

# HI-FI CHOICE

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

OCTOBER 1992 £2.95 US \$5.95

# 20

## Cassette decks on test

## In-depth reviews on 12 of the latest headphones

MUSICAL FIDELITY A1 INTEGRATED CLASS A AMPLIFIER  
*10th Anniversary* *Anthony Mical*

ON OFF

VOLUME

PHONO CD TUNER AUX

MUSICAL FIDELITY B2 INTEGRATED AMPLIFIER

HEADPHONES

VOLUME

OUTPUT TO TAPE 2

PHONO  
CD  
TUNER  
CDV  
TAPE 1  
TAPE 2

SOURCE

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Hi-Fi NEWS MAY 1989

*"This smooth and civilised slimline floorstanding loudspeaker is well built and nicely presented."*

Hi-Fi CHOICE MARCH 1989



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

# HI-FI CHOICE

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# Menu

**L**aserdisc is a rather difficult subject to write about. The reason is that just about everyone who works in the hi-fi industry loves it, but the general public don't seem to want to buy it. Go to any hi-fi show and most A/V demonstrations will be running from a Laserdisc player. Go round to reviewer's houses and you'll see an LD player hooked up to the hi-fi. On press trips to America journalists are to be found filling their suitcases with NTSC software, often picking up dozens of discs on a single trip.

All of which makes writing about the Laserdisc something of a problem. After all, I, and indeed most reviewers, have got access to American software and have built up quite a collection of discs over the last five years or so. It's very easy to get carried away and start raving about Laserdisc based on our own experiences, forgetting that as far as the general public is concerned there is very little software available. There have been so many false starts and promises made by the various manufacturers that many people have written it off entirely.

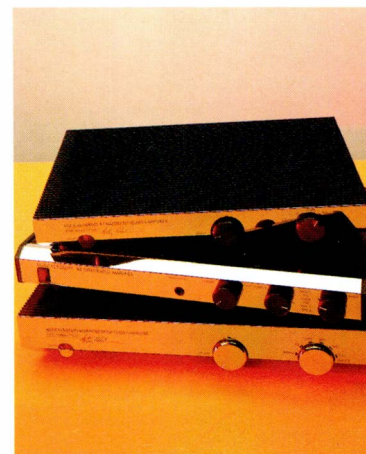
This year's Penta show will see yet another push for the format, with both Sony and Philips joining Pioneer in the dual standard market and around 80 or so movie titles promised for Christmas. But is it really going to be any different this time around or is it all just a smokescreen aimed at making you buy a machine for which there will be no software?

The answer to that question is that we'll have to wait and see just how many of the films that are promised make it onto the market, and in what sort of quantities. Talk to a specialist Laserdisc dealer and he'll tell you that there are hundreds of PAL discs already available, but try and find them in any sort of quantity and you are likely to be disappointed. The key is to get them selling alongside the massed video racks in places such as the Virgin Megastore, Our Price and HMV.

If this happens then people may begin to take Laserdisc seriously. After all the format has a lot going for it. The picture quality is far superior to VHS video and the sound quality leaves tape standing. And of course you can play conventional CDs on LD players.

While I welcome the efforts being made to re-launch the format this autumn, there is still a feeling of déjà vu at the back of my mind. Perhaps this will be the start of a Laserdisc renaissance which will see the product attain the sort of market share it has grabbed in America and Japan. At least this time we are likely to see some major films released. From my point of view I'll remain a committed Laserdisc user. But whether or not the format takes off depends on the reaction of the general public, as well as the film companies, in being willing to support what is still, 20 years after the first demonstrations, a new format.

*Andy Benham*



*Cover photograph by  
Chris Richardson.*

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## Laserdisc market bursts into action (again)

The Penta show looks like producing a flood of activity in the Laserdisc market with the announcement of both software and hardware intended to get the format established in time for Christmas.

Sony and Philips have both decided to introduce dual standard Laserdisc players which will play both the recently introduced PAL titles and imported NTSC titles from America and Japan, thus giving Pioneer's new dual standard CLD-1750 player a run for its money. The £600 Sony MDP-650 will be launched in October and promises variable speed playback, cue review and freeze frame as well as an optical, digital output for connection to an outboard DAC.

The £700 Philips machine features variable speed play and search functions and uses a Philips SAA7321 Bitstream DAC for digital to analogue conversion. Rather unusually, Philips has decided to make the machine available through third party distributor Active Laser Distribution (081 292 1116) rather than

directly from Philips itself, and machines should be in the shops from October.

On the software front Pioneer is following up its recent releases with a new bunch scheduled for September including *Air America*, *Field Of Dreams* and *Narrow Margin*. A new player entering the software market is Columbia Tristar Home Video, which will launch *Silence of the Lambs*, *The*

*Adams Family*, *Flatliners*, and *Bill & Ted's Bogus Journey* all priced at £24.99, plus *The Fisher King*, split over two discs at £34.99. The company has unveiled an impressive release schedule for the rest of the year with titles such as *Platoon*, the original wide screen, uncut version of *Lawrence of Arabia* and the special edition of *Close Encounters* all due out before Christmas.



LD titles coming soon to your friendly local video emporium.

## Marantz tests the DCC waters

Marantz has announced the 'imminent availability' of its first DCC recorders. Due to reach the shelves by early October, the £600 DD-82 is a black version of the top of the range £650 DD-92.

A full width, full feature DCC deck, the DD-82 has an 18-bit A/D convertor for recording from analogue sources, and a DAC 7 Bit Stream D/A convertor for the analogue output. TOSLINK optical and phono electrical inputs and outputs are provided alongside the usual analogue sockets.

The DD-92 is effectively an SE version of the DD-82 with a copper plated chassis and chunky cast alloy side panels that improve appearance and increase the mass by 4kg.

On the CD player front Marantz has re-introduced the

CD-42 and CD-52 in Mark II form. These have in effect received the SE treatment, but it's been carried out at the factory in Japan instead of over here to reduce the cost. The CD-42II costs £170 and the CD-52II costs £200. However, Marantz hasn't abandoned the SE concept, and has applied it to the £500 CD-72SE, which has a copper plated chassis, OFC mains lead and custom-

ised components.

Marantz is also branching out into loudspeakers with a pair of new two-ways. The compact £200 DS-110 model features a titanium dome tweeter and 135mm paper coned woofer. The larger £300 DS-220 harbours a 180mm woofer. Both are ported, feature bevelled cabinet edges, and have the tweeter at the bottom of the baffle.



Marantz' first digital compact cassette deck, the DD82.

## Wide and deep

Canon Audio has launched a new loudspeaker to sit alongside and upmarket of its unusual S-50 wide imaging design. The £600 S-70 is basically an S-50 attached to a cylindrical stand that incorporates an additional bass driver, the whole thing standing 780mm high (around two and a half feet). Now relieved of its bass responsibilities, the driver in the dome is similar to the S-50's full range unit and remains unusual (in hi-fi applications) in combining mid and treble duties from the same voice coil.

The S-70's rocket-like base section contains a 170mm bass unit in an efficient coupled cavity to increase extension and level, and is claimed to go down to 55Hz (-3dB). The enclosure is made out of plastics reinforced with steel rods and has the facility for spiking into the floor.

The S-70 is designed to have the same wide imaging properties as its brother, enhancing the size of the stereo sweetspot by means of the acoustic mirror sitting below the mid/high frequency driver to give a wide 100 degree horizontal dispersion.

## Denon gets remote

Denon has launched two new high feature integrated amplifiers which incorporate full remote control.

Both the £200 PMA-480R, and the £300 PMA-880R include the Denon IS remote control which can also operate certain Denon CD players, cassette decks and tuners.

Both models have six inputs and use polystyrene caps, the 75W PMA-880R featuring metal resistors in critical areas and incorporating Denon's Optical Class A circuit. The cheaper PMA-480R delivers 50W into 8ohms.

Denon has also dropped the price of two of its CD players. The DCD 890 has come down £20 to £250 and the DCD 1290 has dropped by £30 to £300.

# Ensemble brings you the Swiss Tango

Ensemble AG of Switzerland has produced a range of new electronics and another loudspeaker to complement its established *PA-1* and *Reference* mini monitors. The company will be holding its own show at the Edwardian Hotel, Heathrow concurrent with the Penta show this September to demonstrate the complete range.

The new speaker is a compact monitor called *Tango* which is designed to be used in a variety of locations. It's said to be as happy fixed to the wall as placed on the *Landmark* stand and can be used above or below ear height since the tweeter can be tilted by up to 25 degrees. Said to be an easy amplifier load, the *Tango* is capable of serious levels and costs £1,680. *Tango's* inevitably limited LF capabilities can be extended by incorporating the £2,850 *Profundo* combination subwoofers and stands which feature an unusual concave front baffle.

Ensemble has extended its electronics range to include a pre/power combo, phono stage and integrated tube amp. The £2,560 *Virtuoso* is a hybrid line preamp with full facilities that's built first and foremost for sound quality, but looks rather tasty in its wooden knobbed brass case as well. The match-



*New additions from Ensemble: The Virtuoso hybrid line preamp and Tango compact loudspeaker.*

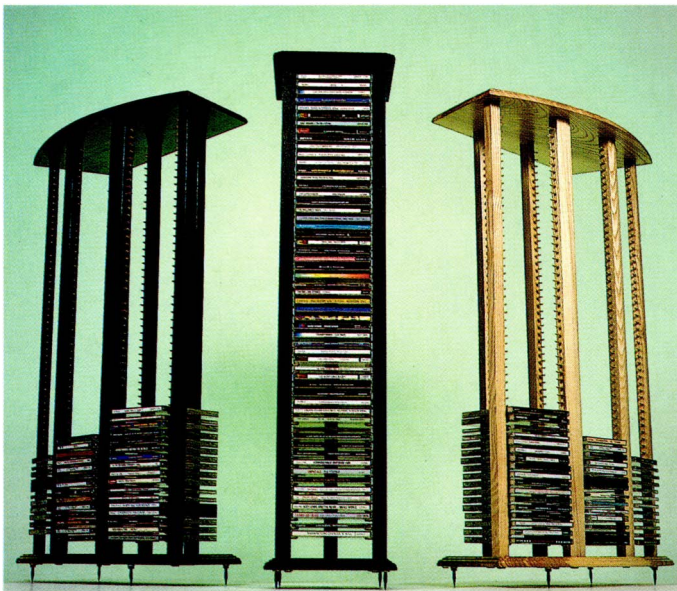
ing £2,930 *Corifeo* power amp is also a hybrid tube/transistor design offering 100W per side. The *Carle Via V* is a 50W integrated tube amplifier that is lavishly finished with inlaid

woodwork and incorporates a 'controlled polarisation circuit'. Not surprisingly this combination of craftsmanship and electronic ingenuity commands a Swiss style £3,590 pricetag.

## Designs on stands

New company Stands Unique has produced a small but rather tastefully formed range of CD storage systems. Working on the premise that your CDs should not only sound good but also look good as well, Stands Unique has produced what it calls "uncompromisingly upmarket" free standing storage systems.

The systems are made of solid ash with brass fittings and come in two basic forms: single columns capable of holding 36 or 60 CDs and triple columns for 100 or 180 single discs; double CDs can also be accommodated. At approximately £1 per disc, the *Single 60* costs £59 and the *Triple 180* £189. For further info contact (0604) 21051.



## A veneered Quartet

Loudspeaker and amplifier specialist Heybrook Hi-Fi has launched a new £535 (£555 in walnut) loudspeaker called the Quartet.

This is the third model to be added to Heybrook's prestige range and follows in the footsteps of the Sextet floorstanding speaker and Signature amplifier with fillets of exotic veneer decorating the front baffle.

A matching wooden stand which has the same filleting in walnut, birds eye maple or yew costs £135 in black ash or £145 for those of you who prefer a walnut veneer.

The Quartet itself is a medium sized model (410x240x220mm) designed for close to wall siting, equipped with a 165mm coated paper mid/bass cone and a 25mm soft dome tweeter.

The cabinet is a twin ported affair with internal bracing and damping and an unusually thick 32mm front baffle.

## Proac's exotic Signature

Proac has launched an upgraded *Signature* version of its top of the range *Response Three* loudspeaker. The new version has a striking appearance courtesy of exotic veneers which include burr oak, burr poplar and silk oak, which have been selected for aesthetic and environmental reasons.

Behind this beautiful facade there's been an invasion of rhodium plating, which Proac has been using on its terminals, primarily for sound quality reasons, for five years now. Every metal part from the terminals to the spikes, including the tracks on the re-configured crossover board is rhodium plated. Higher grade components including silvered capacitors are used in the crossover.

The substantial *Response Three Signatures* cost £4,935 and are said by Proac to exhibit incredible neutrality, speed and bass power.



*Proac's Response Three Signature, yours for £4,935.*

## Dangerous winners

By now the five lucky winners of our Michael Jackson tickets competition will have seen their idol in action and undoubtedly have had a Wacko'tastic time. The fortunate five were Ian Macaskill of London N16, A M Carnegie of Guildford, Stewart Dew from York, Catriona Brennan of Northallerton and Matthew Anderson of Wellingborough.

The answers to the not so cryptic questions were; 1. Sony Music, 2. Dangerous, 3. In-car use and 4. Pepsi.

# Marantz DCC. Treasures The Original.

Imagine, if you will, standing in your living room. You've read about DCC, but words cannot fully describe what you are hearing from your new Marantz DCC deck.

It sounds like the original recording. Clean and pure as mountain air. Beautifully captured and perfectly reflected in the pure blue waters of digital technology.

How, you may be asking, do we achieve such a faithful sound from our new DD-92 and DD-82 DCC decks?

Could it be our 18-bit A/D converter. Or our unique DAC-7 bitstream converter - also 18-bit. Perhaps it's the know-how gained from our 40 year hi-fi heritage. Let your ears be the judge.

See, hear, and feel the Marantz DCC experience for yourself at your nearest Marantz dealer.

Marantz DCC. Treasures the soul and integrity of the original recording.



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DCC  
COMPACT CASSETTE

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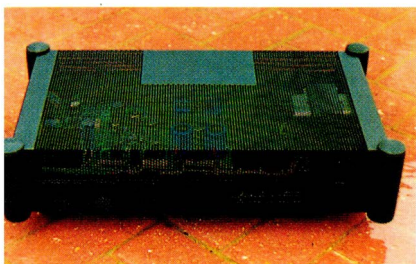
Telephone: 0753 680868



## Al's lines get active

Audio Innovations has produced a new line preamplifier which it has christened the L2. Unlike previous AI preamps and line stages which have been passive in operation, the £699 L2 is an active device complete with a fine array of vacuum tubes. The reason for this apparent change of tack is the realisation that for all their advantages of simplicity, passive devices are difficult to match systemwise and even under optimum conditions don't offer the dynamics of a good line preamp.

An anode follower circuit with an ECC82 double triode was chosen as the active stage, this instead of a theoretically superior cathode follower circuit for sound



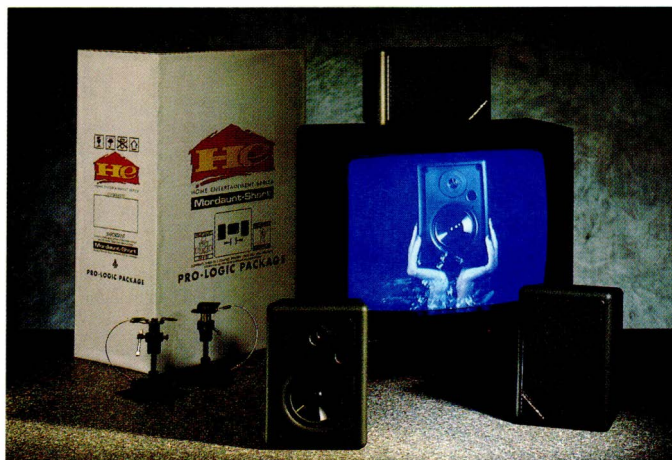
quality reasons. Another ECC82 is used in an active buffered tape output.

Audio Innovations has gone to significant lengths to provide a high quality power supply for the L2, utilising a transconductance bridge valve regulated supply which operates without feedback. This is said to have immense stability and gives the preamp an effortless sound.

## New blood on the amp scene

A new company called WPS, or Waytronics Power Systems, will shortly be launching a new integrated amplifier called the IA1. Due to retail at close to £300 it offers 50 watts per channel, accepts five inputs including two tape loops and the option of a plug in phono board for MM cartridges, and has outputs which encourage bi-wiring.

WPS is a power supply specialist and the IA1 is its first venture into the hi-fi field, although it intends to follow up with a complete system of the aspirational variety. For further information call (0233) 642227.



Havant based Mordaunt Short has moved into the home cinema market in a big way with the launch of six new packages based around the CS-1 loudspeaker.

The CS-1 is a compact (233x160x131mm) two way speaker made out of mica loaded polypropylene, it's shielded for use close to a television and can be purchased in a number of configurations. A basic pair is called the *Stereo Package* and costs £100, add a matching £150

subwoofer (236x580x251mm, with two 165mm drivers) to this and you get the *Stereo-Plus Package* for £230. Alternatively you can go for the *Pro Logic Package* consisting of three CS-1s and two wall brackets, the third speaker is for dialogue and sits on or near the screen.

Individual speakers and pairs of brackets are available for when you want to expand the system. As yet they are only available in black (yawn) but plans are afoot

## More tubes from the fjords

Scandinavian tube specialist Copland has produced a new **CTA 301** preamp and **CTA 504** power amp. Both are cased in the traditional silver livery that Copland does so well, and have included refinements such as one per cent metal film resistors.

The £1,384 **CTA 301** preamp is a five input affair with a pair of **E83CC** triodes in the MM phono stage and one **E82CC** triode per channel in the line stage. It uses relays for signal routing and incorporates four power supplies. Unusually different types of filtering capacitor are used for the bass, midrange and treble.

The £1,991 **CTA 504** power amp offers 50W in tetrode mode and 26W in triode mode, a switch on the front panel allows you to choose between the subtlety of the latter and the power of the former. Driven very close to class A in ultralinear mode, it uses four **E83CC** tubes on the input and four **6550** tetrodes arranged in push/pull on the output. For a more in depth look at these and other aspects of Copland see this month's *Craftsman* feature on page 18.



## In Brief

Deltec Precision Audio which ceased trading on June 12th has re-emerged as DPA Digital Ltd producing the Deltec line-up of products, honouring that company's guarantees and being managed by Robert Watts who designed the Deltec electronics.

The new phone number is (0222) 795 621.

It seems we got our sums wrong in last month's story about Rotel dropping its prices. The *RCD-965BX* CD player is now £280 rather than the reported £380. Apologies.

The Classical Music Show being held between the 24th and 27th of September will showcase Philips' DCC alongside exhibitors and artistes joining forces to promote classical music.

DNM Distribution Ltd has changed its name to Virtual Reality Audio Systems, as the company intends to increase its range beyond the existing DNM and Rehdeko brands and feels the new name to be more appropriate. VRAS can be contacted on (0277) 227 355.

Goodmans has a new bitstream CD player in its range. The £110 *GCD 650* features 20-track programming, remote control, calendar display etc. It can be used separately or with other Goodmans *650* range components.

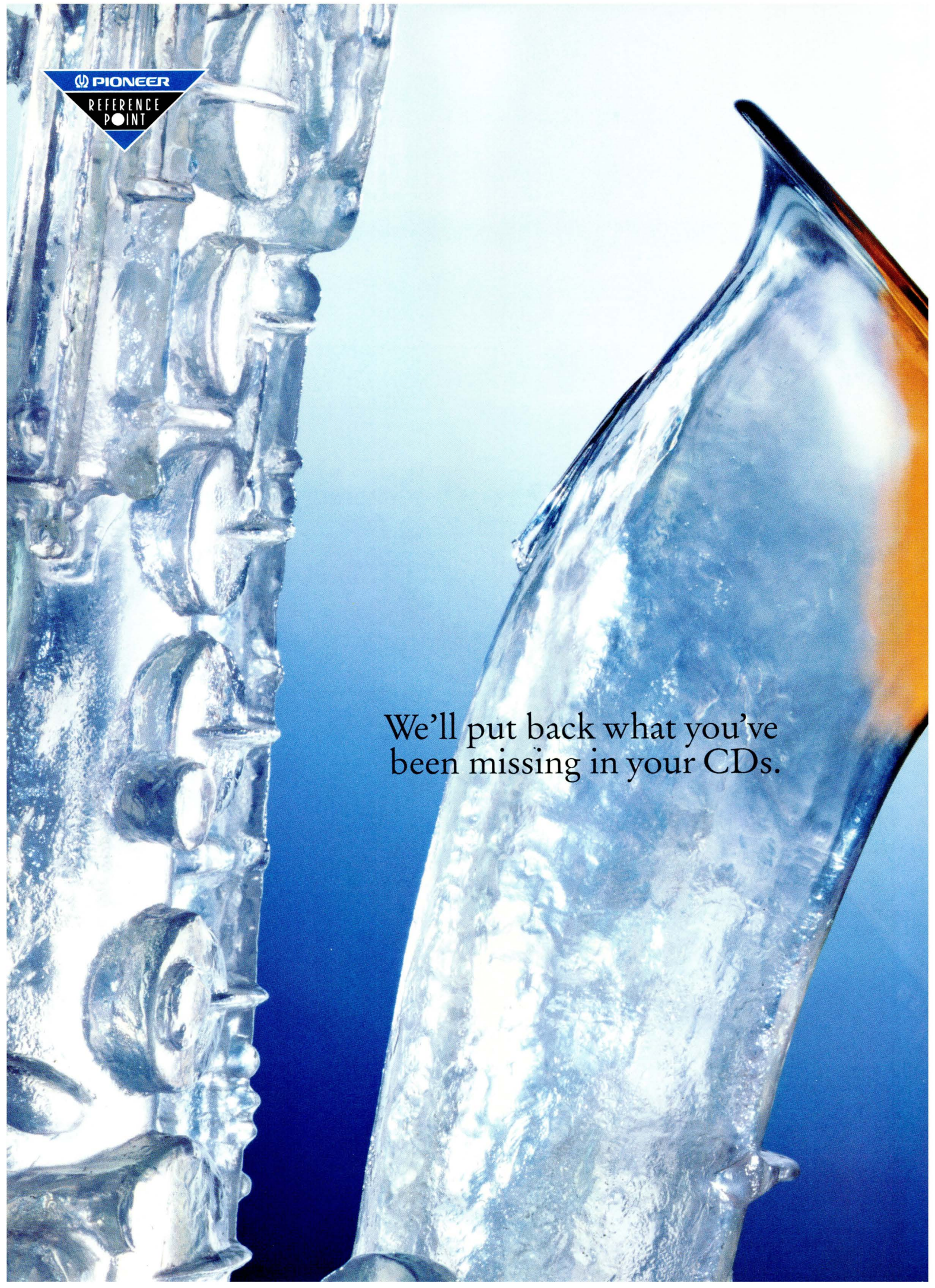
Target Audio Products has produced a versatile new *AV* equipment storage system designed to accommodate all manner of hi-fi and home cinema components. In its basic form, with three 1231x398mm shelves, it costs £160; two further conventional size shelves can be added for £70.

