line, 2 disc inputs, subsonic filter		68



*H i - F i t h a t s p e a k s f o r i t s e l f :*



**AUDIOLAB**



## AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Carver CM-1090</b> £595	Average Average +	Looks very professional with its meters and handles but suffers from a loose and dirty sound that shies away from busy tracks	141W, 2 tape, 4 line and MM disc. Sonic Holography feature		97
<b>Cello Audio Suite</b> £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
<b>Chord SPM-900</b> £1850	Average + Good +	Technically very interesting, this mini-powerhouse uses a switched-mode supply to deliver a crisp and refined sound	236W with protection into lower loads	R	85
<b>Concordant Excelsior</b> £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
<b>Concordant Exultant</b> £700	Average+ Very Good	Individual appearance of this valve pre contrasts with sonic invisibility. An extremely dynamic performer. Recommendation withheld pending more appropriate p.s. plug	3 line, MM, variable gain		100
<b>Conrad-Johnson PV-10</b> £1100	Excellent Excellent	Pricey, yes, but a fabulous preamplifier which confirms C-J's high reputation in the States. Beautiful imaging, superb detail, plenty of gain on the phono stage classy build quality too.	MM plus 4 line inputs	R	78
<b>Conrad-Johnson Premier 7A</b> £8995	n/a Excellent	Price has increased since we tested it but at this price who cares? The 'Seven' is designed without compromise, and it's clearly one of the finest (valve) preamplifiers money can buy.	MM, 4 line inputs, sep. Rec Out, versatile cartridge matching	R	Coll.'90
<b>Creek CAS 4040s3</b> £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
<b>Creek CAS 4140s2</b> £230	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
<b>Creek CAS-4140 S2</b> £230	Average Average +	Running production changes inspired us to re-review this amp which now sounds thicker and 'blurred' compared to the original	41W, 3 line and MM/MC inputs, mono and mute facilities		109
<b>Creek CAS-6060</b> £470	Good Good	An amp that looks like the '5050 but employs the sort of big, confident and meaty-sounding electronics used in the earlier '4040. Dynamic and impressive.	81W, 3 line, 2 tape and MM/MC disc inputs. Bridge-mono facility		104
<b>Croft Series 4S</b> £850	Good Good	The original IV is still available now supplemented by the higher price and power (S); both are line performers	40(60)W channel	R	57
<b>Croft Series 4SA</b> £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
<b>Croft Super Micro A</b> £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
<b>Croft Super Micro A DT/Series V</b> £689/£555	Average+ Good	Micro is still unashamedly "cottage" but offers good performance. Combo is let down by the very low powered Series V	15W, valve, dual vol.control, 2 line, MM, tape out		100
<b>Cyclone Catalyst</b> £1995	Good + Very Good	Exceptionally load tolerant and very refined in delivery. Extra options available in future	74W, external MM or MC stages, 3 R line inputs	R	80
<b>Cyrus I</b> £230	Very Good Very Good	Crisp, meaty and exquisitely detailed, this latest Cyrus amp had us enthralled via CD. MM/MC enjoyed a lesser clarity	34W, 4 line + MM/MC i/p's with dual-conc vol.	R	85
<b>Cyrus II</b> £350	Very Good Very Good	Recently updated this popular favourite captured our attention, once again, with its robust and very convincing sound.	60W, 4 line and both MM/MC disc. R No tone controls	R	92
<b>Cyrus PSX</b> £250	Very Good Very Good	The PSX does make the Cyrus Two sound better; and also improves the PCM II CD player giving more wallop and clarity	Auxiliary power supply	R	62
<b>DNM 3A</b> £1590	Good + Very Good	The DNM3 in its acrylic case is a remarkably revealing and neutral state of the art preamp	5 inputs MM/MC twin vol controls	R	44
<b>Deltec DPA 100S</b> £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
<b>Deltec DSP-50S/DPA-50S</b> £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
<b>Denon DAP-2500/PDA-4400A</b> £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 brill!	172W, monobloks Opt/Coax dig + 2 tape, 4 line and MM/MC inputs		68
<b>Denon PMA-250II</b> £140	Good Good +	Spacious yet tactile and gutsy sound via all inputs. Worthwhile upgrade over original PMA-250	53W, MM 3 line inputs, source-direct	R	80
<b>Denon PMA-350</b> £170	Average+ Good	Bold claims were made at its launch but the sweet and inoffensive sound, though very pleasant, is not mould-breaking at the price.	88W, 5 line and MM disc inputs + source direct.	R	92
<b>Denon POA-6600</b> £1000 p	Excellent Very Good	Delivers abundant high quality sound, solid engineering expertise and content clearly compensating for any compromising of purist audiophile principles - now in revised A form	250W monoblok, remote power	R	60
<b>Dual CV600RC</b> £150	Good + Good	The heart of Dual's latest budget range enjoys a very lively, open and vibrant sound. Slightly sanitised via CD perhaps, but still damn good for a features-first integrated amp!	63W, 3 line, 2 tape and MM inputs. Remote control	R	104
<b>E.A.R. 549</b> £3628 pair	Very Good Very Good	A valve monoblok that measures like a solid state amp is itself an achievement, but exceptional power delivery and bass 'slam' is not fully matched by delicacy and transparency elsewhere	200W monoblok, bias setting		60
<b>E.A.R. 802/509mkII</b> £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
<b>EMF Audio Sequel</b> £349	Good - Good +	A fresh start for Mike Creek has resulted in the Sequel, a minimalist amp with a very refined but mildly restrained sound	47W, 3 line, 1 tape, MM or MC inputs		109
<b>Entire Sound EX50</b> £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
<b>Exposure VI/VII*/VIII</b> £1580	Good Very Good	An established company like Exposure could do more to improve the 'look' of these amps which, nevertheless, sounded confident, dry and musical. Dual version no longer available	63W, Super mod. 4 line and 2 disc inputs with full rec-out switching	R	68
<b>Exposure VII/VIII</b> £530/£580	Very Good Good	Supplied as a combination without the separate preamp power supply, this pre power combination performed satisfactorily especially on the moving coil input	50W, MM/MC, 3 inputs, straight line		62
<b>Exposure XI/XII/VIII Super</b> £1900	Good Very Good	New preamp and improved power amp led to a smooth and refined sound, MM/MC less transparent than CD	61W, MM/MC, 5 line inputs	R	80
<b>Goodmans GSA-600</b> £140	Good Poor	Designed to form the heart of a Goodmans separates system, the wishy-washy and faceless sound of this amp fails to stack up	76W, tape, 3 line and MM inputs. Remote control		97
<b>Grant G60AMS</b> £948 pr	Good Very Good	This neat and compact 60W valve monoblok gave good sound on the Bohm tap, better still on 4ohms. The midrange was particularly natural	60W monobloks 8ohms	R	57
<b>Hafler DH120 assembled</b> £365	Very Good Average	Sound quality results were decent enough, but this power amp won't set the world on fire at this price	60W		44
<b>Hafler SE-100/SE-120</b> £370/£380	Good + Good +	The smallest of Hafler's pre/power range but still imbued with the open, sparkling quality of their bigger models. Preamp sounds significantly better via CD than MM or MC	96W, bridging option. 2 Tape, 3 line + Aux or MM/MC	R	97
<b>Hafler XL-600</b> £1200	Very Good Very Good	Sounds remarkably open, transparent and inherently 'musical'. XL-600 is tremendously powerful and very compatible	426W in stereo mode, 1.5kW in bridge	R	74
<b>Harman Kardon Citation 25/22</b> £699/£899	Good Average +	Not as outrageous as previous Citation amplifiers but neither as punchy nor exciting in the sonic stakes. A good all-rounder but lacks sparkle	138W, MM/MC full range of input and record out		74
<b>Harman Kardon HK6150</b> £160	Good Good +	Based on the older HK6100 but with a more solid, punchy and expressive performance that attracted considerable praise from our listeners	44W, 3 line, 2 tape and MM inputs, loudness, tone controls	BB	109
<b>Harman Kardon HK6850</b> £700	Good + Good	This monster is derived from the HK6800 with a similarly deep and powerful sound but a rather steep price tag	101W, 4 line, 2 tape and MM/MC inputs. Preamp direct		109



## AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Heybrook C3/P3</b> £479/£660	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		85
<b>Heybrook C3/P3</b> £479/£660	Average + Average	Since we last looked at this combo Heybrook has improved the manufacture of its power amp though flaws in the preamp's disc input remain unchecked	146W, oodles of current, passive line inputs		104
<b>Heybrook Signature</b> £649+£150/£92	Good + Very Good	Heybrook have re-boxed the best facets of the old C3/P3 to produce a stunningly powerful and vivid-sounding combination which is equally impressive via vinyl or CD	148W, 3 line, tape and MM/MC inputs. Outboard transformer	R	109
<b>JVC AX-A342</b> £169	Very Good Average	A value-conscious budget amp offering plenty of power but a slightly untidy and inconsistent sound	77W, 3 line, 2 tape and MM inputs, tone, loudness controls		109
<b>JVC AX-A3TN</b> £140	Very Good Good	A true minimalist amp from the masters of mass-production! Offers a very comfortable, accessible sound yet with some loss of deep bass and extreme treble.	50W, 3 line, 1 tape and MM i/p's. CD DiRt and 'Bass Compensator'	R	92
<b>JVC AX-A441</b> £210	Good+ Average	A return to the traditional style of mass-market design brought an inconclusive reaction from our panel. Blowing 'hot and cold', our listeners ultimately found its music uninteresting.	93W, 3 line, 3 tape, MM/MC inputs. CD direct facility		104
<b>JVC AX-A1010</b> £650	Very good Good+	JVC's flagship amplifier also houses a couple of ancient 16-bit DACs for good measure! One of the best behemoths: a big amp with a big, boppy and unmuddled sound	124W, 6 line and MM/MC inputs plus opt/coax digital inputs	R	109
<b>Jadis JP30/JA30</b> £4990/£4900	Average Excellent	Two-box preamp plus monoblok power amps, classic valve design gives stereotype valve sound. Beautiful build, nostalgic styling and delightful sounding midrange transcend limitations at	30W 2-box pre-, monoblok power, MM-only, 4 line inputs	R	60
<b>Jeff Rowland Coherence One/Mod</b>	Very Good Very Good	The technical design of these amps is very elaborate but ensures they achieve an extraordinarily transparent and potent sound. However, the CD i/p is clearly superior to the disc inputs	448W monoblok MM/MC with loading options. Balanced topology	R	72
<b>Kelvin Digital Integrated</b> £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
<b>Kelvin Integrated</b> £449	Good Good	Recent mods have reversed the Integrated's previous good fortune, this unit was just too syrupy.	21W with 10-12W in Class A. Four line + MM/MC.		92
<b>Kelvin Labs Absolute Zero/M30</b> £395/295/595	Good + Average +	Latest versions of the M30 offers a true 30W Class A and a slightly muddled but very comfortable sound. MC preamp is a very linear design	33W monoblok MC only + 4 line inputs. Separate L/R balance	R	74
<b>Kenwood KA-3020</b> £140	Good + Good +	An unassuming little amplifier that turns in a remarkably balanced and entertaining sound. Lively, detailed and engaging	66W, 2 tape, 3 line + MM disc. Source direct	BB	97
<b>Kenwood KA-4020</b> £170	Good + Average +	On paper this is a beefier version of the '3020 yet our listeners thought it sounded weaker, lacking richness and detail	103W, 2 tape, 3 line + MM/MC. Source direct		97
<b>Kenwood KA-4040R</b> £220	Good + Average +	In many respects this sophisticated amp is a 'digitised' version of the KA-4020 with relay-switched inputs and full remote control. Unusual looks but can seem insubstantial via CD.	82W, 3 line, 2 tape, MM/MC inputs. Full remote control		104
<b>Kenwood KA-5020</b> £220	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
<b>Kenwood KA-5040R</b> £270	Good + Average	A flexible, remote-controlled amp that uses the old KA-5020 as a building-block. Unfortunately it lacks dynamics, sounding stifled and uninteresting	100W, 3 line, 2 tape and MM/MC inputs. Source Direct		109
<b>Klyne SK5a</b> £2590	Very Good Very Good	Beautifully made and presented, this American thoroughbred has a good lab performance, but although versatile, is rather expensive for the quality of sound offered	Balanced output, versatile cartridge loading		72
<b>Lecson Quattra</b> £350	Average+ Sound	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
<b>Lecson Stereo</b> £200	Poor Very Good	Can reflect the full weight and ambience of a tense, classical performance. A genuinely deep, detailed and enthralling sound marred by unreliability of our sample. New stock will be cured.	76W, 4 line, 2 tape, MM/MC inputs.		104
<b>Lectron JH50</b> £2300	Average Very Good	Sexily presented valve power amplifier from France. Lovely valve sound too, with delicate and airy top end. Not especially powerful and rather expensive but very desirable!	50W		78
<b>Linn Intek</b> £398	Good - Average +	Linn have slashed its price and made various internal revisions, but their no-nonsense Intek still lacks the authority and confidence to support its forward balance.	55W, 3 line, 2 tape, MM/MC inputs, rec-out, mono + mute		104
<b>Linn LK1/LK280</b> £598/£763	Good Good -	A very modern, logic-controlled amp with distinctive and inoffensive sound quality. Its restrained sound could do with extra insight and zip.	84W, compact amp CMOS sw. for 2 tape, 2 line and MM/MC. xlr sockets		68
<b>Linx Nebula</b> £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		85
<b>MFA Magus</b> £1147	Good Very Good	Versatile valve preamp from USA, genuine MC compatibility and high class construction make the Magus a bargain	3 line, MC, tape out, variable gain	R	100
<b>Magnum MP150/MF150</b> £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
<b>Marantz PM-30</b> £130	Good + Good +	The building-block for Marantz's popular budget 'SE' amplifier is no slouch, providing a lively and very expressive sound with plenty of strong bass. A good 'un.	49W, 3 line, 2 tape and MM inputs, source-direct	BB	104
<b>Marantz PM-30SE</b> £150	Very Good Good+	The breathed-on version of Marantz' PM-30 offers an engagingly detailed and spacious sound though one that's warmer via MM disc than CD.	50W, 3 line, 2 tape and MM disc. Source direct	R	92
<b>Marantz PM-40SE</b> £240	Very Good Good +	The improved version of their basic PM-40 model has itself been updated to provide a bigger and more exciting sound. A good 'un	61W, tape, 3 line + MM/MC disc. Source Direct	R	97
<b>Marantz PM-50</b> £260	Good + Average +	One of Marantz's new breed, the PM-50 has a big and beely sound yet one that lacks refinement	92W, MM/MC, 4 line inputs, source-direct		80
<b>Marantz PM-72</b> £300	Good + Average	This is a very neutral, pleasantly detailed and even-handed performer but one that lacks a sense of emotion or expression	155W, 3 line, 2 tape and MM/MC inputs		109
<b>Marantz PM-75</b> £500	Good Average	More successful than most amps with on-board DACs but still not as balanced as other Marantz products	136W, opt/coax dig inputs, 6 line + MM/MC		68
<b>Marantz PM-80</b> £400	Very Good Good +	Technically robust with an equally beely 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
<b>Meridian 201/205</b> £760/£525each	Very Good Good +	A fine preamp with additional luxury option of full system remote, plus competent and attractive monoblok power amplifiers with generally good performance	100W MM/MC 6 line inputs remote capable straight line	R/-	62
<b>Moth Series 30</b> £132/ £203 (£254)	Good Very Good	A modular system capable of cracking results. The passive preamp and power amp combination is especially good value and warrant a Best Buy in their own right.	35W, 4 line inputs on passive pre, MM/MC on phono eq unit	R/BB	109
<b>NAD 3020i</b> £150	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
<b>NAD 3225PE</b> £160	Average + Average +	Light and detailed if not as rich or weighty sounding as others. MM input sounds warmer than CD	42W + 70W dyn. headroom; soft-clipping, MM only	R	68
<b>NVA AP20</b> £260 or £290	Average - Good +	Available with or without a disc stage this utilitarian amplifier sounds gentle and restrained but is euphonic and utterly engaging	35W, 2 line, tape and either MM or MC inputs	R	109
<b>NVA P70MC/A60</b> £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
<b>Naim Separates</b> £750 pl	Very Good Good	A consistent and coherent series of 'building blocks' for conventional passive or active operation. Sound quality ignores conventional audiophile standards of presentation, but	40-70W, MM/MC etc	R	60
<b>Onix OA-21s/SOAP</b> £350/£180	Average + Good -	Via MM disc this amp comes alive with a fresh and vibrant sound though its CD input sounds utterly dead by comparison.	60W, 1 tape, 3 line and either MM or MC. Outboard PSU option		97
<b>Orell SA-040</b> £359	Good Good +	This promising newcomer from a brand new company sounded pretty good and should improve as production settles	45W MM/MC, 4 line inputs, straight line	R	56



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## AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Orell SA-040SE</b> £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
<b>Philips DFA-888</b> £300	Good Average	As above but including a modified disc input and onboard DAC. Sounds tight but also slightly thin	107W, as above + opt and coax digital inputs		74
<b>Philips FA-880</b> £200	Good Average	A new and cheaper design from Philips that sounds best via MM disc. Can appear soft and unbalanced via CD	108W, MM/MC source-direct tone		74
<b>Philips FA-930</b> £200	Average Average +	Radical styling hides a digital switching facility plus full remote control over what is Philips' best effort to date	99W, tape, analogue and digital inputs with ESI BUS	R	109
<b>Philips FA890</b> £230	Good + Good -	Based on their FA880 model but tarted-up with a remote control facility. Inoffensive, civilised but unexciting sound is retained	120W, 6 line + MM/MC logic-controlled input switching		97
<b>Philips FA960 MkII</b> £300	Good + Average	The MkII '960 still failed to grasp our listeners' attention, but it remains a competent amp nonetheless	122W, 6 line & 2 disc inputs + tone controls		68
<b>Pioneer A-229</b> £130	Average + Average	An unambitious amplifier that fights shy of tricky speakers with a sound that's equally unadventurous. Slightly soft and comfortably even-handed presentation	60W, 2 line, 2 tape and MM inputs, loudness and direct		104
<b>Pioneer A-300</b> £160	Very Good Good	The cheapest of Pioneer's dynamic duo gives off its best with CD rather than MM disc which failed to shine quite so brightly.	55W, 3 line, 2 tape and MM. Independent rec out facility.	R	92
<b>Pioneer A-400</b> £240	Very Good Very Good	Pioneer's design concept snaps into focus with the A-400, an amp that seems to bubble with musical detail. A bench-mark that other manufacturers should strive for.	71W, 3 line, 2 tape, MM/MC. Independent R-out switching.	BB	92
<b>Pioneer A-676</b> £280	Good + Average -	A lusty amplifier at a modest price yet one that failed to inspire our listeners with its bland, indifferent sound	98W, 4 line, 3 tape and MM/MC inputs + subsonic filter		109
<b>Pioneer A-777</b> £400	Very Good Average -	A larger version (!) of the A-676 that offers more power but an equally sluggish and uninspiring sound	121W, 4 line, 3 tape and MM/MC inputs + muting facility		109
<b>Proton 520</b> £115	Average Average	Very well equipped budget amp with a slightly flat and undynamic sound - acceptable at the price though	31W, MM/MC with variable MC gain, 4 line inputs	R	74
<b>Proton AP-1000/AA-1150</b> £250/£395	Good + Average +	Bags of headroom available from this pre/power combo, but can seem bloated or unrefined via MM	67W, MM/MC, adjustable MC gain, 5 line inputs		80
<b>QED A240 CD II</b> £249	Good + Good	Latest 240CD is fine value for CD and has competent MM disc input as well	45W MM 5 line inputs straight line	BB	62
<b>QED A270CD/PA</b> £369/£429	Good Good +	Recent updates have bolstered the output of the A270 without adding to its colourations. The PA option is a touch expensive	61W, 2 tape, 3 line + MM or MM/MC from PA board	R/-	97
<b>QED C300/P300</b> £329/£370	Good Good	A cost-effective combo, limited in its resolution but no less beguiling as a result. Disc stage is sweeter but samey	58W, 2 tape, 3 line, MM/MC + mono/biamp opt.	R	85
<b>Quad 34</b> £366	Very Good Average	This well-built durable preamp has useful filtering and above average tone controls but was found lacking in sound quality (viz: detail/dynamics)	4 inputs MM/MC tone controls		44
<b>Rational Audio</b> £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
<b>Ray Lumley Model 75</b> £1995 p	Average Good +	Monstrous valve monoblocks which represent good value. What they lack in musical subtlety they make up for in sheer muscle. And these are Lumley's small monoblocks!	75W monoblok		78
<b>Revox B150</b> £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
<b>Revox B250</b> £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
<b>Rose RV-23</b> £395	Good Very Good	Beautifully built classy British 'hybrid' preamplifier. You can spend more to get a more transparent sound but it's hard to criticise given the competitive price	MM plus 3 line inputs	R	77
<b>Rotel RA-930AX</b> £160	Good - Very Good	Based on the original RA-820AX but featuring a new look and a tweaked circuit design, this budget wonder captivated our listeners with its clean, vibrant and thoroughly involving sound	53W, 3 line, tape and MM inputs, tone bypass	BB	104
<b>Rotel RA-940BX</b> £200	Good Good	Rotel's cheapest 'BX' amplifier prompted a mixed reaction, some finding it muddled while others thought it 'exceedingly musical'	53W, 3 line, 2 tape plus MM/MC inputs. Tone defeat	R	109
<b>Rotel RC-960BX/RB-960BX</b> £150/£180	Very Good Good -	With excellent standards of construction, flexibility and plenty of power under the bonnet, this duo represents an ideal choice for the first-time buyer.	80W, bridge-mono facility. 3 line, 2 tape and MM/MC on preamp	R	104
<b>Rotel RC-980BX/RB-980BX</b> £275/£350	Excellent Average	Plenty of watts per pound sterling from a technically flawless combination. Its sound is equally expansive but lacks a sense of poise, of control and fine detail - a disappointment	143W (33A!), 3 line, 2 tape and MM/MC inputs + headphone socket		109
<b>SAE P102/A202</b> £499/£599	Average + Average +	Microprocessor-controlled pre and power amp that sounds much better at low rather than high volume levels. Pro-oriented aesthetics	151W, MM/MC + 2 liner and 2 tape, tone memory, spk switching		74
<b>Sansui AU-X111</b> £100	Good Average	Sansui has engineered an amp that's both solid and flexible for the price, but its sound is rather bland compared to competition in the £110 sector	5 line inputs, MM, 52W		92
<b>Sansui AU-X911DG</b> £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
<b>Sony TA-F440E</b> £180	Very Good Good	A new budget amp based on tried-and-tested circuits but free of spurious widgets like tone controls. It has a fresh and up-beat sound with plenty of detail, can sound smeared via CD	109W, 3 line, 2 tape and MM + rec out	R	104
<b>Sony TA-F540E</b> £230	Very Good Good -	An extra £50 buys you an MC input but little else over and above the TA-F440E. This version sounds more consistent from input to input but is still rather superficial or unconvincing	108W, 3 line, 2 tape, MM/MC + rec out		104
<b>Sony TA-F670ES</b> £400	Very Good Good	Nothing fancy, just a heavyweight amplifier that puts up 'a damn fine show'. Fresh and sharp-sounding but a little too expensive	133W, 3 line, 2 tape, direct and MM/MC inputs. Pre-out facility		109
<b>Sony TA-F730ES</b> £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
<b>Sony TA-F770ES</b> £600	Good + Average -	Another monster amp offering full remote control and buckets of power. It's also another monster amp that sounds appalling	125W, 3 line, 3 tape, direct and MM/MC inputs. Remote operation		109
<b>Sound Audio VP3a/HBP60a</b> £599/£599	Good Average ++	Hybrid power amp and valve line stage. Big 'n' beefy power amp is the stronger partner	4 line, 1tape 60W	R	100
<b>Sugden A21a</b> £395	Average+ Good	The modern-day relative of Sugden's original Class A amp and one that offers a smooth, easy-going sound. Best partnered with sensitive speakers.	25W power amp with a good 16W inPure Class A		92
<b>TEAC A-X400</b> £115	Average Average	Sibilance and a lack of crisp vitality hamper the performance of this amp, as does the stringent protection circuitry	59W, 4 line + MM + tone + mic i/p level control		85
<b>TEAC A-X5000</b> £229	Good Average -	This amplifier is compromised by a grey and muddled sound that taxed the concentration of our listeners. Better via MM disc	107W, 3 tape, 3 line + MM/MC. Source Direct		97
<b>Technics SU-810</b> £130	Average + Average	Our sample started off sounding fast, taut and well-integrated yet eventually failed on the MM disc input	66W, 2 tape + 3 line + MM. Tone + loudness		85
<b>Technics SU-VX600</b> £200	Good + Good	What looks like a fairly ordinary mass-market offering is actually the first 'tweaked' amp from Technics, its solid and sharply focussed sound a taste of things to come.	90W, 3 line, 2 tape, MM/MC + power-amp inputs	R	104
<b>Technics SU-VX800</b> £450	Very Good Average	On the other hand, this is a mass-market amp still hampered by over-enthusiastic protection circuits! It sounds raw and congested when the going gets tough - positive but raucous	148W, 3 line, 3 tape, balanced input + MM/MC		104
<b>Technics SU-VZ220</b> £100	Good Average -	Cheap, cheerful and pretty flexible to boot yet the SU-VZ220 quickly sounds thin, splashy and relentless when the going gets tough	50W, 3 line, tape and MM inputs plus tone and loudness controls		109



## AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Threshold FET 10e</b> system/ Woodside SC26/STA35 Renaiss	n/a Very Good	Almost valve-like limpidity and excellent soundstaging are star qualities of the Threshold amps. Line input resistive loading is too low	Component FET phono stage, line pre, FET power amp 100w		Coll. '9
<b>YBA 1 power amp</b> £2995	Good Good+	Synergistic pairing with a cool, controlled sound, good focus and transparency. More about poise than grunt	35W, valve, 3 line, optional MM or MC, 2 tape outs		100
<b>YBA 1 preamp</b> £2895	Good Excellent	This equally well finished power amp offers front rank stereo staging and transparency, and is capable of driving the most difficult loads	85W	R	62
<b>YBA 2 pre &amp; pwr</b> £1395/£1695	Very Good Very Good	A front line French audiophile product. Great stereo and a fine Krell style finish	MM/MC, 3 inputs, straight line	R	62
<b>YBA Model 3</b> £995/£995	Very Good Very Good	Superbly finished French separates, with very good space and transparency, slightly softened bass. Needs extra transformer ( £300) for MC cartridges	70W MM (MC extra) straight line	R	56
<b>Yamaha AX-330e</b> £100	Good Good	Suited to highish sens. loudspeakers this duo produced see-through, ethereal stereo images that were more convincing towards the centre of the soundstage than at the edges	56W stereo amp MM only with 3 line i/p's		72
<b>Yamaha AX-550</b> £240	Average + Average +	An improvement on earlier efforts but still a little bland or lack-lustre. Very compatible though	48W, MM, 3 line inputs, source-direct option		80
<b>Yamaha AX-750</b> £399	Very Good Good	neutral yet lacks the ability to involve on an emotional level	131W, 5 line + MM/MC. Pure Direct + remote control		97
	Very Good Average	Big and bulky with remotely-controlled input and volume. Impressive handling, but two samples split the opinion of our listeners, one sounded squashed the other fast and articulate	149W, 3 line, 2 tape, MM/MC inputs + remote control		104

## 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.

## CABLES - INTERCONNECT

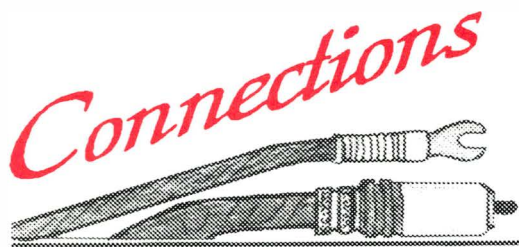
MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Audio Note Copper ANA</b> £44	Average Good	ANC sounded punchy with a faintly lean but tightly-focused bass character. This crystalline precision waned slightly at higher frequencies	OFHC copper twin-axial	R	59
<b>Audio Note Flexible Silver ANS</b> £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
<b>Audio Note Silver ANV</b> £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
<b>Audio-Technica AT-6115</b> £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
<b>Audioquest Livewire Ruby</b> £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
<b>Audioquest Livewire Topaz</b> £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
<b>Chord Mono-t</b> £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
<b>Deltec Gortex Black Slink</b> £152	Very Good Excellent	A true reference quality cable providing an exceptionally detailed and transparent sound	Symmetrical, 8-conductors, Gore-tex ins.	R	83 Supp
<b>Deltec Slink</b> £32	Good Very Good	Ideally used in lengths of under 4 metres, it errs on the lean side of neutral but has an uncommon transparency in the midrange	4 silver plated OFC strands PTFE dielectric	BB	59
<b>Kimber Kable KC-1</b> £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
<b>Kimber Kable PSB</b> £41.40	Very Good Very Good	An exceedingly transparent midband but slightly 'clanky' treble. It always managed to sound remarkably uncluttered and open	OFC, PTFE dielectric	BB	59
<b>Monster Interlink 300</b> £30	Average + Average	A big, larger-than-life sound but with some emphasis of midband detail and loss of bass	Screened, symmetrical cable		83 Supp
<b>Monster Interlink 400</b> £50	Good Good	Bass is solid and punchy, counterpointed by a slightly overblown midband which tends to make vocalists sound larger-than-life	Multi-gauge	R	59
<b>Origin Live Soli-Core Super</b> £60	Good 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
<b>QED Incon Graphite P1G Gold</b> £19.95	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
<b>QED Incon P1-Gold</b> £16.95	Good Good	A lively open presentation that just borders on the lean side of neutral, the quick and lucid delivery affording considerable musical insight	OFHC, gold plated Deltron plugs	BB	59
<b>Supra EFF-1</b> £60/0.75m	Average Average	A new, costly and mildly disappointing addition to the range. Edgy, smeared sound plugs	Screeded, symmetrical dir. cable		83 Supp
<b>van den Hul MC-Gold</b> £230	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
<b>van den Hul MC-Silver</b> £750	Good Good	Although remarkably transparent for an asymmetric design this costly cable was not considered to be of 'state-of-the-art' standard, and is bettered by cheaper models	19 silver plated copper strands		59
<b>van den Hul MCD-102 III</b> £61.50	Good Good	Possessing the same endearing qualities as the D300, it presented open and transparent soundstages and improved timbral resolution	Twin axial silver plated copper	R	59
<b>van den Hul Thunderline</b> £92	Good Average	Thunderline essentially parallels the sonic performance of the cheaper D102. HF is occasionally tainted by a 'tizzy' coarseness, bass is tight and dryscreening	Silver plated 'matched copper'		59



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## CABLES - LOUDSPEAKER

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Absolute Wire Force 4</b> £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
<b>Audio Innovations OR-200</b> £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
<b>Audio Note AN-SP</b> £100 per metre	Average - Excellent	A clean and open sounding cable that offered a deep and pleasantly detailed perspective. Bass was slightly restricted, but seemed tight and coherent	15 silver strands, polyethylene dielectric		64
<b>Audio-Technica AT-6120</b> £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
<b>Audioquest Livewire Black</b> £15 per metre	Good Good	It proved clear and punchy but with some grain across the treble. Nevertheless Black remains an interesting concept and proved better than Livewire Green	OFHC, surface only - foam core construction	R	64
<b>Cyrus</b> £2.50 per metre	Average + Good	Because of its impedance characteristic this cable will deliver a smooth and unfatiguing treble balance with loudspeakers offering an easy load	0.8mm single strand, PVC dielectric	BB	64
<b>Deltec 8S</b> £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
<b>Deltec Cortex Black 16</b> £528 - 4.5m pair	Very Good Excellent	Improvements in bass resolution, transparency and treble poise maintains status of this cable	Silver-plated OF copper with Gore-tex ins.	R	83 Supp.
<b>Exposure</b> £2.50 per metre	Good Good	It could sound a trifle matter of fact but this emotive flattening was also somewhat dependent on the music program. It is also highly suited to long runs	56 OFC strands, webbed PVC dielectric	R	64
<b>Furukawa FS-2F09</b> £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.
<b>Furukawa FS-2T15S</b> £50 per metre	Good + Very Good	An advanced solid-core cable with a highly fluid, detailed and inherently musical sound	Single 1.5mm Super PC-OCC	R	83 Supp.
<b>Kimber 4VS</b> £7.15 per metre	Average + Average	Similar construction to 4TC but dissimilar materials infer a slightly tizzy sound	Open-weave, multistrand, PVC ins.		83 Supp
<b>Kimber Kable 4PR</b> £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
<b>Kimber Kable 4TC</b> £17.65 per metre	Good Good +	4TC made a great impression in the listening tests with an open midband, a smooth and unfatiguing treble with slightly rich but suitably weighty bass	OF copper, PTFE dielectric	R	64
<b>Linn K20</b> £2.95 per metre	Good Average	Subjectively, it erred on the forward and bright side of neutral but enjoyed an essentially clear and punchy delivery	56 OFC strands, webbed PVC dielectric		64
<b>Monitor PC Silverline PC4</b> £5.75 per metre	Good Average	Sonically, it laboured under a heavy and claustrophobic balance, lacking the see through transparency and lucidity of the better solid core cables	2072 x 0.07mm silver plated copper strands		64
<b>Monster Original</b> £3.49 per metre	Good Average +	Original sounded relatively congested and murky at higher frequencies but possessed weight and conviction in the bass	Multistrand		64
<b>Monster SCI 16-4</b> £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
<b>NVA LS1</b> £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
<b>QED 79-Strand</b> £1 per metre	Good 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
<b>QED Flat 200</b> £2.20 per metre	Good Good	I detected a degree of confusion at low frequencies but this did not stifle the acoustic atmosphere which remained open and positive	200 strands, flat webbed PVC dielectric	R	64
<b>QED Incon Graphite</b> £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
<b>Rotel Supra 10</b> £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
<b>Rotel Supra 4</b> £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
<b>van den Hul CS-122</b> £6.50 per metre	Average + Good -	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, rubberised dielectric	R	64
<b>van den Hul D-352</b> £12 per metre	Good Average +	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
<b>van den Hul SCS-12</b> £10 per linear metre	Good + Good +	SCS-12 set a high standard with a tight and well focused soundstage populated with tactile stereo images. Bass wasn't as extended or resolved as some other cables	19 silver plated strands of 12 different gauges, PTFE dielectric	R	64
<b>van den Hul SCS-2</b> £99.95 per linear metre	Good + Good +	Overall it was commendably neutral and transparent but nothing less would be acceptable bearing in mind the tremendous cost of a stereo pair	665 silver plated matched crystal copper strands, PTFE dielectric	R	64



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# The Directory

## 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
<b>Acoustic Research RD-06</b> £300	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
<b>Aiwa AD-F410</b> £100	Average Average	Comparable to AD-F500 but cheaper: Good all round performance, well adjusted, useful basic and not so basic features	2 head, Dolby B/C/HX Pro, bias adjust	BB	99
<b>Aiwa AD-F500</b> £160	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
<b>Aiwa AD-F810</b> £200	Good Good	First class budget 3-head machine with a dual capstan transport that really works at reducing the 'fudge' factor	Dolby B, C, HX Pro, bias adjust, track search, variable hdpd	BB	99
<b>Aiwa AD-WX616</b> £160	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	R	93
<b>Aiwa AD-WX777</b> £190	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
<b>Aiwa AD-WX888</b> £260	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
<b>Aiwa XK-S9000</b> £700	Good + Excellent	Genuine state of the art in battleship pale gold/wood gloss clothes. Fabulous build, clunky transport and sharp, refined sound quality with Dolby S or B and metal tapes	Dolby B/C/S/HX Pro, built in DAC, tape alignment	R	105
<b>Akai DX-57</b> £200	Good Good	Confident sounding deck which eschews fancy gadgets for a good transport and decent electronics. Sound quality is firm and tidy under most conditions of use; avoid Dolby C	3 heads, dual capstans, Dolby B/C/HX Pro, variable bias		105
<b>Akai GX-32</b> £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
<b>Akai GX-52</b> £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
<b>Akai GX-65</b> £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
<b>Akai GX-95II</b> £400	Good Very Good	Sharp, clear and articulate sounding deck, with superb performance extending to frequency extremes	3 heads, dual capstans, tape calibration, Dolby B/C/HX Pro	R	99
<b>Akai GX-R35</b> £200	Average Average	Middling sound quality at best with Dolby B; deteriorates with Dolby C and unsatisfactory anyway with testing material due to loss of low level information	Auto-reverse (optically triggered), Dolby B/C/HX Pro, bias adjust		99
<b>Denon DR-750A</b> £250	Average Average	Workmanlike and simply equipped dual deck which is more appealing on audio grounds than most of its type	Dual transport, Dolby B, C & HX Pro	R	99
<b>Denon DRM-510</b> £140	Good Average+	An amnesic Dolby switch and lack of timer standby detract from an otherwise strikingly successful deck with a consistently good performance	2 heads, Dolby B/C/HX Pro heads, record return	R	99
<b>Denon DRM-710</b> £230	Average Average	Although this is a fair performing model, the design has lost some of the competitive edge of its predecessor, the DRM-700. Memo: must try harder - and where's the timer standby?	Dolby B/C/HX Pro, fine bias adjust, record return		105
<b>Denon DRS-810</b> £300	Poor Average	Basically good deck with non-stressful material let down by an inability to deal with high energy tapes properly. The horizontal loading mechanism is a success.	CD style loading drawer, real time remaining display, Dolby B/C/		105
<b>Denon DRW-650</b> £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
<b>Dual CC800RS</b> £150	Average - Average -	Low(ish) cost auto-reverse deck has mic input but lacks some niceties. Delivers a punchy but ultimately rather crude impersonation of source material, and a thin, lightweight bass.	Auto reverse, Dolby B, C, HX Pro, microphone input.		105
<b>JVC TD-R431</b> £170	Poor Poor	Modestly specified auto-reverse cassette deck which suffers the usual problems of the breed, to wit unstable, homogenised sound quality	2-head, Dolby B/C/HX Pro, auto reverse		99
<b>JVC TD-R441</b> £170	Average - Poor	This deck would make a good choice for those who need the unattended recording time to deal with absentee recording off air, but is a less than wholly convincing musical advocate.	Auto reverse transport, Dolby B/C/HX Pro, CD direct input		105
<b>JVC TD-V531</b> £260	Average Average	A simple but potentially Good deck with an excellent transport, let down by poor setting up. With all tapes, sound quality was thin and lacking in both substance and colour	3 heads, dual capstans, Dolby B/C/HX Pro, var bias		99
<b>JVC TD-V541</b> £280	Very Good Very Good	Crisp, lively sounding deck with excellent timing and occasionally slightly thin tonal quality. Best with metals and Dolby B	Dolby B/C/HX Pro, 3 heads, fine bias, display off	BB	105
<b>Kenwood KX-5030</b> £200	Good Average	confusing mishmash of listening impressions caused by poor set-up afflicting metal tapes and Dolby C in particular. Promising otherwise	2 head, Dolby B/C/HX Pro, auto-bias, track search		99
<b>Kenwood KX-5530</b> £190	Average - Average -	Neat looking and well equipped deck, adequately engineered but somewhat lacking musically. Worth considering if auto-reverse is the key to your happiness.	Dolby B/C/HX Pro, auto reverse, auto biasing, auto fader		105
<b>Kenwood KX-7030</b> £260	Good Good	Fine, articulate middle price cassette deck whose only (mild) failing with some programme material is a just perceptibly synthetic glaze	3 heads, dual capstans, Dolby B/C/HX Pro, auto bias	R	99
<b>Marantz CP230</b> £330	Average Average	This is a competitively priced portable recorder though not suited to replay of musicassettes	Dolby B, bias adjust	R	52
<b>Marantz CP430</b> £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
<b>Marantz SD315</b> £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 i		93
<b>Marantz SD40</b> £150	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
<b>Marantz SD50</b> £230	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
<b>Marantz SD515</b> £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, HX Pro, parallel recording		93
<b>Marantz SD60</b> £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



# The Directory

## CASSETTE DECKS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Memorex SCT-5</b> £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
<b>Nakamichi Cassette Deck One</b> £700	Good Good	New modernised Nakamichi is still curiously old fashioned in many ways, but offers unusually articulate sound of great insight	Dolby B/C, 3 heads, dual capstans, var azimuth	R	99
<b>Nakamichi Cassette Deck 1.5</b> £500	Good Very Good	High grade 3 head deck with minimal features but fine engineering and sweet, open though slightly coloured sound quality.	Dolby B/C 3 heads, bias adjust	R	105
<b>Nakamichi Cassette Deck Two</b> £350	Very Good Very Good	Not completely neutral, this deck is assured, dynamic and quick, with abundant detail and some coarseness. Stable transport but rudimentary features accompany fine under the skin engineering	Dolby B/C, manual tape type selection, bias adjust	R	93
<b>Nakamichi RX-202E</b> £600	Good Very Good	Fine, clear and articulate sounding player. Excellent with prerecorded material, but idiosyncratic and sometimes obstructive control	Auto reverse, Dolby B, C, 2 head	R	63
<b>Philips FC870</b> £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
<b>Pioneer CT-339</b> £150	Average + Average	Auto BLE tape alignment is the most interesting feature. Sound quality is a little flaky, but reasonable, though pitch problems were encountered with cheap tape stock.	Auto tape align, Dolby B /C/ HX Pro, mic inputs	R	105
<b>Pioneer CT-676</b> £250	Average Poor	Dull, compressed and hard sounding deck, which is hamstrung by high measured transport flutter. Good points include sophisticated (and accurate) tape alignment	Dolby B/C/HX Pro, auto tape alignment, 3 heads		99
<b>Pioneer CT-900S</b> £500	Good Average	High spec and well built derivative of CT-93, but disappointingly lacklustre sound	Dolby B/C/S/HX Pro, dual capstans, 3 heads, auto alignment		99
<b>Pioneer CT-93</b> £800	Excellent Excellent	State of the art deck, built like something out of NASA's shuttle, with superb all round performance. Dolby S can muddle ambient information, but increases effective dynamic range	Dolby B/C/S/HX Pro, auto tape align, 3 heads, dual capstans	R	99
<b>Pioneer CT-W650R</b> £200	Average Average	There were some intermittent problems with the tape alignment system on the test sample, but the deck was otherwise good, despite a coloured bass and inability to exploit Type IV tape	Twin deck, both reverse, one records, auto align, B/C/HX Pro	R	105
<b>Revox B215</b> £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
<b>Revox B215-S</b> £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
<b>Revox H1</b> £1,145	Very good Very good	Bare bones version of B215 is still a sophisticated piece of kit, and lacks for none of the 215's engineering prowess	3 heads, Dolby B/C, auto tape align, semi-auto record level set.		99
<b>Revox H11</b> £938	Average + Average +	Costly and well engineered deck which boasts the bare minimum of facilities and which is primarily designed for the Revox multi-room H-Line system. Moderate performance.	3 head, Dolby B/C/HX Pro, manual tape alignment		105
<b>Sansui D-X111E</b> £120	Poor Poor-	Very high levels of flutter, and a shabby, hollow sound with metallic colorations and a severe loss of detail - is it necessary to go on?	Dolby B/C/HX Pro, fine bias adjust		105
<b>Sansui D-X211HXR</b> £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, BB bias adjust	BB	93
<b>Sansui D-X311WR</b> £250	Poor Poor+	Not wholly successful auto-reverse deck which suffers because it has tried to be all things to all people. Lack of clarity is the main limitation	Twin optically triggered auto-reverse, Dolby B, C & HX Pro		99
<b>Sony K870ES</b> £350	Average+ Average+	Good but not outstanding deck which proved slightly disappointing on audition. This model is no standard setter	3 heads, dual capstan transport, Dolby B/C/HX Pro, tape calibration		99
<b>Sony TC-K520</b> £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
<b>Sony TC-K570</b> £200	Good Average+	Good if slightly untransparent sounding recorder, comfortable with all noise reduction circuits and all tape groups	3 heads, Dolby B/C/HX Pro, bias adjust	R	99
<b>Teac V-5000</b> £300	Average+ Good-	Fine middle ranking heavyweight with blemish free overall performance, beaten only on subtleties by the best at the price	3 heads, dual capstans, bias/sensitivity adjust, Dolby B/C/HX Pr		99
<b>Teac V-7000</b> £400	Good Good	Intrinsically sharp, clear and solid sound spoiled by exaggerated detail with prerecorded material and losses imposed by Dolby circuits	3 heads, quartz locked dual capstans, tape align, Dolby B/C/HX		99
<b>Teac R-9000</b> £450	Good + Good	Much better than average auto-reverse deck, well worth considering, though short of the special qualities required for formal endorsement at this price. Nicely engineered too.	Auto-reverse, 3-head, tape calibration, Dolby B, C, HX Pro		105
<b>Teac V-8000S</b> £700	Good + Excellent	Superb stability and real subtlety from a cassette deck, this must be the best Teac yet. The only disappointment was the Dolby C circuit which was coloured and lacking in transparency.	3 heads, dual capstans, Dolby B/C/S/HX Pro, tape calibration	R	105
<b>Technics RS-B965</b> £380	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 alignmen	R	93
<b>Technics RS-BX606</b> £180	Average + Average +	Good middle ranker with accomplished metal tape handling but some HF roughness. Good with both noise reduction systems and with prerecorded material.	Dolby B/C/HX Pro, 3 heads, variable bias	R	105
<b>Technics RS-BX707</b> £220	Average Average -	Uneven but ultimately messy sounding deck with a number of oddities, including a tape calibration system lacking in accuracy and poor Dolby alignment	3 heads, Dolby B/C/HX Pro, bias & level calibration		105
<b>Yamaha KX-250</b> £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
<b>Yamaha KX-330</b> £180	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
<b>Yamaha KX-530</b> £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
<b>Yamaha KX-650</b> £300	Average+ Good	Fine audio manners, especially in the midband and treble, mark this high class deck out from the crowd	3 heads, dual capstans, Dolby B/C/HX Pro, play trim, bias adjust	R	99
<b>Yamaha KX-930</b> £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

## CD PLAYERS

Now nearly a decade old, this all digital music source is well established despite high disc prices and the opposition of many hi-fi enthusiasts. Compact Disc's strengths over conventional vinyl are complete freedom from surface noise, ease of use, and more robust software. Remote control is just about standard on all new players.

However, many vinyl enthusiasts find CDs

sound less involving than top quality vinyl.

Prices average out at a little over £200, although entry level models are now available for little more than £100. Even the most basic models can sound very good indeed and employ state of the art decoding chips and the most useful play features. Extra money can buy remote volume control, audio 'tweaks', plus improved build and component quality control.