Ortofon UK has been appointed as the sole agent for the Foundation Audio range of loudspeaker stands. Ortofon promises what it bills as "innovative new products" for the Penta show, in mid September. The company can be contacted on 0753 889 949.



PIONEER

REFERENCE  
POINT



We'll put back what you've  
been missing in your CDs.



When CDs first appeared, they were hailed as being the perfect music medium.

However, some people maintained that CDs sounded harsh and lacked the warmth of vinyl records.

Now, Pioneer's Legato Link Conversion is about to change everything.

You see, when material is recorded onto CD, the format is such that frequencies above 20 kHz are abruptly cut off. And it is these upper frequencies which are abundantly present in musical instruments, giving them their warmth and natural timbre. Although you cannot hear these upper frequencies, you can actually feel when they are missing.

Pioneer's Legato Link Conversion now addresses the problem by putting back that original, natural warmth.

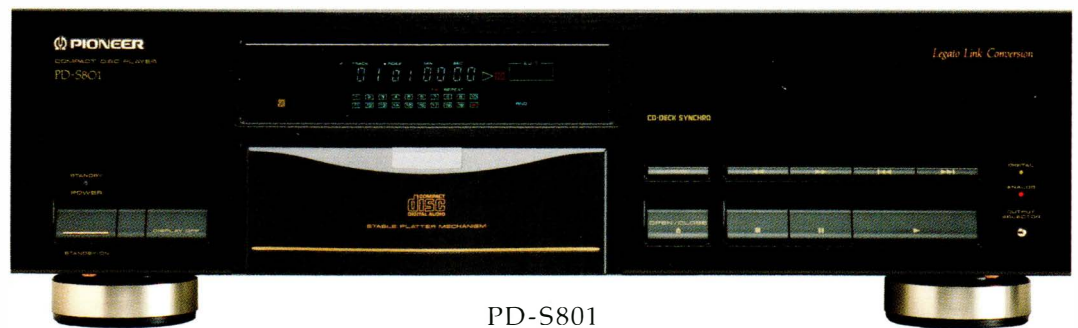
Using data already on the disc, Legato Link Conversion calculates almost exactly what and where the missing data should be and literally recreates a sound wave pattern that is much closer to the

original music. It's a revolutionary new technology that takes CD a real step forward and puts natural sound within the reach of every enthusiast.

Pioneer's unique Stable Platter Mechanism is also a key contribution to this more natural performance, giving full width support to the disc for reduced vibration and truly transparent sound.

Out of sight but certainly not out of mind, twin Pulseflow D/A converters cancel noise generated in and out of the audible range. While Direct Connection enables the music signal to travel along the shortest, most logical path possible for minimal interference.

So why not listen to Pioneer's new range of CD players (PD-95, PD-S901 and PD-S801) very soon? Because if CDs have left you cold until now, you'll



PD-S801

certainly warm to the sound of Legato Link Conversion.

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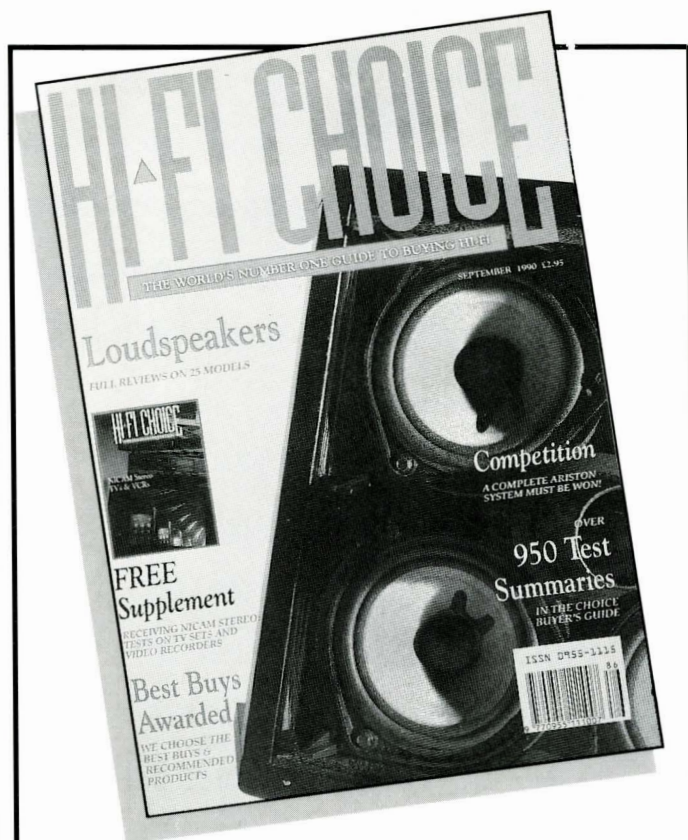
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# Choice Sessions

by Andrew Cartmel and Alvin Gold

## It's how much?

With the introduction of its £125 Digit, QED brings outboard digital to analogue conversion to a brand new sector of the market place. Andrew Cartmel has been putting it through its paces.

First impressions can be misleading, and the first thing you notice about QED's Digit is the packaging.

Normally hi-fi components, particularly the small but perfectly formed variety, are presented in a manner that emphasises their high tech qualities. However, the Digit doesn't even look like a piece of hi-fi. The unit is sealed inside stiff plastic packaging which would look more at home hanging on a hook in a high street electrical shop alongside battery chargers and blister packed aerial downloads.

But, as I said, first impressions can prove misleading. Very misleading. Because this little black box, priced at a mere £125, is not some esoteric accessory but the cheapest standalone digital to analogue converter on the market.

Inside the packaging you find a fairly featureless but solidly constructed black plastic box with the nice added touch of small vibration absorbing feet. Almost the same size as the DAC itself is a substantial mains adaptor of far better quality than the price point would lead you to expect.

This blend of accessory-style presentation, low cost and high quality are characteristic of QED Audio Products Ltd, a Surrey based company which has scored a number of notable successes with cost effective, no frills accessories, like cables and switching boxes, as well as a highly respected amplifier range.

The Digit is QED's first digital venture and it's being marketed with the message "update your old 16-bit CD player to the new bitstream technology". This oversimplifies matters of course giving the misleading impression that the multibit approach was at best old fashioned and at worst an embarrassing dead end, to be escaped from as quickly as possible. Which is not exactly the whole story, though it does give QED a marketing hook on which to hang the Digit.

I used the DAC in conjunction with the original Ariston Maxim, a well built CD player of suitable vintage. On its own the Maxim is a pleasant enough performer, offering excellent rhythmic characteris-



One black box that won't send your bank balance into the red. The QED Digit.

tics and a good big sound that's strong if a little ragged.

I settled into listening to familiar CDs on the Maxim, rehearsed changing the interconnects a few times, then began a relaxed comparison, switching back and forth between direct output from the Maxim and output routed via the Digit.

For the bulk of the listening I used music from hell — quite literally. Christopher Young's soundtrack for *Hellraiser* was probably the most memorable thing about that film. The music has an eerie beauty, presenting a melancholy vision of nightmare landscapes. I'd recommend it to lovers of delicate orchestral composition and to incipient suicides everywhere.

## Raising hell

Using the Maxim on its own, the music had considerable appeal — sad, measured — and stately. The rhythmic virtues of the player were in evidence, providing an engaging sound. But when I swapped over to the Digit, a number of things improved. My first impression was that the music was more clean cut, less wobbly. As listening continued I found the horns in particular sounding brighter and clearer, with a more definite sense of position in the soundstage. Some of the characteristic fuzziness of the CD player was being cleaned up with notable improvements in the high frequencies.

Back to the Ariston on its own, there was still plenty of immediate appeal, but this was a coarser sound than with the QED, with considerably less certainty about the placing of individual instruments.

## The return of the digit

Returning to the QED was like letting the music off the leash. Greater subtleties of shading and character were revealed and the music had acquired a new and more cutting edge. Further comparisons confirmed all this quite emphatically. Without the QED operating I found the selections sounding brassier and flatter with an echoey sound. I found myself writing down comments like wobbly, mushy, foggy and buzzy — not notably desirable adjectives in hi-fi criticism circles.

All of which is not to slag off the Maxim, but to make more or less the same point that QED makes on its packaging. If you have an older CD player and are considering an inexpensive upgrade, then this should be one of the first items you audition. Results weren't quite up there with Audio Alchemy's *Digital Decoding Engine*, losing out particularly in terms of resolution and presence, but then the DDE does cost £250 more.

The Digit may be packaged like an appliance and may be intended to sell to people outside the normal hi-fi fraternity,

but that's certainly no reason for audiophiles to discount it. And those lucky non-audiophiles who wander into a high street shop and choose one off the shelf may well be making one of their best purchases ever.

## Blowing a gale

*Alvin Gold gets to grips with a decidedly low cost pre-power combination which has ideas far above its station.*

The £200 *Preamp* and £300 *Typhoon* are about as close as Musical Fidelity gets to its declared goal of purist, no-frills amplification. Build quality is fine, as is packaging, but there's none of the mutton-masquerading-as-lamb you'll encounter with certain competing products. The *Preamp* and *Typhoon* are as well packaged as they need to be; no more and no less.

The two products are totally dedicated in the sense that they lack the usual phono socket (unbalanced) interconnections, and are instead fitted with XLR based balanced connections. If you happen to have a balanced pre or power amp (unlikely), you'll be in a position to ring the changes; but if you don't, you're stuck. Which sets the *Preamp/Typhoon* apart from every other balanced amplifier I've encountered to date. Perhaps it's best to think of this combination as an integrated amplifier that just happens to come in two boxes.

## Then there were three

Or three boxes. The one important flexibility that is built into the system is that you can in effect double the dose by increasing the number of power amplifiers from one to two.

In its basic form you buy just a single *Typhoon*, a stereo power amplifier with a power rating of 45 watts/channel. As an alternative, or later when funds allow, you buy a second. The combination of replumbed balanced wiring and different speaker outputs changes the system into one using a pair of monoblocs, each rated at 150 watts/channel. No switching or other reconfiguration is required to achieve this, a handy simplification that helps keep the selling price down. Adding an extra *Typhoon* costs a mere £300 for the amplifier itself plus an extra (or should that be extravagant) £45 for the bridging cable.

There isn't a lot to fiddle with while the music signal's in transit, either. There are separate listen and record tape selectors, and a tape monitor switch which in combination allows you to handle a grand total of six line level inputs. There are no vinyl disc replay facilities at all, though there's nothing to prevent one from using an outboard step up of some kind. I was able to use a Roksan record player fitted with an *Artaxerxes*, which as regular read-

ers will know fits near the turntable armbase, and supplies a standard fully equalised line level signal.

Forget correctness. Forget neutrality. Forget all about the usual ideas of holding a magnifying glass to the source and seeing it reflected in letters writ large. This is a combination that sings its own tune, a tune whose sound is subtly but definitely different from the classic stereotype of a literal recreation of the music.

The Musical Fidelity's stereo imagery, for example, is a tad larger than life, but very positively presented and very coherent too, with clear separation of the music and the surrounding ambient 'halo,' given suitable source material and speakers with enough bass to reproduce ambience.

## Blooming amplifiers

There is a certain unpolished diamond feel to these products. As with some other Musical Fidelity amplifiers, there is a degree of excess, of bloom in the lowest octave or so. Strictly speaking this is undesirable, but it can often be justified as a counter to the lean, mid-forward balance of many hi-fi components and systems. With certain combinations of equipment, there is also a rather less welcome top end intrusiveness. At worst, the treble can sound detached, though paradoxically the

shockingly wide volume range. As an example, I used this amp successfully with a big and difficult to drive panel hybrid loudspeaker, the SDA acoustics *Ribbon*, which has a 1.5ohm measured impedance across most of the midband, rising to a hardly generous 4ohms in the bass. I also used it with Martin-Logan *Quests*, a nominal 4ohm load, but again somewhat more punishing in reality. In no case did the amplifier sound out of its depth, or anything less than fully in control.

## Lushing it

In truth though the *Preamp* and *Typhoon* (which, yes, will blow you away) are a bit lush, and won't impress everyone. I'd be the last to suggest their use with high-end loudspeakers like the *Quests*, because although they do their thing well into such loads, their thing is not good enough to stretch speakers of *Quest*-like ability to their limits. (I don't think there is an amplifier costing less than twice as much that can.)

The Musical Fidelity *Preamp* and *Typhoon* does its own thing in the tonal and dynamic department too. The combination has a subtly elevated bass and midband, and a smooth, beautifully rounded upper mid and treble which gives



overall frequency balance appears to be a little rounded down at the extremes.

None of this addresses the central point, however. The *Preamp/Typhoon* has some very distinctive strengths and a couple of weaknesses. It's true that there's a touch of spit and boom, and some coarseness, and not just when extended. Musically, though, the *Preamp/Typhoon* is more than just the sum of its parts.

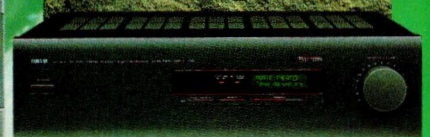
It has a number of important plus points, one of which is its almost complete imperturbability when used in dual monobloc form. It can be plugged into almost anything, and will not only work, but will do so consistently and over a

music a warm, organic and outgoing character. It's no miracle of fine detail or craggy dynamics, but does convey an unusual feeling of being at ease with itself, a feeling it somehow communicates through the music.

When used in dual monobloc form, which is by far the best option, it goes loud, and I mean LOUD, in a way that belies the lack of cubic inches. Although not as analytical as certain amplifiers, the combination sounds bold and powerful, yet even when extended never sounds hard or strained. This is a big amplifier in every sense except the bottom line — the price.

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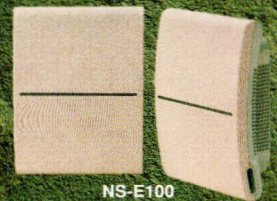
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## YAMAHA HIFI



# Statements

by Andy Benham and Roy Gregory

**T**ransient is an oft mentioned word in the digital world, and is just as applicable to the lifecycle of the products themselves as it is to the way a player presents music. Each year we see another crop of players, usually much the same thing in a slightly different box with another few digits added to the model number. Contrast this approach to the Arcam 170 transport which first saw the light of day as far back as 1989. Although it was updated to Mark II status in late 1990, and reviewed in issue 88, the 170 has continued in much the same form for nearly four years now, which must say something about the commercial merits of the original design.

## A digital eon

Four years is one hell of a long time in the world of digital audio and there can be no doubt that the 170 was beginning to show its not inconsiderable age. With a new Arcam DAC, the *Black Box 5* on the horizon, it came as no surprise when Arcam announced an updated version of the transport, the 170.3, earlier this year.

Comparing the two machines side by side it is impossible to tell which is which, at least from the front, as Arcam has retained the same front fascia, complete with its chunky control keys and a rotary switch which dims, or defeats, the information display.

Turn the box around, however, and it's obvious which is which. The 170.3 is a rather different beast when it comes to digital outputs, for alongside the standard phono and TOSLINK sockets you'll also find a 75ohm BNC socket and a further TOSLINK socket which enables the 170.3 to share a common clock with the *Black Box 5* by means of an external synchronisation system similar, although not identical, to that employed by both Linn and DPA (née Deltec).

For those of you with another £150 to spend there is the option of fitting an AT&T style high speed optical output, provided, of course, that your DAC can keep up with this higher data rate.

Although the outward appearances are decidedly similar, open up the box and a number of changes can be seen, the most obvious being a new digital output board, which, according to Arcam, reduces jitter by a factor of three compared with the previous 170. The output board incorporates a new transformerless, discrete tran-

sistor output buffer with an accurate 75ohm impedance.

The 170.3 sticks with the venerable CDM1 MkII mechanism and its associated control equipment, and to be honest this is now beginning to show its age a bit. After a disc is inserted you have to wait for a considerable period of time before the player will let you perform comparatively simple functions such as selecting a track. With newer machines you can insert a disc and select track four before the disc has actually started to spin, but with the Arcam you've almost got time to go

Switching DACs to the ds/d *Decode 1* that I wrote about last month turned the above findings on their head. Things really came alive and the Arcam/*Decode 1* combination trounced the 200/*Decode 1* combination, giving a more natural acoustic, better edge definition and extra bass control. Considering that I really like the 200/*Decode 1* combination in the first place, this is a very good result indeed. The other big advantage was that everything stayed in focus and proportion right across the volume range, it sounded happier at both comparatively quiet and outrageous



*The Delta 170.3 looks like its predecessor but is an entirely different black beast.*

off and have a cup of coffee while it ponders what to do next.

Still this is a small price to pay, as I found out once the unit was wired into my main system. The Arcam took the place of a Meridian drive in a 200/203 combination, but proved a far from happy partnership, perhaps due to the fact that the Meridian drive has a rather unusual impedance trend (see issue 101, December 1991) and the partnering DAC isn't as happy with a by-the-book 75ohm feed.

Anyway, the Arcam/Meridian combination sounded decidedly relaxed, which is a polite way of saying boring. I like the 200/203 because it is slightly laid back but still has a very decent sense of impact; swapping over to the Arcam drive unit got rid of the sense of impact and resulted in a rather bland sounding combination.

volume levels, while the 200/*Decode 1* combination tended to be happiest across a fairly narrow listening range.

As nearly always happens when we review transports, it turns out that the sound is totally dependent on the DAC used to partner the transport. I haven't got the space to go into this subject in more detail here but if you want to learn more about the transport/DAC interface you should look out Paul Miller's comments in recent DAC and CD transport reviews (issues 96, 101, 103).

On the basis of my time with the Arcam 170.3 I'd say that it is an excellent transport when partnered with a DAC which adheres closely to the 75ohm impedance standard, but tends to suffer a bit when faced with a non-standard DAC, although that is the fault of the DAC rather than the Arcam and it's rather unfair that it should

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be blamed for the problems inherent in other components.

A nice touch is that Arcam will upgrade older versions of the 170 to the new spec for £150, which seems like a bargain and I recommend that owners of an older unit should get it upgraded immediately.

In its latest guise the 170 is one of the best drives on the market, and at £650 looks to be very competitively priced, even if the rather dated ergonomics do let it down a bit.

*Andy Benham*

**A**nybody familiar with EC Audio's *Finestra* pre-amp will tell you that it's a far from ordinary product. Looks, construction technology and above all sound quality set it well apart from the crowd. Now we have the *Lectern* and the *Finestra* finally has a matching power amp. It too is unusual, but then EC Audio isn't your run of the mill hi-fi company.

EC Audio is the audio manufacturing arm of a much larger company specialising in ultra high technology circuit boards for the only people who can afford them, the military. As EC Audio boss Henry Cheung puts it, "Most of what we make either gets fired, or fired at!" What gives products like the *Finestra* their particular character is the combination of those manufacturing skills with the vision of young designers like Tom Evans, of *Iso* fame. Tom has now moved on to build his own products with John Mitchell, and the *Lectern* is the work of another rising star, Michael Hang, although technologically it has a great deal in common with its partnering preamp.

### Rowland on the cheap

Externally the *Lectern* is compact and exceptionally well finished, looking rather like a baby Rowland Research (at rather less than Rowland prices!). First there's not a screw in sight.

The lid is held in place by six hidden Allen bolts that mate with bonded ferrules which makes a bit of a change from the normal self tappers and stripped metalwork. Prise the lid open (it's an interference fit to prevent ringing) and you'll see that the fanatical attention to detail is more than just skin deep.

The boards are beautifully laid out and packed with matching components, the multi layer construction avoids RF interference, the mains wiring and transformer are kept as far from the signal path as possible, and every component runs at less than half its rated spec.

The *Lectern* isn't only well made, it should be extremely reliable. Construction is best summed up by a competitor who, estimated its price at "twelve to thirteen hundred pounds". It costs £700.

So the *Lectern* is well made and apparently cheap at the price. It's also an unusual circuit, but that's not all. The *Lectern* is available in two different versions. The standard one is rated at 50W, and in the interests of reliability, uses two pairs of output devices a side for its modest output. (One professional amplifier I know of manages to extract 200 watts a side from an identical line up.) However, some listeners believe that multiple pairs of

open and uncluttered, characterised by a good sense of organisation, the feeling that everything is in the right place, that everyone is playing together. The bottom end is agile and weighty but a little soft around the edges. Not disastrously so, but it's one of the few flaws in an otherwise balanced performance. Another is a slight compression of really wide dynamics which you'll only notice on the best recordings when comparing it with tube electronics.

These observations are offered regardless of price and in the context of the system whose amps outperform the *Lectern*, but at nearly eight times the price.



*The Lectern is a discreet but remarkably capable little power amp from EC Audio.*

output devices are the root of all evil, so if you own speakers of at least 90dB efficiency and don't need the current delivery, you can order the *Lectern* at the same price, with a single pair of output transistors per channel.

Crazy huh! But then less is more and the proof of the pudding is in the eating. I listened to the *Lectern* with *Iso/Argo*, Audio Innovations and *Finestra* pre-amps, and speakers from KEF, Audioplan and Spica; cabling was Cogan-Hall and Audioplan.

Whatever the combination one thing was clear, the *Lectern* is fast, detailed and has the timing integrity which is the hallmark of a phase coherent design. It has eradicated the slightly mechanical feel and tonal bleaching which stood between the early *Finestra* and world class. I don't like saying it because it's so often misunderstood, but the *Lectern* is valve-like; not warm and woolly, but easy and unforced with a natural sense of liveliness. The top end is excellent, the definition of cymbals and percussion superb. The midrange is

As I said before, this is an astonishing amplifier. Remove half of the output stage and it gets even better, more transparent and better focused; quicker, cleaner and more dynamic in the bass. The lower current option turned in a stonking display on KEF 105/3 speakers, on music as varied as Sly and Robbie, Shirley Bassey and Shostakovich.

Okay, so I really like this amp. More important, it shows that there's a future for high-end sound in a marketplace where fewer and fewer people can afford American behemoth prices and also outperforms many of those monsters in most situations. In order to hear it at its best, you'll have to take the *Lectern* home. Not only is it a remarkably unflashy amp, but it warms up over days! Quick A/B dems are definitely out.

This is the first of a new generation of British solid state designs and promises great things. Meanwhile it's the first transistor amp that I could happily live with, and that is praise indeed.

*Roy Gregory*



# North Star

*Choice heads for the Arctic Circle, drawn by the glow of Copland valve amplifiers. Andrew Cartmel meets their creator, Ole Moller.*

**A**s we fly over the border, the Danish aircrew break out the champagne and announce that Denmark has just won the European Football Championship. With this victory and with the Danes throwing spanners into EC policymaking at Maastricht, there's clearly a new spirit of nationalism on the rise. And although our plane is just beginning its long descent into Sweden, where the equipment is actually made, it's Danish hi-fi we've travelled all these airmiles to look at.

## Hungry for power

Copland is a name which is increasingly becoming associated with high quality, high end valve amplification. The company was founded in the mid Eighties in Copenhagen and its first models were the CTA10 and CTA15. Most recently (February 1992), *Choice* appraised the CTA401, an elegant integrated amp harbouring Shuguang Golden Dragon valves behind a silver alloy fascia. Our only reservation was the somewhat meagre 26watt output, but now Copland is set to unveil a new power amp rated at 50watts.

Something new: A Copland with muscle. So there is a certain feeling of excitement as our plane descends over this landscape of broken lakes and hills, and it has nothing to do with lack of faith in the flight crew.

These amplifiers and Copland itself are the brainchild of a young Danish de-

signer named Ole Moller, the man we've flown all this way to meet. Formerly with Ortofon, perhaps Denmark's most famous and well established hi-fi company, Moller has carved out a substantial reputation for his products and his own firm in just six years.

After landing and customs we stow our luggage at a rural hotel where the Muzak system is playing endless Swedish language versions of Chuck Berry standards and Sixties pop monstrosities like *The Green Beret*. But an hour later we're at the factory in Vaxjo listening to Copland's silver boxed CTA301 and CTA504, the promised new pre/power combination. The amplifiers are flanked by substantial QLN speakers and are delivering a sweet powerful sound. Stevie Ray Vaughan is making my toes tingle through the vibrating soles of my shoes. Things are looking up.

The spotless high tech factory is situated on the side of a wooded lake, with a floating dock, fish stirring in the clean blue water and waterlilies drifting near the shore. The building itself is a converted Thirties lumber mill. In the long winters of previous decades felled trees were brought across the frozen lake, dragged along the mirror smooth ice.

Now all the lumber machinery has long since been stripped out and sold to Lapland and these thick stone walls house an assembly line for state of the art circuitry. The assembly area is small and

*The blues of Swedish glass, sky and lake provide contrast for one of Copland's silver clad amplifiers.*



immaculately clean, with bright Monet prints above the workbenches. The staff have gone home after the day's work and the building is silent except for the whisper of air conditioning.

Ricardo Franassovici of Absolute Sounds is inspecting a Tesla valve, tapping and rolling it in his fingers like a connoisseur appraising a fine cigar. Rows of Copland amplifiers stand waiting for the final quality control checks.

Copland is a name which was chosen because of creator Ole Moller's love of the American composer Aaron Copland, but it's also suggestive of the company's origin in Copenhagen, where manufacturing originally took place. Initially a technical specialist with Ortofon, Ole went solo in 1986, five years later joining forces with Lars Pedersen of Xena, who now look after manufacturing as well as sales and promotion. Now Ole remains in Denmark for most of the time, concentrating on design work, while his designs are implemented in the factory in Vaxjo.

The word 'factory' hardly does justice to the Xena premises. The Vaxjo region is heavily wooded lakeland, a wild country of bleak, beautiful landscapes where the Swedes (and more recently Danes and Germans) escape to weekend and summer holiday log cabins. Ironically, this quiet rural retreat is also a major centre for advanced electronics, particularly weapon systems.

### As you lake it

Now the peaceful Swedish lakeshore is reverberating with raw Deep South blues. Stevie Ray Vaughan's *Tin Pan Alley*, sounds haunted and passionate through the Copland CTA301/504 combo, and is followed by a thunderous version of *Voodoo Chile*. Then the soundtrack to *The Hot Spot*, sounding vastly sweet and deep, offering Miles Davis' stabbing trumpet and monolithic guitar chords from John Lee Hooker.

We sit looking at the new amplifiers, two neat silver boxes at the far end of the room. One of the novel aspects is revealed by the presence of two control knobs on the fascia of the 504 power amp. In addition to the predictable on/off rotary switch there is also a switchable relay which allows you to operate the amplifier either in tetrode or triode mode.



Circuit boards for Copland's amps are assembled at the Xena factory in Sweden.

Historically the triode configuration was the original way of making valves. Tetrode valves were a subsequent refinement which allowed greater control, but as is so often the case, purists felt there had been a trade off whereby an advance had been achieved but sound quality had been sacrificed. Tetrodes are technically better and more powerful, but triodes are still held to have a more pleasant sound. Triode/tetrode switching theoretically offers the choice between sound and

money would be better applied somewhere else."

Seen from the lake the most striking aspect of the Xena factory is the towering brick chimney which saw active service during the lumber mill days. It was a tradition then that the apprentices had to scale the heights of the chimney when they completed their apprenticeship. There was a wooden ladder attached but the top few rungs were kept deliberately loose, a surprise for the lucky candidate.

Who says the Swedes don't have a sense of humour?

Tearing ourselves away from factory and the demonstration of the new amplifiers, we leave the music playing, jazz and blues giants doing battle in the hot

"To build an amplifier without compromises isn't realistic," says Ole Moller. "I'm more interested in what can be achieved with relatively little money."

power. It's an intelligent compromise and, according to Moller, this is what amplifier design is all about.

"To build an amplifier without compromises isn't realistic," he says. "I'm more interested in what can be achieved with relatively little money. There are always compromises. I would like to use silver wire in my output transformers but that would cost money, and maybe that

bright afternoon, and head out to attend a press conference with Ole Moller himself.

Press conferences in any profession tend to be dull or overrehearsed affairs and hi-fi is no different; but today's event proved as distinctive as the music offered by the Copland amps.

Instead of a conference room or some other soulless hole, Ole chose to meet the press outdoors. And not just by the



Xena's resident electronics expert (and Kate Bush fan) provides the final quality control tests on the Copland amplifiers.

lakeside but on the water itself. The anchor for Xena's floating dock was hauled up, a bucket of cold beers brought down from the factory, and we proceeded to drift out into the centre of the lake. Here, in the brilliant sunlight, with the fish jumping and dragonflies skimming, Ole offered his personal vision of hi-fi, technology, and, of course, music.

This is one of the first things that strikes you about Ole Moller and Copland. Music is central to their philosophy. In a world where high end amplifiers are more likely to be named after races of warlike aliens, or be brazenly emblazoned with the name of their power mad creators, Ole has chosen instead to name his brainchild after a favourite composer.

A ground rule for the audiophile might be never to trust a designer who doesn't love music. Ole is clearly a man who can be trusted.

These days he listens mainly to Bach, Mozart (and of course Copland) and jazz: Miles Davis and Chick Corea. He first experienced jazz in a school band, "Four guys who tried to play like Weather Report." His parents were serious classical music lovers although they weren't into hi-fi. "At that time it was not normal."

Ole, on the other hand, became fascinated by hi-fi early. The first valve amplifier he heard, auspiciously enough, was an Ortofon. Nowadays he listens exclu-

sively to LPs, using an old Garrard 401 with an SME 3012 arm and an Ortofon MCA20 Super cartridge. "But I wound it myself," he adds casually.

### The piano man

Ten years of piano lessons at an early age didn't manage to kill Ole's love of music. He simply decided if he wasn't good enough to play professionally he would pursue his other passion. "If you can't play it at least listen to it." And so he began questing for the most pleasurable ways of reproducing music.

"I started to work with electronics very early. I've always been one of those who wear glasses, sitting at home fooling with chemistry sets, microscopes." He adds with a grin, "I must have been awful."

He ended up working for the company who'd built that first tube amp of his. "I spent all my time working on hi-fi anyway, so it was natural when Ortofon was looking for people to get a job with them. The hi-fi business owes a lot to Ortofon." He obviously retains a lot of respect for his old company. When asked what contemporary equipment he likes besides his own, Ole confesses to a certain regard for Audio Research and Hiraga products.

### Rewriting the book

While his technical expertise clearly stood him in good stead at Ortofon, Ole empha-

sises that good hi-fi doesn't arise solely from striving for textbook perfection.

"You have the total engineers on one hand and on the other devoted music lovers who know nothing about the technical side. I like to feel that I'm somewhere in between." And indeed, while talking about amplifier design Ole freely mixes technical detail with artistic description. "It's a bit like a chef making a sauce, constantly tasting it, and carefully choosing ingredients. Maybe a polycarbonate capacitor will have better results than polypropylene in some applications."

And it's this artist and music lover, who is speaking when he says, "I would rather make some colorations on the sound. Either you want make an amplifier which is true to what is put into it, or you want one that has the most pleasant possible output. I favour the latter."

We free the anchor from a snag, start the outboard motor and head back in to the lakeshore. There's Swedish hospitality waiting for us, in the form of a smorgasbord in the sunshine, brilliant white tablecloths flapping in the hot summer breeze. And then, for the intrepid journalist, white water canoeing.

But the impressions that linger longest are of a conversation on a lake, and an individual committed to blending the best aspects of artistry and technology in the pursuit of making music.

# Old Gold

**B**uying an entirely new hi-fi system in these days of recession may be the last item on your list of things to do, but what about choosing and using something second-hand?

Second-hand hi-fi often appears to be sold alongside other hardware in shops which seem to specialise in electrical junk. The man at the counter peers at you down his nose from behind thick chunky glasses and has the quixotic demeanour of those who have spent their life too close to audio equipment. "No," you say, "I'm just browsing . . ."

So where do you find the bargain you're looking for, and what are the pitfalls to be negotiated before you have it installed at home, and working well?

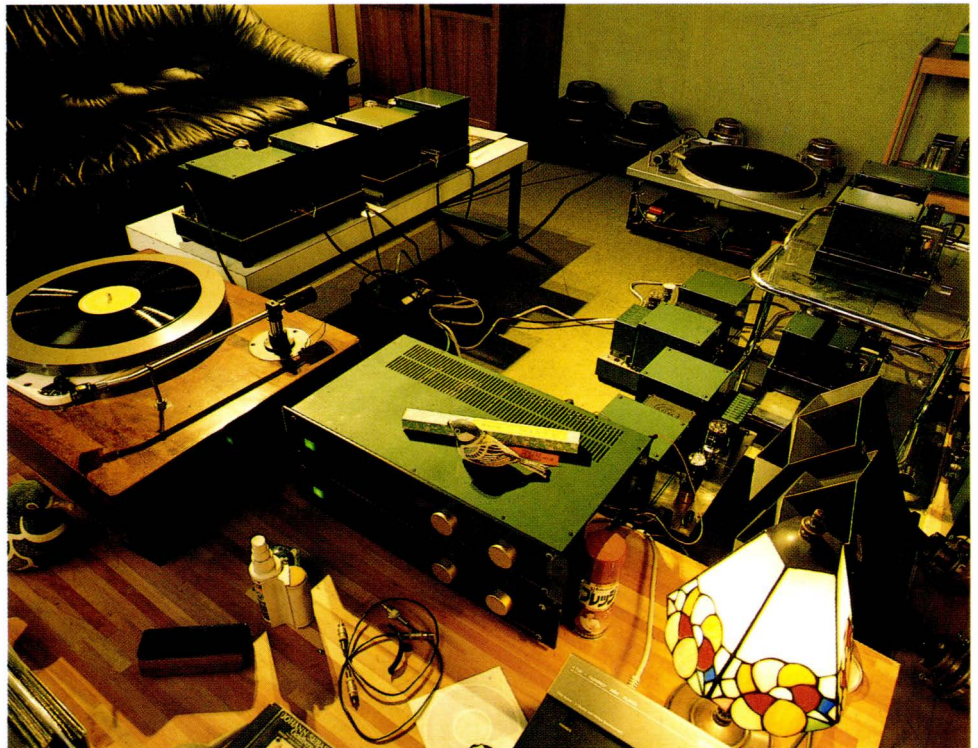
Like cars, second-hand hi-fi falls into two distinct groups. There are recent models which can perform much the same task as something new, or the vintage classic, that seems constant in a changing world, indeed which by still working well proves that little changes.

Some specialist hi-fi dealers sell equipment second-hand — it's mostly kit which they have taken in part exchange when a customer upgrades. But, surprisingly, most would prefer not to, saying they cannot make a profit on such sales.

"BADA (British Audio Dealers' Association) has no policy on selling second-hand equipment as such," said Michael Lewin for the organisation, "and most dealers would advise customers wanting to sell non vintage equipment to do so privately, by advertising it in classified sections of specialist magazines or the likes of *Exchange and Mart* or *Loot*."

The above advice applies especially to the more common Japanese marques. British hi-fi equipment is seen by dealers as having better second-hand value. Lewin also works for Graham's Hi-Fi in North London and admits that the shop takes "all the old Linn LP12s we can get".

"We tend to handle second-hand Linn and Naim equipment," he explained, "because we can vouch for its reliability and longevity. We find we can sell those brands to customers who came in wanting some-



*Dan Houston examines the pitfalls of buying second hand hi-fi and provides some hints for those who want a vintage sound system.*

*An audiophile Aladdin's cave complete with Garrard 301 and EMT turntables.*

thing like a Rega 3, who may have thought an LP12 was out of their price range. With good equipment like this buying second-hand represents a much better investment in the long run, and we have some really happy customers who have done just that."

Tony Revelle of the Audio Excellence chain, of Bristol, Gloucester, Cardiff and Swansea, said that selling second-hand equipment only accounted for around two per cent of turnover: "The equipment which holds its value tends to be the better British brands like Quad, Arcam, Meridian, Linn and Naim. But then NAD amplifiers — something like the 3020 — also go very quickly for around £80, when they had cost £110 new. The reason for that may be that it was a very long-standing model, and became very well known. Many of the Japanese companies are changing their models every year, so they



don't have any long-standing appeal."

Revelle added that CD players fell into the same category. CD technology has advanced dramatically during the last few years with the development of bitstream players. "A player which was highly recommended and sold well a couple of years ago will not be wanted now because it's not bitstream — the technology has moved on," he said.

With all this going against you it is still better to buy second-hand from a reputable dealer unless you are absolutely sure about what you want and what you are getting. The dealer should offer a minimum three months' guarantee, some will offer a year, and this can be invaluable protection. You will also get the dealer's advice about using the equipment, of matching it to the rest of your system and will be able to get a proper demonstration.

A specialist dealer will take care of those small details which may easily be overlooked when negotiating a private sale. For instance you may think the advertised Meridian 101 preamplifier is just what you need, but discover having bought it that it is fitted with the wrong phono stage — for a moving coil cartridge when you use moving magnet or vice versa.

Upgrading and servicing old equipment can be a costly affair. One dealer recounted the story of a customer's 'new' second-hand Deltec amplifier, originally a £1,000 model, which had a faulty power supply. The cost of repair, he said, was so high that the customer was advised to buy a new amplifier from the manufacturers at a 'special price'.

Of course, you can save more money if you decide to buy privately. Even so, most of the hi-fi available through the classified columns isn't so cheap that the phrase caveat emptor — buyer beware — can be ignored.

From a private vendor's point of view there are probably three reasons for selling hi-fi: to upgrade, to raise some cash or because it is faulty. You should be able to weed out the latter category by insisting on listening to the product, either in your or his system. Check the springiness on suspended subchassis turntables, try all the potentiometers on amplifiers, look under grilles on loudspeakers, and if equipment is supposed to be used by remote control make sure this is tried; some functions can only be activated via the remote.

When it comes to CD players and cassette decks you need to be especially vigilant since the bill for a new set of recording heads or laser assembly has reduced many to tears.

Heads can last a decade if the cassette deck isn't used much, but you should expect them to last five or six years with regular use. Solid state electronics

"Undoubtedly many audiophiles use vintage equipment for nostalgic or aesthetic reasons and one shouldn't underestimate the appeal of open valves and the chunky styling which is beginning to crop up again in so much modern 'retro' design."



*A IIX in cosmic clothing; the Systemdek IIS is a good turntable from the early Eighties.*

shouldn't wear as quickly as moving parts, and if a laser is merely dirty this can be rectified fairly easily by someone who knows what they're doing. But skip right through a recording to make sure the laser will track to the outside of the disc.

One could go on; the point is not to pay for the boxed item without having seen it. Having said that, the presence of the original box is a good indication of how someone looks after his or her purchases and whether they respect the fragility of hi-fi equipment.

Vintage hi-fi is often underestimated here in Britain, but there is already a large market in Japan for some of the better known makes from hi-fi's golden years. In the Fifties and Sixties the advent of stereo gave impetus to the fledgling hi-fi markets which had been growing out of hobbyist roots since before the Second World War.

Amplifiers from Leak, Radford and Quad were matched with Tannoy,

Wharfedale, KEF or Celestion loudspeakers and the new 45rpm singles could be played, along with the old 78s and LP 33s, on a Garrard turntable.

During our series on Japan we discovered thousands of aficionados of this equipment. Many have been collecting records since the golden days of recording (before the multi microphone recording and manic editing practices of the Seventies), but their number is being swelled by younger audiophiles. In our August 1991 issue Ken Shindo, who makes exceedingly expensive valve amplifiers, claimed there were over 100,000 such analogue audiophiles in Japan. For many of these the ultimate system is built around revamped vintage equipment which Shindo often sources from Britain. He refurbishes and often rebuilds loudspeakers and record decks, making his own plinths, platters and tonearms.

Near to Shindo, in Tokyo's

Akihabara (see August 1992), a shop called the Audio Professor also sells vintage hi-fi equipment alongside new kit amplifiers priced from £400 to £2,000. The Audio Professor claims there are now around 300,000 users of valve amplifiers in Japan.

Undoubtedly many audiophiles use vintage equipment for nostalgic or aesthetic reasons and one shouldn't underestimate the appeal of open valves and the chunky styling which is beginning to crop up again in so much modern 'retro' design.

There are many people who will tell you that the technology of yesteryear was as good if not better than what is on offer today. Valve circuitry is often cited as being simpler in layout than the solid state alternative, and valve amplifiers are described as a necessary sweetener for CD's often abrasive sound.

Nor are the newfangled, small box, gold-dome, liquid cooled, bi-wired, spike-stood loudspeakers given much credence



## A few good points to remember next time you choose a hi-fi unit.

Point 1. The AX-R742 (that's the amplifier in the foreground if you're not into serial numbers) has the kind of startling features to impress the most enthusiastic hi-fi enthusiast.

Six pre-programmed graphic equalisations plus six more you can create yourself. And for those even more in the know, it can handle both moving magnet and moving coil cartridges.

Point 2. The high-performance single cassette deck (TD-R452) has a new high-tech

direct drive motor for purer sound. Designed to decrease vibration, the deck also includes CD direct, Dolby B/C NR and Dolby HX-Pro.

Point 3. The CD player (XL-Z452) has the unique JVC 1-bit PEM DD which delivers highly accurate sound. It's less prone to mistracking

and read-out error and includes an optical digital output.

Point 4. The receiver (RX-506) has a built-in graphic equaliser and Dolby Pro Logic Surround for cinema sound experience at home.

Point 5. Each unit has a COMPULINK control system so one remote can control all JVC compatible components.

Point 6. You don't need to understand it all, you do need to listen to it all.

# JVC

HI-FI + VIDEO + TV + TAPE

by these audiophiles, despite their chronic shortage of domestic space. Cone technology for loudspeakers was well established by the late Forties, just as valve amplifier technology was largely complete by the late Twenties: "What we have been doing since then is tweaking a little and experimenting with different materials."

Vintage loudspeaker enthusiasts will save up to buy a pair of colossal Vitavox, Wharfedale *Airedale* or Tannoy *Westminster* loudspeakers, some originally designed in the Forties, and sit back in their tiny remaining living space to enjoy the stunning transients and immediacy claimed for a well-executed paper cone design in a large enclosure.

Audiophiles the world over have felt forced into buying CD, due to the dearth of vinyl in the shops. More die-hard analogue enthusiasts are likely to limit their new technology purchases to some of the cartridges which have been developed more recently, and tonearms like the exquisitely engineered SMEs.

Vintage hi-fi fiends would almost certainly want to partner these with the classic Garrard 301, often cited as being superior to its 401 successor. It suffered from rumble in its original casing but men like Shindo build a massively heavy plinth for it and generally tweak the mounting. Like other Garrards, the 301 used a rubber idler wheel turning the inside rim of the platter and driven by a stepped (three speed) pulley. Aficionados claim that with proper mounting, and with this wheel replaced, the 301 is a good match for the Linn LP12.

The Japanese are keen enough to come to Europe to find equipment and The Vintage Wireless Company in Bristol is busiest supplying the far eastern markets, particularly with old vintage valves from the Twenties through to the Sixties. The firm also deals with old classics such as Leak *Troughline* mono or stereo tuners (the MKIII version is FM), Quad II mono power amplifiers, Garrard, Lenco and Thorens record players and a range of loudspeakers from the period.

Tudor Reece, who runs The Vintage Wireless Company laments that the hobbyist side of hi-fi has dwindled in Britain, but added that he is snowed under by demand from Japan. As an indication of prices Reece says he pays £80 for reasonable 301 turntables. "We totally refurbish them. It's a morning's work for



Shops specialising in older equipment are few and far between. In London the Music and Video Exchange in Notting Hill Gate deals in some vintage equipment (071 221 1949), and Used Hi-Fi in Paddington sells and repairs all manner of hi-fi (071 723 8545). Hi-fi specialist Radlett Audio, in Radlett, Hertfordshire sells both new and vintage equipment and offers a £200 virtual rebuild on a Garrard 301, as well as rebuilding tuners and valve amplifiers. "New" Leak *Troughlines* sell for £359 (0923 856 497).

Overhauls and spares for a range of early turntables, arms, cartridges and styli are also available from the Technical and General Company of Crowborough, East Sussex (0892 654 534).

The rebuilding of valve amplifiers is undertaken by Concordant Audio, of Barwell in Leicestershire which, for example offers the guaranteed *Exultant* upgrade on Quad IIs at £380 a pair (0455 843 752). Avondale Audio in Chesterfield upgrades transistor amplifiers, breathing new life into early Naim, Meridian, Leak and Radford equipment (0246 200 096).

New valves, including the highly regarded Golden Dragon range from China can be sourced from PM Components, of Gravesend, Kent (0474 560 521).

***Only buy old cassette decks from the brands that will be able to service them.***

an engineer," he adds, while not giving away the price at which he sells them on.

Many of the caveats of buying second-hand equipment apply equally to searching out the vintage stuff, but if you're willing to spend some time and energy hunting, there are many bargains to be found. Something like the *Troughline* tuner can be bought for as little as £20 and, reportedly, its performance on FM has to be heard to be believed. Quad and Leak pre and power amplifiers occasionally turn up at car boot sales for similar amounts, and dare I say it, at the sort of shops where you have to know what you're looking for.

Often such items are in need of repair and a few businesses specialise in such activity. New valves are the most common requirement and The Vintage Wireless Company claims to have three million vintage valves in stock. The equipment can also be upgraded by specialists, and although it's not cheap, the benefits to sound quality often disprove the adage that new is better.

If you are keen to do things yourself then a good place to start may be with one of Vintage Wireless' service manuals. The 25 year old company has one of the most comprehensive libraries on the subject and reprints are quickly dispatched (telephone 0272 565 472).



*This month our Aspirations team visits the Sussex home of a pop musician who wishes to remain anonymous. Dan Houston reports, with photographs by Chris Richardson.*

# Through **the** keyhole

**B**are steel and wood panelling provide the predominant design themes for this house set in the heart of the Sussex countryside overlooking the South Downs. It belongs to a musician who is unusually bashful in wanting to remain anonymous. He has lived here since March having had the house re-decorated during the previous six months.

As part of the refurbishment he commissioned a largely hidden hi-fi and video system to be run throughout the house using a bewildering array of high quality sources, amplification and loudspeakers interfaced with remote controllable Audio Access kit.