Digital outputs facilitate an easy upgrade path

Machines can be split into bitstream and multi-bit with each school having its adherents. Bitstream is the newer technology and will probably win in the end, although the development time spent on multi-bit systems means that excellent results can still be obtained.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Acoustic Research CD-06SE</b> £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



# The Directory

## CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Acoustic Research CD-07</b> £300	Good Good	AR's first Bit Stream CD player relies heavily on Rotel know-how to produce a smooth, detailed but undemanding sound	Few features on player, remote, dig o/p. SAA7321 PDM DAC	R	100
<b>Aiwa XC-300</b> £130	Average + Average +	Cheap, cheerful and gratifyingly free of digital 'nasties', this new bitstreamer is well-equipped but safe rather than thrilling on the sonic front.	Remote control, optical output, Toshiba bitstream DAC.	R	107
<b>Aiwa XC-700</b> £180	Good+ Very Good	Generously equipped player that harbours a top Philips' Bit Stream DAC. Offers a characteristically smooth and effortless 'bitstream sound'. Exceptional value	Remote control plus index skip, midship transport and 7350 PDM DAC	BB	95
<b>Aiwa XC-900</b> £210	Good + Good -	The loss of transparency and general awkwardness of this player comes as a surprise after the XC-700. Extra features have taken their toll	Remote control with variable o/p, midship transport, 7350 PDM DAC	R	100
<b>Akai CD-52</b> £249	Good Good	A nice surprise from Akai, genuinely good sound from this mid-priced model. Better linearity will help further	Remote, digital output, headphone socket	BB	64
<b>Akai CD-55</b> £230	Good Average -	Budget model which fails to compare with the CD52	Remote, hdph, Good programming		83
<b>Akai CD-57</b> £180	Average + Average +	A very flexible machine with a slightly lumpy but fullsome bass, no model of clarity but very entertaining!	Remote control, motorised volume, hybrid PWM DAC.	R	107
<b>Akai CD-62</b> £330	Average Very Good	Looks, build quality and the technical specification are right up to date. As it stands it sounds ve good but if the indifferent lab performance is improved, it would probably sound even better	Remote, programme, hdph, comprehensive display etc	BB	70
<b>Akai CD-73</b> £450	Good Average	A little uneven musically, the Akai tends to smother fine detail, but has first class dynamics and stereo imagery. Worth auditioning	Track entry keypad remote, menu display (switchable)		62
<b>Akai CD-93</b> £700	Good Very Good	Undoubtedly a CD player of real class in build, presentation, lab performance and sound quality, but also a shade expensive for formal Recommendation though that's not to dissuade lovers of	Track entry remote, menu display etc.		58
<b>Arcam Alpha</b> £420	Very Good Very Good	Arcam's new star, its best CD player yet and great value	Remote, etc, coax dig. out	BB	83
<b>Arcam Delta 70.3</b> £650	Good Good+	Latest in a line of Delta 70 CD players and one that offers a distinctly rugged, beefy sound. Plenty of power behind individual instruments but lacks a feeling of involvement	Remote cu. display dimmer, variable and dig outputs. 7350 PDM		95
<b>Ariston CD1</b> £400	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
<b>Ariston Maxim CD2</b> £550	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	Remote control, coax digital output. 16bit 4x chipset.		95
<b>Ariston Maxim CD3</b> £430	Good Good	CD1 electronics given room to breathe in the heavyweight CD2 chassis. The result? A fine all-rounder with a positive, dynamic sound that's better than either parent.	Remote control, display-off facility, Philips 16-bit chipset.	R	107
<b>CEC 880CD</b> £230	Poor Average	The dynamic and spritely sound of this machine is gratifying in the light of its primitive design but is otherwise poor value	Remote control, direct track access, dig o/p, hybrid PWM DAC		100
<b>Cambridge Audio CD3</b> £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
<b>Carver TL-3220</b> £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
<b>Carver TL-3300</b> £595	Good + Poor	Carver needs to listen critically to CD sounds; in our opinion. DTL does not improve the recipe	DTL, remote, programming, digital output		83
<b>Cary Audio Design CAD-955</b> £899	Average Average +	Rotel's latest 16-bit wonder with an add-on valve processor to filter-out any residual RF garbage. Nice idea but the player sounds very dry and taut, lacking warmth and body.	Remote control, triode-output stage, Philips 16-bit chipset.		107
<b>Creek CD60</b> £500	Good + Good	A big and confident sound from a player that's stuck with a green display, green lettering and green-fronted drawer. So it looks ghastly even if the internal design is very thoughtful.	Remote, spring-loaded buttons, coaxial digital output, 16-bit.		107
<b>Denon DCD-1290</b> £319	Good Good -	This player certainly looks the business but its sound is a real five-minute wonder. Its compelling fizz lasts about as long as your average firework.	Remote, pitch control, index skip, variable output, 18-bit		107
<b>Denon DCD-1460</b> £400	Good+ Average+	Here's a player that benefits from solid casework and decent features yet the overly complex electronics knock the stuffing from its sound	Remote control, volume, index search. 18+2-bit DACs		100
<b>Denon DCD-2560</b> £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, tape edit features, opt/coax digital output, 20bit 16		95
<b>Denon DCD-860</b> £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
<b>Denon DCD-960</b> £300	Good + Average	A fine feature package with sood lab results, but unfortunately an unexceptional sound quality	Remote inc vol, hdph, keypad, well featured		88
<b>Dual CD1080RC</b> £200	Very Good Average -	A rather strange-sounding player with a top-heavy treble that does little to redress its lack of vibrancy and emotion. The back-lit LC display and clean digital output are plus points.	Remote, coaxial digital output, digital volume, MASH/PWM DAC.		107

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## CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Ferguson CD007</b> £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
<b>Ferguson CD008</b> £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
<b>Goodmans GCD-435</b> £140	Poor Average -	Goodmans has the poweer to source with more care than this, music centre quality!	multibit, remote, basic facilities		88
<b>Harman Kardon HD7450</b> £230	Poor Average +	This player looks little different to other HKs but its performance is dominated by a budget decoder/oversampling IC. Good bass nonetheless but pop tracks can sound fizzy and tiring.	Remote control, display-off, timed-shared mono 18-bit DAC		107
<b>Harman Kardon HD7450</b> £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		95
<b>Harman Kardon HD7500II</b> £350	Good+ Good+	An update of the original HD7500 but featuring superior analogue electronics to the HD7450. Total integration is much improved, packed with detail that's expressed with enthusiasm.	Remote, variable, digital and headphone outputs. MASH/PWM	R	95
<b>Harman Kardon HD7600II</b> £429	Good+ Average+	Based on the HD7500II but with a motorised volume control and extra-heavy casework. Either way it lacks the transparency and sparkle of the cheaper machine	Remote, variable and digital outputs. MASH/PWM DAC		100
<b>Harman Kardon HK7300</b> £200	Average Average -	Budget low bit technology, does not deliver enough for a recommendation	No remote, no digital out; basic control features		83
<b>JVC XL-V231</b> £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
<b>JVC XL-V241</b> £160	Good Average	Even with its mkII PEM DAC this new machine sounds pleasant but not especially interesting. Stereo imaging is a trifle suspect	Remote control, slim centralised drawer, PEM bitstream DAC		100
<b>JVC XL-Z1011</b> £520	Very Good Good+	JVC's current flagship combines old K2 technology with PEM bitstream to deliver a full, beefy and engagingly dynamic sound	Remote control, variable and digital outputs, PEM bitstream	R	100
<b>JVC XL-Z431</b> £200	Very Good Average-	This is a player that started life off the back of the successful XL-V231 but whose performance fails to come up to scratch. The sound is weak and uninspiring - poor use of JVC's PEM DAC.	Remote operation, motorised volume + tape edit. PEM bitstream		95
<b>JVC XL-Z441</b> £200	Very Good Good	The smoothest-sounding of JVC's budget machines - clear and bold but also very even-handed. One if not their best sub-£500 players to date and strongly recommended.	Remote control, tape edit, index skip, PEM bitstream DAC	R	107
<b>Kenwood DP-4030</b> £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
<b>Kenwood DP-5030</b> £200	Good+ Good+	This looks like the DP-4030 but has more in common with the DP-7030 inside. Either way its neutral, uncluttered and intimately detailed sound is better than both	Remote control, motorised volume, disc file. Sony PLM DAC.	R	100
<b>Kenwood DP-5040</b> £200	Very Good Average	Better built and technically superior to the older DP-5030 but its untidy, detached treble quality proved a real disappointment in our listening tests	Remote, display control, tape edit, peak search, Sony PLM DAC.		107
<b>Kenwood DP-7030</b> £300	Good+ Good+	By adapting established Sony bitstream technology Kenwood has moulded its own exceptionally smooth and polite sound. Very nicely built machine with midship transport mechanism.	Remote, index scan, variable and optical outputs. Sony PLM bitstream	R	95
<b>Kenwood DP-7040</b> £300	Very Good Good	A classy, polished sound from a decidedly refined piece of engineering. Close to the older DP-7030 in terms of performance but better value in construction and technology.	Remote control, Disc File memory, display control, Sony PLM DAC.	R	107
<b>Kenwood L-1000D</b> £830	Very Good Good	A beautifully constructed and very stylish player that really only gives off its best when teamed-up in balanced-mode with Kenwood's matching pre/power combination	Remote control, balanced XLR's, 16-bit integrating DACs		100
<b>Luxman D105u</b> £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
<b>Marantz CD-42</b> £180	Average+ Good +	Not as warm or rugged-sounding as the CD-52 but still wonderfully spacious and intimately detailed. Currently the best player under £200, plus it's got a decent coaxial digital output.	Remote control with direct track access, SAA7350 Bit Stream DAC	BB	107
<b>Marantz CD-52</b> £200	Average+ Good+	Hardly the most neutral player on the planet but its rich, full and very generous sound cannot fail but warm the coldest of hearts	Remote control, FTS and dig outputs SAA7350 PDM DAC	BB	100
<b>Marantz CD-52SE</b> £180	Average + Very Good	A similarly dramatic yet far more neutral sound than the basic CD-52. Either way, its engaging and believable performance was a real hit with our listeners	Remote, FTS memory, switchable digital output, Bit Stream DAC	BB	107
<b>Marantz CD-62</b> £300	Good Good-	Basically this is a Philips CD850II with Signetics op-amps all plonked into an old CD-50 chassis. Something of a range-filler	Remote control, index, 8-step volume and FTS. SAA7350 PDM DAC	R	100
<b>Marantz CD-72</b> £400	Good - Good +	A heavily-constructed player based on the same digital electronics as the CD-42 and CD-52. This implementation sounds astonishingly solid and immediate but also rather too 'clean'.	Remote, variable and digital outputs, FTS, Bit Stream		107
<b>Marantz CD-80</b> £560	Very Good Good	A dynamic and bold sound from a machine that is equally bold in appearance. It betrays no fear of the most thundering crescendos yet can sound a little hard or glassy with pop CD's.	Remote, motorised volume + FTS programming, 16bit 4x.		95
<b>Memorex CD1650</b> £200	Poor Poor	An overpriced music centre player. Surely the giant Tandy corp. can get a better standard than this?	remote, keypad, multi bit, midi		88
<b>Meridian 206B</b> £995	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
<b>Meridian 206B (DAC7)</b> £971	Good + Very Good	Plenty of tight, strong bass but a little mechanical or even sparse at times. Its technical presentation of music is spot-on, only the sense of drama or anticipation needs working on.	Remote control, novel direct-loading transport, DAC7		107
<b>Meridian 208</b> £1,550	Excellent Excellent	State of the art CD sound combined with a decent preamp and full remote control	Hdph + remote level. Programming, R phase invert, various outputs		83
<b>Micro Seiki CD-M100</b> £5541	Very Good Good	One of the hernia inducing bricks of hi-fi, the Micro is extravagantly styled, finished and built. The good lab performance led to an 'only good' sonic display when the price demanded excellent	Balanced output, remote, display blanking		72
<b>Micromega Logic</b> £500	Good- Good	A rather expensive version of Philips CD624 with new op-amps and CD tray. Still, it does sound rather meatier, better integrated and more purposeful	Remote control, no FTS but switchable digital output, SAA7321 DAC		100
<b>Mission DAD5</b> £300	Good Average +	Similar-sounding to Philips' 600-series players: lively, plenty of space and full of 'bounce' but a little too eager to impress in the short term.	Stylised remote, no 'stop' key on player, digital out, Bit Stream		107
<b>Musical Fidelity CD1</b> £400	Average + Good -	Put together in Taiwan to MF's specifications, the main PCB and digital electronics are also used by Rotel's RCD-965BX! This version lacks the creamy, engaging quality of the latter.	Simple remote, index and track skip, digital out, SAA7323 DAC		107
<b>NAD 5425</b> £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
<b>NAD 5440</b> £300	Very Good Good+	The 'no compromise' version of NAD's 5425 but still rather lacking in facilities. Its sound is smoother and richer than the 5425, preferring to seduce with subtlety rather than have	Remote with direct track access, variable output, MASH/PWM	R	95
<b>Nakamichi CD Player 2</b> £625	Average+ Average+	This may look like a CD Player 4 but features a special transport able to store 7 CD's with one in play. Nevertheless its digital electronics are flawed and its sound powerful but blunt	Music bank, remote, volume control, digital o/p, 18 bit DACs		100
<b>Nakamichi CD Player 4</b> £300	Average+ Good-	Attractively styled but suffers high-ish distortion for a modern CD player. Best suited to up-beat pop rather than complex classical works which seem to lack focus and secure soundstaging	Remote with track access, coax dig. output. 18bit 8x		95
<b>Nakamichi OMS-5EII</b> £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



# The Directory

## CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Nakamichi DMS-7EII</b> £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
<b>Philips CD604</b> £130	Poor Average +	To all intents and purposes this slightly ponderous but weighty-sounding player is the older CD610mkII minus remote control. Good sound at a daft price.	No remote, tape edit, peak search, digital out. 16-bit	R	107
<b>Philips CD618</b> £170	Good Good	Cheapest of Philips bitstreamers and quite possibly the best with its excellent definition, punch and sparkle	Remote control, shuffle play, variable headphone, SAA7321 PDM	R	100
<b>Philips CD624</b> £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
<b>Philips CD634</b> £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	Remote, FTS + Title + personal programming. SAA7321 Bit Stream		95
<b>Philips CD850mkII</b> £400	Very Good Good	This looks just like the original but sounds completely different, trading a little transparency and pizzaz for an altogether smoother but slightly less memorable performance	Remote control, 2 FTS, personal presets. SAA7350 Bit Stream DAC	R	100
<b>Philips CDV185</b> £350	Average + Average	Hard to value with the video singles facility but it all works well enough for a recommendation	Video singles + CD scarf + digital out etc	R	76
<b>Pioneer PD-75</b> £800	Very Good Very Good	A confident yet beautifully poised and relaxing sound from an equally luxurious package. Oodles of refinement plus Pioneer's hi-tech Stable Platter transport, but still expensive.	Remote, index and track skip, display off, PDM Bit Stream DACs		107
<b>Pioneer PD-7700</b> £250	Good+ Good+	A busy-looking player with an upside-down transport yet one that offers a very tight, confident and dynamic sound. Bubbly and entertaining but still very refined	Remote control, turntable drive mechanism. 1-bit PDM DAC	R	100
<b>Pioneer PD-8700</b> £300	Good+ Very Good	A pair of PDM DACs builds upon the sound of the '7700, crafting a generous soundstage populated with big-hearted and thoroughly captivating musical images	As 7700 plus index/skip, display off and motorised volume. 1-bit	BB	100
<b>Pioneer PD-91</b> £900	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
<b>Pioneer PD-93</b> £1430	Very Good Good+	The extremely civil, understated feel of its music contrasts markedly with the over-engineered construction of this unit. It will not offend anyone but then neither will it spark much excitement	Remote with fader and index facilities. Two dig o/p's. 20bit 8x		95
<b>Proton AC-120</b> £180	Average Average -	Fine styling, low price but barely average performance	15 track memory, simple design, remote, hdph		76
<b>Revox B126</b> £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
<b>Revox B226S</b> £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
<b>Rotel RCD-955AX</b> £260	Good + Average	Touted as a repackaged version of the evergreen RCD-855. In practice, however, our sample disappointed on several visits lacking the clean, cohesive quality of the original.	Remote control, digital output, repeat, scan, Philips 16-bit		107
<b>Rotel RCD-965BX</b> £300	Average+ Excellent	Two years on and the 865's replacement turns out to be an exceptionally refined bitstreamer: transparent, exquisitely detailed and powerfully emotive. A landmark player	Remote control, index skip, digital out. SAA7323 PDM DAC	BB	100
<b>SAE D102</b> £700	Good Good	Considering the high price of this player, most of the innards seem fairly prosaic. Sound quality and lab performance are both respectable enough, but hardly justify the price premium involved	Remote (inc volume), skip, scan etc.		58
<b>Sansui CD-X311mkII</b> £250	Good+ Good	Sansui's mid-ranked player uses Technics' technology but provides a warm and cuddly sound that's atypical of the breed	Remote control, variable and digital out, MASH/PWM DAC	R	100
<b>Sansui CD-X317</b> £300	Good + Average	Not in the same class as Sansui's older CD-X311mkII. Same technology and a similar appearance but the sound is neither as responsive or engaging	Remote, fixed, variable and digital outputs, MASH/PWM DAC		107
<b>Sansui CD-X711</b> £600	Excellent Very Good	Luxury features, finish and sound from this classy Sansui; no excuses required here	Hdph + vol, remote full programming	R	83
<b>Sharp DX150</b> £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
<b>Sharp DX750</b> £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
<b>Sony CDP-591</b> £160	Good+ Average+	Tons of features at a highly affordable price but let down by its lacklustre if inoffensive sound quality. The sound of these new Sony players lacks the grip and purpose of the last generation	Remote control, variable and optical digital out. PLM bitstream		100
<b>Sony CDP-797</b> £200	Good + Good -	Another day, another DAC. This new budget player succeeds with its taut imaging, clean and impressive soundstaging. Can seem a little too lean or dry, however.	Remote, motorised volume, edit and scan facilities, PLM DAC	R	107
<b>Sony CDP-991</b> £230	Good+ Average+	Another well-equipped and well-specified machine and one that can sound very up-beat and detailed with simple material. Tends to loose its way with complex stuff, however	Remote control, Custom File programming, variable out. PLM DAC		100
<b>Sony CDP-X333ES</b> £400	Very Good Good-	This beautifully built player has a very tidy and well-ordered style of music-making, but in the long run it lacks the ability both to excite and involve	Remote control, Custom File programming. Complementary PLM DAC		100
<b>Sony CDP-X339ES</b> £430	Excellent Very Good	Superbly constructed, this tour-de-force of features and technology offers a tightly detailed almost cavernous sense of acoustic. The mid and treble can sound positively magnetic	Comprehensive remote, Custom/Edit Navigation System, new PLM DAC	R	107
<b>Sony CDP-X77ES</b> £1000	Excellent Good+	Rather like Pioneer's PD-93 this flagship player is beautifully put together but simply lacks the thrill or conviction of cheaper and perhaps more ragged-sounding machines. Still,	Remote, everything but Custom File titling. Complementary PLM		95
<b>Stax Quattro</b> £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
<b>TEAC CD-P4500</b> £250	Good + Good	TEAC's first genuine 1-bit player uses Philips BS DAC to great effect, its sound described as having a certain 'organic warmth', very composed and easy-going.	Remote, pitch control, variable out, SAA7350 Bistream	R	107
<b>Technics SL-PG200A</b> £160	Good+ Good+	This season's version of last season's favourite (the SL-P277A) offers extra features and a similarly punchy, dynamic and up-beat sound. All this plus an uncommon poise - Best Buy	Remote control, random play, variable out, MASH/PWM bitstream	BB	100
<b>Technics SL-PG420A</b> £160	Good + Good +	No repackaged version of the SL-PG200A but a new player in familiar clothes. Still offers an open, transparent and uncommonly fresh sound but a little of the 'magic' is missing.	Remote, digital volume, synchro edit, auto cue, MASH/PWM DAC	R	107
<b>Technics SL-PG520A</b> £200	Good + Very Good	A cracking player that builds upon the astonishing out-of-the-box sound of earlier budget players. Superb clarity and dynamics, thrilling but musically involving too.	Remote, shuttle search dial, edit mode, peak search, MASH/PWM DAC	BB	107
<b>Technics SL-PS900</b> £350	Very Good Good-	Just about the quietest transport in existence and a sound that is equally unobtrusive, polite and refined. There's plenty of detail too but the overall result won't set your pulse racing	Huge remote control, function manager MASH/PWM DAC		100
<b>Wadia WT/Digimaster 2000</b> £5614/£6641	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
<b>Woodside WS2</b> £1095	Good Good+	Prompted a mixed reaction on audition, responding well to our jazz and classical selection but sounding bright and grainy with the pop CD's. RF emission is very high	Remote control, display defeat, variable and digital outputs, 16bit		95
<b>Yamaha CDX-450</b> £170	Average+ Good	A contentious player this and one that prompted a range of reactions from enthusiasm to disinterest among our listeners. It could prove too safe-sounding but worth a try at the price.	Remote control, track access, variable out. 18-bit hybrid DAC	R	100
<b>Yamaha CDX-750</b> £250	Good Average+	A sleek machine that can sound rich and vibrant with simple material but seems to lack expressiveness and subtlety when dealing with more complex passages	Remote control, variable and digital out, LC display. PDM DAC		100



## CD TRANSPORTS AND DACS

A CD player can be split into two basic components, the mechanism which reads the information from the disc, known as the transport, and the device which turns the digital numbers contained on the disc into the music that comes out of your speakers, this device being referred to as a digital to analogue converter or DAC. Although at the lower end of the market both of these are contained in a single box, at the top end of the market two box machines consisting of a CD transport and a separate DAC become more common.

Although many of these units will be purchased as two box machines, which are generally considered to sound better than a one box equivalent, a DAC can also be used to upgrade an existing CD player. A good example is where an early machine with a satisfactory drive unit but a rather dated DAC can be brought up to the latest spec by the addition of a new DAC.

When upgrading an existing player best results are usually obtained using the electrical digital output rather than optical, and obviously

to be upgradeable your CD player must have a digital output in the first place.

The choice of interconnect is crucial in linking drives and DACs and conventional interconnects used for analogue signals should be avoided, a dedicated 75ohm digital cable will give far better results.

Mixing and matching transports and DACs from different manufacturers can be a bit of a lottery and readers are referred to the full reviews where this subject is discussed in more detail.