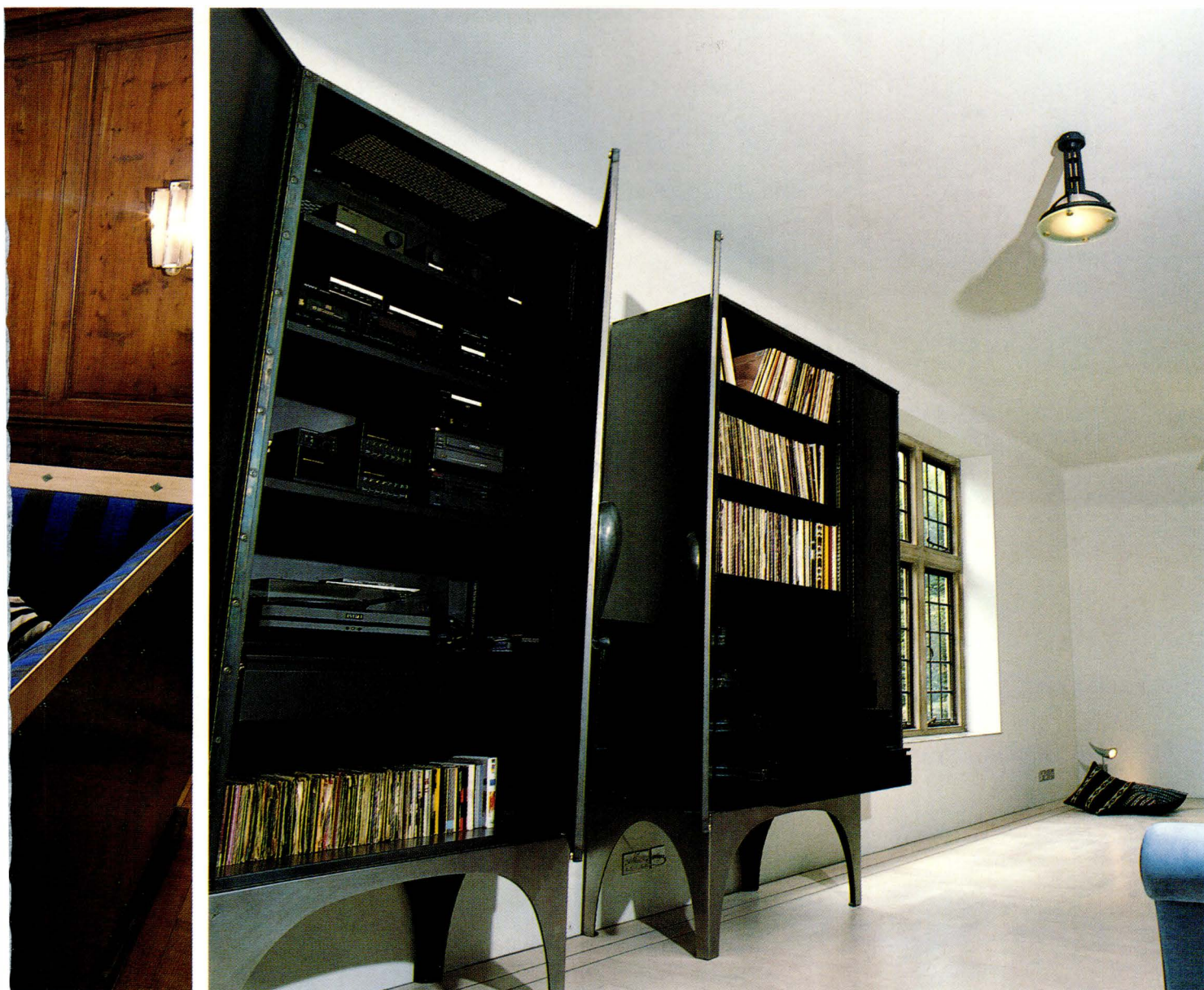
The £40,000 system has been split into two halves. On the ground floor it caters for the lounge, television room, office and kitchen, while from the converted loft sound is relayed to two bedrooms on the first floor.

The 1930s redbrick house is set in the middle of 42 acres of land, 12 of which are mature garden and woods. "It's always been in one family and many of the original fittings have been maintained which is what we liked most about it," said its new owner. "I was a bit dubious about moving here from London at first but now I really like the space and the quiet. The house was a bit gloomy, especially

with all the wooden panelling and heavy velvet curtains, so we have tried to de-gloom it by bringing in some contemporary metallic furniture and enhancing the natural light."

## **A little minimalism**

When the house was redecorated, which included laying down a few acres of bleached beech floor, the keyboardist and his wife had a problem in finding appropriate furniture. They were keen to maintain a minimal style, without curtains, carpets, paintings or too much furniture to crowd out the imposing splendour of the natural wood.



"When we started looking for pieces we found it very difficult to find what we liked, and what might suit the house," our host explained. "But then we gradually found people who could design things especially for us."

"It's lovely having things made for you," our anonymous star enthuses, "and in the end we found most of the furniture was being bought like that. One of the problems with buying ready made furniture was that the rooms were so large; normal sofas would just look lost in the music room. Even so Steven came down here to check his measurements because he thought the sofa would be too big!"

While the house was being redecorated it was wired for sound by The Cornflake Shop, which has hidden all the communications, aerials and loudspeaker cables behind plaster and panelling.

"I was bemused about how to put a decent music system together, and I wasn't aware that there were companies like The Cornflake Shop who would do it for you. Also from my previous experience I felt that hi-fi dealers were pompous and

***Cabinet meeting. Software and hardware stand poised and ready for use in specially built shelving units.***

stuffy," he says. "But this experience has been like a breath of fresh air."

It was decided to put one system in the office, which is where our host spends most of his time, and use American Audio Access zoning equipment to give comprehensive use through the music room, the TV room next door and the kitchen. A second system housed in a relaxation area of the upstairs gym would also cater for the master and second bedrooms. Neither system can "talk" to the other but this isn't felt necessary at present.

While the guts of the system are housed in the office, the best sound can be heard in the music room where Monitor Audio 1200 Gold floorstanding loudspeakers are installed. These were chosen as much for looks as for sound quality, their black lacquer finish matching the grand piano.

With the system in standby mode any of the sources can be chosen using an infra-red remote control which talks to a

sensor on the wall. By the same token you can skip tracks on a CD, or jump preset channels on the tuner and listen to the sound of a TV channel as well as controlling the room's own volume via Naim NAP power amplifiers in a nearby cupboard.

Two CD players were installed for the ground floor, a Meridian 206B Bitstream version for quality listening and a Sony ten disc magazine CDP C100, the sort of thing you fill on Sundays for a week's listening. But if you were sitting down to listen long term, and wanted the capabilities of the Meridian, it would mean running to the office, at the other end of the house to change discs.

"It does take some preparation," the elusive owner conceded, "but the system is flexible so if I wanted to make life incredibly cushy I could add more equipment or change it. We're still in the trial period of seeing whether it's comfortable at the moment."

As mentioned, the power amplifiers for this system are housed out of sight in a cupboard near to the loudspeakers. "This

# THE LISTENER



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 **SENNHEISER**

is because we don't want Naim amplifiers puffing away down long lengths of loud-speaker cable," Steve Moore of the Cornflake Shop said. Speaker cabling is commensurate with the rest of the equipment, being Naim *NACA5* to the Monitor Audio loudspeakers and QED *79 Strand* for the other loudspeakers.

While the music room may have the best sound, it is a large space with hard walls and floor, and so creates a live acoustic which might be helped by soft furnishings. A rug has therefore been commissioned from Annette Nix, who sews metal-plate cutouts into her woven designs, not the sort of thing you'd want to roll around on naked in January, but nevertheless complementary to the other designs in the room.

In the office the most impressive pieces of furniture are Steven Povey's steel cabinets. There are three of them — two either side of a Bang and Olufsen TV — which house the system and records, CDs and tapes, and another built especially to store VHS video tapes.

The cabinets are huge, imposing and deep with shelves and drawers especially designed for equipment or CDs. Vents at the back allow air to circulate which keeps the system cool when the doors are closed. These are essential according to our host, who prefers not to look at the black and grey boxes that inevitably seem to clad hi-fi components. Above a steel bookshelf on the wall a pair of white Acoustic Energy *AE1* loudspeakers look innocuous but provide some of the meatiest sounds available from small monitors. These are locally run by Naim amplifiers and probably used often as the living room system.

Apart from the CD players, the sources here include a Roksan *Radius* turntable with *Tabriz* tonearm, a Nakamichi *1.5* cassette deck, Meridian *204* tuner (with a timer) and a Denon *DTR 2000* digital audio tape machine which is useful for listening to his own studio master tapes as well as those of the band.

The record collection is comprehensive and reflects classical as well as modern taste. Favourite composers at the moment include Philip Glass and Michael Nyman while he cites Kraftwerk as being the nearest thing to his musical heroes. "But I don't like to hold people in great esteem, and I like a whole cross section of music in different styles. I was classically trained," he says, "and I occasionally like to dig out musical scores to see if I can still sight read them. But I don't seem to get the time to play here every day," he adds, "I've been off recording recently and I'm starting work on my own 24 track digital studio in one of the cottages.

"I like listening to music and at the moment I'm doing a lot of that here, as well as watching TV. But when I'm working I don't listen as such, it tends to be more referring to music in the studio and then sampling it and taking ideas."

The system downstairs has to compete with that upstairs for pleasurable listening. Here the whole space under the eaves of the roof has been dedicated to a gym. Even that makes it sound smaller than it is, with its Jacuzzi, showers, flotation chamber and relaxing area with black leather seating. It is reached by a small wooden panelled lift which serves all three floors.

### Interior monologue

Like the rest of the house the gym was conceived by the owner himself: "I'd much rather coordinate with a builder," he says, "instead of getting an interior designer in who would be dictating how you're going to live in your own home."

Here, in-wall Boston speakers and Roksan *Hotcakes* make a good job of filling the space with sound while some waterproof Boston *Voyagers* can provide suitable musical backing to the sensory deprivation of spending some time in the blood warm flotation tank. If less salubrious than downstairs, the source equipment is nevertheless capable with a Rotel *RCD 965* CD player, Rotel *RT950* tuner and Sony ES DAT machine. Amplification is again by Naim for some Royd loudspeakers in front of the leather seats while a four channel Yamaha *MX35* powers the smaller loudspeakers.

Communications cabling has been run from the gym to two bedrooms on the first floor. The first of these is our host's and contains a colossal bespoke bed made for

him by Detail. From its plush confines he can watch television or listen to music through a pair of Royd *Sintra* loudspeakers. In this room a further, entirely local system can also be used, obviating the dubious pleasure of having to go upstairs to put on a CD. A cupboard next to the bed houses a Nakamichi *BX300E* cassette deck, Rotel *RCD965* CD player and JVC *HRD910* VCR to use with the B&O TV. These sources are patched in to the Audio Access circuitry as an add-on to the set-up in the gym.

There is a learning curve to be negotiated when using a system as extensive and complex as this, and although the hand-held remotes and wall keypads are logical and simple in terms of layout, getting to know your way around a system that you cannot see requires some concentration.

The Cornflake Shop supplies its own 'Idiot's Guide' which takes a lot of the fuss out of the electronic navigation, and all the equipment is sensibly labelled telling you what does what. The beauty of this system is that it is hidden but does not compromise on sound quality. It is flexible enough to add on extra 'rooms' as well as better, or different equipment as you wish.

Hi-fi like this won't appeal to everyone. It is very much a hands-off design. But if you like having one remote control which caters for everything, both aural and visual, and if the idea of having sound anywhere you go at home appeals, then this must be one of the best systems around.

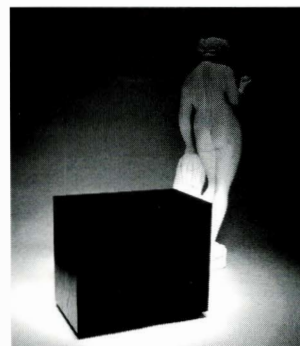
### System supplied and installed by:

The Cornflake Shop, 37 Windmill St, London W1. Tel: (071) 631 0472.



*Bed and boards. Beech flooring highlights stark black hi-fi and furniture.*

## Rock Bottom



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Noel Keywood in his review of the STADIUM in *Hi-Fi World*, June 1992.

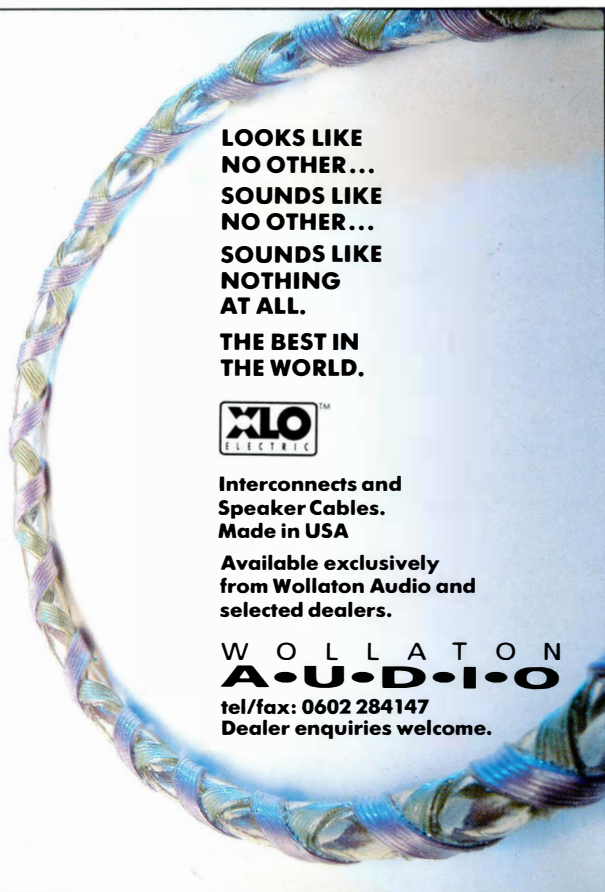
REL's Active Base Controller not only gives deep fundamental base if present in the music, but magically enriches *all* music with the deepest harmonics that most speakers cannot reach.

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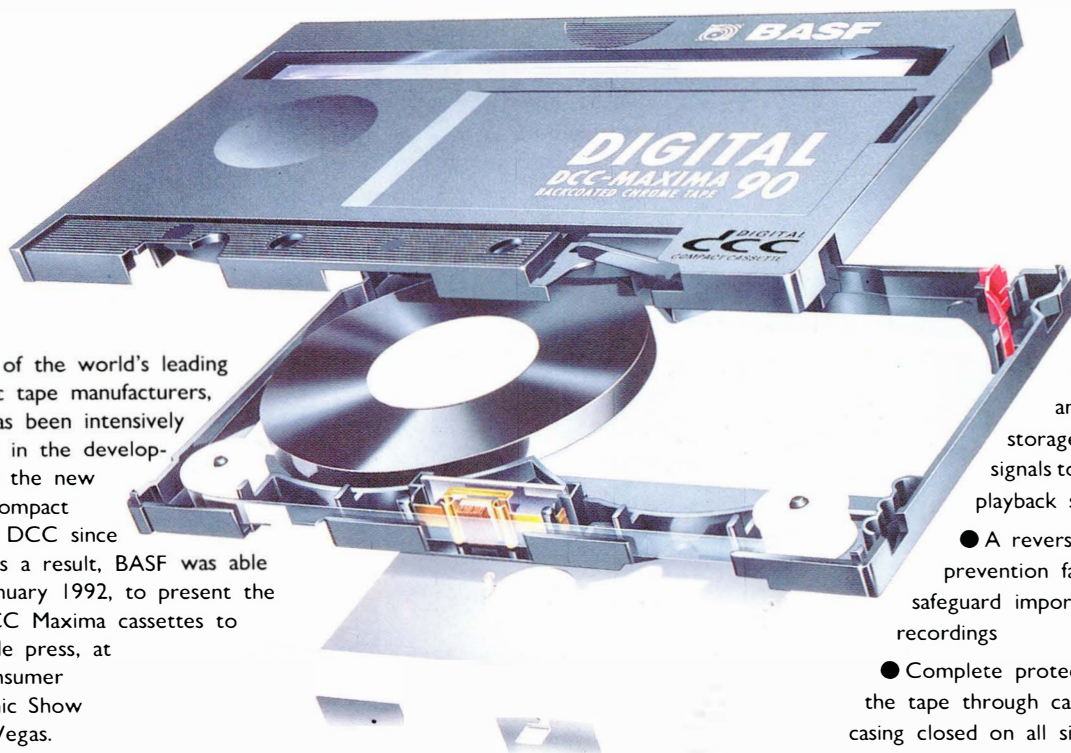
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# Readers Write

CHOICE ANSWERS

## Imaging versus domestic harmony, an audio conflict

I would like to pose a question concerning a possible upgrade to my current hi-fi system. My current system is composed of the following: Pioneer PD8700 CD player, Teac V5000 cassette deck, Dual 505-3 record deck, Yamaha TX400 tuner, Rotel RA810A amplifier, KEF C200 subwoofers with JM LAB Laureate speakers as satellites.

The French JM Lab speakers resemble Mission 760s with the bass driver above the tweeter. I find they are a better match than the KEF C15s for the subwoofers, reducing the emphasis on the latter.

My main sources are the Pioneer and Teac — the record deck collects dust. Because of domestic considerations the JM Lab speakers are high up (10cm from the ceiling) and not symmetrical (they are against different walls). The subwoofers are below and slightly to right of the satellites. I am reasonably satisfied with the sound but



Canon S-50s, eager to provide wide angle sound.

would like a larger soundstage to the music (classical/jazz/new age). One choice is to upgrade the amplifier but I'm not convinced this would really make a significant difference.

Would I be better off changing

the JM Lab speakers for one of the recent "wide-angle stereo" types (Canon S-50, Acoustic Research M2). This would perhaps help the odd placement of speakers I'm obliged to live with.

Eric Stein, Villejuif, France.

The Canons seem like a good solution but they are not designed to work up against the wall and will create a bass heavy sound if used there, especially if they are near the ceiling as well. One radical but potentially effective approach might be to install in-wall loudspeakers (in more suitable positions than 10cm from the ceiling) but these are still largely unknown beasts when it comes to absolute sound quality, they may not match the qualities of your JM Labs.

Possibly the only hi-fi solution would be to find some satellites which look so good that you won't mind having them in more suitable positions.

## A bit more verve for the system

My system consists of a Pioneer A-400 amp, Denon DCD-660 CD player, Denon DRM-650 tape deck, Denon TU-260L tuner and a Rotel RP-855 turntable. Presently it sounds rather lacklustre via a pair of Wharfedale Diamond IIIs.

Having listened to several models of speakers, I am still undecided, especially since listening to the Diamond IVs, which seemed to lack the bass of my Diamond IIIs. I can only

put this down to the acoustics of our living room, which is approximately five metres by eight metres, but open plan.

The speakers are presently wall mounted but I eventually intend to have my next pair on stands. A regulating factor will be size, they cannot be too large. Budget is not particularly important (within reason) as long as a bit

more verve can be brought to my system. I listen mainly to rock and pop via CD and LP. S J Wibberly, Wickersly, Rotherham.

Verve huh? In the budget arena the AR M1 (£200), JPW Sonata (£115), Cyrus 780 (£180) and Rogers LS2a/2 (£209), are good bets, further up the scale try

the JRT AD1 Micro (£389), any of the small Royds (£200 - £330) or the SD Acoustics SD3.

The above are capable of reproducing verve if it's coming out of the amplifier in the first place, and with an A-400 it should be. Make sure the cables, stands etc are up to the job and you should end up with a good rockin' system.



Rogers LS2a/2s may be just what the audio doctor ordered.

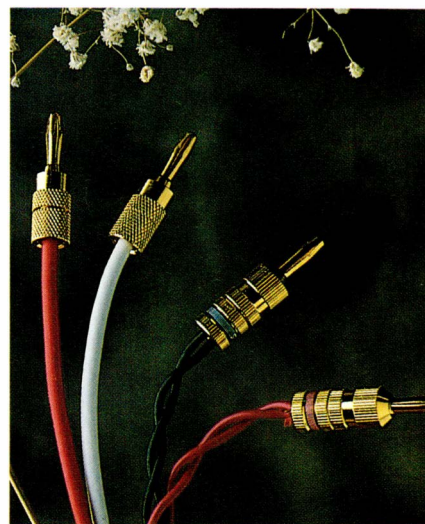
## The search for decent cables

My hi-fi system is made up of the following components; Marantz CD50 CD player, Cyrus II amp and KEF 103/3 loudspeakers. The connections are made with Chord Co interconnect and Mission stranded speaker cable.

The speakers are the latest addition to the system and when I bought them the dealer included the Mission cable commenting that it would suffice until I bought some "decent" cables.

I am delighted with the vast and natural soundstage my system creates, but I've been thinking about what the dealer said and would welcome your advice on some "decent" cable to replace the Mission.

Neil Hodder, Loudwater, Bucks.



Ready, willing and cable. Get your speakers decently connected.

Presumably you haven't seen the speaker cable supplement that was given away with the August issue. It's positively bulging with recommendations to suit every pocket. We found only two cables worthy of Best Buy status and one of them was the Mission that you use. Which means that you are going to have to spend a reasonable amount to better it.

We could trot out the names of some of the more affordable Recommended cables but it would be a lot more logical for you to read the supplement and select the cable which sounds as though it will enhance your system in a way that suits your taste.

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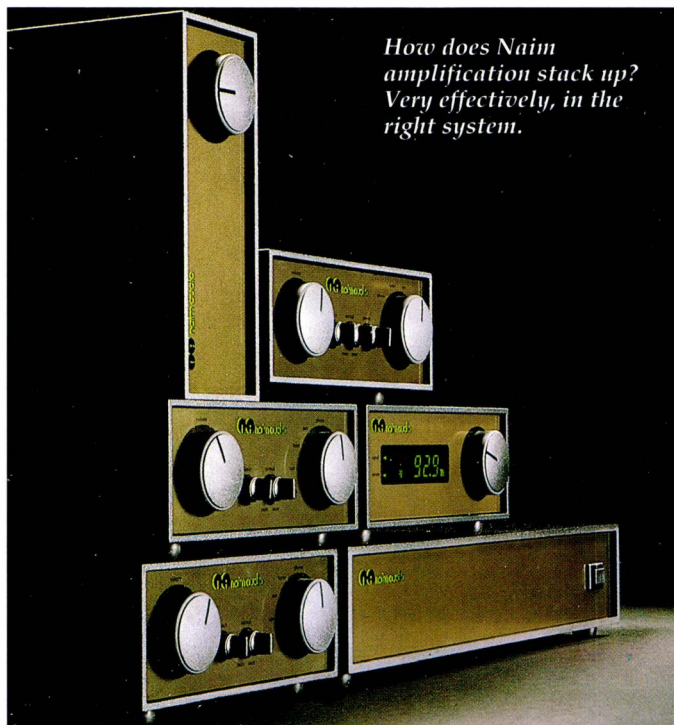
## Searching for the perfect partner for Epos ES11 loudspeakers

At this moment my system consists of a Rotel 855 CD player, Rotel 840 BX3 amplifier, Epos ES14 speakers, and Micro DD31 turntable with Stanton 681 Mk2 cartridge. I use CDs 90 per cent of the time.

I have a fairly large irregularly formed room, and I am satisfied with the sound. However, I should like to upgrade my system, and my dealer told me to start with a new amplifier.

Since the speakers seem (as you wrote) to be system sensitive, I should like you to advise me on what to buy. I have about £400-£500 to spend. Is it sufficient to replace the amplifier, or should I replace the CD player too? (The Pioneer A-400 and Audiolab are not available in Holland.)  
George van Ravenswaay, Volkel, Holland.

*Given that the ES14 isn't the easiest speaker to match well I decided to take a very small poll of dealers opinions, and got a variety of suggestions. However, one choice kept coming up and that was the Naim Nait 2 in its CD form. This is Naim's only integrated amp and costs £420.*



*Since the ES14 was developed around this style of amplification it would seem to be a natural choice. Its only slight drawback if you're a headbanger is that it won't go very loud. But I stress*

*the very.*

*There are alternatives, of course, and you should compare a few of them with the Nait. Try the Cyrus II (£350), Ion L100 (£300) and the Linn Intek (£398).*

## Want more from your system?

My current system comprises a Valhalla'd Linn LP12 with an Ittok LVII and a K18, the amplification being provided by Exposure VI, VII, Super VIII, and speakers are Linn Index Plus.

The music produced is very pleasing, but as with everyone bitten by the hi-fi bug I'd like more. Logically, the next step would seem to be to upgrade the record deck power supply to the Lingo (the convenience of 45rpm alone is worth a lot). It's the step after that I'm a little unsure of. Arguably I should replace the Ittok with an Ekos, but I've only just bought the arm, secondhand in good condition for a good price, and it matches the age of the deck (about three years old).

I feel that even now the speakers are probably letting the rest of the side down, in the context of the system, and it is here that I should concentrate.

Having looked through the Directory many times, choice would seem perhaps a little limited, if varied. Obvious recommendations would be Linn's own Kaber, and Audio Note's AN-E/B. Others may include the Epos ES14, Royd Apex and Castle Chester. However, I'm unsure as to the compatibility of some of these speakers with my system, and indeed how much improvement they will make. The sort of improvements I am after include more detail and clarity (especially at louder volumes), greater invisibility and more "realism". Which, if any, of the above are likely to best satisfy me and are there any I haven't thought about. Indeed, am I even looking at the correct weaknesses?  
Simon Chambers, Doncaster.

*I'd say that the speakers, and to a lesser extent the cartridge, are undoubtedly the weakest links in your*

*system and would advise that you listen to some of the models you've shortlisted without delay. They are all good speakers but a couple of them are likely to be better suited than the rest. The Epos ES14 for instance was designed with the LP12 in mind and does seem to have a magical synergy with it. Another model which we tested lately and seriously impressed Linn user Paul Messenger was the Audio Note AN-J/B (£799) which will satisfy most of your requirements with ease.*

*Before you get embroiled in the multifarious turntable upgrades available for the LP12 I'd suggest you seriously consider a cartridge upgrade. You will find that with more transparent speakers the slightly brash character of the K18 will be fully revealed. Consider one of Linn's moving coils, a Dynavector 17D2 (£280) or even an Audio Note IO (£1,295) if funds permit.*

## All you need is faith

Will you please help? I am in the market for a quality stereo system and having looked at what there is on offer I still find myself unsure.

Different dealers push different makes for all the obvious reasons and I feel I need your assistance. My choice at the moment would be a Technics system, using the top models in the range, ie the best turntable, best amplifier etc.

My first choice here was the Technics Digital Reference system but I have now been told that this range has been discontinued.

I am prepared to spend up to £5,000 on a proper system, and have vast amount of vinyl which requires cross recording.  
B A Smith, Batley.

*With this sort of budget your money would be better spent on separates from different brands, rather than going for a system from one company.*

*It's not easy to pick a system which would be perfect for you, however. More information about the circumstances of its use and the sort of volume levels you want to listen at are really necessary, not to mention your tastes in sound and music.*

*We would suggest you spend a bit more time with a few dealers and listen to the products they have to offer. They're not just out to clear stock from the shelves; some of them genuinely care about the results that they achieve. After all, if they don't give you what you want then you're not going to go back for more. Perhaps you should give some of them a second chance.*

*Having said that it's good fun putting together systems that we'd choose for the money, so we offer you the following list: Voyd Valdi/Moth/Roksan Corus Black record player, Meridian 200/203 CD player, Nakamichi Cassette Deck Two, Audio Note Oto amp and Audio Note AN-J/B loudspeakers should bring you close to the budget and sound superb.*

# Extrema



Sonus Faber's inert Poly Stratum cabinet system — a patented sandwich construction with solid walnut wood and black satin lacquer finish

Extrema has been described as 'one of a handful of loudspeakers which qualify as legends'. *Hi-Fi News & Record Review* warned: 'this'll take your breath away'

(Ken Kessler, October 1991).

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**Minuetto**

# Write on . . .

*What do you think about the way things are shaping up in the ever changing 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.*

## Fusing and using confusion

I decided to start buying *Choice* because I like the way you give technical detail on the products you test; as an electronics engineer I'm into all this stuff.

However, I'd also like to bring up a few observations. I've heard and read a lot about

using gold plated mains sockets and plugs and heavy duty mains cables on hi-fi equipment. The idea is that the mains power reaching it will be as pure as possible. But what about the fuse? You have

just replaced your mains sockets and plugs, using all gold contacts then you fit a fuse with cheap metal contacts. Is it possible to get a gold plated fuse? Do some fuses sound better than others? And can you get a better sound by replacing a three amp fuse with a 13 amp?

And what about inside your system itself? What if you replaced the one amp fuse in your amplifier with a six inch zinc galvanised nail?

D Mawtus  
Harrogate.

*Firstly and most importantly, anything like that nail trick is*

*the sort of life threatening activity which earned a skull and crossbones in our recent pocket guide on tweaking (June). Similarly we stress that it's not safe to use incorrectly rated fuses with any product.*

*As for sound quality, the fuses inside an amp are said to have a major influence while those in a mains plug are supposed to make a smaller but noticeable difference. Cleaning the contacts is often audibly worthwhile.*

*If you are interested in pursuing gold plated fuses (and indeed mains plugs) then try Colin Wonfor at Incatech on (0460) 406 38.*

## In one ear, but not the other

I have a problem which I have yet to see discussed in any of the hi-fi journals I take, which of course includes yours

I am somewhat deaf in the right ear and obliged to use headphones for most of my hi-fi listening. I have not encountered an amplifier which provides independent controls for each ear of the headphones and the balance controls never seem to include the headphone output. My dealer appears unable to help; can you? And is there a solution (short of surgery)? I imagine there are quite a few folk out there with a similar problem — which, as politicians are fond of saying, needs addressing.

D C Turner  
Preston.

*There is no need to resort to surgery. Help is available in the form of a brand new product from those clever people at QED.*

*The MB45 headphone amplifier comes with balance as well as volume controls and retails for around £75. QED can be contacted on (0276) 511 66.*

## Fishing for tuners & personal CD

On looking through the *Directory* I am struck by what I feel is a serious imbalance in *Choice's* reviewing policy on tuners. Surely this major source warrants more attention? So how about 25 or so new models?

I also have a request which stems from lack of space. I plan to buy a *Pro Walkman* and also need a couple of recommendations for a portable CD player to use mainly with my system.

Lastly, regarding the proposed cost of DCC software, £12 is far too much. Surely it is easier to produce quality digital information than quality analogue information. As for the continued high price of CDs, it's disgraceful simply on the basis of economy of scale.

Rob Howell  
Cornwall.

*Hopefully the two part tuner review we've just completed (July and August) will go some way to appeasing your craving for music from the airwaves. Regarding a portable CD player I'd look no further than the Aiwa XP-6 (£150),*



*which is extremely small, well built and sounds good. It also comes with an even smaller (and very useful) remote control. We reviewed it back in May.*

*And as for your comments on the prices of the music industry's digital products, what can we say? We heartily agree.*

*The moody wet-look Aiwa XP-6 provides notably good sound along with the tiny size you expect from personal CD players.*

## Music at the centre of your life

Over the past 20 years I have owned and enjoyed three different music centres. Now once again, because of a burglary at my home I find myself in the market to purchase a replacement.

I have visited my local electrical dealer and I have now had so much conflicting advice from different sources that I am even more confused than when I started. Can you help me?  
M D Stephenson  
Doncaster.

*Normally I pass all the music centre queries over to Jason Kennedy. But in this case, the answer is straightforward enough: check out next month's issue with its in depth reviews on mini systems.*

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Covent Garden Records, WC2 071-379 7635  
Deans, W2 071-723 4630  
Desgate/Galaxy, E1\* 071-247 0567  
Francis, Streatham 081-769 0466  
Harp Electronics, W1\* 071-636 4611  
Hi-Spek, N3\* 081-349 1166  
Hi-Way Hi-Fi, W2\* 071-262 9267  
Hyper-Fi, Barking 081-591 6961  
Massey, Chiswick 081-994 1317  
Studio 99, NW6 071-624 8855  
Tempo, Kingston\* 081-547 0404  
Woolfmans, Ilford\* 081-553 2587

## South East

Adams & Jarrett, St. Leonards on Sea 0424 437165  
Audio T, Enfield\* 081-367 3132  
Brittain & Hobbs, Sheerness\* 0795 665 512  
Chew & Osborn, Epping\* 0992 574242  
Jenners, Tenterden 0580 63230  
Sevenoaks Hi-Fi, Sevenoaks\* 0732 459556  
Smythe & Barrie, Eastbourne 0323 29192  
Standens, Tonbridge 0732 353540  
Vernon Collard, Rayleigh 0258 772237  
VJ Hi-Fi, Folkestone 0303 56860

## East Anglia

Hughes TV/Audio, Lowestoft\* 0502 585 611  
Levett & Ward, Colchester 0206 210 844  
McCullough, Cambridge 0223 426766  
Rose & Wright, Bury St. Edmunds 0284 764 586  
R. C. Snelling Ltd, Norwich 0603 712 202  
Tavistock Hi-Fi, Bedford 0234 356323  
Whealers, Kings Lynn\* 0553 774 037

## South

B&B Hi-Fi, High Wycombe\* 0494 535910  
Bryants Hi-Fi, Aldershot 0252 20728  
Burden Electronics, Swindon 0793 490613  
Churcher Audio Video, Worthing 0903 230558  
Vic Climo, Maidenhead 0628 21765  
Cosmic, Weybridge 0932 854 522  
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Power People, Bicester 0869 320280  
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Suttons, Salisbury 0722 327171  
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# 21st Century Fox

**W**hen is a delay not a delay? When it is "adapting the launch scheduling and distribution". So reads the Orwellian doublespeak used by Philips in its July 30th announcement to the press in the USA, confirming trade rumours that the DCC launch was being delayed. Needless to say Sony in the US was quickly rubbing its hands with undisguised glee over this unsolicited fillip for Mini Disc.

As far as I can decode the various statements floating around, the situation is this. The Philips DCC 900 deck is being made by the Marantz factory in Japan. Around 50 have been shipped to the UK, for review tests and demonstrations. Similar quantities went to other European countries.

*Digital Compact Cassette appears to be stalled on the launch pad. Barry Fox asks when DCC will really take off, and questions the price of blank, recordable Compact Discs.*

The major record companies, BMG, EMI, MCA, Polygram, Sony and Warner, had all been alerted to the delay. Philips had planned to make an announcement at a financial press conference held in Eindhoven on August 6th. But within hours of hearing about the delay the record companies had leaked it to the press and market analysts. Hence the need to put out a statement and hence the vague dribble put out in America. This waffled that "Philips expects to have sufficient quantities for a full-scale introduction well before the Christmas selling season in the USA, Japan and Europe (with) 1992 European introduction (targeted) to four markets, United Kingdom, Germany, France and the Netherlands".

Significantly Jan Timmer used the D-word when he answered questions at the conference. He was also refreshingly frank:

"They say that an accident never comes alone. There has been an excessive reaction to the delay on introduction of DCC in some markets. People say, if only you hadn't mentioned the date, if only you had just said the autumn. And yes, they are right. We have made difficulties for ourselves. We have shot ourselves in the foot. It is a pity that this has happened. But there is no real problem."

In the meantime, Philips will be shipping up to 250 players into the UK, so that every shop committed to selling DCC will have at least one player available for working demonstrations.

So in many respects this puts Philips back to where they were early in 1992, promising an April launch of limited scope. We then saw Philips delay the launch until September, while refusing to use the word "delay", and justifying the time slip by saying it was better to wait until September and blitz all countries with plenty of stock. The interim period, April to September, would be used to create a buzz of enthusiasm.

The buzz has been buzzing in Europe, but certainly not in the USA where there have been no players for reviewers and the industry group formed

to promote DCC across the country ended up with just \$30,000 spare to spend. At the same time loose mouths inside Philips in America had dug themselves into a pit. They had said that Philips would not launch DCC until the US Congress had passed the proposed law to tax digital tape, and so legitimize sale of a digital recorder. The Bill got bogged down and the chances of legislation before launch in September evaporated. Hence the cooling of Philips' push on DCC in the USA.

After the fiasco of the April launch delay, the press found that most of the promises made by Philips had been verbal. It was for instance very hard to tie audio MD Wim Wielens down to any written commitment to April. We all knew we had been told April, but could not prove it. So when Philips' own newsletter, "DCC News" contained repeated written commitment to a September launch, complete with accompanying picture and quotes of Wim Wielens, the trade and press felt that the September date really was cast in a tablet of stone. I for one quoted Wielens' personal commitment as safe evidence that the September date would not be missed.

So when I heard that Philips was "adapting the launch scheduling and distribution", I sent personal faxes to Wim Wielens, asking for his personal comment. I also asked what he thought the press should do next time a Philips MD made a firm commitment in writing. Should we believe it, and if so why?

No reply yet.

## What standards battle?

Meanwhile, despite all the talk by Philips and Sony about there being no standards battle, and despite the complete discrediting of market research by the last election, both companies have done market research into what the public wants. Needless to say, Philips' research proves conclusively that DCC is going to be very popular; 55 per cent said they would definitely or probably buy DCC, with only 27 per cent saying the same of Mini Disc. Sony's research had 62 per cent preferring the idea of Mini Disc and 33 per cent wanting DCC. What neither company asked was the most significant question, how would people like a recordable version of the conventional CD instead of either DCC or MD?

They are going to have to ask it soon. Kodak's Photo CD went on sale in London, a month ahead of the September 1st official launch date. The retail price of blank Photo CDs, which are nothing more or less than blank write-once recordable audio CDs, was — as predicted — £4.99 including VAT. These are one-off prices and they match the price of a DCC or MD blank.

Kodak's pricing policy has clearly made Taiyo Yuden hopping mad. Taiyo has been selling CD-R blanks to professionals (eg studios) for 40 DM wholesale, in bulk. This equates to nearly £15, meaning a retail price of around £30. People keep asking Taiyo how it can justify the price differential. Of course Kodak is cutting margins, or even loss-leading. But the effect is the same. The baseline price for a CD-R blank is now under a fiver.

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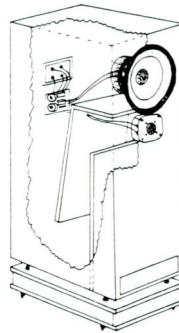
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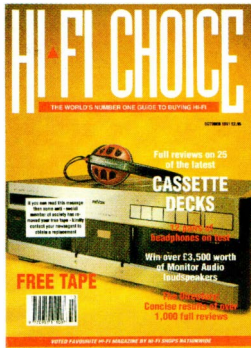
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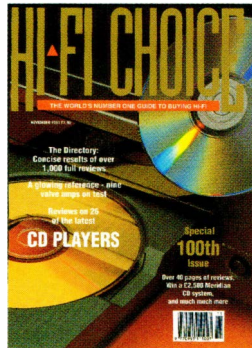
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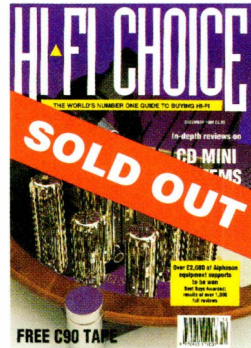
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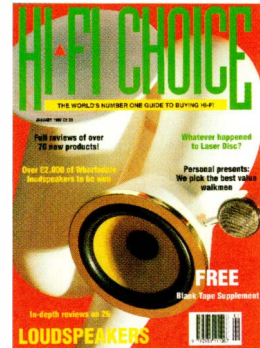
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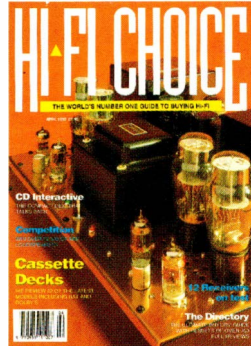
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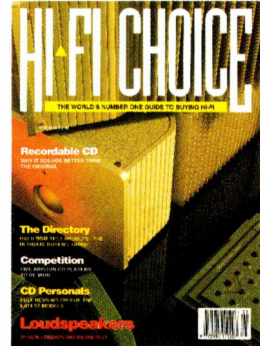
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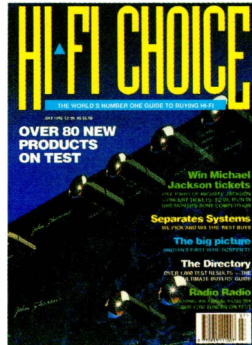
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### The questions

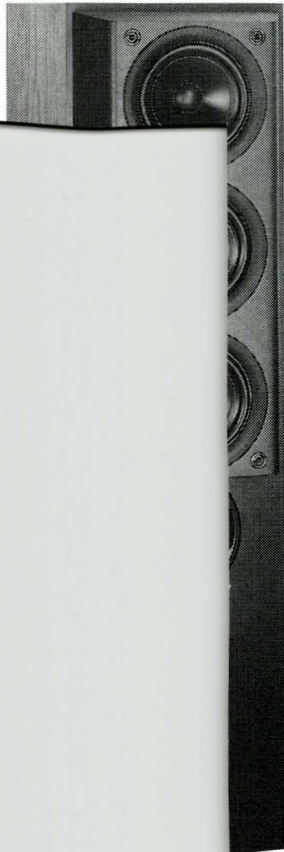
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1. In what country are Copland amplifiers designed?
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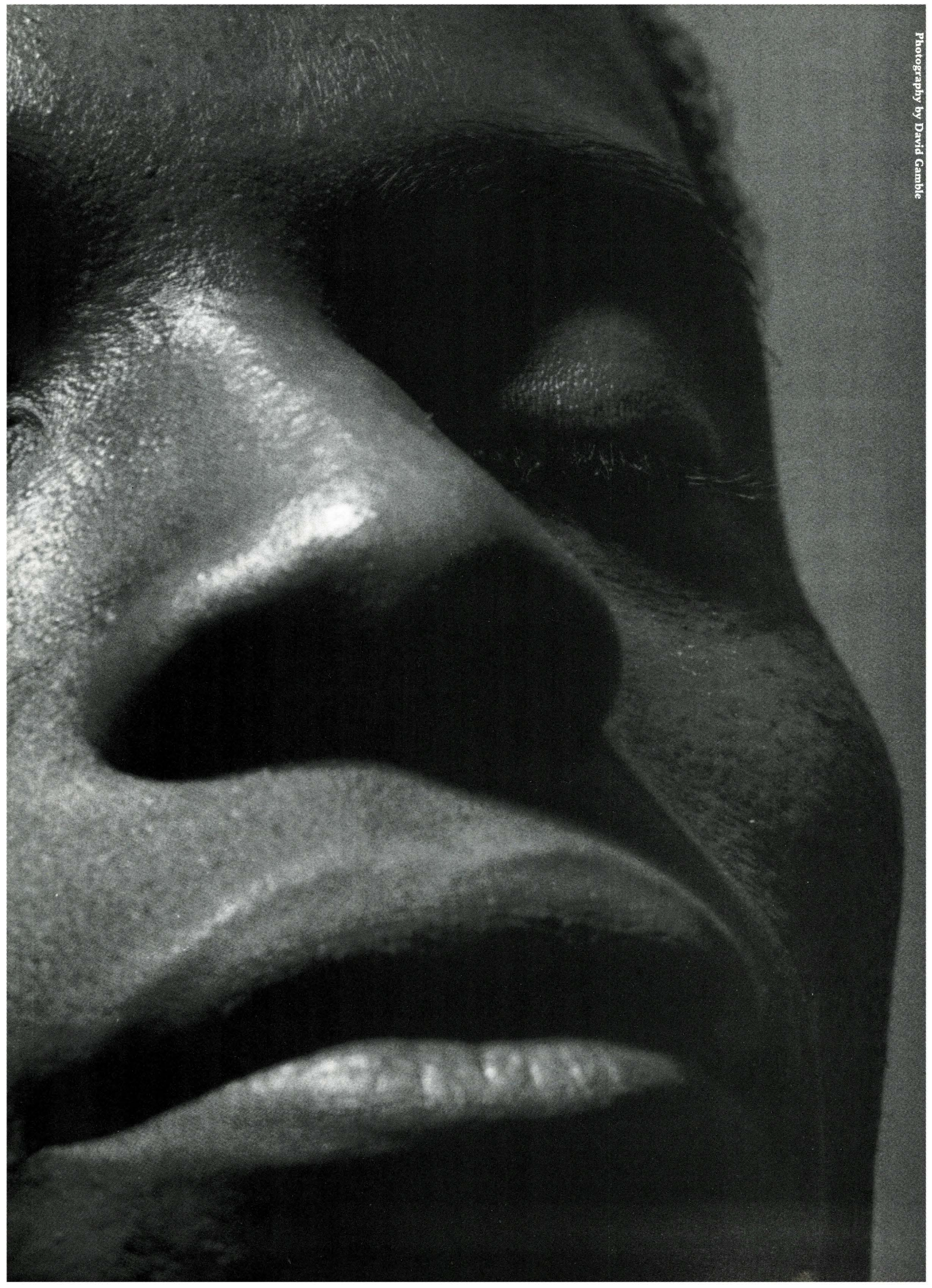
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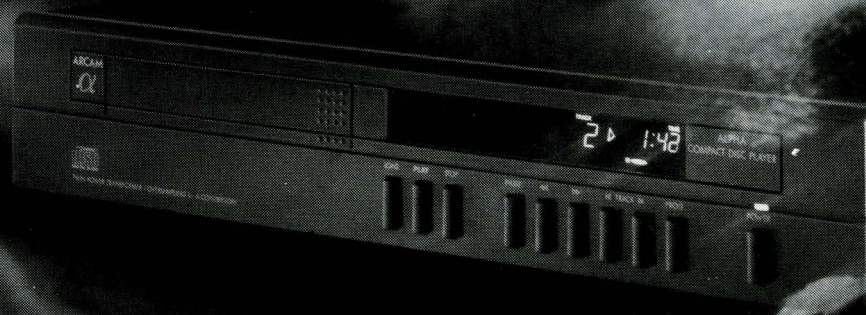
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# Choosing and Using . . . Cassette Decks

**T**he title of this page is becoming increasingly hard to sustain. Not that there's any problem with the idea of cassettes decks as a breed, or of choosing one as an occasional diversion from the usual daily routine. The difficulty of course is that where there were only two basic choices for those wanting a recording medium for use in the home - it had to be a cassette deck or another cassette deck - this is no longer the case. There is DAT of course: bowed and far from being a success commercially, the medium is sustained by the studio market and refuses to lay down and die. Soon there will be DCC, the first example, of which is also reviewed in this issue. Mini Disc is also scheduled for launch this year, and if MD is primarily designed as a contender for the car and personal stereo arena, it remains likely to prove attractive as a general purpose medium quality recording medium, and a real threat to compact cassette and DCC.