## CD TRANSPORTS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Arcam Delta 170.2</b> £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
<b>Kenwood DP-X9010</b> £500	Average Average +	Compromised by jitter, RF noise and poor clock selection this transport generally encourages a dynamic but bright and edgy sound with most DACs	CD transport, optical + coax outputs, Class 2		96
<b>Marantz CD-95DR</b> £1500	Very Good Good	At its best with Philips-based DACs, this transport sounds confident if not totally pure, sparkling or fresh	CD transport, optical + coax digital, Class 1		96
<b>Meridian 200</b> £895	Very Good Very Good	Broadly compatible with most DACs and offering a light, fresh and very bubbly sound that is both natural, engaging and unfatiguing	CD transport, optical + coax outputs, Class 1	R	96
<b>Meridian 602</b> £1,750	Very Good Good	This dedicated CD transport teams-up most successfully with the 606 DAC. Otherwise it lacks the life and pizzazz of the 200	CD transport, optical + coax outputs, Class 1		96
<b>Philips CDD882</b> £500	Good Good	A butchered CD880 CD player-cum-CD transport that pairs up well with most Philips-based DACs. Dynamic and lively but can also sound a little mechanical	CD transport, optical + coax outputs, Class 1		96
<b>TEAC P-10</b> £1499	Good Very Good	A chunkier and altogether more successful transport than the P-500 with an especially beefy and compelling sound. TEAC's best	CD transport, coax + optical outputs, Class 1	R	96
<b>TEAC P-2</b> £2849	Very Good Good	TEAC's flagship CD transport is beautifully styled and constructed but its sound is bleached and generally less inspiring than that of the P-10	CD transport, coax + optical outputs, Class 1		96
<b>TEAC P-500</b> £649	Good Good +	Provides a smooth and very sympathetic sound with most DACs yet is also rather vague, lacking the crispness and resolution of its peers	CD transport, coaxial and optical outputs, Class 2	R	96
<b>Technics SL-PA10</b> £470	Good + Good	Built to partner the SU-MA10 upmarket integrated amp/DAC, this transport has the unusual limitation of only optical output. Reassuringly solid and more immune to vibration than most	CD transport, optical output only, remote		88
<b>Wadia WT2000</b> £5614	Very Good Good +	Based on TEAC's P-2 with outboard mains transformers, active digital output and solid alloy casework. Dynamic and crisp sound best realised with Wadia DACs, otherwise less impressive	CD transport, AT&T opt + direct -coupled coax outputs, Class 1		96
<b>Wadia WT3200</b> £1800	Excellent Very Good	Based on Marantz's CD-95DR with new casework, active digital output and revised grounding. Very clean, clear and authoritative sound with Wadia and Philips-based DACs	CD transport, AT&T opt + direct -coupled coax outputs, Class 1	R	96

## DIGITAL TO ANALOGUE CONVERTORS (DACs)

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Arcam Black Box 2</b> £260	Very Good Very Good	An upgraded version of the old BB1 with more inputs and improved sound quality	Optical and wired inputs	BB	76
<b>Arcam Black Box 3</b> £360	Good + Very Good	Top of a series of three decoders it can offer a high sonic standard with top class transports	Bitsream, auto input switching,	R	88
<b>Audio Alchemy Digital Decoding Engine V1.0</b> £376	Good Very Good	A very sweet and seductive sounding unit that gives good results with a wide range of CD players/transports	Coaxial and optical inputs, phase invert, Bit Stream DAC	BB	101
<b>Audio Research DAC1-20</b> £3898	Very Good Good	This expensive DAC works surprisingly well with Meridian's cheaper 200 transport, an impressively weighty and engaging combo that proved entertaining on audition.	BNC, Toslink and AT&T optical inputs, phase invert, 20-bit DACs		103
<b>Audiolab 8000DAC</b> £695	Very Good Good	Needs to be used with a genuine Class 1 digital drive. At its best with the Wadia WT3200 where it sounds vivid and alive. Otherwise can sound a little antiseptic.	Coax and opt inputs, phase invert, crystal lock, Bit Stream		103
<b>Deltac Bigger Bit</b> £650 + £98	Good Very Good	Partnered with either TEAC P-10 or Meridian 200 transports, the Bigger Bit delivers a very taut and dynamic sound, bathed in an open acoustic. Deltac's RF mains filter is a must.	Coax and opt. inputs, Deltran sync facility, DAC7 Bit Stream	R	103
<b>Deltac Little Bit (Optical)</b> £400	Very Good Good	Our sample suffered from radiated RF interference but new LB's are now cured. Works especially well with Meridian's 200 transport but does require the services of Deltac's 'Power' mains filter.	Coaxial and optical inputs, SAA7350 Bit Stream DAC		101
<b>Deltac PDM1</b> £500	Average Very Good	A no frills audiophile bitstream converter at an affordable price	Coax-in, special cable and mains filter options	R	83
<b>Deltac PDM1 Series 3</b> £1195 + £196	Very Good Good +	Hailed as a budget version of the PDM2, it bears technical comparison with both the PDM2 and Bigger Bit but - in terms of sound quality - is no great advance on its cheaper relative.	Coax and opt inputs, two-box construction, DAC7 Bit Stream		103
<b>Deltac PDM2</b> £2000	Excellent Excellent	State-of-the-art technical performance with a pristine sound to match. Repertoire includes a solid, invert, two-box DAC7	Coaxial and optical inputs, phase invert, SAA7321 Bit Stream	R	101
<b>Forté Audio Model 50</b> £950	Good Very Good	The first American DAC7 design and one that offers a typically big and full-blooded sound, infiltrated by a slightly euphonic quality but never hard or gritty.	2 Coax and 2 optical inputs, DAC7 Bit Stream technology	R	103
<b>Kelvin PDM DAC</b> £200	Average + Average +	Don't disregard this DAC-in-a-matchbox for though it can sound a little unconvincing it is capable of developing a surprisingly lyrical and natural sound with the right transport.	Single coaxial input, low analogue outputs, SAA7320	R	103
<b>Meridian 203 DAC7</b> £510	Good Very Good	This is another broadly compatible DAC that's free of fatiguing nasties yet remains bubbly and exciting. If you find the 606 too sober then the 203 will undoubtedly suit	Coaxial and optical inputs, single-box DAC7 Bit Stream	R	101
<b>Meridian 606 DAC7</b> £1220	Very Good Good	Extra cash buys you a better standard of construction and finish over the 203 yet by refining its sound further Meridian have also tempered its vibrancy and 'life'. Fickle with other transports	Two coaxial and optical inputs, phase invert, DAC7 chipset		101
<b>Micromega Duo BSII</b> £500	Average Good	This DAC has a tendency to sound light, airy and 'fast' but it can also become a little hard or - fatiguing with some digital outputs. At its best with Meridian's 200	Coaxial and optical inputs, phase invert, SAA7321 Bit Stream		101
<b>PS Audio Superlink</b> £1498	Average Good -	Another transport-fussy DAC that, once again, does the business with Meridian's 200 but can sound bloated, smeared and even vaguely electronic with standard 75ohm digital outputs.	Touch-sensitive coax and optical inputs, phase invert, 18-bit		103
<b>Proceed PDP2</b> £1595	Average Good -	The PDP2 has a wobbly input impedance that's suited to specific drives, ie Meridian 200, or Proceed's own. At its best expressive and enticing, otherwise it can seem gutless and smeared.	Coax and XLR inputs, balanced outputs, 18-bit DACs		103
<b>Stax DAC-Talent</b> £1400	Excellent Good +	Natural, refined and never over-zealous, the DAC Talent is also capable of sounding very spicy and dynamic. Capable of wielding a maturing influence over a light or bright-sounding system	Coaxial and optical inputs, phase invert, mute, 20-bit DACs		101
<b>TEAC D-500</b> £399	Good + Good +	An unusual combination of NPC oversampling filter and no less than two Philips' DACs. Its reliable 75ohm input infers broad compatibility. A dynamic and 'interesting' sound	Coax and optical inputs, complementary 16-bit DACs.	R	103



## DIGITAL TO ANALOGUE CONVERTORS (DACs)

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Threshold DAC 1/e</b> £3150	Very Good Very Good	The DAC 1/e can sound beautifully detailed with a marvellous sense of scale and sharp, solid images. Its unpredictable behaviour with unknown transports precludes recommendation.	Coax and opt inputs, balanced outputs, phase invert, MASH/PWM DA		103
<b>Wadia DigiMaster X-32</b> £2000	Average - Good -	Wadia's freaky input circuit gives unpredictable results with non-Wadia transports. Otherwise it can sound bold, dynamic and crisp but lacks the warmth to bind its music together	BNC and optical (TosLink and HP) inputs, 18-bit 32x		101
<b>Wadia DigiMaster X-64.4</b> £5000	Average Good*	The X-64.4 positively buzzed with vibrant, sharply-etched detail. An exciting sound	BNC + Toslink/AT&T optical inputs, phase invert, 18-bit 64x		101
<b>Woodside DAC 1</b> £895	Good Good	Fine but slightly dated and costly package in performance terms - but flexible, musical and t well built	2 electrical + optical i/p. tape ou		87
<b>Woodside DAC2</b> £510	Good Good +	Based on Woodside's earlier 16-bit CD player and offering a similarly sharp and dynamic sound, all the more captivating for its lack of graininess and 'tizz'. Should be a reliable upgrade	BNC coaxial input (no optical), 16-bit 4x	R	101

## DIGITAL AUDIO TAPE

DAT, or digital audio tape, has been on the market for quite some time now but has never really 'made it' as a consumer medium, probably due to the fact that very little prerecorded software has been made available.

In the last year or so it has begun to carve itself a niche at the top end of the market replacing reel to reel tape recorders as the audiophile's tape based medium.

The DAT standard specifies a 48kHz sampling rate, which is higher than CD, so direct copying in the digital domain is only possible on those machines with dual sampling frequencies, ie 48kHz and 44.1kHz. Some machines also record at 32kHz to give a longer recording time for a given length of tape.

To try and get around the copying problem many machines incorporate SCMS, the Serial

Copy Management System, a device which enables you to record from a CD but not to 'clone' one digital tape from another.

Portable machines are now entering the market but make sure the price you are quoted includes an analogue to digital converter, with some portables these have to be purchased separately and increase the price considerably.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Aiwa HD-S100</b> £450	Average - Average -	Largely bulletproof in non-critical and semi-critical applications. Despite the usual limitations of DAT as a hi-fi medium, the HD-S100 is a practical and well built tool.	Portable, ADC, mic in, phone/line sockets (3.5mm), 70 min battery	R	105
<b>Aiwa XD-S1100</b> £550	Poor Average -	A muddled fascia detracts from the appeal of this inexpensive deck, but the real no no is a significant loss of the finer virtues: detail, imagery etc	SCMS, analogue, coaxial & optical in/outputs, full subcode editing		99
<b>Aiwa XD-S260</b> £500	Poor Poor	Unlovely sounding deck lacks weight, clarity and presence. Low pricing and mini dimensions excuse many sins however	SCMS, optical/coaxial and analogue in, optical/analogue out		99
<b>Denon DTR-2000</b> £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 rec/play, LP analogue play only	R	93
<b>JVC XD-2505</b> £620	Good Good	Competent middle market DAT with uncomplicated (but still flawed) user interface, but good basic sound quality. A fine CD dubbing machine.	DAT SP/LP en/decode, low bit conversion, remote control	R	105
<b>Kenwood DX-7</b> £500Sony	n/a Average	Sound quality is pretty fair, but a little rougher than the best of the breed. Controls are good, the display however is poor - and most users will require the accessory pack	Mains recorder, LP mode. Optional accessory packs adds battery/ADC		94 Supp.
<b>Kenwood DX-7030</b> £700	Average Average-	Bland sounding deck that lacks low level clarity and imaging. No analogue LP mode. Build quality is good however and ease of use ranks highly	Remote control, stand-alone DAC facility, optical/coaxial in/out		99
<b>Pioneer D-500</b> £600	Good - Average	Looks extremely good. Fascia design is complex yet accomplished, and offers very slick tape handling. Musically however it is on the messy side compared to others in this price area.	SP/LP en/decode 1-bit converters, many search/display aids		105
<b>Sony DTC-750</b> £450	Good Good	Superb value for money: the lowest price full size DAT on the market, fine features, build, measurements and sound approaching the best DAT has to offer at any price.	SP/LP record, real time/date recording	BB	105
<b>Sony DTC-77ES</b> £1000	Excellent Average	Superb engineering, many well implemented features (including off tape monitoring) and technical near perfection (!) don't offset perceptibly slowed, thickened sound	4-head, tape monitor, many search/display options, SP/LP		105
<b>Sony DTC-M100</b> £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
<b>Sony TCD-D3</b> £500	n/a Very Good	n/a At the time of writing, this model represents the state of the art, and beats all comers.	DAT recorder, detachable rechargeable power pack, LP/SP	BB	94 Supp.

## EQUIPMENT 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.

## EQUIPMENT SUPPORTS - COMPONENTS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE (H x W x D)	VALUE	ISSUE
<b>Alphason R444</b> £120	Rack Good	A heavyweight structure with stressed MDF shelves, ideally suited to the Sonata turntable	82 x 60 x 39.5cm	R	83
<b>Audioquest Sorbothane Feet</b> £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
<b>Cornflake TCS6</b> £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.
<b>Foundation Stable Table</b> £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
<b>Origin Live Skyline Super</b> £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
<b>Roksan Equipment Table</b> £169	Rack Good	An upgradable/expandable system suited to Roksan's Xerxes if not other competing turntables	65 x 52 x 38cm		58



## EQUIPMENT SUPPORTS - COMPONENTS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE (H x W x D)	VALUE	ISSUE
<b>Sound Organisation Table</b> £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
<b>Sound Organisation Wall Stand</b> £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
<b>Sound Organisation ZD22</b> £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
<b>Stand Design Duplex</b> £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
<b>Target TT2</b> £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

## EQUIPMENT SUPPORTS - LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE (H x W x D)	VALUE	ISSUE
<b>Appolo A10</b> £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
<b>Appolo A820</b> £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
<b>Foundation Fred</b> £70	2 leg Average	With sand filling the Freds made speakers sound tight and coherent with a more even balance.	19 x 19cm 36/43/59cm		58
<b>Foundation Maggi</b> £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
<b>Foundation Pi</b> £269 to order	2 leg Very Good	Overpriced in material terms the Pi nevertheless has a very positive effect on the low frequency performance of conventional speakers.	20 x 20cm 25/38/46/5	R	58
<b>Foundation Sir Fred</b> £80	2 leg Good	Upgraded 'Fred' with special in-fills. Sweet sound but one that also lacks bite and edge	19 x 19 x 46.5cm		83 Supp.
<b>Goldring Black Satin</b> £65	1 leg Very Good	Screw together stand tastefully hewn from medite. Some loss of bass but still pleasantly rhythmic	18 x 20 46cm	R	83 Supp.
<b>Heybrook HBS1</b> £109	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
<b>Heybrook P5S</b> £69	3 leg Very Good	An unusual triangulated open frame stand that can help certain speakers sound more transparent and fluent - a good value stand	23 x 21.5cm 47cm	BB	58
<b>Linn Kan II</b> £101	4 leg Very Good	Built to support Linn's Kan speaker this stand is well suited to the task, but is less successful with other loudspeakers.	19 x 16cm 59cm		58
<b>Linn Sara</b> £112	4 leg Very Good	The Sara exhibits some odd properties so its use other than with the Sara loudspeaker should be viewed with caution.	25 x 21cm 53cm		58
<b>Origin Live Three Leg</b> £89	3 leg Good	An unusual tripod stand devoid of top plate and taking up more floor space than normal, subjective and technical performance was exemplary.	(support area) 22 x 17.5cm 52cm	R	58
<b>QED TS22 Tristand</b> £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
<b>Standesign Z20</b> £75	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.
<b>Target HJ15/3</b> £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
<b>Target HS20</b> £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
<b>Target T-40</b> £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.

## 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	FIT SOUND	COMMENTS	TYPE	VALUE	ISSUE
<b>Aiwa HP-X30</b> £31	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
<b>AKG K1000</b> £500	Very Good Excellent	One of the best moving coil headphones on the market, hooks directly to speaker outputs and makes much of the competition sound lame. Looks a tad weird	Extra-aural, open-back, dynamic	R	99
<b>AKG K135</b> £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
<b>AKG K145/S</b> £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
<b>AKG K240 Monitor</b> £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
<b>AKG K280 Parabolic</b> £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
<b>AKG K340</b> £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
<b>AKG K44</b> £40	Good+ Average	Good quality personal oriented phone, could have a better sense of space but is musically quite communicative	Supra-aural, open-back, dynamic		99
<b>Audio-Technica ATH-609</b> £31	Average Average-	Warm feeling and sounding with impressive physical substance for the price, could be more relaxed and open	Circumaural, open-back, dynamic	R	99



## HEADPHONES

MODEL PRICE	FIT SOUND	COMMENTS	TYPE	VALUE	ISSUE
<b>Audio-Technica ATH-611</b> £51	Average Good	Same basic design as 609 but bigger thinner diaphragm makes this a more relaxed and informative headphone	Circumaural, open-back, dynamic		99
<b>Audio-Technica ATH-909</b> £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
<b>Audio-Technica ATH-910</b> £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
<b>Audio-Technica ATH-911</b> £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
<b>Beyer DT 325</b> £32	Very Good Average	Lightweight in more ways than one, the 325s may be a little bright for some systems and tastes but will suit duller sources	Supra-aural, open-back, dynamic	R	63
<b>Beyer DT330 Mk II</b> £50	Good Poor	Not the most revealing 'phones encountered, the 330s were nevertheless enjoyable and rarely offended	Circumaural, semi-open, dynamic		55
<b>Beyer DT550</b> £61	Good Good	On their own the 550s sound articulate with a slightly 'gritty' treble and 'keen' midrange; not suitable for headbangers!	Circumaural, semi-open, dynamic		55
<b>Beyer DT880</b> £80	Good Good	Well made cans with a warmish sound but fairly solid midrange, though they're not that informative for the price	Circumaural, semi-open, dynamic		63
<b>Beyer DT990</b> £102	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
<b>Beyer IRS690</b> £203	Good + Very Good	High quality infra-red headphones with soft comfy earpads and mellow but informative sound quality which is hard to dislike	Circumaural, open-back, dynamic	R	75
<b>Jecklin Float Electrostatic</b> £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
<b>Jecklin Float Model One</b> £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
<b>Jecklin Float Model Two</b> £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
<b>JVC HA-D990</b> £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
<b>Koss K/6X Plus</b> £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
<b>Koss TD/60</b> £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
<b>Pioneer SE-72</b> £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
<b>Quart Phone 30 X</b> £40	Good Average	Slightly dark character makes these more suitable for some sources/material than others, specifically music that needs bass weight	Supra-aural, open-back, dynamic		99
<b>Quart Phone 70</b> £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
<b>Quart Phone 95 X</b> £100	Good+ Good+	Can sound even handed, relaxed and open with a good drive system but may be a bit too transparent for lesser headphone outputs	Circumaural, open back, dynamic	R	99
<b>Ross RE2530 CD</b> £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
<b>Ross RE2560 CD</b> £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
<b>Sennheiser HD40</b> £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
<b>Sennheiser HD450II</b> £40	Good+ Good-	A neat looking supra that makes quite acceptable noises with a variety of outputs, could sound more spacious but is pleasantly relaxed	Supra-aural, open-back, dynamic		99
<b>Sennheiser HD480 Classic II</b> £60	Good+ Good	The same basic design as the 450 but improved sound quality as a result of aluminium coil and extra damping, natural with good bass	Supra-aural, open-back, dynamic	R	99
<b>Sennheiser HD520</b> £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
<b>Sennheiser HD530</b> £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
<b>Sennheiser HD540 Ref Gold</b> £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
<b>Sennheiser HD560 Ovation II</b> £120	Very Good Good+	A comfortable and nicely styled headphone that could be more natural sounding at HF, but is detailed and open with good power	Circumaural, open-back, dynamic		99
<b>Sony A21EX</b> £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
<b>Sony MDR-CD3000</b> £300	Very Good Very Good	Better than most of the headphone outputs around so hard to make the most of, potentially up there with the electrostatics	Circumaural, closed-back, dynamic	R	99
<b>Sony MDR-CD350</b> £32	Good+ Good	Very impressive for the price the 350 is possibly the most open sounding cheap closed back can around, lightweight in balance but transparent	Circumaural, closed-back, dynamic	BB	99
<b>Sony MDR-CD550</b> £50	Good+ Good+	A very competent headphone for the price, creates a remarkable sense of space for a closed back design and sounds natural to boot	Circumaural, closed-back, dynamic	BB	99
<b>Sony MDR-R10</b> £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
<b>Stax Gamma pro/SRD-X pro</b> £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
<b>Stax Lambda Signature/SRM-T1</b> £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
<b>Stax SR Gamma</b> £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
<b>Stax SR Lambda Pro/SRD-7SB Mk 2</b> 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
<b>Stax SR Lambda Pro/SRM-1</b> 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
<b>Stax SR34</b> £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
<b>Stax SR84</b> £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
<b>Yamaha YHL-006</b> £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



## LOUDSPEAKERS

Last item in the hi-fi chain, to some extent the loudspeaker is merely the slave of what has gone before, capable only of reproducing a signal as good as it is fed. Nevertheless the distortions (colorations and stereo effects) introduced by loudspeakers (and rooms) tend to be more immediately obvious than those anywhere else in the chain, so careful choosing according to taste is very important.

The average loudspeaker consists of a smallish enclosure, much of which may have begun life as part of a tree, plus a couple of drive

units hidden behind a removable grille. Inside the box lurks a simple electrical circuit known as a crossover, which divides the incoming (full range) signal into the right bits for the drivers to handle. Variations on the above formula are specifically identified in the entries. The designer's primary task is to balance the sensitivity of the loudspeaker (how loud it goes for a given electrical input) against the bass extension (how low does it go) for the given box size. After that such subtleties as coloration and dispersion come into the equation.

Careful placement of the loudspeakers within the room is as important as the initial choice of model.

For good stereo they need to be more or less the same distance from nearby walls, and preferably on rigid stands. The listener should be about the same distance from and listening angle to each loudspeaker. The ideal placement depends on the way a particular model has been balanced (not to mention a number of other factors), and our recommendation is given in the entries.

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
<b>ATC SCM20</b> £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
<b>Acoustic Energy AE1</b> £767	Good Good	Amongst the best miniatures around, this metal driver pioneer shows exceptional mid focus and coherence, but is pricey and could be faster and more agile.	29.5x18x25cm stands clear of wall	84dB 48Hz (in room)		102
<b>Acoustic Energy AE2</b> £916	Good Very Good	Dynamic, solid and lively, a great allrounder if a bit small considering the price. AE proves that metal cone/dome drivers really work	39 x 23.5 x 29.5cm heavy stands, free	88.5dB 45Hz	R	66
<b>Acoustic Energy AE3</b> £1650	Very Good Very Good	Solid, authoritative and impressively accurate – if a shade ponderous and slow – AE's latest 'big one' is a much better bet than the earlier '4, combining	63 x 26.5 x 37cm low stands in free space	85dB/w 23Hz (in room)	R	86
<b>Acoustic Research AR-112</b> £125	Average Average -	Nicely presented and engineered, but sounds a bit small and boxy without true coherence	36 x 19 x 18.5cm stands near rear wal	87dB/w 75Hz		66
<b>Acoustic Research AR-122</b> £150	Average Average	Despite a promising enough list of ingredients, the 122 failed to excite real enthusiasm amongst the listening panel	38.5 x 19 x 22cm stands near rear wal	87dB/w 68Hz		68
<b>Acoustic Research AR-132</b> £200	Average + Average -	Good presentation and detail engineering was not sufficient to counter bass heavy balance problems on auditioning	44.5 x 23 x 25.5cm stands 1ft from rear	87dB/w 50Hz		66
<b>Acoustic Research AR-152</b> £373	Good Good-	Large bookshelf size model with luxury finish has a slightly thin overall balance, but fine coherence and agility makes it well worth considering	44 x 23.5 x 28cm stand 1-2ft wall	87dB 25Hz in room		98
<b>Acoustic Research Red Box</b> £100	Average Average	Lively and balanced if a bit crude and uneven, this econobox succeeds partly because of its simplicity, and works well with some rear wall assistance	32 x 19.5 x 17cm close to rear wall	87dB/w 85Hz	R	74
<b>Alexander SE11</b> £299 (s)	Good Good	Clearly better than its cheaper stablemates, the metal jacket delivers a different – and in some respects superior – sound than the wood-based	52 x 14 x 17.5cm stands close to wall	86dB/w 25Hz (in room)	R	82
<b>Alexander SE5</b> £199	Average Average	Particularly well suited to surround sound A/V applications, the SE5 can give any miniature a run for its money on bass performance; hardness and coloration	40.5 x 12 x 15cm ALS stands near wall	82dB/w 50Hz (in room)		78
<b>Allison AL100</b> £120	Average- Average	Loud and lively budget wall-mount is bigger and beefier than most of the competition, if lacking some subtlety and refinement	33.5 x 24 x 21.5cm stands against wall	87dB/W 30Hz (in room)	BB	94
<b>Allison AL105</b> £150	Average Average -	Pretty enough in appearance, sonically the AL105 doesn't really make the grade at the £150 asking price	37 x 24 x 21cm high stands against wall	87dB/w 45Hz (in room)		78
<b>Allison AL110</b> £220	Good+ Good-	Compact bookshelf model is a little dry and mid forward, but bass is extended and solid. Free space balance is good, though build quality could be improved.	40x24.5x22.5cm stands 1-2ft from wa	86dB 28Hz (in room)	R	102
<b>Allison AL120</b> £429	Good Average	Cleverly engineered compact floorstander is pretty well balanced if slightly mid forward, but sound quality is a little disappointing for the price	63 x 28 x 27cm floor, clear of walls	88dB 30Hz (in room)		98
<b>Allison CD6</b> £290	Average Good -	An unusual cube-shaped model designed for wall mounting gives exceptional bass extension from a small box, though it's also a bit heavy, coloured and slow	28.5 x 28.5 x 28.5cm stands against rear	88dB/w 45Hz	R	71
<b>Allison MS 200</b> £220	Average- Average-	Built as small and solid as a brick, this micro-miniature has limited bass and bright balance, but sounds agile and communicative	25.5 x 14.5 x 15cm 50Hz (in room)	85dB close to wall		106
<b>Alphason Amphion</b> £680	Good Good	This fine-sounding, nicely finished compact wall-mount is just a little too expensive for formal Recommendation, but is a good performer for all that	44 x 23 x 27.5cm high stands against wall	88dB/w 47Hz (in room)		78
<b>Alphason Artemis</b> £299	Average Average+	Pretty little miniature sounds nicely unboxy but is also a bit short of punch and balanced rather too bright.	27 x 17.5 x 22cm stands 1ft from wall	86dB/W 50Hz (in room)		94
<b>Alphason Orpheus</b> £1000	Good Good +	Large hi-tech two-way features unusual, sweet-sounding isodynamic tweeter; well engineered and balanced if a shade odd in appearance	65.5 x 28 x 34cm stands near rear wal	87dB/w 43Hz	R	71
<b>Apogee Caliper Signature</b> £3998	Good + Very Good	Pretty but power hungry full range panels have remarkable transparency and delicacy, though loudness and bass 'grunt' are both a bit lacking	122 x 59-70 x 6.5-28cm floor, free space	81dB/w 30Hz (in room)	R	81
<b>Arcam Alpha</b> £200	Good Good	It has its own colorations to be sure, but delivers a fine room balance with unusually good dynamics, timing and 'life', and is fine material value	46 x 26.5 x 26cm stands close to wall	89dB/w 30Hz (in room)	BB	82
<b>Arcam Delta Two</b> £340	Average+ Good	Pretty luxury compact sounds a shade forward and coloured but has dynamic and lively bass for its size	37.5 x 22.5 x 27.5cm stands 1-2ft from wa	87dB/W 40Hz (in room)	R	94
<b>Ariston Image</b> £180	Average - Average -	Despite a sweet treble character, the Image fails to impress with a 'lumpy' over-rich balance that has room integration problems	42 x 22 x 27.5cm stands in free space	89dB/w 28Hz (in room)		82
<b>Ariston Q</b> £395	Average + Average	The prettily shaped Q delivers a good impression of scale from a small box, but a rather laid back, ponderous and over-rich overall sound	35 x 16.5-25 x 20-27cm high stands in free	85dB/w 30Hz (in room)		86
<b>Audio Electronics TC10 II</b> £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 40Hz	R	68
<b>Audio Note AN-E</b> £1300	Very Good Very Good	Lovely coherence, great midband dynamics and transparency, extended bass and high sensitivity – pity it's so darn ugly!	80 x 36 x 28cm 20Hz (in room)	90-91d low stands, free space	R	106
<b>Audioplan Kontrapunkt</b> £799	Good Good +	Cute little German miniature sounds as sweet as it looks, dressed expensively in real wood with matching stands. Not for bass or loudness freaks	31 x 24 x 13cm free space, matching stan	83dB/w 48Hz (in room)	R	86
<b>B&amp;W 610</b> £200	Good Average	Fine presentation and good perceived value, with good in-room bass extension and impressive loudness credentials too, but rather indifferent integration and coherence.	49x23.5x30cm stands clear o	89dB/W 25Hz(in room)		102
<b>B&amp;W 620</b> £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	74 x 23.5 x 30cm floor, free space	89dB/W 25Hz (in room)	BB	94
<b>B&amp;W CM1</b> £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>B&amp;W DM550</b> £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>B&amp;W DM560</b> £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>B&amp;W DM600</b> £150	Good+ Average+	Attractive hi-tech appearance and clever engineering makes for an impressively smooth overall balance, but sound is a touch bland with it	35 x 20.5 x 25cm stands 1-2ft from wa	85dB 30Hz (in room)	R	98
<b>B&amp;W Matrix 801</b> £3295	Good + Good +	Lacks the transparency of the best panels, and the drama of the best dynamics, but is something of an acoustic tour de force, with low coloration and fine imaging	77/99 x 56 x 43cm floor or stands, fre	86dB/w <20Hz (in room)	R	81



## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
<b>B&amp;W Matrix 805</b> £915	Very Good Good	A genuine compact monitor, stylish, with remarkable imaging properties, good balance and low coloration, though less successful at communicating musical	42(max) x 26 x 22.5cm Slate stands in free	87dB 30Hz (in room)		98
<b>B&amp;W Vision DS1</b> £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>B&amp;W Vision DS2</b> £180	Average Average -	Although the box is generous for the price, the DS2 is a rather uneven performer, both on the measurement and listening.	50 x 24 x 25cm stands in free space	89dB/w 43Hz (in room)		86
<b>Bose 305</b> £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
<b>Bose 901 MK6</b> £1600	Good Average	Still controversial after all these years, the pre-equalised multi-driver 901 is cleverly engineered to deliver exceptional loudness.	33 x 54 x 32cm rigid stands in free space	(92dB/ midband) 28Hz (in room)		86
<b>Bose Interaudio 3000XL</b> £150	Average Average -	Lots of perceived value and well enough balanced, but low cost cabinet and driver engineering results in a crude and unsubtle sound	46.5 x 29 x 23cm stands in free space	89dB/w 45Hz		71
<b>Boston A120</b> £349	Average + Good -	Ugly but cleverly engineered, the 120 combines a tiny main driver with much larger ABR to give a generous, bighearted and lively sound despite little bass	62.5 x 31.5 x 25cm stands in free space	89dB/w 48Hz	R	86
<b>Boston A40II</b> £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 63Hz		41
<b>Boston Acoustics T830</b> £399	Good Good	A lot of speaker for the money, the T830 is a smooth and accomplished performer with a big and easy - or alternatively a lazy and laid back - sound	82.5 x 25.5 x 24cm floor, away from wal	87dB/w 30Hz (in room)	R	82
<b>Brinkmann Endymion</b> £395	Average- Average+	Omnidirectional design with rococo styled urn-shaped ceramic enclosure. Distinctly bass light, but sounds impressively coherent and solid	48 x 29 (diam)cm 50/150Hz (in room)	85-87d stands in free space		106
<b>C-J Synthesis LM210</b> £895	Good Good+	Elegant compact US floorstander is eminently relaxing and listenable, with open and coherent midband, if a bit short on welly and drive	90 x 26 x 27cm 28Hz (in room)	86dB clear of walls	R	106
<b>Cambridge SoundWorks Ambianc</b>	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
<b>Canon S-50</b> £349	Average Average+	Though only a small cone miniature at heart, the fascinating styling and extended stereo listening area feature make it utterly original and unique.	30x24(diam)cm stands in free space	84dB 48Hz (in room)	R	102
<b>Castle Chester</b> £599	Good Very Good	A brilliant throwback, using horn-type approach to provide startling midrange dynamics and coherence.	94 x 23 x 27cm floor, experiment	87dB 45Hz	BB	98
<b>Castle Durham</b> £259	Average + Average	Listening results were encouraging, well engineered and finished, but lean on treble and a bit weak on bass; still recommended	41 x 21.5 x 25cm near rear wall	89dB/w 67Hz	R	46
<b>Castle Pembroke</b> £379	Good Average +	Comfortably recommended, a sweet smooth sound with good overall balance of engineering-based performance	55 x 37.5 x 30.5cm open space on stands	88dB/w 46Hz	R	31
<b>Castle SG Trent</b> £129	Average Average	The grey paint finish looks much more modern than black vinyl woodprint, and this miniature wall-mount sounds lively and engaging, if a bit rough at the top.	33.5x18x20cm stands close to wall	88dB 50Hz (in room)	R	102
<b>Castle Warwick</b> £229	Good Average -	Excellent presentation and fine engineering with overload protection, but a sonic disappointment in bass and dynamic qualities	46.5 x 25 x 23cm stands 1ft from rear	88dB/w 50Hz		66
<b>Castle Winchester</b> £1400	Very Good Very Good	This unconventional and beautifully crafted model is physically large for its bass extension but is engagingly agile and sounds attractively open and airy	114 x 24 x 47cm in free space	87dB/w 25Hz	R	90
<b>Celef CF2 Nimbus</b> £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
<b>Celef Cirrus</b> £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
<b>Celestion 3</b> £109	Average + Average	This attractive little wall-mount gives good balance and stereo imagery, with a character which leans more towards inoffensiveness than excitement	31 x 18.5 x 21cm high stands against wall	86dB/w 55Hz (in room)	R	78
<b>Celestion 5</b> £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 23cm heavy stands close to wall	89dB/w 30Hz		90
<b>Celestion 6000</b> £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	R	60
<b>Celestion 7</b> £200	Average Average+	Good value, good looking large bookshelf size wall-mount has lively up front presentation. Can sound a bit coarse and stand selection is critical.	45 x 24.5 x 32cm heavy stands close to wall	87dB 30Hz (in room)	R	98
<b>Celestion 9</b> £249	Good Average	Nicely presented and fair material value, with impressively flat bass-to-mid balance, the 9 doesn't really make a convincing case for the return of the three-way.	49.5x20.5x24cm stands clear of wall	89dB 30Hz (in room)		102
<b>Celestion DL6 Series II</b> £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
<b>Celestion DL8 Series II</b> £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 60Hz	R	59
<b>Celestion SL12Si</b> £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 clea	85dB/w 50Hz		66
<b>Celestion SL600Si</b> £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
<b>Celestion SL6Si</b> £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 wa	86dB/W 30Hz (in room)		94
<b>Creek CLS20</b> £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	88dB/W 30Hz		90
<b>DCM Timeframe TF250</b> £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
<b>Dali 700</b> £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
<b>Diamond Acoustics Ref III</b> £895	Average Good+	Lovely freestander suffers from indifferent bass alignment, but is fast, coherent, solid and very informative indeed.	87 x 27.5 x 28cm 30Hz (in room)	90dB well clear of walls	R	106
<b>Duntech PCL1000 Crown Prince</b> £8478	n/a Excellent	Immensely 'listenable', refined sounding speaker capable of creating lifesize musical images. Not overly transparent to source, but very civilised	180 x 30.5 x 43.5 free standing away from	90dB/w 42Hz	R	72
<b>Duntech PCL500 Marquis</b> £5250	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	92dB/w 48Hz	R	65
<b>Eitax Linear Response 8</b> £399	Average- Average+	Good material value Danish floorstander suffers from 'loudness contour' balance due to twin main drivers, but nevertheless has pleasing coherence	97 x 21 x 33cm floor, free space	88dB 22Hz		98
<b>Epos ES11</b> £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
<b>Epos ES14</b> £449	Good Very Good	Substantial stand mount model delivers delightful midrange focus and delicacy with good bass control. Tends to be system sensitive	49 x 22.5 x 29cm own stands 1-2ft from wa	85dB 25Hz (in room)	R	98
<b>Equation 0</b> £1290	Average + Very Good	Expensive but most attractive floorstanding miniature. Bass is limited and mid tends to shout but sound is fast and lively with fine dynamics and timing	85 x 20 x 35.5cm floor, c1ft from wal	85dB/w 45Hz	R	90
<b>Faraday FS5</b> £589	Good Good	Pricey and ugly, but with its own sonic charm nonetheless, thanks to the substantial (largely positive) influence of the concrete enclosure has upon the sound	46x27x26cm stands in free space	90dB 28Hz (in room)		102



## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
<b>Faraday Siren</b> £330 (d)	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
<b>Goodmans HIM 440</b> £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 wall	94dB/w 24Hz		90
<b>Goodmans M100</b> £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
<b>Goodmans M300</b> £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	89dB/w 50Hz (in room)	R	82
<b>Goodmans M500</b> £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
<b>Goodmans Maxim 3</b> £110	Good Average	Smooth and accomplished wall-mount miniature makes a worthy replacement for the bestselling Maxim 2	26 x 17 x 21cm stands against wall	85dB 50Hz (in room)	R	106
<b>Harbeth HL Compact</b> £584	Very Good Average	The clean and neutral sound lacks resolution and gives rather unobtrusive though well differentiated stereo. Can be bi-wired to advantage	52 x 27.2 x 28.1cm open space, on high	87.5dB 65Hz		59
<b>Harbeth LS3/5A</b> £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
<b>Heco Interior 120</b> £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
<b>Heco Interior 430</b> £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
<b>Heco Interior 90</b> £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 90Hz		74
<b>Heco Interior Plus 404</b> £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
<b>Heco Presto Superior 750</b> £600	Good+ Average	Tall slim and attractive floorstander delivers a fine, even in-room balance but lacks transparency, coherence and dynamic drive	95 x 24 x 27cm 22Hz (in room)	87dB clear of walls		106
<b>Heco Reflex 10</b> £160	Average+ Average	This nicely balanced and well mannered small bookshelf wall-mount is a competent rather than exceptional package for the price, thanks to indifferent build.	32x21x23cm stands up to 1ft fro	90dB 30Hz (in room)		102
<b>Heco Superior 740</b> £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
<b>Heco Superior 940</b> £999	Good Good	This large and beautifully finished floorstander has an impressively smooth and transparent midband. Bass is well extended but follows rather than drives the music	110 x 26 x 31.5cm free space	88dB/w 20Hz		86
<b>Heybrook HB1 S3</b> £250	Average+ Good	Latest version of long established favourite delivers good liveliness and fine coherence for the price, even though the shape looks a bit dated	47 x 29 x 24cm HBS1 stands close(ish) to	88dB 30Hz (in room)	BB	98
<b>Heybrook HB100</b> £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
<b>Heybrook HB150</b> £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	89dB/w 42Hz (in room)		82
<b>Heybrook HB200</b> £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
<b>Heybrook Point 5 S2</b> £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 28Hz (in room)	BB	94
<b>Heybrook Point 7</b> £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	85dB/w 60Hz		68
<b>Heybrook Sextet</b> £949 (f)	Good Very Good	Elegant floorstanding three-way wall-mount is engagingly coherent and a highly analytical, partly due to distinct and not always comfortable upper-mid forwardness.	96x27x20cm close to wall	85dB 25Hz (in room)	R	102
<b>Heybrook Solo</b> £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
<b>Infinity Kappa 6</b> £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	88dB/w 35Hz		66
<b>Infinity Kappa 8</b> £1850	n/a Very Good	Very nicely made and unobtrusive but large four-way speakers which have a tendency to sound bass heavy unless used with solid core cables	118 x 51.5 x 17.5cm floor standing, open	89dB/w 33Hz		72
<b>Infinity Modulus</b> £695	Good Average +	Luxury high-tech miniature, carefully conceived and beautifully built. Undeniably attractive in the mid and treble, it failed to handle the bass as successfully	30 x 18 x 26cm high stands 1ft from wall	84dB/w 45Hz (in room)		86
<b>Infinity RS2001</b> £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
<b>Infinity Reference 10</b> £149	Average Average	Follows the Infinity tradition in providing an engaging and lively sound from a prettily finished and substantial small bookshelf size model	36 x 23 x 23cm stands in free space	87dB 50Hz (in room)	R	98
<b>Infinity Reference 20</b> £220	Good Average	Large bookshelf size model is well presented and balanced with good bass control, but somehow lacks convincing cohesion and agility; build was slightly suspect too.	46x27x24cm stands 1-2ft from wa	88dB 27Hz (in room)		102
<b>Infinity Reference 30</b> £330	Good Good	Drivers from Ref 20 in box from Ref 50 creates a well balanced and extended floorstander at a very competitive price	85 x 26.5 x 25cm clear of walls	87-88d 25Hz (in room)	R	106
<b>Infinity Reference 50</b> £499	Average Average-	Despite hi-tech drivers, attractive presentation, good bass extension and sensitivity, this three-way floorstander suffers from a forward, coloured sound	86 x 26.5 x 25cm floor in free space	89dB 25Hz (in room)		98
<b>JBL Control 1 Plus</b> £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
<b>JBL L20T3</b> £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
<b>JBL LX33</b> £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	80 x 25 x 21cm floor, 1ft from wall	89dB/w 48Hz	R	82
<b>JBL LX44</b> £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
<b>JBL LX55</b> £350	Good Average	This big bluff three-way provides lots of speaker, bandwidth and loudness for the asking price, but is ultimately a bit of a dinosaur	66x34.5x29cm stands clear of wall	91dB below 20Hz (in room)		102
<b>JBL XE2</b> £149	Average- Average-	Budget Danish-built 'bookshelf' model has anomalous 'laid back' balance and lacks the genuine JBL spirit	38 x 23 x 23cm stands in free space	88dB 48Hz (in room)		98
<b>JBL XPL 90</b> £699	Good Average +	Though undoubtedly pretty and very expensively engineered, this elaborate near-miniature didn't really convince our listeners.	39.5 x 24 x 24cm stands in free space	85dB/w 45Hz (in room)		86
<b>JPW AP2</b> £180	Good Average	Good size bookshelf model offers real wood veneer at a bargain price; performance is cleaner but broadly comparable to P1 Vinyl overall	43.5 x 25.5 x 26cm stands in free space	86dB 45Hz (in room)	R	106
<b>JPW AP3</b> £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
<b>JPW Minim</b> £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



## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
<b>JPW P1</b> £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
<b>JPW P1 Vinyl</b> £135	Good Average	Not particularly pretty, this is still a lot of highly competent loudspeaker for the price, with a safe and middle-of-the-road sound that's unlikely to disappoint.	43.5x25.5x26cm stands 1-2ft from wa	87dB 32Hz (in room)	BB	102
<b>JPW Sonata</b> £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
<b>JPW Sonata Plus</b> £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
<b>JRT AD1</b> £500 (s)	Average + Good +	A most auspicious Choice debut for relative newcomers JRT. A fair share of cosmetic deficiencies do little to spoil the impressive coherence and timing	59.5 x 28 x 36cm own stands close to rear	86dB/w 28Hz (in room)	R	86
<b>JRT AD1 Micro</b> £389	Average Good	Beautiful bijou miniature has delightful life and coherence and gives surprising impression of scale; some aggressive tendencies but very open to system tuning	28 x 17 x 21cm stands against wall	87dB/W 50Hz (in room)	R	94
<b>Jamo Concert II</b> £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
<b>Jamo Concert V</b> £500	Average Average	Compact, solid, nicely finished floorstander delivers unusually extended bass at the expense of lowish sensitivity; midband is smooth but laid back.	86x24x28cm well clear of walls	85dB below 20Hz (in room)		102
<b>Jamo Concert VII</b> £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
<b>Jamo Cornet 40</b> £100	Average- Average	Pretty little Danish-built miniature with respectable rather than exceptional sound quality for the price	32 x 20 x 22cm stands 1-2ft from wall	86dB 48Hz (in room)		98
<b>Jordan JH400</b> £504	Average- Average+	Beautiful piano finish hexagon has single full range driver and controversial sound, with uneven balance but delightful mid coherence	33 x 24 x 30.5cm 1-2ft from wall	83dB 50Hz (in room)	R	106
<b>KEF 104/2</b> £1,295	Very Good Very Good	A reference point for dynamics, preferred without KUBE, suited to many rooms. Good stereo, high sound level	90 x 28 x 41.5cm floor standing in free spa	92dB/w 50Hz	R	60
<b>KEF 1120</b> £159	Good Average	Physically pretty and sonically competent but undistinguished medium bookshelf size model has good sensitivity but limited extension	34 x 20.5 x 26cm 1ft from wall	87dB 45Hz (in room)		106
<b>KEF Q60</b> £349	Good Good	Uni-Q co-axial driver provides fine imaging and mid coherence, while magnet decoupling reduces cabinet coloration. Goes loud, bass not entirely convincing.	48x25x27cm stands close to wall	90dB 25Hz (in room)	R	102
<b>KEF Q80</b> £499	Good Average+	Uni-Q floorstander has good stereo and fine midband coherence, but bass lacks extension, drive and resolution	85 x 24.5 x 26.5cm free space	87dB 45Hz (in room)		106
<b>Kammerzell Reference Mini</b> Monitor	Average+ Good	Lovely miniature has a beguilingly sweet sound with good pace and drive, but scale is restricted and presence a little dulled considering the high price	stands 1-2ft from wall 85dB/W	50Hz (		94
<b>Kenwood LS-770E</b> £260	Good Good	Impressively communicative made-in-Japan large bookshelf size model has fine vigour, scale and dynamics, if not the smoothest sound around	48 x 27 x 25cm stands in free space	89dB 25Hz (in room)	R	106
<b>Lindley New Age</b> £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
<b>Linn Helix II</b> £357 (s)	Good Good+	Ku-Stone supported, this is one of the best 'large bookshelf' size models around. Dry, controlled bass and very open, if slightly aggressive balance.	57x24x30cm KuStones 1-2ft from	88dB 33Hz (in room)	R	102
<b>Linn Index II/KuStone</b> £235/£1	Good Good	Combination of stand and speaker looks and sounds very good for the price, with good bass extension and control, fine dynamic range. Clean, clear if a shade slow	44 x 21 x 23.5cm (box only) close to rear	86dB/w 28Hz	BB	90
<b>Linn Kaber LS500</b> £1098	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
<b>Linn Kan II</b> £439	Average + Average +	A niche product for those prepared to tolerate its strong character for the sake of its fine bass performance and near invisibility	30.5 x 18.5 x 16.5cm Kan stands against	82dB/w 35Hz (in room)		78
<b>Linn Nexus LS250</b> £458	Good Average	Good features include a solid, meaty bass plus good imagery and tonal balance. The catch is that Nexus lacks resolution and timing	49 x 23.5 x 30.4cm near rear wall	89dB/w 60Hz		59
<b>Magneplanar MG1.4</b> £1090	Good + Good +	Replaces the stalwart MG1c with a revised panel layout. Offers a very crisp and articulate sound, particularly revealing of upper mid vocal details	155 x 8 x 57cm open space	88dB/w 40Hz	R	72
<b>Magneplanar SMGa</b> £688	Average - Average	Tonally 'rich', in the right room it proved a satisfactory musical experience	122 x 48 x 4.5cm on floor clear of wall	85dB/w 56Hz		46
<b>Marantz LD-50DMS</b> £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
<b>Martin Logan CLS II</b> £3998	n/a Very Good	Much improved high resolution design, fussy about system set-up and demanding of ancillaries and software alike. It rewards the efforts though	60 x 28 x 7.5cm open space	86dB/w 45Hz	R	72
<b>Meridian Argent 1</b> £1,200	Good+ Good+	Beautifully built, finished and shaped but pricey compact has fine bass extension and virtual absence of 'boxiness'; needs a big amplifier	33 x 27(max) x 27(max)cm Slate stan	83dB 28Hz (in room)		98
<b>Meridian Argent 2</b> £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
<b>Meridian M30</b> £895	Average + Average	Pricy but easy on the ears and worth considering especially where space is at a premium	38.5 x 18 x 32cm free space on stands	Active 40Hz		46
<b>Mission 760</b> £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
<b>Mission 761i</b> £150	Good Average	Variation on 760 theme adds an extra main driver for easier amp loading and power handling. Sound was judged slightly inferior to its simpler, cheaper stablemate.	38x19x24cm stands close to wall	88dB 48Hz (in room)		102
<b>Mission 762</b> £200	Average Average -	Mission's 'bookshelf middleweight' offers high sensitivity and loudness capability, but at the expense of a somewhat untidy and rather 'heavy' sound	50 x 25 x 27cm stand, experiment advised	91dB/w 55Hz		66
<b>Mission 763</b> £300	Average + Average +	A very artful combination of generous volume and good bass extension at a modest price. Works well in the listening room despite a few rough edges	77 x 25 x 32cm near rear wall	86dB/w 40Hz	BB	68
<b>Mission 764i</b> £480	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		94
<b>Mission 767</b> £2500	Very Good Very Good	Magnificent and massive part-active monoliths have fine acoustic subtlety and impressive loudness capability, ultimately limited by partnering (Cyrus) electronics	138 x 29 x 43cm floor, flexible	91dB/w <20Hz (in room)	R	81
<b>Mission Cyrus 780</b> £180	Good Average +	Pricy 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
<b>Mission Cyrus 781</b> £250	Average + Good	Properly run in, the pretty little 781 delivers a fast, dynamic and informative sound which more than justifies its price.	43 x 22.5 x 28cm matching stands 1ft	88dB/w 28Hz (in room)	R	86
<b>Mission Cyrus 782</b> £350 (s)	Good - Good -	Lively, articulate and beautifully finished, this compact wall-mount model with twin main drivers has good integration but a rather rich, 'Loudness' balance	50 x 25 x 32.5cm Cyrus stands near wall	90dB/w 50Hz		71
<b>Monitor Audio MA1200</b> £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
<b>Monitor Audio MA1800</b> £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
<b>Monitor Audio Monitor 11</b> £330	Average Good	This tall and slim and attractive free space compact has an extra driver to help out in the bass, giving extra urge at some price in delicacy	52 x 20 x 24cm stands free space	87dB/W 48Hz (in room)	R	94