All of this makes the future difficult to predict, but there is an important and perhaps rather unexpected

*The world of domestic recording is getting more diverse and complicated every day, Alvin Gold outlines the options and tells you what to look for in a cassette deck.*

point buried underneath all these facts. Consider how enduring the humble compact cassette has become. It's over quarter of a century old, its technology is way over the hill, but every attempt to replace it has flopped ignominiously. The question that must be asked then is this: do any of the current batch of contenders have what it needs to succeed the humble analogue cassette? Let's turn the question on its head and ask instead what is it that has made the cassette so enduring. Surely it has a lot to do with its simplicity, its cheapness and that fact that just about everyone on the planet knows what a compact cassette is and how to make it record and play. More than even Compact Disc, compact cassette sound (for all its limitations and idiosyncrasies) is the lingua franca of the casual listener. This may change, and it is encouraging to find that DCC and MD are inherently less expensive than DAT, but it is far from clear that they really have the wherewithal to replace compact cassette.

## Dolby S

I have written fairly dismissively in the past about the prospects for Dolby Labs latest cassette noise reduction process. I also felt that Dolby S was probably too late to have much impact given the imminent launch of the rivals discussed above. Only one of the new decks tested in this issue (from Arcam) includes Dolby S, and it is a moot point whether it particularly

benefits from its inclusion (under most conditions of use, the ubiquitous Dolby B sounds more transparent and less manipulated). Even so, there are suddenly grounds for thinking that Dolby S may come to have more importance than I and some others had previously suggested.

There are two reasons, one of which is the adoption of Dolby S processing for prerecorded titles to be produced by a number of important record labels. The other is the fact that Dolby S recordings do play back quite successfully through Dolby B relay equipment, and that the mild resulting compression is (a) accomplished without too many obvious side effects with most music material, and (b) it is actually beneficial with most personal stereos where sudden peaks can be damaging to the ears, and in cars where wide dynamics imply non-audibility during low level passages.

## Primary attributes

What other factors should you take into account? Obviously sound quality is a primary attribute, and is discussed fully in the reviews. Suffice it to say here that a good budget price deck (with the emphasis on 'good') costing say £100-£150, will be able to make recordings free of obvious problems like excessive noise, instability or varying pitch, at least when listening reasonably casually. However, something better will be needed for intensive use in a high resolution system, and you'll find rewards for paying extra.

One advantage of better quality cassette decks is that they make more of the tapes you feed them. It's surprising how noise free a sympathetically chosen deck and tape combination can be, and omitting noise reduction processing generally adds clarity and articulation to the sound which is, literally and metaphorically, less manipulated. Dolby HX Pro assists here, since it helps prop up flagging high frequency dynamics on musical passages recorded at high level, keeping compression at bay a crucial few decibels more than would otherwise be the case.

Metal tapes tend to be noisier (as well as being more expensive of course), and consequently it's harder to dispense with Dolby noise reduction. Nevertheless, metal tapes remain the best option for capturing music's solidity and dynamics since the nature of the recording process with metals is inherently less prone to compression.

Three independent heads — erase, record, play — are also part of the territory with expensive cassette decks. Reviewers love three head decks because they make testing a less complicated task, but they do very frequently sound better, especially where other decks are at their weakest, at high frequencies and high levels. Dual capstan transports are often used in three head decks, and generally this leads to improvements in wow and flutter, and in output stability.

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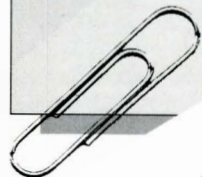
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# Akai GX-W45

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



**A**kai admits to being 'not keen' to produce twin decks, which it correctly points out are generally purchased for convenience reasons first, and quality ones a very poor second. The GX-W45 is intended to elevate the sound quality of twin decks, at a price of course.

The remote control-equipped £299 GX-W45 has Dolby B/C/HX Pro, normal and high speed one-button dubbing, plus sequential play and track search, and is supported by good quality record level meters and fixed level headphone monitoring. Unusually, both transports are auto reverse capable, which means the deck can make recordings lasting as long as four hours. Parallel recording is also possible, and end of side recognition is optically triggered to minimise continuity losses. More specialist features include a 'character' mode switch, which makes recordings that are pre-equalised to sound better on personal stereos and in cars.

## Lab report

Wow and flutter hardly varied between the two directions. The raw figures are poor, though the spectrum analysis implies a more stable performance than, say, the Yamaha KX-W362.

The deck has good head lineup and low azimuth errors, but the record/play results with Type II and IV tapes all favoured the treble and could not be ironed out by adjusting the bias control, mainly because this Akai doesn't have one. Bass rolls off a little early, but is largely free of contour ringing effects which implies careful optimisation of head geometry.

Type I tapes conversely show a modest HF decline, and again this is non-correctable, unless you can find a tape that happens to fit the Akai's particular state of internal adjustment. Maxell UD1 has the required qualities, and, it transpires, is the tape Akai recommends.

MOLs are satisfactory for this class of player, but the distortion figures at +8dB are horrendous, and they remain extremely high at -8dB, by which point the figures are close to their lowest level. Altogether this interesting collection of flaws promised intriguing listening!

## Sound quality

It proved necessary to keep recording levels in check, especially where the source material included lots of up-front percussion, which of course is typical of modern popular and rock material generally. The treble lift noted above in the case of certain tapes resulted in a rather breathy and sometimes sibilant sound, with occasional signs of the internal muddle characteristic of Dolby mistracking. Some care is needed with tape matching in any case: I achieved near optimum results on audition with BASF *Maxima II* chrome, and the most excruciatingly edgy results with modern high energy doped ferrics like TDK SA-X and Maxell UD-XLII-S.

Pitch integrity was generally not a problem on test, and used with care — and the right tape — the Akai was the only one of the dual transport decks tested in this issue that made music truly enjoyable. In fact the W45 turned out to be a genuinely competent design capable of an open, spacious and vibrant sound with good detail and a genuinely musical bass.

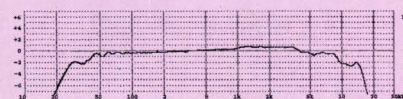
Take care over siting this deck, which on playback is rather more susceptible than most to radiated magnetic fields, typically from amplifier transformers.

## Conclusion

One of the few dual decks to merit a Recommended flag, the Akai has foibles by the bucketload, but it is possible to work around them and extract a genuinely musical performance standard, though the price inevitably reflects the high equipment level.

## TEST RESULTS

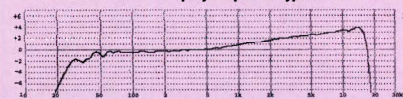
Wow & flutter IEC386 Q-Pk %	0.22/0.20%	
Pk Wtd	0.15/0.15%	
Mean Wtd	0.15/0.15%	
Crosstalk ref OdB L/R		
100Hz	-34.9dB/-35.5dB	
1kHz	-30.3dB/-32.2dB	
6.3kHz	-27.8dB/-29.3dB	
10kHz	-25.8dB/-27.6dB	
Phase (mean) OdB		
40Hz	0degrees	
100Hz	-1degrees	
1kHz	0degrees	
6.3kHz	+18degrees	
10kHz	+32degrees	
15kHz	+39degrees	
Line input sensitivity/overload	100mV/>13V	
Mic input sensitivity/overload	n/a	
Line output for OdB/maximum	596mV/4.12V	
Tape Speed	+0.51%/+0.37% FWD/REV	
IMdistortion 10kHz/11kHz	2.5% OdB peak, 1kHz product OdB	
VU indication at IEC OdB		
	IEC Type I	IEC Type II
Noise CCIR 468-3 Q-Pk IEC L/R dB		
Peak Wtd	-37.6/-38.5	-42.2/-42.9
Peak Unwtd	-40.1/-41.9	-41.9/-44.4
Mean Wtd	-37.8/-38.7	-42.5/-43.0
MOL 3% ref OdB, 1kHz	+1.6/+0.8	-0.2/-0.7
		+0.8/+0.1
Distortion (THD+N) @ +8dB %		
100Hz	3.33/3.48	6.39/6.62
1kHz	2.23/2.88	6.21/6.49
6.3kHz	2.09/2.59	3.16/3.70
Distortion (THD+N) @ -8dB %		
100Hz	1.31/1.10	0.823/0.892
1kHz	1.43/1.28	0.781/0.728
6.3kHz	1.77/1.47	0.862/0.963
Dimensions	42.5 x 14 x 35.5(w x h x d)cms	
Average wind/rewind time (C90)	2min 39sec	
Typical Retail Price	£299	



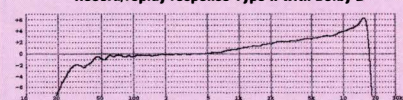
Record/replay response Type I



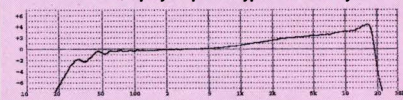
Record/replay response Type II



Record/replay response Type II with Dolby B



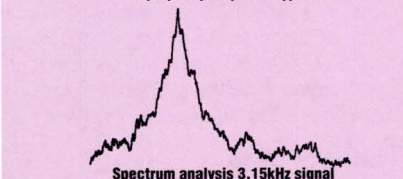
Record/replay response Type II with Dolby C



Record/replay response Type IV

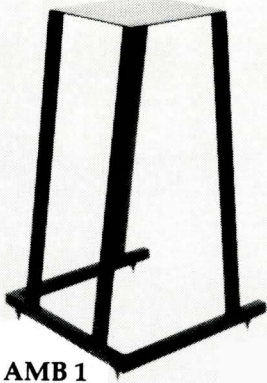


Replay only response Type I



Spectrum analysis 3.15kHz signal

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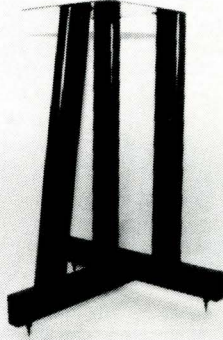
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# Arcam Delta 100

A&R Cambridge Ltd, Pembroke Avenue, Denny End Industrial Centre, Waterbeach, Cambridge CB5 9PB. Tel: (0223) 861550



**A**stonishingly, the Arcam *Delta 100* is the first British domestic cassette deck since the days of Neal and Ferrograph. In effect, the much vaunted consumer-friendly British hi-fi industry has until now completely ignored the world's single most widely used carrier. Until now that is . . .

Built around a Denon sourced dual capstan mechanism and head block, the £850 *Delta 100* offers automatically controlled source/tape monitoring while recording, Dolby S in addition to Dolby B and C, and built in oscillators to assist in tape alignment, which takes seconds to do, though the system lacks the slickness of some Japanese offerings. The vertical meters are easy to read and can be switched off during playback along with the tape counter. There are few gimmicks, though the Arcam has all of the advanced basics including variable level headphone monitoring and a memory counter.

## Lab report

The *Delta 100*'s on board tape alignment circuits were used before running the frequency responses shown, which are about as accurately aligned as can be achieved, with small residual errors being on the downwards tilting side. The bass is well extended, but slightly curtailed in the 10-30Hz range, which is close to optimum given the inherent limitations of the medium. Treble response extends out smoothly to 18kHz (Type IV -3dB). However, the test sample supplied had significant azimuth errors, and the pre-recorded responses showed a quite strongly rolled off treble and some evidence of excessive LF equalisation. Dolby NR alignment was extremely accurate with all three tape groups.

Pitch integrity of the Denon-sourced transport is of a high order, with only mild, innocuous wow sidebands and good central pitch

definition. Noise levels are among the lowest in this issue, and MOLs are excellent, especially in the case of metals, the latter backed by relatively modest +8VU distortion figures.

## Sound quality

The slightly rounded off treble response helps account for a certain euphony and restraint on audition, but not too much should be made of this since in most respects this mixture of Japanese and British technology has the measure of the other models tested.

With almost the clarity of line of the JVC *TD-V1010*, the Arcam adds a certain warmth in the midband. Without sounding overtly detailed, the *Delta 100* has an easy informativeness that communicates even quite complex scores at low replay levels. At high levels the sound remains easy and unstressed, and at all times the Arcam displays a sureness of touch in the bass at least the equal of any of the other decks tested. Only with pre-recorded material was the Arcam slightly too laid back for comfort, a probable consequence of the azimuth errors noted in the lab test programme.

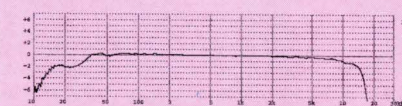
As expected, the *Delta 100* was at its best with metals, which provided a freedom from compression that Type IIs couldn't match. An early sample had a rather squashed and messy sound when using the Dolby S processor, and Dolby B was preferred. The newer sample submitted shows some progress, and if anything the balance now lies the other way, though recording without noise reduction always gave a more open and tangible sound.

## Conclusion

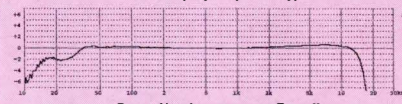
Naturally there is some overhead in the price to allow for the small scale of Arcam's production, but the design is talented and capable enough to wear this handicap lightly. Firmly Recommended.

## TEST RESULTS

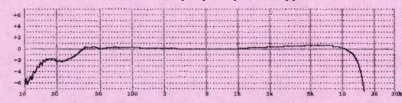
<b>Wow &amp; flutter IEC386 Q-Pk %</b>			
<b>Pk Wtd</b>			0.09%
<b>Mean Wtd</b>			0.07%
<b>Crosstalk ref 0dB L/R</b>			
<b>100Hz</b>			-44.9dB/-44.9dB
<b>1kHz</b>			-46.5dB/-47.2dB
<b>6.3kHz</b>			-46.9dB/-45.2dB
<b>10kHz</b>			-37.3dB/-39.3dB
<b>Phase (mean) 0dB</b>			
<b>40Hz</b>			0degrees
<b>100Hz</b>			0degrees
<b>1kHz</b>			+4degrees
<b>6.3kHz</b>			+31degrees
<b>10kHz</b>			+49degrees
<b>15kHz</b>			+39degrees
<b>Line input sensitivity/overload</b>			112mV/>>13V
<b>Mic input sensitivity/overload</b>			n/a
<b>Line output for 0dB/maximum</b>			1.32mV/10.25V
<b>Tape Speed</b>			+0.23%
<b>IM distortion 10kHz/11kHz</b>			3.6% 0dB peak, 1kHz
			product
			+2dB
<b>VU indication at IEC 0dB</b>			
	<b>IEC Type I</b>	<b>IEC Type II</b>	<b>IEC Type IV</b>
<b>Noise CCIR 468-3 Q-Pk IEC</b>			
<b>Peak Wtd</b>	-38.7/-39.9	-43.9/-45.1	-41.9/-43.0
<b>Peak Unwtd</b>	-39.9/-41.2	-41.2/-42.7	-40.3/-41.8
<b>Mean Wtd</b>	-38.8/-40.1	-44.1/-45.3	-42.1/-43.3
<b>MOL 3% ref 0dB, 1kHz</b>			
	+9.6/+9.4	+7.3/+6.9	+8.4/+7.9
<b>Distortion (THD+N) @ +8dB %</b>			
<b>100Hz</b>	3.88/4.97	7.04/8.04	4.48/4.98
<b>1kHz</b>	3.30/4.44	5.55/6.82	3.92/4.48
<b>6.3kHz</b>	1.32/1.31	1.23/1.57	2.22/2.31
<b>Distortion (THD+N) @ -8dB %</b>			
<b>100Hz</b>	0.982/0.859	0.621/0.526	0.657/0.613
<b>1kHz</b>	1.02/0.898	0.562/0.487	0.655/0.559
<b>6.3kHz</b>	1.01/0.905	0.608/0.570	0.703/0.609
<b>Dimensions</b>	43 x 12.5 x 33(w x h x d)cms		
<b>Average wind/rewind time (C90)</b>	2min 11sec		
<b>Typical Retail Price</b>	<b>£850</b>		



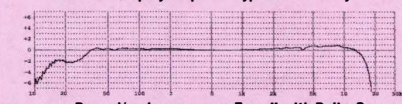
Record/replay response Type I



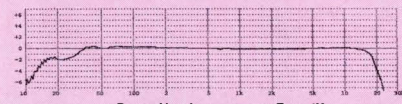
Record/replay response Type II



Record/replay response Type II with Dolby B



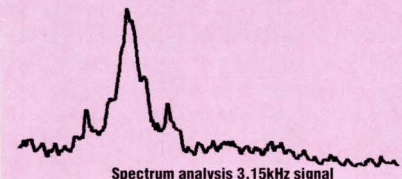
Record/replay response Type II with Dolby C



Record/replay response Type IV



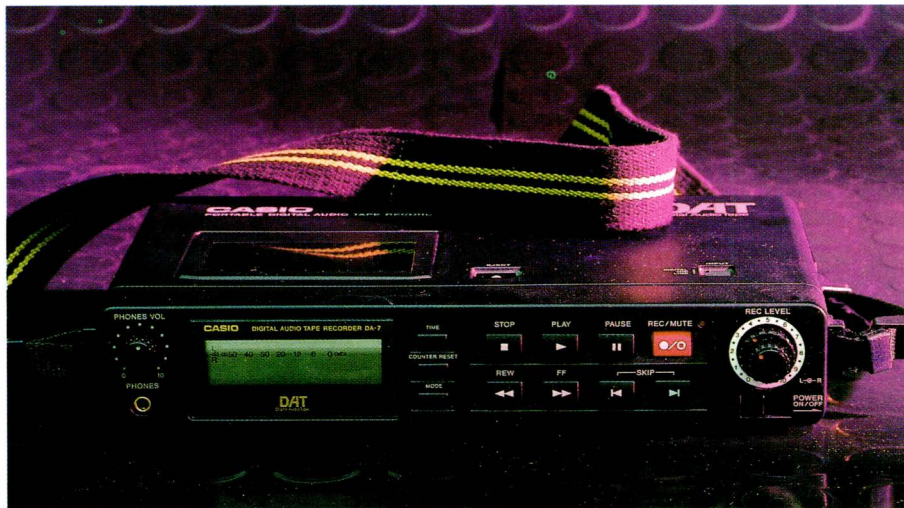
Replay only response Type I



Spectrum analysis 3.15kHz signal

# Casio DA-7 DAT

Casio Electronics Co Ltd, Unit 6, 1000 North Circular Road, London NW2 7JD. Tel: (081) 450 9131



The DA-7 offers a performance standard that in principle should make any Nagra owner blanch with envy. It's all done by the magic of numbers of course, made by Casio and it costs a paltry £400.

The DA-7 is a perfect crossover product, one aimed at the domestic user who wants a high grade portable to bootleg the Dire Straits road show when it plays the local Palais, but which is also designed to attract all those impecunious local radio stations for its low cost and all-round utility. It comes with a mains adapter/charger/lead but gives up to about two hours recording duration with rechargeable NiCads which can be fully recharged in about eight hours. The Casio can record from microphones, a line level source, or an S/PDIF digital one. An ever-ready case is supplied: all important transport controls, the record key and the input level control are protected with the cover closed, but access holes have been provided for microphone and other signal leads, the mains charger and so on.

The display is a little cramped and operational status is not always readily determined. Subcode editing, however, is available, though the modus operandi is on the obscure side.

## Lab report

In some ways this model measures worse than its pocket counterpart, the DA-R100, the sharp EHF loss (-1.7dB at 20kHz) providing a striking example. Basic in-band noise is low, but significant levels of hum and noise are visible in the 10kHz spectrum analysis in the area below 1kHz, a finding closer to the perceived noise intrusion (see below) than the perfectly satisfactory raw noise test figure implies. The out of band noise spectrum is clean down to nearly -130dB, a typical multibit result. Linearity at least is first rate, with no measured departure from the straight line down to -100dB.

## Sound quality

There are clear parallels with the pocketable DA-R100 here: audio performance is well behind standards readily achieved by entry level domestic standalone decks, though it could be argued that this is hardly the point since the Casio can go where larger, mains bound machines would be useless.

Recordings sounded rather flat and lacking in dynamic range, not because of any obvious compression, but because background hiss (with a pronounced low frequency bias, in line with the spectrum) was frequently apparent when listening closely, irrespective of whether the recording was originally made through the analogue input or the digital one. This implicates the replay amps, though the record chain is not free of noise. The bass end did sound squashed, and as a consequence the deck tended to sound bland, without real weight or substance. Stereo soundstaging was short of incident and detail, and well recorded female voice (eg Mary Black *Babes in the Wood*) showed up a predisposition to sounding inarticulate as consonants and sibilants were imperfectly formed. Stereo imagery was quite well portrayed in both planes, and on the whole the deck managed to sound rather like a decent CD player.

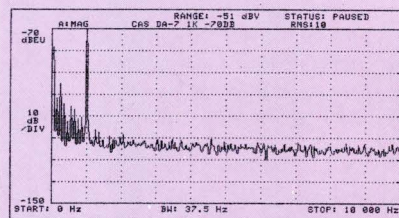
## Conclusion

It was ironic that this deck should sound more limited and restrained than the gutsy little DA-R100. It is self-evidently an excellent bet for informal location recording, and in many ways more practical than the real miniature could hope to be, though it would have been better if an additional battery pack had been fitted to extend battery life beyond two hours. Musically it is a significant under-achiever despite a good set of numbers from the lab tests, but the cost is low and this ensures that the DA-7 is of interest in a variety of niche applications.

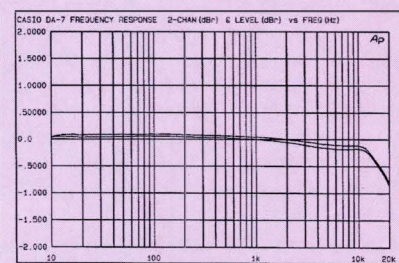
## TEST RESULTS

Test resolution	15.3 bits		
Output level, dB rel 2V, Source (digital in) (1.93V)	-0.29		
Line input sensitivity/overload	238mV/>13V		
Level meter indication at full level (digital in)	>0dB		
Effective dyn. range (-70dB thd + N + dither)	110dB		
	20Hz	1kHz	20kHz
Pure harmonic distortion			
full level ref 0dB	-84dB	-83dB	-75dB
(20kHz in-band products only)			
	0.0063%	0.0071%	0.018%
at -70dB encode + dither	-46dB or 0.606%		
Stereo separation	115dB	84dB	65dB
Stereo balance L/R	0.02dB	0.01dB	0.07dB
Frequency response (ref 1kHz) 20Hz - 20kHz	+/-0.9dB		
Audible high frequency intermodulation	-96dB or 0.0016%		
Audible elect. noise (CCIR, ARM wtd, 1kHz)	-87dB		
Audible mechanical noise	low		
Ultrasonic noise	-115dB		
Deemphasis	+/-0.9dB at 5kHz		
White noise overload test	some peak clip		
Dimensions (w x h x d)	24 x 4.7 x 17.5cms		
Typical Retail Price	£400		

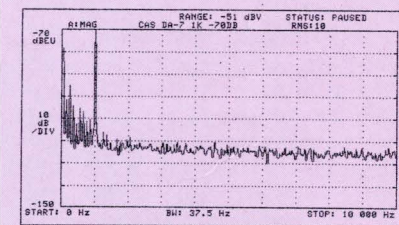
Tested with analogue in/analogue out unless otherwise stated



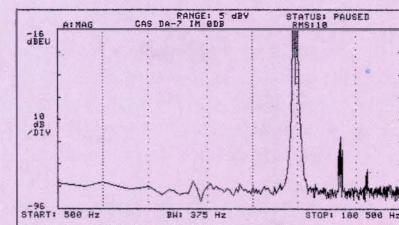
Full encode/decode linearity



Full encode/decode frequency response



-70dB 1kHz spectrum



Intermodulation spectrum





# Casio DA-R100 DAT

Casio Electronics Co Ltd, Unit 6, 1000 North Circular Road, London NW2 7JD. Tel: (081) 450 9131



Obviously at least, pocket size beauties like this one are little worse than any other DAT deck (or CD-R recorder) in bandwidth, freedom from dynamic squash, maximum signal/noise and of course rock-solid pitch, but it is inevitable that the small size does entail certain more subtle trade-offs. The trick is in discovering where they can be found.

This £450 machine is a chunky handful, which will certainly fit a coat pocket and would scarcely be noticed in a bag or briefcase. The major controls are well signposted and prominently positioned along the top lip.

The Casio is also surprisingly well endowed. It is capable of recording in LP (four hour) mode as well as SP, and has a standard TOSLINK optical input as well as S/PDIF in/output on a 3.5mm socket. Line and microphone inputs are fitted — the latter with an attenuator switch — and a 'lock' switch protects control assignments from being inadvertently changed. The meters have optional backlighting, and simple subcode editing is supported, though skip IDs cannot be recorded. Automatic fades of adjustable duration can be performed.

Accessories supplied include an ever-ready case and strap and one NiCad rechargeable battery which comes in a sealed pack that forms the clip-on rear section of the player, allowing rapid changes.

The battery pack is capable of up to 2.5 hours continuous recording. A full recharge cycle takes eight hours, and spare batteries are available, at a cost of £50. NiCads have well recognised peculiarities, the most important of which is to discharge the batteries fully before recharging to ensure a long life, which is often dangerously inconvenient when making an important recording.

## Lab report

Linearity measures well down to -100dB, and the frequency response plot is almost

completely accurate, both results that put some grown up machinery in the shade.

There are shortcomings, however. Resolution and dynamic range are both below normal full size DAT standards. Separation is below average at 20kHz (though not enough to have any effect on perceived L-R separation), and the IM test threw up a series of artefacts, notably within the audio band.

Noise levels and out of band filtering were to a good standard.

## Sound quality

The machine feels chunky and solid, and gives a real feeling of confidence, though it must be reported that the first sample received (subsequently replaced) jammed with a tape inserted at the beginning of the listening test programme.

As expected, the A/D convertor, which is only used when recording from an analogue source, was the weakest separately identifiable component part of the DA-R100. While digital domain recordings had a touch of sparkle and life, and sounded relatively open and uncongested with most types of music, the same music recorded through the analogue input (sourced from a vividly 3D sounding Pioneer PSD-S801 CD player) sounded flat and undifferentiated. Stereo soundstaging lost much of its farfield information, and depth imagery collapsed into a single plane. As a digital recorder however, there was little to criticise in the Casio's sharp, clean and articulate sound.

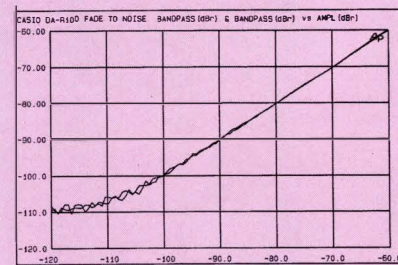
## Conclusion

Although the Casio DA-R100 is some way short of standalone DAT standards, still less the best that Compact Disc has to offer, its small size, evidently good engineering (fault aside — see earlier) and often tidy sonics make this deck more than just routinely worth considering. Recommended.

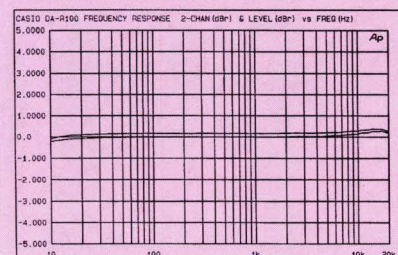
## TEST RESULTS

<b>Test resolution</b>	15.2 bits		
<b>Output level, dB rel 2V, Source [digital in]</b>	-5.4		
<b>Line input sensitivity/overload</b>	200mV/>13V		
<b>Level meter indication at full level (digital in)</b>	0dB		
<b>Effective dynamic range (-70dB thd + N + dither)</b>	90dB		
	<b>20Hz</b>	<b>1kHz</b>	<b>20kHz</b>
<b>Pure harmonic distortion</b>			
<b>Full level ref 0dB (20kHz in-band products only)</b>	-82dB	-82dB	-75dB
<b>at -70dB encode + dither</b>	0.0079%	0.0178%	
<b>Stereo separation</b>	95dB	77dB	51dB
<b>Stereo balance L/R</b>	0.02dB	0.02dB	0.05dB
<b>Frequency response (ref 1kHz) 20Hz-20kHz</b>	+/-0.44dB		
<b>Audible high frequency intermodulation</b>	-90dB or 0.00327%		
<b>Audible electrical noise (CCIR, ARM wtd, 1kHz)</b>	-84dB		
<b>Audible mechanical noise</b>	low		
<b>Ultrasonic noise</b>	-97dB		
<b>Deemphasis</b>	+/-0.1dB at 5kHz		
<b>Whitenoise overload test</b>	OK		
<b>Dimensions (w x h x d)</b>	117 x 38 x 90cms		
<b>Typical Retail Price</b>	<b>£450</b>		

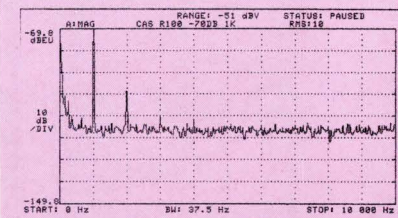
Tested with analogue in/analogue out unless otherwise stated



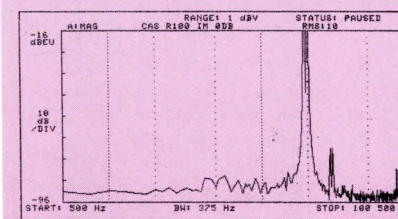
Full encode/decode linearity



Full encode/decode frequency response



-70dB 1kHz spectrum



Intermodulation spectrum

# The Sound Organisation London

● Just when you thought that record players were dead, Sound Organisation introduce not one, but two models from major manufacturers.

By the time of the Penta Show (mid Sept) we expect to have both models on demonstration with delivery times of around 10 - 14 days.

It is our view, that in terms of musical performance, both these players offer substantial improvements over the existing crop of top players. If your interest lies in vinyl and you want your record collection to realise it's full potential, we invite you to contact us for information.

**FINAL DETAILS  
STILL TO  
BE REVEALED**

● **The Touraj Moghaddam Signature:**

*The ultimate Roksan. The TMS takes many of the design ideas of the Xerxes and follows them to their ultimate realisation. The unique three tier construction gives the player tremendous isolation and provides great support for the arm and cartridge of your choice. The player is powered by an external DS1 or DS4 power supply, both of which can also be used to power the ArtaXerxes phono amplifier if fitted.*

**Price: £2500.00 player only.**

**£695.00 DS1, £495.00 DS4**



● **The SME Model 20A:**

*Based closely on the Model 30A this new player takes advantage of SME's superb new computerised manufacturing facility to build a smaller lighter version of the player at a fraction of the cost. Performance is very similar to the 30A in many areas and it is clear that the 20A is a player of outstanding value for money.*

**Price: £2495.00 player only.**

**£3495.00 including a Series V arm.**

- Available for demonstration will be;  
Cartridges: *Lyra Clavis & Parnassus, Koetsu Urushi, Audio-Technica ART1 and Kiseki PHS*  
Dedicated phono stages: *Audio Research PH1, LFD, Michell ISO and Roksan ArtaXerxes.*
- For Linn LP12 owners, we can demonstrate the superiority of the Naim Armageddon power supply and ARO arm over the standard Linn combinations and we can modify late model LP12s to this specification.

**4 Pickfords Wharf,  
Clink Street,  
London,  
SE1 9DG.  
071 403 2255**



# Denon DRS-610

Hayden Labs Ltd, Hayden House, Chiltern Hill, Chalfont St Peter, Gerrards Cross, Bucks SL9 9UG. Tel: (0753) 888447



Instead of the usual vertical loading mechanism and hinged door arrangement we're all familiar with, the £200 *DRS-610* has a sliding drawer mechanism into which the cassette is loaded. Denon claims that the drawer provides improved environmental isolation, better tape to head contact and lower azimuth errors.

The use of a drawer mechanism means that there is no ready means of seeing which part of the tape you've reached, so Denon has provided a 'time to go' readout which is available on request after a few seconds delay from play or record mode. Other features are much as expected, including Dolby B, C and HX Pro, fine bias adjust, track search and variable level headphone monitoring. Unlike some previous Denon cassette decks, this one even has a timer facility.

## Lab report

Fulfilling Denon's promise, the wow and flutter figure is quite good, and the spectrum analysis backs this with a sharply defined central peak, which implies sharply defined pitch, though some wow and flutter sidebands are visible. MOLs are satisfactory too, though proportionately better with low bias tapes than the others, reinforcing a finding from early in the tests that the Denon is best adapted to Type I and (especially) Type II tapes. Note that a 3dB channel mismatch above 10kHz was measured with Type IV tapes. Azimuth errors are low, and compatibility with prerecorded cassettes is good, the frequency response runs even showing a mildly elevated treble.

Running through the numbers, Type II tapes gave the lowest noise (as expected), the best MOLs and the lowest high level distortion figures (at +8dB). Significantly, the same tapes yielded the lowest distortion results at -8dB too, which is close to the average level for most music, most of the

time. The frequency responses are all well tailored and extended in the treble, but LF extension is limited, and head contour effects are visible up to 200Hz or so.

## Sound quality

Confirming the measurement findings, Type II tapes suit this deck best, and near-IEC standard Type IIs are accurately handled, but if the Type IV channel mismatch is a random variation, it could apply to any tape group on other samples of the model. The way machines like the Denon are designed makes it impractical to rebias or equalise for individual tape groups (except by adjusting the fine bias control, which of course alters both channels together).

Bass quality is on the thin, raw side, though the problem was not serious enough to be a real impediment with small scale music making — solo or accompanied singers, recital or chamber material et cetera. Play something that really needs meat on its bones, however, and the *DRS-610* tends to sound a little thin and weak.

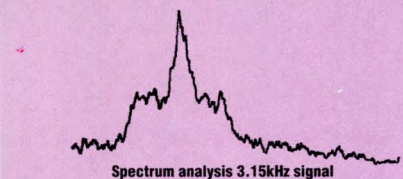
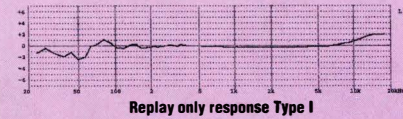
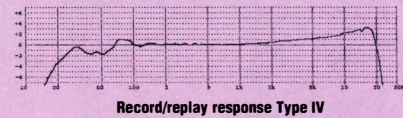
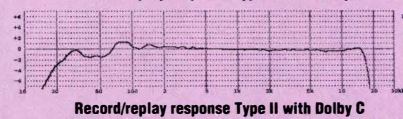
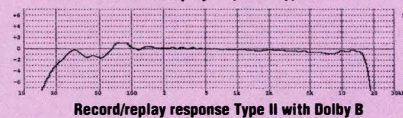
In other respects this model puts up a strong showing, especially with Dolby B and good Type IIs like TDK *SA-X*, by sounding sharp and under excellent control, though the lack of warmth certainly had the effect of artificially tautening the sound. Prerecorded material was handled in character, and attracted few criticisms.

## Conclusion

This is an interesting deck which may not yet provide wholly convincing evidence of the benefits of horizontal loading, but which even more convincingly demonstrates the dangers of over-emphasising one point at the expense of a more unified, holistic approach. Bass performance notwithstanding, however, this is a fine, well dressed cassette deck of considerable merit. Not a Best Buy, but heartily Recommended.

## TEST RESULTS

<b>Wow &amp; flutter IEC386 Q-Pk %</b>	
<b>Pk Wtd</b>	0.093%
<b>Mean Wtd</b>	0.077%
<b>Crosstalk ref 0dB L/R</b>	
<b>100Hz</b>	-42.6dB/-45.3dB
<b>1kHz</b>	-47.6dB/-45.4dB
<b>6.3kHz</b>	-34.1dB/-31.5dB
<b>10kHz</b>	-30.4dB/-27.6dB
<b>Phase (mean)0dB</b>	
<b>40Hz</b>	+1degrees
<b>100Hz</b>	0degrees
<b>1kHz</b>	0degrees
<b>6.3kHz</b>	+9degrees
<b>10kHz</b>	+7degrees
<b>15kHz</b>	+19degrees
<b>Line input sensitivity/overload</b>	107mV/>13V
<b>Mic input sensitivity/overload</b>	n/a
<b>Line output for 0dB/maximum</b>	885mV/1.68V
<b>Tape Speed</b>	+0.40%
<b>IM distortion 10kHz/1kHz</b>	1.12% 0dB peak, 1kHz product 0dB
<b>VU indication at IEC 0dB</b>	
	IEC Type I IEC Type II IEC Type IV
<b>Noise CCIR 468-3 Q-Pk IEC L/R dB</b>	
<b>Peak Wtd</b>	-40.2/-41.1 -43.9/-44.4 -42.3/-43.0
<b>Peak Unwtd</b>	-42.2/-41.8 -43.1/-42.5 -42.6/-42.4
<b>Mean Wtd</b>	-40.7/-41.4 -44.1/-44.7 -42.4/-43.2
<b>MOL 3% ref 0dB</b>	
<b>1kHz</b>	+4.0/+3.8 +3.5/+2.9 +2.3/+1.5
<b>Distortion (THD+N) @ +8dB %</b>	
<b>100Hz</b>	11.5/12.4 11.7/13.0 13.7/14.4
<b>1kHz</b>	7.88/8.16 9.26/10.2 13.3/13.9
<b>6.3kHz</b>	5.24/3.77 5.60/3.34 10.6/7.76
<b>Distortion (THD+N) @ -8dB %</b>	
<b>100Hz</b>	1.15/1.19 0.636/0.596 0.807/0.781
<b>1kHz</b>	1.14/1.22 0.655/0.625 0.808/0.768
<b>6.3kHz</b>	1.47/1.22 1.87/0.877 2.50/1.17
<b>Dimensions</b>	43.5 x 12.5 x 31(w x h x d)cms
<b>Average wind/rewind time (C90)</b>	2min 35sec
<b>Typical Retail Price</b>	£200





# JVC TD-V1010

JVC (UK) Ltd, JVC Business Park, 12 Priestly Way, Staples Corner, London NW2 7BA. Tel: (081) 450 3282



The cool, shiny grey exterior is quite sexy by cassette deck standards, an impression backed by the unusual weight and solidity of the deck. Some of the weight is ballast, being contributed by a large sheet of what appears to be fibreboard fixed to the base, which stiffens and damps the casework considerably. Internally too this is an impressively turned out deck with masses of internal screening, and remote control switching for input level and input selection (there are three) to minimise signal runs.

A three head deck, the £400 *TD-V1010* additionally features Dolby B and C noise reduction and switchable Dolby HX Pro. In contrast to most cassette decks, the Dolby NR circuits are completely bypassed when set to off. You also get a time remaining counter and a display off switch, but there are few fancy gadgets. Record bias and equalisation can both be adjusted to help tune tape to machine, but the setting up procedure is manual.

## Lab report

The standout feature of this deck is the quartz controlled direct drive transport, which is state of the art at this and most other price levels. It's not that the measured wow and flutter figure is low — though it is — so much as the remarkable result of the spectrum analysis, whose shape closely matches the input signal, with none of the mid level spread that defines the miscreant behaviour of other transports.

Electrical behaviour of the *TD-V1010* is rather closer to expectations. Frequency responses are all satisfactory, especially in the LF, but at the standard bias setting Type IV tapes are slightly overbiased, giving a depressed HF output above 1.2kHz, and Type II tapes are a little underbiased, giving a shallow mid-treble suckout followed by a small treble peak. Signal/noise is satisfac-

tory, and harmonic distortion levels are moderate even at +8dB, but the MOL figures for Type I and II tapes were modest, and the output wasn't clean enough to allow the Type IV measurement to be made.

## Sound quality

This is a wholly remarkable sounding deck, which has a rare ability to pinpoint musical detail of all kinds without any suggestion of false highlighting. Although the electronics are audible — just — they have a benign signature, and the tape itself (compared to the amplifier sidechain) is almost completely transparent. The bass is remarkably solid and tuneful and stereo imagery is open and explicit. Most of all there is none of the subtle modulation of background instruments (or tape hiss) by the dominant instrument or voice, and the result is a style of music making remarkably close to a good CD player and therefore remarkably unlike a typical cassette deck.

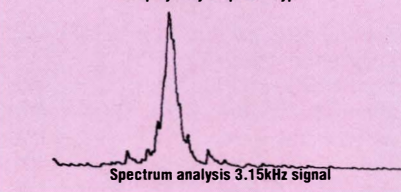
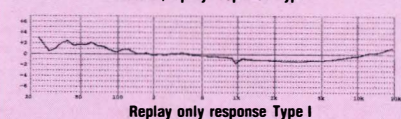
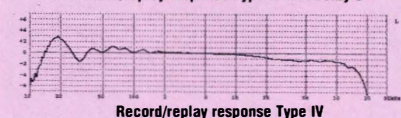
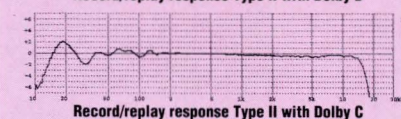
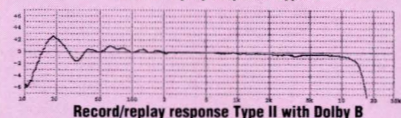
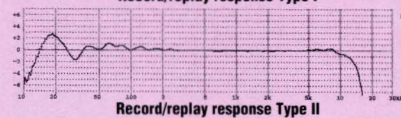
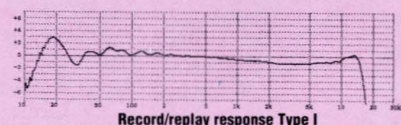
These comments, however, apply only when the JVC was used under very particular conditions, namely with metal tape (TDK *MA-X*) with the appropriate level of bias (about 20'clock), with Dolby HX Pro switched out, the display switched off, and with Dolby B or no noise reduction at all in use. In practice it was often feasible to record without Dolby, not because the JVC is quieter than with other decks, but because the hiss is reproduced in a way that doesn't draw attention to itself.

## Conclusion

The worst that can be said of the *TD-V1010* is that the instructions are an impenetrable mess. The machine itself is either a labour of love or a demonstration of JVC's audio expertise — or both. Either way, it's a superb recording tool aimed at the enthusiast, lacking only in nice but non-essential features like auto tape lineup and Dolby S.

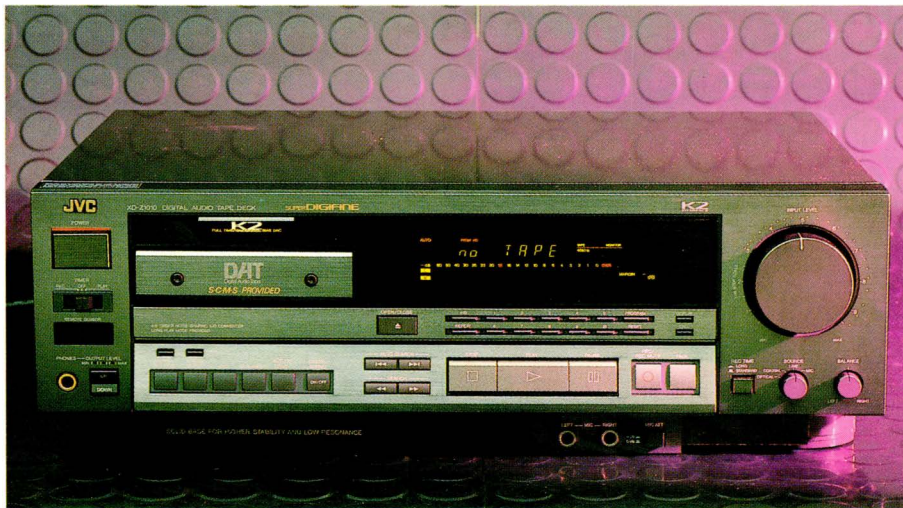
## TEST RESULTS

Wow & flutter IEC386 Q-Pk %	0.053%		
Pk Wtd	0.041%		
Mean Wtd	0.041%		
Crosstalk ref 0dB L/R			
100Hz	-47.0dB/46.3dB		
1kHz	-52.7dB/53.3dB		
6.3kHz	-41.5dB/40.8dB		
10kHz	-35.9dB/37.3dB		
Phase (mean) 0dB			
40Hz	-1degrees		
100Hz	+1degrees		
1kHz	+21degrees		
6.3kHz	+134degrees		
10kHz	-148degrees		
15kHz	-1degrees		
Line input sensitivity/overload	126mV/>13V		
Mic input sensitivity/overload	n/a		
Line output for 0dB/maximum	534mV/5V		
Tape Speed	+0.21%		
IM distortion 10kHz/11kHz	0.22% 0dB peak, 1kHz	product	
VU indication at IEC 0dB	4dB		
	IEC Type I	IEC Type II	IEC Type IV
Noise CCIR 468-3 Q-Pk IEC L/R dB			
Peak Wtd	-38.6/-39.1	-43.8/-44.0	-42.1/-42.3
Peak Unwtd	-43.4/-43.6	-45.8/-46.2	-45.8/-46.0
Mean Wtd	-38.8/-39.3	-44.0/-44.3	-42.3/-42.5
MOL 3% ref 0dB			
1kHz	+1.2/+2.1	-0.9/-0.4	n/a
Distortion (THD+N) @ +8dB %			
100Hz	2.55/2.05	3.69/3.63	2.41/2.30
1kHz	1.12/1.16	2.60/2.64	1.06/1.06
6.3kHz	1.22/1.15	0.83/0.92	1.27/1.30
Distortion (THD+N) @ -8dB %			
100Hz	0.906/0.852	0.617/0.606	0.645/0.625
1kHz	1.12/1.04	0.637/0.589	0.702/0.650
6.3kHz	1.38/1.36	0.776/0.727	1.01/0.944
Dimensions	43.5 x 14 x 33.5(w x h x d)cms		
Average wind/rewind time (C90)	2mins 18cs		
Typical Retail Price	£400		



# JVC XD-Z1010TN DAT

JVC (UK) Ltd, JVC Business Park, 12 Priestly Way, Staples Corner, London NW2 7BA. Tel: (081) 450 3282



Unlike the other full-size DAT recorders reviewed in this issue the XD-Z1010TN (TN = titanium) is strictly a domestic machine, which means its basic capabilities and limitations are rather different. Briefly, the JVC has an LP record mode giving four hours maximum recording time from analogue sources, but SP mode analogue recordings are limited to the 48kHz sampling rate. Finally, the JVC fully implements SCMS, which limits the user to a single generation of digitally made copies.