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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
<b>Monitor Audio Monitor 14</b> £400	Average Average	Floorstanding version of M11 suffers from excess upper bass, giving a thick, chesty coloration beneath a quite lively and well focused mid and treble	78 x 20 x 24cm floor well clear of walls	86dB 30Hz (in room)		98
<b>Monitor Audio Monitor 7</b> £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
<b>Monitor Audio Monitor 9</b> £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
<b>Monitor Audio Monitor One</b> £180 (rosewood)	Average+ Average+	Pricy but very cute little micro-miniature just about gets away with it sonically, though performance envelope is inevitably limited	24 x 15 x 16cm stands against wall	85dB 55Hz (in room)	R	106
<b>Monitor Audio Studio 10</b> £1200	Average Average +	Expensive, luxury build/finish and all-metal driver diaphragms provide engagingly transparent midrange and treble, spoiled by over-strong mid-bass.	40 x 20 x 25cm heavy stands clear of wall	87dB/w 45Hz		90
<b>Monitor Audio Studio 15</b> £1,600	Average+ Good	A little slow and lazy but better balanced than the smaller Studio models, the midband coherence and focus is superb, but it ain't cheap	51x20x26cm free space	87dB 45Hz (in room)	R	102
<b>Monitor Audio Studio 5</b> £500	Average+ Average+	All metal diaphragm luxury miniature has splendid presence coherence but sound can be aggressive and lacks welly.	32 x 18 x 20cm stands close to wall	83dB 28Hz (in room)		98
<b>Mordaunt-Short 5-30</b> £200	Average+ Average-	Good hi-tech material value for money, but a disappointingly dull and rather bland sound. Safe but uninspiring.	42.5 x 25 x 28cm stands clear of walls	86dB 28Hz (in room)		106
<b>Mordaunt-Short Classic 20</b> £395	Average+ Average+	Luxuriously finished compact delivers beguiling mid transparency but bass is altogether less convincing — one for the carpet slippers generation perhaps	37x22x27cm stands in free space	86dB 45Hz (in room)		102
<b>Mordaunt-Short MS3.10</b> £110	Average Average+	Probably the liveliest and most communicative miniature around, this beautifully presented design is probably better suited to budget 'real hi-fi'	28.5x17.5x20cm stands in free space	88.5dB 48Hz (in room)		78
<b>Mordaunt-Short MS3.20</b> £140	Average Average+	All the charm of its BB rated £99 baby 3.10 brother, plus a smidgeon more bass for those in a suggestable frame of mind	35.5x18x20cm stands against wall	85dB 50Hz (in room)	R	82
<b>Mordaunt-Short MS3.30</b> £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	46x23.5x27cm stands 1-2ft from wal	87dB 38Hz (in room)		78
<b>Mordaunt-Short MS3.40</b> £260	Average+ Average	It looks pretty and sound civilised but the 3.40 failed to ignite any degree of enthusiasm amongst our listeners. LF room matching is critical	57x23.5x27.5cm stands in free space	87dB 30Hz (in room)		86
<b>NAD 8100</b> £300	Average+ Average+	Floorstanding variation on attractive 8225 miniature adds some half convincing extra bass thump and saves the price of stands - very cost effective	75 x 20 x 25cm floor clear of walls	88dB 25Hz (in room)	R	98
<b>NAD 8225</b> £150	Good Average +	Notwithstanding lacklustre styling and an unprepossessing appearance, this NAD miniature has a smooth and even midband plus an appealing overall jauntiness	34 x 20 x 18cm stands close to wall	87dB/w 45Hz (in room)	R	86
<b>NVA Cube 1</b> £600 (s)	Good - Good +	Attractive, cube-shaped semi-omni is very sturdily built, and gives an idiosyncratic but unusually open, spacious and informative sound	33 x 32 x 32cm own stands c0.5m from wa	85dB/w 52Hz	R	71
<b>NVA Cube 2</b> £380	Average Good	A rude but exciting miniature, with unusually accomplished bass capabilities for its size	28.5 x 27 x 28.5cm NVA stands against wall	85dB/w 48Hz (in room)	R	82
<b>NVA Cubix</b> £1100	Average Good	Too idiosyncratic for formal recommendation, the Cubix possesses remarkable bass extension for its size, but is tricky to optimise	60 x 32.5 x 32.5cm	84dB/w 28Hz (in room)		78
<b>Naim NA IBL</b> £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 (		94
<b>Naim SBL</b> £1,527	Good Very Good	Impressive scale and full bandwidth coherence from an attractively discrete floor standing wall-mount — coloured midband but very well balanced and agile with it.	88x26.5x17-27cm close to wall	86dB 25Hz (in room)	R	102
<b>Neat Petite</b> £525	Average Good+	Pricy and far from perfect, this near miniature is nevertheless one of the most entertaining and enjoyable speakers around, colorations notwithstanding.	30.5x20x18cm stands close to wall	86dB 33Hz (in room)	R	102
<b>Opus 3 Capella</b> £599	Good Good	The sound of this Scandinavian curiosity certainly benefits from the crushed marble enclosure, though presentation is strictly DIY	32 x 40.5 x 26(ave)cm amongst books in	86.5dB 45Hz		66
<b>Opus 3 Credo</b> £399	Average Average	Credo's odd-shaped silicate-based cabinet confers good box and bass performance, but the sound could be more neutral for the price	32 x 28 x 32cm stands in free space	88dB/w 65Hz		74
<b>Origin Live OL1</b> £499	Very Good Good	Luxury miniature has very good overall balance, sacrificing sensitivity to achieve remarkable bass extension for the box size	30.5 x 19 x 21cm stands close to wall	82dB 25Hz (in room)		106
<b>Pearl &amp; Oakley Victoria 200</b> £1099	Average - Average -	Extraordinary — and to many very attractive — 'ginger jar' presentation in Staffordshire ceramics, but let down by need for further acoustic development	93 x 33 x 33cm on floor in free space	87dB/w 30Hz (in room)		78
<b>Philips FB815</b> £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	63 x 27 x 27cm low stands in free space	85dB/w 30Hz		86
<b>Philips FB820</b> £450	Good Average	Big-but-less-than-beautiful three-way is well enough balanced but lacks communication skills in the time domain	86 x 27 x 35cm floor clear of walls	87dB 28Hz (in room)		98
<b>Philips FB825</b> £650	Good Good	Generous sounding and impressively uncongested for the type, loudness and bass extension don't quite match the large and rather plasticity box	110 x 29 x 41cm on cones clear of walls	88dB/w 25Hz	R	90
<b>QLN Model One</b> £700	Good Average	Similar to Signature at two thirds the price, Model One exaggerates the latter's rich and heavy midbass and lacks its velvet smoothness	35 x (16-25) x (21-27)cm pillar	85dB/w 28Hz (in room)		82
<b>QLN Signature</b> £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
<b>Quad ESL-63</b> £2072	Good + Very Good	With its unusual but subtle characteristics this classic electrostatic may not be punchy in the bass, but has strengths that some cannot live without	92 x 66 x 27cm open stand well clear of	84dB/w 34Hz	R	60
<b>RAM Hermes</b> £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
<b>RCF Mytho 3</b> £1,395	Average Average+	Undoubtedly very attractive and well built, incorporating a number of unusual and interesting ideas, the high price isn't really justified by the performance.	100x21.5x30cm away from walls	88dB 25Hz (in room)		102
<b>Richard Allan CD5</b> £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
<b>Rogers LS2a/2</b> £209	Good+ Good	Balance is a bit warm and rich but 2a/2 has delightful mid-to-treble coherence and transparency, and more welly than Mk1	35.5 x 23 x 22cm stands clear of walls	84-85d 30Hz (in room)	BB	106
<b>Rogers LS8a</b> £425	Average + Average +	This modestly priced floorstander is a mixed bag, with plenty of scale and welly but lacking the subtlety, clarity and agility delivered by some rivals	89x25.5x25cm clear of walls	91dB 48Hz (in room)		102
<b>Rogers Studio 1a</b> £599	Very Good Good -	The classic BBC monitor style sound sensitively updated — transparent and natural with fine stereo, but a touch 'heavy' in balance	63.5 x 30.5 x 30.5cm stands in free space	87dB/w 36Hz	R	66
<b>Roksan Darius</b> £1569 (	Good Very Good	Now totally realigned, the current Darius provides an exceptionally impressive combination of transparency and delicacy with fine information retrieval and speed	47 x 27 x 40cm own stands angled in spa	82dB/w 20Hz	R	86
<b>Royd A14 II</b> £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
<b>Royd A7 Series 11</b> £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	86dB/w 75Hz	R	53
<b>Royd Apex</b> £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
<b>Royd Eden</b> £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



# The Directory

## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FRDM	VALUE	ISSUE
<b>Royd Sapphire</b> £200	Average+ Good-	Neat little miniature sounds a touch cold and thin but unusual main driver delivers remarkable speed and coherence for such a reasonably priced model	30.5 x 20.5 x 21cm frame stands 1ft fro	88dB 28Hz (in room)	R	98
<b>Royd Sintra</b> £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
<b>Ruark Swordsman</b> £219	Good Average	Very attractively styled and finished, the Swordsman is a well built 'small bookshelf' model that delivered better test than listening results	38.5 x 20 x 27.5cm stands 0.5m from wal	84dB/w 50Hz		71
<b>Ruark Swordsman Plus</b> £269	Good Average	This real wood variation on the established Swordsman theme looks and measures rather better than it sounds, probably due to rather prosaic drivers	38 x 20 x 28cm stands 1-2ft from wall	84dB 27Hz (in room)		98
<b>Ruark Talisman</b> £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 wal	86dB/w 30Hz	R	90
<b>SD Acoustics OBS</b> £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	92dB/w 30Hz (in room)	R	82
<b>SD Acoustics Ribbon</b> £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	91dB/w 30Hz (in room)		81
<b>SD Acoustics SD1</b> £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
<b>SD Acoustics SD3</b> £379	Average Good	Neither cheap nor perfect, this near miniature sounds unusually lively and dynamic within inevitable physical constraints. Both engaging and entertaining!	38 x 19 x 29cm stands 10cm from wall	83dB/w	R	86
<b>SD Acoustics SD3</b> £399	Good Good	Port firmly blocked, the new SD3 has the agility and charm of a quality miniature, with good bass extension but low sensitivity	38 x 19.5 x 29cm stands 1ft from wal	83dB 25Hz (in room)	R	106
<b>Seventh Veil System IV</b> £1290	Average Good +	Lacks welly and loudness but delivers astonishing results with female vocals in particular. Antithesis of the 'good allrounder'	72 x 44 x 21 x 29cm own-stands close to	84dB/w 28Hz (in room)	R	86
<b>Shan Shimna</b> £315	Average+ Good-	Pretty little miniature with resin-based enclosure has a bright, thin but sweet and communicative sound; loudness and welly are both limited	31 x 21 x 17cm own stands 1ft from wall	84dB 48Hz (in room)	R	98
<b>Sony APM-101ES</b> £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
<b>Sony APM-121ES</b> £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)		86
<b>Sony APM-141ES</b> £200	Average Average	A great deal of loudspeaker for the money, the rich sounding '141 needs a big room and still shows significant 'loudness' (boom'n'tizz) tendencies	61.5 x 26 x 32cm stands in plenty of	88dB/w 30Hz (in room)	R	78
<b>Sony APM-181ES</b> £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		71
<b>Spendor S20</b> £510	Very Good Good	This solid and elegant luxury compact maintains Spendor's tradition for peerless mid-to-treble coherence and perspectives. Bass is rather unconvincing	38x22x26cm stands 1-2ft from wa	83dB 25Hz (in room)	R	102
<b>Spica Angelus</b> £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 50Hz		60
<b>Spica TC50</b> £599	Good - Good	This triangular-profile 'grown up' miniature is a shade boxy and laid back but has good rhythmic and musical integrity	40.5 x 33 x 29cm stands in open space	88dB/w 55Hz		71
<b>Spica TC50SE</b> £799	Good - Good	A heavily UK-modified TC50, the SE sounds less boxy and more spacious, but lacks some of the urgency of the standard model	40.5 x 33 x 29cm stands in open space	88dB/w 55Hz		71
<b>Studio Power DMS100</b> £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
<b>TDL Monitor</b> £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
<b>TDL Studio 0.5</b> £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)		94
<b>TDL Studio 1</b> £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
<b>Tannoy 603</b> £120	Average+ Average+	Pretty hexagonal cabinet miniature is optimised for free space siting and delivers fine imaging with little boxiness, but little in the way of welly and power either.	33.5x22(max)x16cm high stands in free	85dB 45Hz (in room)	R	102
<b>Tannoy 605</b> £150	Good Average+	Largish bookshelf size hexagon is potentially fine performer, though unusual stand sensitivity makes optimisation difficult	40 x 27.5 x 18cm stands 1-2ft from wall	85dB 25Hz (in room)	R	106
<b>Tannoy 609</b> £250	Good Good	Distinctive hexagonal cabinet reduces box colorations, and new dual concentric driver is sweeter than its predecessors, making this one very superior speaker	50x32(max)x22cm stands clear of wall	90dB 25Hz (in room)	BB	102
<b>Tannoy Westminster</b> £3600	n/a Good +	These awesome horn loaded speakers are remarkably controlled and impressive, if only suited to a few pockets and rooms	Huge, flat against rear wall, away from	96dB/w	R	Coll '87
<b>Technics SB-EX2</b> £180	Average- Average	Nicely presented, well built and decent size enclosure sounds solid but somewhat dull, thanks presumably to rather ordinary, low cost drivers	48 x 23.5 x 27cm stands clear of wall	86dB 20Hz (in room)		98
<b>Technics SB-RX50</b> £650	Very Good Average +	With its unique coaxial drive unit the RX50 proved a smooth and well balanced loudspeaker, its minor weakness being a mildly excessive low bass	48 x 30 x 26cm free space on 40cm stands	86dB/w 40Hz	R	46
<b>Townshend Glastonbury IIS*</b> £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	91.5 x 28 x 4.6 free standing in room	88dB 27Hz	R	65
<b>Townshend Glastonbury Tor</b> £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
<b>Vandersteen Model One</b> £1000	Average + Average +	This compact American floorstander's elegant staggered baffle arrangement contributes to a refreshing freedom from boxiness, but the price is quite high	100 x 30.7 x 25.6cm floor clear of walls	87dB/w 23Hz (in room)		86
<b>Vecteur Premiere</b> £695	Average Good	Expensive for its material content, this pretty French compact nevertheless has a beguiling sound quality that indicates painstaking development	34 x 19.5 x 25cm light stands clear of wall	88dB 48Hz (in room)		98
<b>Wharfedale 410</b> £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)		94
<b>Wharfedale 505.2M</b> £260	Average+ Good-	Luxury red mahogany finish version of 505.2, confirms that this well balanced design remains fully competitive nearly three years after the original	44 x 25.5 x 25.5cm stands in free space	87dB 45Hz (in room)	R	98
<b>Wharfedale 505/2</b> £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
<b>Wharfedale 515</b> £260	Good Good	Effectively a technical update on the continuing 505 theme, this is still more evenhanded, with better bass extension and smoother treble	40 x 25.5 x 30cm stands clear of walls	85dB 28Hz (in room)	R	106
<b>Wharfedale Coleridge C</b> £600	Good Good	Very prettily dressed and sounds pretty good as well, though whether enough to justify the £600 pricetag is open to debate. Well balanced, smooth and a little dull.	48x25.5x25.5cm stands clear of wall	86dB 30Hz (in room)		102
<b>Wharfedale Delta 30.2</b> £100	Average- Average	This hundred pounder has a bigger main driver than many of its rivals, and so packs a bit more welly and loudness. Coloration is rather obvious, but timing is good	38 x 22 x 17cm stands close to wall	88dB 48Hz (in room)	BB	98
<b>Wharfedale Diamond IV</b> £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
<b>Yamaha NS 1000M</b> £900	Good Good +	Living up to its monitor label, and tonally well suited to digital material, the NS 1000M is superbly crafted and capable of high levels	67.5 x 37.5 x 32.5cm 30cm from wall, stan	90dB/w 40Hz	R	46



## LOUDSPEAKERS - SATELLITE AND SUBWOOFER SYSTEMS

Satellite and subwoofer systems, sometimes referred to as three way systems, consist of a small pair of speakers (the satellites) and an extra box (or two) to handle the low frequencies.

Most systems use a single sub-woofer to supply low bass output, although stereo sub-woofer systems are available. By freeing the main speakers of the necessity of generating deep bass they can be made much smaller than a standard design and as a result satellite

and subwoofer systems are usually visually unobtrusive.

Positioning of the sub-woofer is usually not as critical as the positioning of a conventional speaker and as a result the largest part of the system can be hidden away entirely, although please refer to the placement notes below as this does not apply to every system.

In general the sonic performance of these systems will fall below the performance of a good, comparably priced, conventional speaker

The value ratings given below are judged in the context of sat and sub woofer systems only and are not judged by the same criteria as the main loudspeakers, thus a Recommended sat and sub system probably won't sound as good as a Recommended traditional speaker

If you are prepared to compromise slightly in terms of sound quality then a satellite and sub-woofer system might represent a good solution for those situations where the loudspeaker should be heard but not seen.

## LOUDSPEAKERS - SATELLITE AND SUBWOOFER SYSTEMS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE (cm) PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
<b>Allison MS 205</b> £420	Average Good -	Tasty high quality satellites give this quite pricey 3-box system a touch of class. Subwoofer is very compact and only slightly boomy.	25.5x14.5x15 + 29x 29x36 stands close to wall	86dB 30Hz	R	104
<b>Bose Acoustimass AM3</b> £289	Average Average	Ultra compact 3-box is well balanced though limited in loudness and bass. Tiny satellites are a bit fierce, and grilles unhelpful	9x11x11 + 20x37x19 close to wall	85dB 48Hz		104
<b>Bose Acoustimass AM5</b> £569	Average + Average +	Pricey but cleverly engineered 3-box system is well balanced and uses tiny twin-driver satellites to good effect	16x7.7x12 + 36x19x48 sats at wall, sub 2ft from wall	85dB 40Hz	R	104
<b>Heco Libero</b> £375	Average Average	Attractive 3-box package uses neat metal satellites with versatile mounting accessories, but subwoofer is boomy in the midbass	18x11x12 + 21x55x 31.5 uncritical	85dB 45Hz		104
<b>Jamo SW/SAT300</b> £300	Average Average	Attractively finished 3-box package has 'tunable' subwoofer that allows boom to be minimised and a good balance achieved	21x15x8 + 21x48x34.5 uncritical	85dB 40Hz	R	104
<b>RSS Solid/Bass Station</b> £550	Average Average	Multi-driver macho subwoofer adds mucho muscle to Solid satellites, but it's much more midbass than serious extension	24x12x12 + 47x 4x x 20 sub at wall, sats in free space	91dB 45Hz		104
<b>Wharfedale 2130</b> £300	Average Average +	3-box system marred by indifferent boomy subwoofer but rescued by novel wide-dispersion satellites that give an open sound	14x24x11 + 19x32x 50 sub away from wall	86dB 48Hz	R	104

## PERSONAL STEREOS

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 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.

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	SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Aiwa HS P505MkII</b> £70	Good	Very good clutch of features and accessories plus good sound at a reasonable price. Could be more user friendly	Remote control, rechargeable battery and charger	BB	102
<b>Aiwa HS-PL707</b> £135	Very Good-	Has a precise, attractive sound, if a little clinical and cold. This player might be ideal for the user who will listen to mostly classical music. Somewhat fiddly to use	Remote control, BBE sound enhancer, charger & battery	R	102
<b>Aiwa HS-JX705</b> £220	Good	Rather expensive radio-equipped player. Sound quality on tape playback didn't match up to the Aiwa HS-PL707	FM/AM tuner, recording mic remote control, charger		102
<b>Panasonic RQS15</b> £85	Good	Considerable power and immediacy to the music though with some raggedness. Good features and accessories. Well designed and easy to use	Remote control, rechargeable battery and charger	R	102
<b>Panasonic RQV520</b> £100	Good	Features an onboard radio without sacrificing sound quality on tape playback. You lose out on accessories, though (no battery charger)	Radio, remote control, bass enhancer		102
<b>Panasonic RQS65</b> £130	Good+	Solid, warm sound plus a good selection of features and accessories all combined in a stylish and very user friendly package. Comes with one of the better remote controls	Remote control, rechargeable battery and charger	R	102
<b>Sanyo MGR401D</b> £40	Average-	Easy to use budget model with a radio and some useful features (including a simplified remote control). Sound quality on tape isn't great but is helped by the bass enhancer	Radio, remote control, bass enhancer with graphic equaliser		102
<b>Sanyo MGR580</b> £50	Poor	A more sophisticated radio than on Sanyo's 401D but the feature count is low and the tape playback unexceptional	Radio 'digital tuner', auto reverse		102
<b>Sanyo SPT1000</b> £40	Average	Despite outlandish colourful trim and features completely unrelated to audio enjoyment (a 'Pedometer' for monitoring jogging) this has a better basic sound than the other Sanyos	Bass enhancer		102
<b>Sharp JC-510</b> £30	Average	Serviceable sound quality and some decent features at a low price	Radio, bass enhancer, auto reverse		102
<b>Sharp JC-K99</b> £160	Good-	Sharp's 'extremely lightweight' model. Well made, elegant and it certainly doesn't weigh a lot. Pleasant sound, marred on the test sample by some distortion	Remote, rechargeable battery and charger, bass enhancer		102
<b>Sony WM DD33</b> £90	Good-	Well built and resistant to vibration on the move but comes with very limited features and accessories for the price	Bass enhancer		102
<b>Sony WM EX80</b> £150	Good	User friendly Sony with a good remote control and high quality, accurate sound. Comes with all the extras	Remote control, rechargeable battery and charger	R	102
<b>Sony WM DD99</b> £240	Good-	Mixed bag of accessories (nice headphone storage system, but no remote control) with variable sound quality at a steep price. But it does have Dolby B&C, good build quality and ergonomics	Dolby B&C, rechargeable battery and charger, auto reverse		102
<b>Sony Walkman Pro</b> £249	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



## PERSONAL CDS

MODEL PRICE	SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Aiwa XP-6</b> £150	Good	Punchy sound both via headphones and when used in a system but transport lets the side down a bit - not one to take out jogging	Digital output, mains adaptor, remote, headphones	R	106
<b>Denon DCP-100</b> £250	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
<b>Denon DCP-50</b> £180	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
<b>Goodmans GCD-10</b> £120	Average -	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	Mains adaptor, headphones		66
<b>Kenwood DPC-41</b> £130	Average -	Lightweight, not very walkable but nice control layout. Sound through the phones is on the thin side, through the line output it's pretty average for a portable	Mains adaptor, rechargeable batts headphones		94 Supp
<b>Kenwood DPC-81</b> £200	Good +	Chunky metal cased player that makes pretty confident sounds through a system but sounds dry via earphones and ain't exactly walkable	Remote control, mains charger and batts, digital output		94 Supp.
<b>Philips AZ6897</b> £200	Good +	Unusually designed and equipped with a radio the Philips is almost joggable, it sounds remarkably good via a system and a little cautious through the phones	Mains adaptor with built in plug, wired remote, clock, headphones	BB	94 Supp
<b>Philips AZ6819</b> £300	Excellent	Unusual looking machine with interesting radio headphones. Excellent sound quality but not one to walk with, superb styling	Radio headphones, rechargeables, plinth, infra-red remote	BB	106
<b>Samsung MY-CD2</b> £110	Poor	Cheap and not particularly cheerful, minimum of facilities and naff sound quality, could suit those on a very tight budget	Headphones, mains adaptor		106
<b>Sanyo CP-12</b> £260	Good +	Sonically amongst the more enjoyable CD players and capable of revealing the musical aspects of a disc in an interesting and entertaining fashion	Wired remote, headphones main adaptor	R	66
<b>Sony D-11</b> £135	Average -	Chunky player with old fashioned styling, a rather lightweight sound and limited dynamic range.	Headphones, AC adaptor bass boost		106
<b>Sony D-202</b> £160	Average +	Good sound quality twinned with relatively good portability accounts for the recommendation, can also sound OK in a main system. Nice entry level machine	Headphones, AC adaptor rechargeables, remote, digital out	R	106
<b>Sony D-303</b> £280	Excellent	Tidy design with adequate features but not as cluttered as the D-350. Excellent sound quality and will even serve as a CD transport	Headphones, AC adaptor rechargeables, remote, digital out	BB	106
<b>Sony D-350</b> £300	Good	More buttons and widgets than any of the others but not the sound quality or walkability to go with it	Mains adaptor, clock, rechargeable batteries		94 Supp.
<b>Sony D-66</b> £180	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.
<b>Technics SL-XP1</b> £140	Good +	Remarkably competent and enjoyable player that you can actually use on the move and sounds enthusiastic through a domestic system	Rechargeable batts, mains adaptor/charger, headphones	BB	94 Supp
<b>Technics SL-XP505</b> £180	Average -	Excellent transport makes this one of the most stable players on the market and the infra-red remote control is a nice bonus. Sound quality leaves a little to be desired	Headphones, AC adaptor rechargeables, infra-red remote		106
<b>Technics SL-XPS900</b> £280	Excellent	Great sound quality both via phones and in the home backed up with an impressive array of accessories. Transport is not up to use on the move	Headphones, AC adaptor rechargeables, infra-red remote	R	106

## TUNERS

The radio medium operates at a much lower profile than TV, but in areas outside pop music the BBC service is the envy of the world, Live Prom concerts can rival all other sources from a hi-fi perspective

Only the FM (VHF) bands give stereo hi-fi sound, though AM (MW & LW) are useful for certain transmissions in the UK.

Something of a hi-fi afterthought, tuners are often selected merely to match a chosen amplifier

cosmetically. However, the task they carry out is far from simple (or cheap), combining the skills of RF (reception) and audio (signal processing) engineering

The importance of the former will depend on local reception conditions, but money invested in a high quality outside aerial system is well spent. For more information on choosing and aerial see the feature in issue 108

Tuners come in two basic types. Analogue

models tune gradually (and usually manually) across the bands, and can have analogue or digital displays; they are often preferred for sound quality, and are certainly best for AM bands. Digital tuners offer convenient automatic tune facilities and hold many station positions in pre-set memories. (The Lab and Sound results for models tested in issue No. 65 refer to FM only. For AM results see under Comments.)

## TUNERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Aiwa XT-003</b> £105	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.
<b>Akai AT-52L</b> £150	Very Good	Holds its own on FM against many much more expensive tuners, but AM is very poor	All bands	BB	65
<b>Akai AT-56L</b> £170	Good	Listenable, but not exciting, was the overall verdict - it had no gross flaws but failed to capture the imagination	FM/MW/LW digital, 20 presets, 2 aerial sockets, switchable IF bandwidth		108
<b>Akai AT-93L</b> £250	Good +	By AM standards presentable (good) while FM delivers the goods	All bands, aerial switch	R	65
<b>Arcam Alpha 2</b> £185	Good	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.
<b>Arcam Delta 80</b> £340	Average+	Hi-fi sound on FM, good on AM, a dependable British all-rounder	6AM, 6FM presets. FM/MW/LW display, manual tune	BB	55
<b>Ariston Maxim</b> £299	Very Good	It may look a bit agricultural, but it has true audiophile performance; clean, well balanced with a good sense of scale. Only a very slight bass-lightness detracts from its general high standard.	FM digital, 16 presets, optional remote control.	R	109
<b>Aura TU-50</b> £230	Good	Tonally neutral, but with rather poor imaging and a certain woodenness to the sound.	FM digital, 16 presets		109
<b>Creek T40s3</b> £220	Good	Creek's FM-only analogue tuner is now in series 3 form, though the aesthetics remain unchanged. Ours was hampered by an obvious bass 'hump' though production units are said to be cured.	FM-only analogue, no presets, manual tuning + AFC		93 Supp.
<b>Denon TU-260L</b> £100	Average	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.
<b>Denon TU-660L</b> £190	Good	Not so successful under 'ideal' conditions, the '660 nevertheless made a fair fist of real reception, if a little muddled and lacking life.	FM/MW/LW digital, 30 presets, switchable IF bandwidth, remote	R	108
<b>Harman Kardon Citation 23</b> £600	Good	Fine performance, interesting features and ease of use are this tuner's forté, and the sound quality is top notch	FM/AM seek/manual adjustment muting 16 presets remote control	R	60
<b>Harman/Kardon TU9200</b> £170	Average	The listening panel appreciated its liveliness, but found it a little muddled. Excessive pilot tone breakthrough may be distressing to listeners under 30 and indicates some design slip-up.	FM/MW digital, 16 + 16 presets		109



## TUNERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Harman Kardon TU9400</b> £250	Good Very Good	Striking in appearance and with a sound to match, this new digital tuner comfortably exceeded our expectations. On stereo FM it's HK's best yet.	FM/AM digital, 24 presets, auto-tuning, signal strength meter	R	93 Supp.
<b>Harman/Kardon TU9600</b> £299	Average Good	Good bass and detail, and good - perhaps slightly 'enhanced' - dynamics, but measured performance is odd in normal mode and poor in 'Active Tracking' mode.	FM/MW digital, remote control, 24 presets, 2 aerial sockets		109
<b>Linx Theta</b> £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
<b>Magnum Dynalab FT101</b> £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
<b>Marantz ST-40L</b> £140	Average + Good	A little slow to tune but once accomplished it provides a meaty and dynamic sound on FM. AM too has a little extra bite to its performance	FM/AM digital, 30 presets, manual/auto tuning	R	93 Supp.
<b>Meridian 204</b> £660	Good + Good	Pleasant sounding with a fine finish but does not make the grade at this price	FM only, auto scan, digital, remote, timer		55
<b>Naim NAT 01</b> £1377	Very Good Excellent	There may be better sounding tuners in the world, but we have yet to hear one	No presets. Two box, flywheel tuning, FM only, Analogue	R	50
<b>NAD 4225</b> £160	Good Good ++	Slightly edgy at times and a tad coloured too, but the sound is so free and open that the tuner must be regarded as one of the most enjoyable models of its type.	FM/MW digital, 14 presets.	BB	108
<b>Nakamichi Tuner 2</b> £350	Good Good +	Generally a believable sound with good detail in complex music, but imaging is not 100%. The price seems rather high for the performance offered.	FM digital, 30 presets, switchable IF bandwidth		109
<b>Nakamichi ST-7E</b> £750	Good + Good +	Exceptionally good for weak-signal areas, and good all round	16 AM/FM presets, auto time digital		55
<b>Pioneer F-676</b> £200	Good + Good ++	Pioneer's extensive homework on the design seems to have paid off in a tuner that's detailed and clean-sounding. Perhaps a little bright, but not unpleasant.	FM/MW digital, 36 presets, switchable IF bandwidth, 2 aerial sockets	R	108
<b>Pioneer F91</b> £360	Excellent Good +	Easy to use, this model has excellent RF performance and scored very high ratings on the listening tests	FM/AM 24 presets	R	60
<b>Proton AT-300</b> £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
<b>Quad FM4</b> £399	Very Good Good +	Fine sound, excellent ease of use, good build and finish and a more than satisfactory technical performance	7 presets. Digital	R	50
<b>Revox B260</b> £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
<b>Rotel RT-930AX</b> £150	Good Good -	A competent rather than exciting performer, with low audible interference though slightly compressed and muddled sound.	FM/MW/LW digital, 20 presets	R	108
<b>SAE T-102</b> £449	Good + Good +	Expensive for all the radio you get, but sounds interesting, AM - poor	FM/MW only	R	65
<b>Sony ST-S530ES</b> £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.
<b>Sony ST-S570ES</b> £200	Good Average	A host of features, but the sound is muddled, compressed and lacking in frequency extremes.	FM/MW/LW digital, 30 presets, RDS, switchable IF bandwidth		109
<b>Technics ST-G70L</b> £200	Good+ Good+	Another very polite and refined-sounding tuner but one that does retain just enough sparkle to keep your interest. Plenty of widgets to play with too...	FM/AM digital, 39 presets, selectable RF/IF + fine tuning, signal. str. mtr.	R	93 Supp.
<b>Yamaha TX-950</b> £260	Good + Good +	Very clean and civilised - a bit too much so for one listener. But tonal balance, detail and clarity are all very good; lots of useful features add to its value.	FM/MW digital, up to 40 presets, switchable IF bandwidth, 2 aerial sockets	R	108

## TURNABLES - 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.

## TURNABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
<b>Arcam C77</b> £22	Average + Average +	A sensible moving magnet package with good bounce at a competitive price	6-16g Normal, MM	BB	48
<b>Arcam C77Mg</b> £30	Average - Average	Punchy sound quality with plenty of extra energy to liven things up. The solid body seems well worth the extra £10	4-8g Normal, MM	BB	67
<b>Arcam E77Mg</b> £50	Average Average	Our sample had a disappointing stylus, but gave a coherent, rich and laid back sound, with good 'scale'	3-8gN Normal, MM	R	48
<b>Arcam P77Mg</b> £60	Average + Average +	Cautiously recommended, the P77Mg was preferred to its cheaper partner by virtue of a better tip. Channel balance could have been better	4-9g Normal, MM	R	48
<b>Arcam PMX10</b> £100	Good + Very Good	Not the very clearest in complex high-frequency sounds, but lively and exciting, good transients	5-11g Low, MC	R	85
<b>Audio Note I02VDH</b> £1295	Good Very Good	One of the best, giving 'an extraordinarily relaxing midrange clarity', needs a transformer	8-18g Very low, MC	R	43
<b>Audio-Technica ART1</b> £800	Good + Very Good	This is a delicate and very fluid-sounding MC that tracks well, offers very low distortion and exceptionally good stereo separation	9-18g Low, MC	R	72
<b>Audio-Technica AT-420E</b> £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
<b>Audio-Technica AT-95E</b> £19	Average - Average	Clear, dynamic if richly balanced, the magnetic '95E is a definite Best Buy	8-14g Normal, MM	BB	48



## TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
<b>Audio-Technica OC-10</b> £307	Good + Good +	Good treble and good detail too, but some congestion and coloration reduces its informativeness.	4-12g Low/MC	R	103
<b>Audio-Technica OC-5</b> £123	Good + Good	For the price, it's unusually effortless and detailed, but it tends to become rather relentless and tiring after a while.	5-14g Low/MC	R	103
<b>Audioquest AQ 404i-L</b> £400	Very Good Good +	Slight harshness detracted from the performance of this otherwise clear-sounding and detailed cartridge	8-16g Low, MC		84
<b>Audioquest AQ 7000</b> £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
<b>Audioquest MC5</b> £220	Average Average	Offers high-output benefits but the drooping frequency response and severe VTA error preclude recommendation	10-20g Normal, MC		54
<b>Cello Chorale</b> £750	Average + Good	Now available through a new distributor at a saving of some £300, the Chorale is still blessed with a delicate but highly detailed treble. Arm matching is a problem	3-9g Low, MC		72
<b>Denon DL103</b> £99	Good Average +	An oldie but in many ways a goodie, the 103's good performance in bass and general 'life' is seriously let down by its spherical stylus which kills subtle details.	9-22g Low/MC		103
<b>Denon DL110</b> £69	Good Good	Firmly recommended as a fine all-rounder, this high-output moving coil model is likely to perform well in nearly all circumstances	6-16g Normal, MC	BB	48
<b>Denon DL160</b> £89	Average + Good	Although listeners just preferred the 110, its brother here proved a twin in lab tests and is still "thoroughly competent"	6-16g Normal, MC		43
<b>Denon DL304</b> £200	Very Good Excellent	Uncoloured, detailed, neutral, superb tracking; top notch altogether, and a top notch bargain too.	4-12g Low/MC	R	103
<b>Dynavector 17D2</b> £280	Very Good Very Good	Clear, detailed, neutral and generally very informative - excellent.	6-18g Low, MC	R	91
<b>Dynavector DV-50X</b> £99	Good Average	A high-output MC model with impressive lab performance, but whose tip and sound quality both disappointed	6-14g Normal, MC	R	48
<b>Dynavector DV10X IV</b> £125	Average Average +	Fine sounding and realistically priced, damping is recommended to ensure successful tracking ability	8-18g (damping) Normal, MC	R	48
<b>Dynavector DV23RS</b> £230	Average + Good	Sound quality was described as "shut-in", lacking energy and sparkle but with some "edginess" in high frequencies	10-22g Low, MC		28
<b>Dynavector XX-1</b> £680	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
<b>Dynavector XX-1L</b> £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
<b>Empire Benz Micro MC-Gold</b> £130	Good + Good	Nothing is obviously wrong, but nothing is stunningly right either and tracking isn't perfect. Safe, but perhaps a little too safe	7-17g Low/MC		103
<b>Empire Benz Micro MC-Silver</b> £130	Good Good	High output MC that though ultimately not the peer of the MCGold is more appropriate to the sort of equipment it's likely to be partnered with	8-18g Normal/MC	R	103
<b>Empire Benz-Micro MC-2</b> £699	Average Good +	Similar to both the Empire MC1000 and vdH MC2 in design, the Benz offers a warmer and very transparent account of the music. Its tracking prowess is slightly limited	5-12g Low, MC	R	72
<b>Glanz GMC-10EH</b> £50	Good Good	The rising HF trend of this high o/p MC may cause problems in certain systems but with a favourable wind its seductive qualities will win out	8-14g Normal, MC	R	67
<b>Glanz GMC-10LX</b> £80	Average + Average +	Bearing some of the hallmarks of the '10EH, the '10LX is still less competitive in the sonic stakes	7-15g Low, MC		67
<b>Glanz GMC-20E</b> £129	Good + Good +	Very good tracking, smooth sound and good detail. Very slight surface noise enhancement	5-10g Low, MC	R	91
<b>Glanz MFG-110EX</b> £25	Average Average	A little bright but giving detailed bass and clear treble, this was competitive at the price	6-16g Normal, MM	R	43
<b>Glanz MFG-310LX</b> £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
<b>Glanz MFG-610LX</b> £90	Good + Good +	Similar to cheaper '310 but slightly clearer transients and bass. Benefits from lowish impedance loading	3-10g Normal, MF	R	85
<b>Goldmund Clearaudio</b> £1500	Average + Very Good	Something of a mixed bag overall, its sonic character bears a strong resemblance to the Pradikat though it shares some of the hallmarks of the more expensive Accurate	5-12g Low, MC		60
<b>Goldring 1012</b> £50	Good + Good	Slightly harsh sound but plenty of life and quite good detail. Some very high frequency coloration apparent	6-12g Normal, MM	R	85
<b>Goldring 1022</b> £70	Good + Good	As with 1012, a touch harsh; detail and transient purity improved, though, and it goes well with electric guitar!	5-11g Normal, MM	R	85
<b>Goldring 1042</b> £90	Good + Good	Not terribly subtle, and not such good value alongside 1012 and 1022. Quite lively, though	7-12g Normal, MM		91
<b>Goldring Elan</b> £20	Average + Average	A lightweight and frisky-sounding MM that appears to be based upon the same body as the Nagaoka mm4	7-15g Normal, MM	R	67
<b>Goldring Elite</b> £200	Good + Good	The basics are right, and the Elite will cheerfully tackle any source material, but its sound possesses a certain dirtiness which can irritate.	8-18g Low/MC		103
<b>Goldring Epic II</b> £32	Average Average +	An excellent budget choice though the limitations of the stylus are rather obvious at higher frequencies	5-12g Normal, MM	R	67
<b>Goldring Eroica H</b> £105	Good Good -	More confused and coloured than its low-output sibling - high output less of an issue in these days of cheap MC-compatible amplifiers	8-15g Normal, MC		84
<b>Goldring Eroica LX</b> £120	Good + Good	Not the most subtle cartridge in the world, can sound edgy at times, but lively and informative	8-14g Low, MC	R	84
<b>Goldring Excel</b> £549	Average + Good	Goldring's most expensive cartridge to date errs on the warm and heavy side of neutral. Strong bass lines are its forte though its ability to resolve subtle treble details is weaker	6-13g Low, MC		72
<b>Goldring Excel GS</b> £600	Very Good Good +	The Excel has some true high end quality in its lack of annoying colorations, but tracking seems indifferent and high levels tend to sound rough and edgy.	9-20g Low/MC		103
<b>Grado ZF3E + *</b> £47.50	Average - Average	Downtilting balance disguises the brightness of this cartridge; bit of a mixed bag at this price	9-20g (damping) Normal, MM		54
<b>Grado ZTE +1</b> £26.50	Average - Average	Bass and treble are a trifle coloured but the midband proved highly enjoyable. Ideal for budget systems	6-13g (damping) Normal, MM	R	54
<b>Kiseki Blackheart</b> £1795	Good Good	This cartridge demonstrated refined poise and a delicate but at once potent security, however, the price did seem a little on the high side compared to other Kisekis	6-16g Low, MC		60
<b>Kiseki Blue Goldspot</b> £450	Very Good Good +	Good bass and imaging, but hints of spit and coloration let the side down slightly	8-15g Low, MC		84
<b>Kiseki Lapis Lazuli</b> £4000	Good Very Good	Combining very sensible design concepts at a silly price, the Lapis Lazuli is best thought of as combining the detail of the MC3000 and the fluidity of the Clearaudios	4-12g Low, MC		60



## TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
<b>Kiseki Purpleheart Sapphire</b> £799	Good + Good +	Rare, beautiful to look at and sweet to listen to, our review of this high-flyer conjured up images of Japanese art	5-14g Low, MC		48
<b>Koetsu Black S</b> £612	Average Good +	The S is an OEM design built to Koetsu's blueprint. It features a sturdier fixing plate and offers a brighter, faster and more tactile sound than the earlier K	8-15g Low, MC	R	72
<b>Linn Asaka</b> £373	Good + Good +	Disciples of Linn who are trying to realise their true "Karma" may find that saving money is not a short cut to heaven	9-18g Low, MC	R	Coll. '86
<b>Linn K5</b> £39	Average Average +	Not as crisply focused as the costlier Linn magnetics, the K5 offers a smoother presentation	7-16g Normal, MM	R	67
<b>Linn K9</b> £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
<b>Linn Karma</b> £564	Very Good Very Good	A specialist which is strongly recommended for Linn-based systems; results may be less predictable in more general application	9-18g Low, MC	R	Coll. '86
<b>Linn Troika</b> £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
<b>London Maroon</b> £149	Average Average +	Now manufactured under the London brandname this Decca cartridge is as iconoclastic as ever	9-20g (damping) Normal, MM		67
<b>London Super Gold</b> £300	Poor Average -	Immediate and (in the midrange at least) detailed, but very coloured, very nonlinear and questionable effect on records. Devotees swear by it	9-15g (damping) Normal, fixed stylus MM		84
<b>Militek Aurora</b> £249	Good + Good +	An overall feeling of relaxed ease characterised this clear and atmospheric Kiseki-built cartridge	8-16g Normal, MC	R	Coll. '86
<b>Militek Olympia</b> £349	Average + Good +	Warm and detailed sound - packs the punch of the best MCs with high output as a bonus	12-20g (damping) Normal, MC	R	54
<b>Nagaoka MM4</b> £9	Average - Average -	Clear punchy sound that delivers the rudiments of a good performance	6-16g Normal, MM	R	54
<b>Nagaoka MP10</b> £18	Average Average	High frequencies sounded "shut-in" with this spherical-stylus model, but mid and mass were energetic, bouncy and punchy	5-13g Normal, MM	R	48
<b>Nagaoka MP11 Boron</b> £40	Average Average +	Responding well overall in PM's equipment and listening room, this model was mildly criticised for low level and dynamic limitations	5-13g Normal, MM	BB	48
<b>Nagaoka MP11 Gold</b> £47	Average - Average +	There were mild criticisms directed at most areas, but in general the sound was clear, open and even	3-8g Normal, MM	R	48
<b>Ortofon 510</b> £30	Good Good +	For the price, a good blend of virtues - weight, clarity and neutrality.	3-11g Normal, MM	BB	85
<b>Ortofon 520</b> £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
<b>Ortofon 530</b> £80	Good + Good +	Very clean and assured sound; transients not quite perfectly pure but plenty of detail.	4-11g Normal, MM	R	85
<b>Ortofon 540</b> £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
<b>Ortofon MC10 Super</b> £70	Average Good	"What a delightfully sweet-sounding cartridge this is ..." we said	5-15g Low, MC	BB	48
<b>Ortofon MC15 Super</b> £100	Good + Very Good	A good all-rounder, with outstanding performance in detail retrieval, even if it can be very slightly bright and close-up at times.	10-24g Low/MC	BB	103
<b>Ortofon MC20 Super</b> £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
<b>Ortofon MC3 Turbo</b> £100	Average + Good	Not terribly subtle, but it obviously doesn't aim at that. The 3 Turbo is bright, cheerful and bouncy - take it as it comes!	10-24g Normal/MC	R	103
<b>Ortofon MC30 Super</b> £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
<b>Ortofon MC3000 MkII</b> £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
<b>Ortofon MC5000</b> £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
<b>Ortofon Quartz</b> £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
<b>Ortofon Quasar</b> £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
<b>Ortofon Quattro</b> £200	Good + Good +	Undoubtedly a competent performer, the Quattro however seems a less obvious choice than the other Qs. Generally neutral, but can be edgy and bright in loud passages.	6-18g Low/MC		103
<b>RATA RP20</b> £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
<b>RATA RP40</b> £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
<b>RATA RP70</b> £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
<b>Rega Bias</b> £34	Average Average +	Difficult to mount in some arms due to its shallow build, the bias offers a gentle, refined SQ that certainly makes it worthy of audition	4-10g Normal, MM		67
<b>Rega Elys</b> £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
<b>Revolver</b> £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
<b>Roksan Corus Black</b> £110	Good + Good	Recognisably related to Corus Blue, but distinctly more civilised and smoother.	7-12g Normal, MM	R	91
<b>Roksan Corus Blue</b> £65	Good + Good	Roksan-specified modified Goldring 1012; slight harshness detracts from otherwise good sound.	7-11g Normal, MM		91
<b>Shure M104E</b> £36	Average - Average	Capable in many ways, but giving no substantial improvement over the 92E in our view	5-15g Normal, MM		38
<b>Shure M105E</b> £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
<b>Shure M110HE</b> £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
<b>Shure M111HE</b> £72	Average Average	Early reviews of this cartridge complained principally of the price - which has since come down	5-10g Normal, MM		38 Summ



## TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
<b>Shure M92E</b> £17	Average - Average	Though lacking depth, the overall sound quality was competent, but treble was not its forte	10-15g Normal, MM		43
<b>Shure M99E</b> £29	Average - Average -	Sister to the 92E this is a solid but not particularly exciting cartridge	5-10g Normal, MM		38 Summ
<b>Shure ME75ED</b> £26.50	Average Average -	Rather bright and splashy in the high frequencies but nevertheless a competent model	5-10g Normal, MM		38
<b>Shure ME97HE</b> £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
<b>Shure ML120HE</b> £95	Average + Average +	Quite decent sound quality and a generally fine balanced performance	6-18g Normal, MM		48
<b>Shure ML140HE</b> £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
<b>Shure Ultra 500</b> £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
<b>Shure V15 VMR</b> £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
<b>Shure VST V</b> £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
<b>van den Hul MC One</b> £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
<b>van den Hul MC Two</b> £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
<b>van den Hul MC1 Super</b> £799	Very Good Very Good	Slight softening effect on transients was the only real flaw, but it didn't quite seem to have that special touch one expects for the money	8-15g Low, MC		84
<b>van den Hul MC10</b> £599	Good Good +	A neutral balanced performer giving transparent midrange, fine depth and focus with firm extended bass. Gosh!	5-10g Low, MC	R	60
<b>van den Hul MM1</b> £200	Good + Very Good	If its wooden-sounding midrange coloration could be tamed, the excellent imaging and admirable all-round security of the MM1 would make it an excellent performer.	7-15g Low/MC	R	103

## TURNTABLES

The schizophrenic split between consumer electronics and 'real hi-fi' is most obvious amongst turntables. The former are supplied simply as a means of playing vinyl in a system context. Cheaply manufactured in the Far East, these are complete 'record players' with a variety of automatic facilities, sometimes tied into a system remote control. But engineering compromises usually severely limit sound quality, cartridge choice may be P-mount restricted, and nowadays such machines are rarely stocked by specialist hi-fi dealers

Specialist turntables offer big sound quality improvements, but lack so-called convenience features (that practised users often find irksome). Such turntables at the cheaper end of the market (sub-£350) tend to be supplied with matching tonearm, and often include a 'starter' cartridge.

Still better quality is found at higher prices amongst the separate motor units and tonearms. Careful partnering and set-up is essential for these components, but 'naturally sympathetic' combinations exist, and a good dealer can help. Listed separately as integrated players and

as motor units and tonearms, our sound quality rating is based on results achieved using a high quality system – but in point of fact the deck is usually the limiting factor soundwise in any system.

Lab performance rating summarises the speed stability, vibration generation and environmental isolation of turntables, along with the friction, alignment and adjustment of tonearms. The tonearm's physical characteristics also define a range of compatible cartridges

## TURNTABLES - INTEGRATED

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	ISSUE
<b>Acoustic Research EB-101</b> £230	Good Good	This genuine high fidelity product offers an impressive package at a competitive price	Subchassis, manual, 13.5g	BB	48
<b>Alphason Sonata/HR-100S</b> MCS/Atlas £835/£550/£400	Very Good Very Good	Good sound in all areas - bass, clarity and neutrality all in the top class and bettered by very few decks. Atlas PSU expensive but worthwhile	Belt drive, suspended, optional PSU, 13g	R	79
<b>Ariston Pro</b> £160	Good Good	Remarkably clear and detailed for the price, very neutral. Benefits from cartridge upgrade	Manual, belt drive, 12g, cart.	BB	91
<b>Ariston Pro Maxim/RB250</b> £210	Average Fair	Warm, full sound with a deep bass and solidity is partly offset by lack of fine detail in mid and top. On a suitable surface, with a crisp sounding cartridge, it easily qualifies for shortlisting	Solid plinth, belt drive, manual, 11.5g		103
<b>Ariston Q-Deck</b> £180	Good Average +	Well engineered and good sounding low cost package which is both easy to set up and to use	Semi-auto, belt drive, solid, inc. cart	BB	67
<b>Dual CS-505-4</b> £170	Average Average	Easy to set up and to use, this is a consistent sounding and well isolated turntable with a long pedigree. It is slightly lacking in balls, but compensates with a consistently unmuddled presentation and good stereo focus perspectives.	Auto-armlift, interlocked cueing, 2 speed, pitch control	R	103
<b>Dual CS-750</b> £300	Average- Average-	Attractive but lazy performance from a deck with many good ideas and which is a pleasure to use. Cartridge is past it's sell by date. Has 78rpm facility	Solid plinth, belt drive, cart. 3-speed, quartz referenced, auto lift		103
<b>Dual CS430</b> £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
<b>Dual CS5000</b> £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
<b>Dual CS-503-2</b> £145	Good - Average	Not wholly inspiring; generally coarse and woolly sound is at least not offensive, but easily bettered by the CS505-4. Good value in material terms	Semi auto, belt drive, 10g	R	91
<b>Goldmund ST4</b> £4589	Very Good Excellent	The Studio turntable takes on a cheaper tonearm than the T3F, yet provides a similar reference standard performance at £2,000 less, in a neatly integrated though bulky package	Solid subchassis, direct drive, parallel arm, detachable h/shell	R	60
<b>Goldingr Excelda 1</b> £160	Poor Poor	Untidy, resonant sound, narrow effective dynamic range and lack of tracking security. The cartridge (the only authentic Goldring part) is quite nice	Manual integrated arm, synchronous motor, auto-start/stop		103
<b>Heybrook TT2 turntable &amp; arm</b> £469/£269	Good + Good	A gradual process of informed evolution and a sensibly designed arm combine to make this a good sounding middle of the road package. Well supported by dealers	Manual subchassis motor with arm, R belt drive, 14g		67
<b>JVC AL-FQ555</b> £170	Average - Poor	Clear midband sound but woolly bass and crude treble. Ease of use however ranks highly, and there's little to go out of adjustment	Auto, direct drive, 5.5g		67



## TURNTABLES - INTEGRATED

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	ISSUE
<b>Kuzma Stabi/Stogi Reference</b> £995/£899	Very Good Very Good	Beautifully made in a solid oak plinth, the Stabi also sounds very clear, detailed and extended. Stogi Reference is also most capable.	Manual, belt drive, subchassis.12g R		91
<b>Linn Axis/Akito</b> £443	Good - Average +	A neat, attractive and well-made package which delivers a rather harsh sound with a 'one-note' effect in the bass, but it's well suited to mid market systems	Belt drive, semi-suspended, electronic PSU, 10g		79
<b>Linn Basik</b> £250	Good Average+	Strong midband analysis and imagery, clean if sharp treble is matched to a good if occasionally weak bass. Good at the price, and requires no complex setting up or fine tuning in service	Solid plinth, inc cartridge, manual speed change	R	103
<b>Linn LP12 Basik/Akito</b> £599/£137	Very Good Good	Familiar Linn virtues and vices - plenty of the former though and few of the latter. Trails the full LP12 significantly, but pace, rhythm, timing etc. still in top class, and bass tauter than of old	Suspended subchassis, belt drive, single speed, 45rpm adaptor	R	103
<b>Linn LP12-Lingo/Ekos/Troika</b> £1168/£1097/£798	Good + Good +	The classic reference is improved (at a price) by the Lingo but character remains the same - not as detailed or neutral as the best. Ekos arm, though pricey, is well made and suited to many decks	Manual, subchassis, belt drive, 9g R		91
<b>Manticore Mantra/Musician</b> £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
<b>Marantz TT400</b> £160	Average - Poor	Everything one hopes a budget deck won't be: coarse, confused, muddled and woolly. Construction isn't wonderful, either	Manual, belt drive16g		91
<b>NAD 5120</b> £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 armtube/weight, 9g	BB	67
<b>Opus 3 Continuo/Decca London International (Revise)</b> £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
<b>Rational Audio Aura 01</b> £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 arm10g	R	91
<b>Rega Planar 2</b> £185	Average + Good	A remarkable product at the price, surprisingly articulate and confident	Manual, 11.5g	BB	48
<b>Rega Planar 3</b> £250	Good Good	A long time leader in its price category, the '3 (with its excellent RB300 arm) sounded nicely 'musical' in a balanced and coherent manner	Manual, 11.5g	BB	48
<b>Revolver Rebel</b> £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
<b>Revox B291 *</b> £892	Average - Average -	Sound quality ranks as below average. Subjective bandwidth is narrow and the music lacks grace and energy. Ease of use however is unrivalled	Automatic, remote controllable, direct drive parallel arm, cart		55
<b>Roksan Radius/Tabriz zi</b> £635	Good Good	Truly modern turntable in appearance. The design is subtle, refined and easy on the eye. Musically it offers exceptional performance with a minimum of setting up and operational fuss	Semi-suspended, belt drive, mains plug PSU.	R	103
<b>Roksan Xerxes 33/Tabriz zi</b> £550/£255	Good Good	Good but not exceptional sound quality from expensive package. At its optimum with a relatively inexpensive arm/cartridge unless upgrade to full Xerxes is contemplated. XPSII PSU adds 45rpm and much to sound quality	Semi-suspended, belt drive, 33rpm only, mains plug PSU, one piece arm tube, 'intelligent' counterweight		103
<b>Roksan Xerxes/Artemiz /Artaxerxes</b> £785/£655/£559	Excellent Excellent	Superb though costly record playing hardware, highly integrated and synergistic in nature, but suitable for use with any good MC cartridge. Will not suit all tastes, however	Semi-suspended, belt drive, quartz locked 2 speed PSU	R	103
<b>Rotel RP-855</b> £200	Good Good	Great sound for the money - detailed and clear with good bass and no irritating nasties	Belt drive, solid, speed adjust, 9g	BB	79
<b>Systemdek 1/900</b> £188	Poor Average-	The motor unit is derivative of the Rega Planar 2, but sounds inferior by virtue of insufficient structural integrity. Pitch stability is also far from acceptable	Solid plinth, manual speed change, no cartridge		103
<b>Technics SL-DD33</b> £120	Average Average	As with the QD33 though better value	Automatic, direct drive, solid plinth, 7.5g, P-mount	BB	48
<b>Technics SL-L20</b> £120	Poor Average -	A rather lightweight parallel tracker achieving a poor overall rating, with little to recommend it unless you dig facilities	Electronic, solid plinth, 5g, P-mount		48
<b>Technics SL-QD33</b> £150	Average Average	The quartz speed controlled version of the DD is short on sound quality but not features. But it did have fair focus and some depth	Automatic, Quartz, direct drive, solid plinth, 7.5g, P-mount	R	48
<b>Technics SLBD-22</b> £100	Average - Average -	Not bad for the price and a great improvement on the L20, it performs reasonably when not stretched	Semi automatic, solid plinth, electronic, 6g P-mount	R	48
<b>Thorens TD 166 Mk V</b> £240	Good Good	Classic suspended-subchassis deck with clear, stable sound of no particular character. Unlikely to make enemies	Belt drive, suspended, 12g	BB.	79
<b>Thorens TD 280 Mk II</b> £190	Good - Good -	Legendary Thorens build quality on the cheap - slightly unsubtle sound but eminently liveable-with and very good value	Belt drive, solid, electronic PSU, 12g	BB	79
<b>Thorens TD 316 Mk II</b> £250	Good Good -	Very solid deck with neat split-chassis construction. Sound is a bit insecure in the bass, but it could suit classical music lovers well	Belt drive, suspended, electronic PSU, 12g	R	79
<b>Thorens TD-3001/TP90SF</b> £850	Very Good Good	Excellent middle ranking esoterica, with strong all round abilities rather than excellence in particular areas. Engineering content is particularly high	Suspended subchassis, belt drive, available w/o arm	R	103
<b>Thorens TD166 VI/UK/RB250</b> £270	Good Average-	Refined and articulate sound with well focused imagery, suitable for use with good MM and budget MC cartridges. The Rega arm is the best at its price, a good purist deck	Manual, belt drive, suspended, 11.5g	BB	103
<b>Thorens TD2001</b> £650	Good Good -	Similar to TD320 but much dearer - why? Sound is comfortable but not very detailed	Semi-auto, belt drive, subchassis 15g		91
<b>Thorens TD280 II/UK</b> £189	Average Average	Excellent value for money from a built to last player which is also easy to use. Will benefit from a cartridge upgrade in due course, but has an energetic and detailed sound	Solid plinth 2-speed player, inc cartridge	BB	103
<b>Thorens TD320 Mk II</b> £400	Good Good	Good, consistent sounding deck with much improved (but not ideal) arm. A little expensive for performance offered	Semi-auto two speed belt drive, 14g		67
<b>Townshend Rock Reference/Excalibur</b> £2295/£745	Excellent Excellent	Overall the closest reproduction to master tape we've yet heard, with stunning real bass and excellent neutrality. Front end damping trough improves LF detail significantly	Belt drive, suspended, electronic PSU, front-end damping, 12g	R	79
<b>Voyd Reference/Helius Cyalene</b> £5414/£1350	n/a Excellent	Voyd's flagship is equipped with three of the biggest motors in the business, a Lexan platter and a real brute of a power supply (it dwarfs most power amps!). A strong contender for best turntable in the known universe	Belt drive, 3 motors, subchassis, outboard PSU,12/14g	R	Coll. '90
<b>Well Tempered WTAT</b> £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
<b>Zarathustra S4/Pluto 5A</b> 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
<b>CEC ST930</b> £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
<b>CS Audio Resan kit for Rega</b> £90	Good - Good	After-market kit to convert Rega 2 or 3 to semi-suspended subchassis style. Looks good and sounds tidier than original. Feedback is much reduced	Conversion kit, all work reversible	R	79



# The Directory

## MOTOR UNITS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Micell Gyrodec</b> £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
<b>Micell Syncro</b> £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
<b>NVA Senior</b> £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
<b>Oracle Paris</b> £695	Good - Average	Looks good but sounds coarse, confused and uneven, with bass liable to thump	Belt drive, semi-suspended, electronic		91
<b>Origin Live Oasis A</b> £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
<b>Origin Live Oasis B</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
<b>Oxford Acoustics Crystal Reference</b> £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
<b>Pink Triangle Anniversary</b> £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
<b>Pink Triangle Export</b> £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
<b>Pink Triangle Little Pink Thing</b> £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
<b>Revolver</b> £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
<b>Systemdek IIX/900</b> £200	Good Good	The Systemdek IIX is a high performance, low cost turntable which is particularly strong in the areas of fine detail resolution and imagery. Tested with Rega RB250	Suspended subchassis, metal armboard, glass platter, 2 speed	BB	103
<b>Systemdek IIXE/900AP</b> £358	Good Good+	A development of the IIXE/900, with a comparably detailed sound reinforced by better frequency extremes, timing etc. Needs careful setting up.	Suspended subchassis, metal armboard, acrylic platter, PSU	R	103
<b>Systemdek IV</b> £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
<b>Voyd 0.5</b> £3062	n/a Excellent	Based on the standard 3-motor Voyd but with upgrade options (better bearing, platter, etc) which take it half way to a Voyd Reference. Superb build and finish; colourful, dramatic performance	Belt drive, 3 motors, subchassis, outboard PSU	R	72
<b>Voyd Valdi</b> £868	Good - Very Good	Recent power supply upgrade has resulted in alround improvements. This Perspex plattered, two motor deck is remarkably competent, revealing and neutral	Belt drive, suspended subchassis, electronic PSU		79
<b>VPI HW-19Mk3</b> £1600	Very Good Very Good	Built to accommodate parallel tracking arms, this large but elegant deck produced clean, smooth sound when fitted with an SME arm. Good bass	Belt drive, suspended subchassis	R	79

## TO NEARMS

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFF, MAS	VALUE	ISSUE
<b>Airtangent 1B</b> £1990	n/a Excellent	A complex but superbly built arm for high quality systems, giving excellent stereo and resolution	7.5g (vertical)	R	60
<b>Alphason Delta</b> £230	Good Average +	A highly competent design from Alphason gives good sound quality but with slight blurring and treble fizz	16g	R	48
<b>Alphason HR100S</b> £490	Very Good Very Good	This S-shaped arm sounds smooth, but nevertheless reproduces transients with fine attack	10g	R	Coll. '86
<b>Alphason Xenon</b> £286	Good Good +	A trimmed down HR100S, the Xenon has inferior bearings and a simpler finish, but sounds crisp and coherent. Fits any Linn cutout	12.75g	R	55
<b>Audio-Technica AT-1130</b> £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
<b>Decca London International</b> £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
<b>Eminent Technology</b> £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
<b>Goldmund T3F arm</b> £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
<b>Kuzma Stogi Reference</b> £899	Very Good Very Good	A large, solid and well-made arm that holds the cartridge firmly, giving exceptionally clear sound with just a hint of brightness	12g	R	79
<b>Linn Ekos</b> £1097	Very Good Very Good	Superb, state of the art design which builds significantly on Ittok's strengths	9g	R	67
<b>Moth Arm</b> £95	Good Good +	The ultimate budget arm? Refined, detailed, sweet and natural - performance improves in line with the rest of the system	12g	BB	60
<b>Naim Aro</b> £752	Good Good -	Designed for use on the Linn LP12 turntable and Troika cartridge, the Aro is a little bright and congested.	10.5g		91
<b>Rega RB300</b> £139	Very Good Very Good	Despite its modest price this sets exceptional performance standards and could be used on a number of high-quality turntables	10-11g	BB	60
<b>Roksan Artemiz</b> £655	Average Good	Interesting design which works a treat on the Xerxes deck. Fits Rega cut-out.	8g		67
<b>Roksan Tabriz</b> £165	Good Good +	Though obviously targeted at Roksan's own Xerxes, it is also a good alternative to the Rega arms in many applications. A trifle bright.	9g	R	91
<b>SME 3009 Series III</b> £253	Good Average +	Comprehensively adjustable and very well made, suited to MM and high compliance MC cartridges	5g		48
<b>SME 3009 Series IIIS</b> £182	Good Average +	A simplified less flexible (as regards adjustment) Series III with a similarly 'soft' sonic character	5g		48
<b>SME 3009R</b> £335	Average + Average +	A higher mass version of the Series III designed for low compliance MC cartridges	12g		48
<b>SME 309</b> £568	Very Good Very Good	Beautifully made, finished and presented, this arm is fully and easily adjustable and a highly neutral performer	10g	R	79
<b>SME Series IV</b> £828	Excellent Very Good	Superb engineering and finish with a finely balanced sound giving impressive stereo focus and low coloration	10.5g	R	60
<b>SME Series V</b> £1232	Excellent Very Good	Excellent in terms of design engineering and sound quality, this arm arguably sets a new reference standard regardless of price	10.5g	R	60



# Personal Messages

It was a bit of a busman's holiday really. To one who spends most of his working life trying to get to grips with a never ending stream of loudspeakers, visiting a television factory represents a similar set of challenges, albeit in a different frame of reference.

So it's in with the earplugs, out with the eyeballs for a quick polish, and a chance to get down to some serious watching, just for a change.

This being 1992, I took the car and ferry and met up with the plane/bus party in the delightful medieval city of Bruges, then spent the next couple of days appreciating Philips' wisdom in locating its 'European competence centre for high-end televisions' so close to so many excellent restaurants, even though, as events unfolded, the timing proved less well chosen.

*Paul Messenger visits Philips in Bruges in search of high-end television but finds flicker free perfection temporarily snookered.*

The factory tour itself provoked the usual glazed expressions, as we watched machines doing things to each other while the odd worker cycled past our footsore group. The real reason for the visit, however, was to be briefed on and sample the next generation of Philips television display technology.

Not that the last generation is exactly long in the tooth. It missed our A/V supplement last Autumn, and I eventually borrowed one in October, and never did get around to writing about it before hearing of these extra new tweaks.

In fact I was rather impressed by that particular *Matchline* set, which incorporated 100Hz 'flicker-free' scanning at very little extra cost over the normal 50Hz competition. I'm a confirmed flicker free fan, and the set had the usual superb Philips colour balance, and pretty good on-set sound for a TV too. Mild disappointments were the lack of advanced PAL colour filtering and rather limited resolution, the simple two-way sharpness control looking softish and softer to my eyes.

## Frames at last

Although 100Hz scanning very effectively removes what's known as large area flicker, it does have the unfortunate side effect of slightly exaggerating something known as line flicker. This is most intrusive on horizontal lines with stable and still pictures, and is the flaw that the new 'Digital Scan' enhancements are designed to combat.

This is a much more difficult task than simply doubling the scanning rate to remove flicker, but to explain why requires a bit of background information. The standard, conventional analogue colour TV picture is composed of a succession of 'frames' of something close to 600 lines, traced out by a flying spot. To provide the illusion of movement, each frame is changed ('refreshed') 25 times a second, a rate which would cause quite objectionable flicker if

scanned sequentially top to bottom.

To get round this, a technique called 'interlace scan' is used. Each frame is organised into two interlaced 'fields' known as A and B (odd and even) each containing every other line of the picture information (about 300 each). The flying spot first traces A and then B, giving a field change rate of 50 times a second (50Hz). While it's true that 50Hz flicker is perfectly tolerable (we've all lived with it for years), there's no doubt in my mind or perception that double speed 100Hz 'flicker free' scan creates a significantly more solid image, especially with large screen sets.

Simple 100Hz flicker free scanning involves storing each incoming picture field in a large (digital) memory and then spitting it out again at twice the normal speed, so that the interlace line structure remains as before but is refreshed at twice the usual rate. (A1/B1/A2/B2 etc becomes A1/A1/B1/B1/A2/A2/B2/B2 etc).

Large area flicker is most irritating during the Open Golf championship, whereas line flicker problems peak during Wimbledon, where horizontal court markings show an irritating tendency to vibrate up and down, simply because they are being displayed alternately by field A and then field B, which are displaced by one vertical picture line from each other. One solution involves alternating the A and B fields in the double speed scan, using an A1/B1/A1/B1/A2/B2/A2/B2 sequence.

This works beautifully on still pictures, such as test card and Photo CD sources, but runs into difficulties with movement. A1/B1 is fine, but then repeating A1 again represents a step back in time that creates 'judder' in a moving image.

Philips' nifty Digital Scan solution lies in using comparator algorithm averaging for the information that is displayed out of sequence, the order becoming A1/B1'/A1'/B1'/etc, eliminating the line flicker without compromising movement. The demonstrations all seemed to be going swimmingly enough, but Philips' timing contained one flaw. It coincided with the BBC's hours of live coverage of the Embassy World Snooker championships, which also coincidentally is relayed to the Belgian cable network.

Snooker is the perfect make-or-break test for a TV display, being effectively a test card with added movement (and some pretty vicious colour and geometry contrasts too). And it was the sight of the white ball juddering perceptibly as Alain Robidoux played delicately across the table that makes me wonder whether Philips hadn't better check its algorithms again.

The observation doesn't negate Digital Scan, which in many respects looks very impressive — for all I know the effect might have been due to something nasty in the Belgian cable network. But it does throw up a question mark which needs to be answered, hopefully with the help of an S-VHS recording of the live final that I am saving until I get to try a production sample of the new *Matchline DS* sets. And I can't help relishing the delicious irony that snooker — which did so much to increase the popularity of colour over monochrome TVs — remains just about the most difficult test of picture quality around.



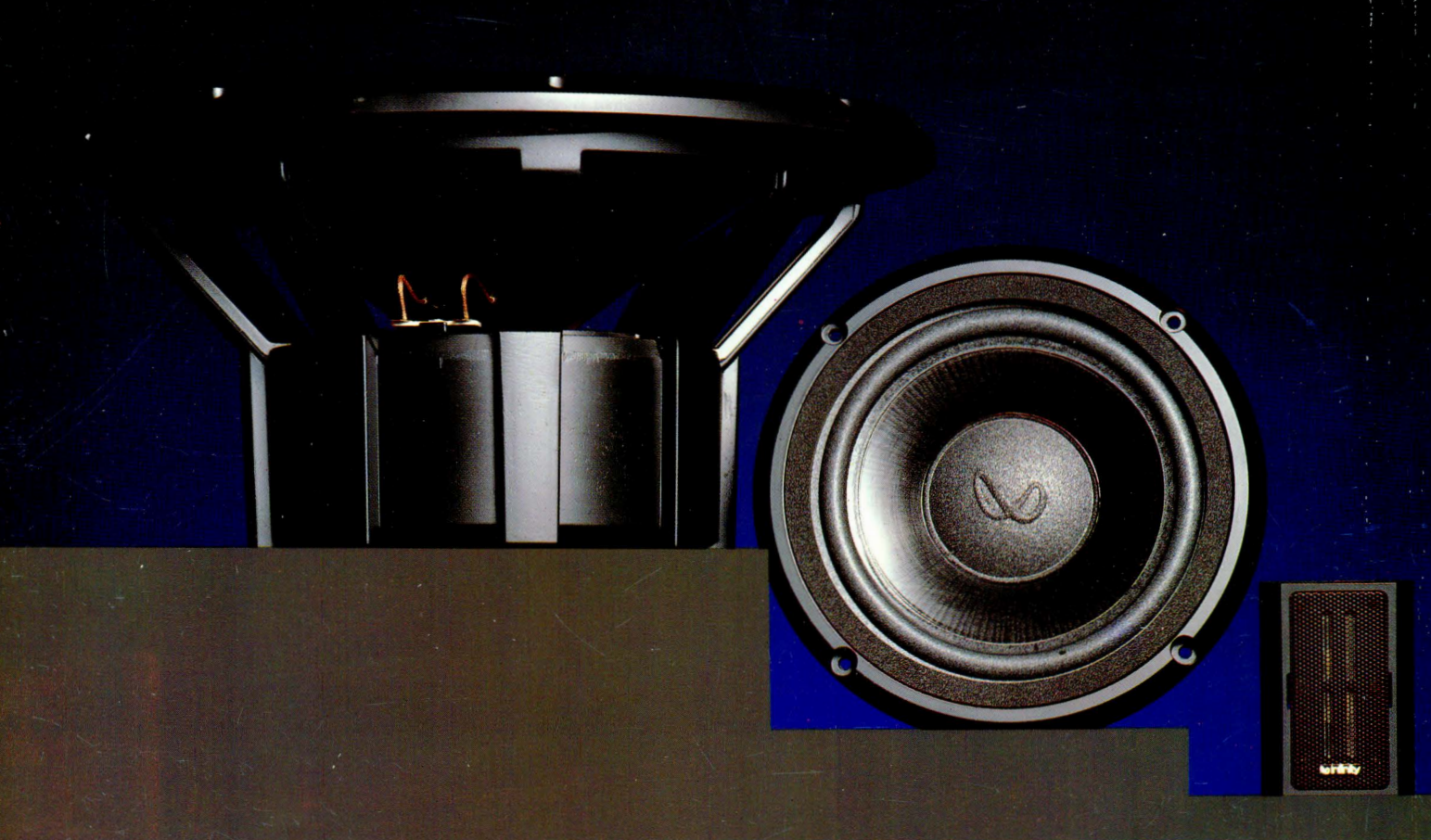
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