The Z1010 is large, has many complex features and a silver grey nightmare of a fascia which has a confusing layout, often invisible control legends, and is covered in masses of quite unnecessary hieroglyphics. The most striking example forms a column on the left of the machine, and reads XD-Z1010 Digital Audio Tape Deck, Super Digifine, Full Time 18-bit Digital Bias DAC, DAT - Digital Audio Tape, SCMS Provided, Fourth order noise shaping A/D Converter, Long Play Mode Provided and — finally — Solid Base for Higher Stability and Low Resonance. Ever seen a car with a label reading something like 'Cantilevered Direct User Access to Engine Bay' on the bonnet?

In addition to the standard (wide) range of tape editing and display options and the obligatory full function remote control, the XD-Z1010 has some neat extras: display off for some visual piece of mind, microphone inputs, one-button fades and bus connectors for linked system operations if you happen to be running other JVC hardware.

## Lab report

The ADC is a Delta-Sigma 1-bit type with fourth order noise shaping, and the DAC function is taken care of by an 18-bit DAC powered by four PSM701s. The deck employs JVC's low jitter K2 interface.

The XD-Z1010's frequency response rises a small amount in the final octave though it

is otherwise accurate, but the linearity plot shows a departure from the ideal transfer characteristic as high as -80dB, with some noise intrusion not far below that level. Intermodulation, however, is very low with effective out of band filtering. The 10kHz spectrum shows some third and ninth harmonic distortion of a low level (-70dB) 1kHz signal, with the highest harmonic at about 27dB below the test signal.

## Sound quality

The deck proved a little confusing to operate, and was rather too happy to flash its Copy Prohibit flag and lock the record mode out, though perseverance always cured the blockage in the end. It didn't cure the SCMS flagged digital monitor output though, which stubbornly remained flagged, preventing recorders being daisy-chained in digital dub mode, which is non standard.

When recording from Compact Disc in the digital domain, the JVC has a big and colourful sound, and produces tapes which for much of the time are little different to the originals. Nevertheless a subtle loss of image focus is identifiable, dynamics being a little understated, and individual instruments slightly less distinctive and properly separated. Comparatively simple source material such as Keith Jarrett's predominantly sparse solo piano in *Paris Concert* tended to lack vitality and air.

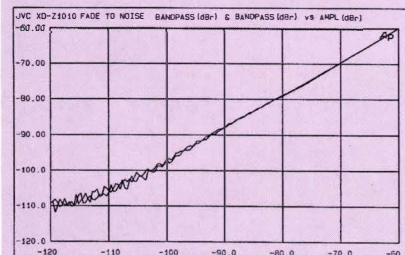
When the going became more complex, however, the JVC lacked detail and seemed muddled and opaque, as though the sound was getting bogged down under the weight of its electronic sophistication.

## Conclusion

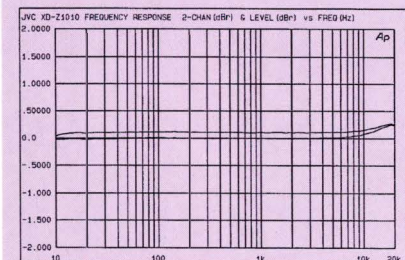
Well equipped and built, but over-hyped, over-complex and with poor ergonomics, the JVC lacks the purity and control of a thoroughbred. In short, this is the sound of hi-fi rather than the sound of music.

## TEST RESULTS

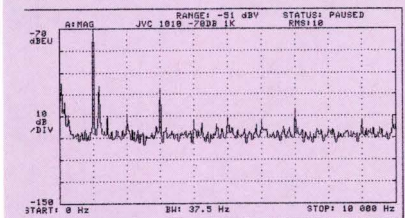
Test resolution	15.4 bits
Output level, dB rel 2V, Source [digital in]	2.486 (+1.91dB)
Line input sensitivity/overload	450mV > 13V
Level meter indication at full level (digital in)	0dB
Effective dyn. range (-70dB thd + N + dither)	104dB
	20Hz 1kHz 20kHz
Pure harmonic distortion	
Full level ref 0dB	-87dB, -88dB, >-90dB
(20kHz in-band products only)	
	0.005% 0.004% 0.004%
at-70dB encode + dither	-27dB or 4.47%
Stereo separation	100dB 96dB 75dB
Stereo balance L/R	0.04dB 0.04dB 0.14dB
Frequency response (ref 1kHz) 20Hz - 20kHz	+/-0.12dB
Audible high frequency intermodulation	-86dB or 0.0015%
Audible elect.noise (CCIR, ARM wtd, 1kHz)	-86dB
Audible mechanical noise	low
Ultrasonic noise	-117dB
Deemphasis	+/-0.09dB at 5kHz
White noise overload test	OK
Dimensions (w x h x d)	43.5 x 14.4 x 35.5cms
Typical Retail Price	£1,050
Tested with analogue in/analogue out unless otherwise stated	



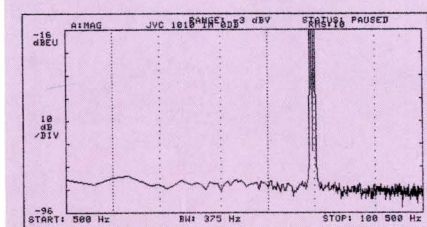
Full encode/decode linearity



Full encode/decode frequency response



-70dB 1kHz spectrum



Intermodulation spectrum

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# Philips DCC900

Philips Consumer Electronics, City House, 420 - 430 London Road, Croydon CR9 3QR. Tel: (081) 689 4444



## TEST RESULTS

<b>Wow &amp; flutter IEC386 Q-Pk %</b>		
<b>Pk Wtd</b>	0.096%	
<b>Mean Wtd</b>	0.110%	
<b>Line input sensitivity/overload</b>	220mV/>7.7V	
<b>Level meter indication at full level (digital in)</b>	0dB	
<b>Effective dyn. range (-70dB thd + N + dither)</b>	105dB	
	<b>20Hz</b>	<b>1kHz</b>
<b>Pure harmonic distortion</b>		
<b>Full level ref 0dB</b>	-87dB	-87dB
<b>(20kHz in-band products only)</b>		
	0.0045%	0.0048%, 0.0048%
<b>at-70dB encode + dither</b>	-38dB or 2.26%	
<b>Stereo separation</b>	90dB	70dB
<b>Stereo balance L/R 0.12dB</b>	0.19dB	0.17dB
<b>Frequency resp. (ref 1kHz) 20Hz - 20kHz</b>	+/-0.09dB	
<b>Audible high frequency intermod.</b>	-86dB or 0.005%	
<b>Audible elect. noise (CCIR, ARM wtd, 1kHz)</b>	-86dB	
<b>Audible mechanical noise</b>	low	
<b>Ultrasonic noise</b>	-60dB	
<b>Deemphasis</b>	+/-0.1dB at 5kHz	
<b>White noise overload test</b>	OK	
<b>Dimensions (w x h x d)</b>	43.5 x 14 x 33.5cms	
<b>Typical Retail Price</b>	<b>£500</b>	
Tested with analogue in/analogue out unless otherwise stated		

On the face of it you may think that including Philips' DCC900 in this group test is a little close to overkill. After all DCC is the subject of this month's cover-mounted booklet and last month this machine got an eight page going over. Still, it is interesting to see where DCC sits with reference to the other tape based machines that are available, hence its inclusion here.

Although DCC is to be targeted primarily at the personal stereo and in-car market, the first machine to be launched is a full width unit, pitched directly at the middle to upper end of the cassette deck market.

One reason is technical: early PASC chipsets turned out to be power hungry, creating battery life problems in portables and potential (but unconfirmed) heat dissipation problems in car units, though new chipsets are on the way and both in-car and personal units should go on sale early next year. The other reason is to reinforce the quality theme. DCC is designed to offer roughly similar quality to Compact Disc, with a set of operating features broadly on a par with, or even superior to, DAT.

Testing the DCC900 as a digital record/playback medium, in exactly the same manner as the DAT machines were tested, yielded the results and graphs shown opposite, which are included for comparative purposes. Readers are referred back to issue 110 (September 1992) for an in-depth analysis of the measurement techniques applicable to DCC.

### Sound quality

The listening programme was carried out over several weeks, utilising both digital and analogue inputs. By their nature comparative tests draw attention to the differences between the sounds being compared rather than their absolute musical value. Subtle but important failings can slip by, and the only way to search them out is with extended,

non-comparative listening, asking simple questions like 'is this music, or what?'

The good news is that the DCC900 passed the tests with a fair, though uneven, degree of success. The DCC900 was indeed quite often inaudible in that it sometimes proved impossible to distinguish CD from DCC copy, though with time and experience, it became possible to do so in a reasonably consistent manner in the case of transient rich or very complex multi-layered material (eg Brahms *Deutsche Requiem*), where DCC could sound instantaneously muddled.

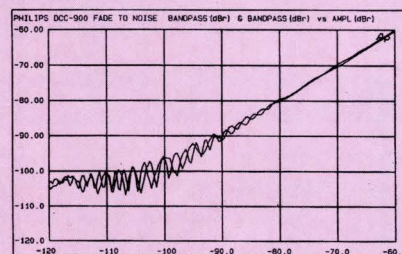
With prerecorded music, the story was quite, quite different, though exactly what should be made of this is far from clear because the range of titles available at the time of writing could not have been calculated to show any new medium in a worse light if it had been deliberate policy. The DCC version of U2's *Achtung Baby* sounded as flat as a pancake in the gut wrenching opening to *Zoo*, and even laid back ballads like *One* failed to open out and communicate. This was real mid-fi, midi system stuff . . .

### Conclusion

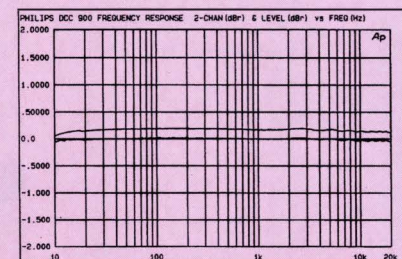
It is too early to make definitive statements about the efficacy of PASC coding specifically or DCC generally. The very mixed nature of the results suggest that it's not yet a fully debugged system.

There were times when the DCC900 was palpably disappointing. The ADC is open to criticism here, but the worst offenders were the prerecorded tapes, though in fairness I had only a handful of titles to try, and they were very early test samples.

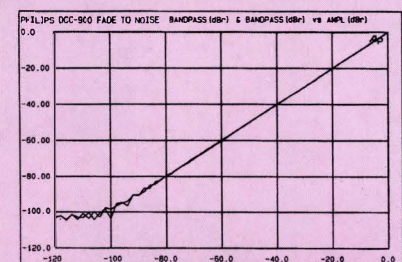
The DCC900 worked best playing recordings made digitally, which showed that DCC is more than a technological *tour de force*, it also has what it takes to succeed. Nevertheless, I'm going to take a raincheck until the second generation of hardware arrives before jumping on board.



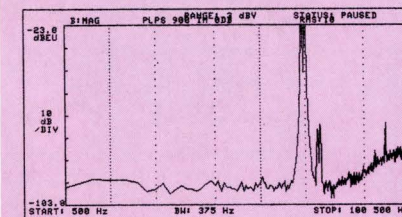
Full encode/decode linearity



Full encode/decode frequency response



-70dB 1kHz spectrum



Intermodulation spectrum



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# Pioneer CT-S410

Pioneer High Fidelity (GB) Ltd, 1-6 Field Way, Greenford, Middlesex UB6 8UZ. Tel: (081) 575 5757



The £200 CT-S410 is one of the least costly three head decks on the market. It is also one of the easiest and most pleasurable to operate.

Pioneer's current USP (unique selling point) of course is Super Auto BLE. No, not the notifiable cattle disease, but a fully automated tape lineup routine that in this case takes approximately 11 seconds to adjust bias, level (sensitivity) and equalisation setting which it stores in memory until the tape is replaced. The only jarring feature is an appallingly tacky display graphic which seems to have been included on the basis that if you've got it, you might as well flaunt it. One look will convince you that Pioneer should have thought again.

There are no other operational complaints. Although the raw materials are nothing special the controls are large, quiet in operation and notably well laid out, a comment that applies equally to the display (with the exception of the part devoted to BLE). A facility which allows automatically synchronised recordings to be made has been included along with the industry standard Dolby B, C and HX Pro triumvirate (with separate MPX filter switching), fixed level headphone monitoring and a remaining time display.

## Lab report

The plots and numbers displayed apply to the first player supplied; by request this was replaced by a second sample, which was used for the listening tests, though it arrived too late for the full lab test regime. Nevertheless a quick check using different test equipment showed that wow and flutter of the second sample was down to about 0.12 per cent, and that the noise figures had returned to normality: the poor figures were due to a regular background ticking noise of unidentified origin.

Frequency responses were well adjusted at the two ends of the audio band, but there

is a low level suckout in the aurally significant 1-5kHz area, which due to its breadth is bound to have an effect of some sort on audition.

## Sound quality

For a model costing only £200 but which has three heads, auto tape lineup and a time remaining indicator (still an up-market feature), the CT-S410 looks dangerously feature-laden, yet although the deck wasn't wholly neutral, it did make more than routinely acceptable noises. The bass was a little shallow and bland, and even the second sample of the deck could have sounded more stable and freer from the insidious muddying effect of modulation noise. This problem was a subtle one, however, and the midband was explicit and intelligible, which meant that the majority of recordings made on this deck reproduced well.

Unlike certain middle price machinery, the CT-S410 was a resounding success with metal tapes, the extra cost of which was amply justified not just in the lack of HF squash, but by extra focus and consistency as well. Chromes worked well too, but the potential drop in bias noise from ultra-quiet tapes like TDA SA-X was not fully realised, and the Dolby noise reduction circuits were not wholly transparent. Metals often seemed to cut through the background hiss more effectively.

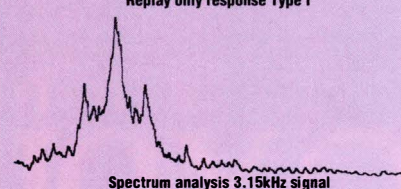
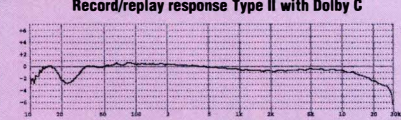
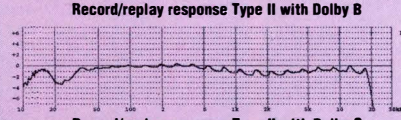
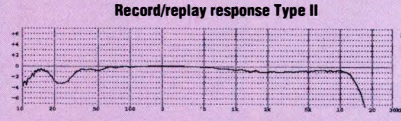
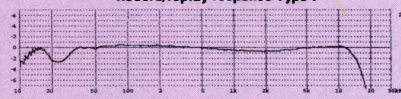
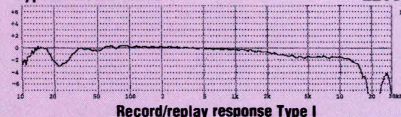
## Conclusion

A word of warning about reliability is in order: this was not the first Pioneer cassette deck in recent times to have developed a fault on test. Nevertheless, to withhold Best Buy status would be perverse for such a thoroughly well conceived design. Features included are those calculated to serve the enthusiast, while making the deck child's play for grannie. Musically it is good for the price, verging on very good with metal tape.

## TEST RESULTS

<b>Wow &amp; flutter IEC386 Q-Pk %</b>	0.88%*
<b>Pk Wtd</b>	0.56%*
<b>Mean Wtd</b>	
<b>Crosstalk ref 0dB L/R</b>	
<b>100Hz</b>	-47.2dB/-46.5dB
<b>1kHz</b>	-48.2dB/-47.6dB
<b>6.3kHz</b>	-38.2dB/-42.0dB
<b>10kHz</b>	-31.9dB/-35.4dB
<b>Phase (mean) 0dB</b>	
<b>40Hz</b>	-2degrees
<b>100Hz</b>	-3degrees
<b>1kHz</b>	-4degrees
<b>6.3kHz</b>	-14degrees
<b>10kHz</b>	-31degrees
<b>15kHz</b>	-18degrees
<b>Line input sensitivity/overload</b>	109mV/3.5V
<b>Mic input sensitivity/overload</b>	n/a
<b>Line output for 0dB/maximum</b>	536mV/2.04V
<b>Tape Speed</b>	-0.34%
<b>IM distortion 10kHz/1kHz</b>	4.0% 0dB peak, 1kHz product
<b>VU indication at IEC 0dB</b>	0dB

	IEC Type I	IEC Type II	IEC Type IV
<b>Noise CCIR 468-3 Q-Pk IEC 4/L/R dB</b>			
<b>Peak Wtd</b>	-22.1/-23.2*	-25.4/-26.6*	-25.3/-25.3*
<b>Peak Unwtd</b>	-29.0/-30.1*	-31.0/-32.0*	-30.8/-31.5*
<b>Mean Wtd</b>	-22.4/-23.5*	-26.0/-27.0*	-25.3/-25.6*
<b>MOL 3% ref 0dB</b>			
<b>1kHz</b>	-0.4/-1.4	-2.7/-2.9	+0.4/+0.3
<b>Distortion (THD+N) @ +8dB %</b>			
<b>100Hz</b>	17.9/17.1	12.3/12.0	6.72/6.26
<b>1kHz</b>	12.3/12.9	10.6/10.3	4.70/4.34
<b>6.3kHz</b>	3.31/3.32	3.00/3.01	5.14/4.50
<b>Distortion (THD+N) @ -8dB %</b>			
<b>100Hz</b>	2.90/2.63	1.98/1.56	1.67/1.67
<b>1kHz</b>	3.20/2.86	1.68/1.71	1.99/1.77
<b>6.3kHz</b>	3.54/3.40	2.28/2.13	2.48/2.06
<b>Dimensions</b>	42 x 12.5 x 27.5(w x h x d)cms		
<b>Average wind/rewind time (C90)</b>	2min 10sec		
<b>Typical Retail Price</b>	<b>£200</b>		



# Pioneer CT-W601R

Pioneer High Fidelity (GB) Ltd, 1-6 Field Way, Greenford, Middlesex UB6 8UZ. Tel: (081) 575 5757



The main selling feature of the CT-W601 is Pioneer's proprietary Auto BLE circuit which at the press of a button adjusts bias, level and equalisation to give an accurate match of tape to recorder. This is especially important in avoiding Dolby mistracking. Only one of the two transports records, but both are auto-reverse capable (side change is triggered at the wrong end of the leader). The deck is equipped with Dolby B, C and HX Pro, good quality meters and tape counter displays, high speed dubbing, relay play, track search and enough other features besides to make your head spin. There is even a switch to provide a tailored response for tapes destined for use in personal stereos or car players.

There's a price to pay, however. The deck is sloppily built, and every corner that can be cut has been, presumably to help fund gadgets like Auto BLE.

## Lab report

The overall record/play frequency responses dropped away at high frequencies. This effect was more noticeable on one channel than the other with Type IV stock and even then wasn't excessive, but stepping down two grades to Type I revealed a smoothly progressive 4dB drop between 50Hz and 10kHz, which adds up to a substantial amount of energy integrated over the full bandwidth involved. The real problem, however, is the fact that this response shape was obtained after alignment using the BLE circuit. Other applications of the Super Auto version of this circuit have proved much more effective, the inference being that cost constraints may have prevented the job being done properly in this case.

Pitch integrity varied wildly from side to side on the record capable transport, and some variation was inferred on the play only transport too by playing a single frequency test tape and checking replay only wow and

flutter (this was confirmed by measurement). Azimuth errors were low however, and tapes could be replayed the 'wrong' way, ie turned over and played in reverse) with little apparent difference.

MOL and harmonic distortion figures follow the established pattern by being poor. Although bias noise is quite low, effective dynamic range is therefore only marginal.

## Sound quality

Prerecorded material sounded less than wholly stable, but was at least listenable (cf the Sansui D-X117WR which costs £20 more). The level of detail was fairly good, and the sound wasn't noticeably bandwidth limited or dynamically constrained.

Dubbing from Compact Discs soon showed where the limitations lay. One test CD for this project was a 35 year old recording of *Porgy & Bess* from Ella Fitzgerald and Louis Armstrong, chosen for its supremely articulate vocal quality. The Pioneer had the unfortunate effect of slurring the leading consonants and sibilants, and of making Ella's voice sound both fuller and 'baggier.' The sense of deliberation and concentration that makes this recording special was dissipated, and the obvious dullness that afflicted ferric tapes in particular made matters worse. As usual, after an initial test run Dolby B was chosen as the nearest to an optimum compromise setting between hiss and transparency.

## Conclusion

Although the Pioneer was generally easy to use, the dubbing controls were small and fiddly, the otherwise good quality display was messy and confusing, and the deck felt flimsy. Performance is not the equal of the better Technics and Denon dual decks at this price, and the Pioneer is not a distinguished addition to the convenience end of the market.

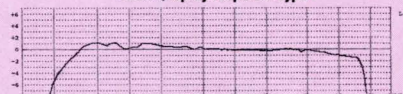
## TEST RESULTS

<b>Wow &amp; flutter IEC386 Q-Pk %</b>	
<b>Pk Wtd</b>	0.78/0.23% FWD/REV
<b>Mean Wtd</b>	0.83/0.19% FWD/REV
<b>Crosstalk ref 0dB L/R</b>	
<b>100kHz</b>	-39.4dB/-33.5dB
<b>1kHz</b>	-66.3dB/-51.1dB
<b>6.3kHz</b>	-39.5dB/-42.8dB
<b>10kHz</b>	-33.7dB/-38.6dB
<b>Phase (mean) 0dB</b>	
<b>40Hz</b>	+3degrees
<b>100Hz</b>	+2degrees
<b>1kHz</b>	+2degrees
<b>6.3kHz</b>	+9degrees
<b>10kHz</b>	+14degrees
<b>15kHz</b>	+21degrees
<b>Line input sensitivity/overload</b>	93mV/6.0V
<b>Mic input sensitivity/overload</b>	n/a
<b>Line output for 0dB/maximum</b>	517mV/2.1V
<b>Tape Speed</b>	-0.32/+0.21% FWD/REV
<b>IM distortion 10kHz/11kHz</b>	0.9% 0dB peak, 1kHz product
<b>VU indication at IEC 0dB</b>	-1.0dB

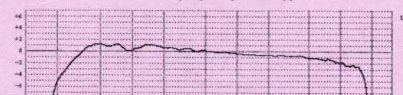
	IEC Type I	IEC Type II	IEC Type IV
<b>Noise CCIR 468-3 Q-Pk IEC L/R dB</b>			
<b>Peak Wtd</b>	-42.3/-43.0	-44.1/-44.4	-42.5/-43.4
<b>Peak Unwtd</b>	-46.4/-48.7	-46.0/-47.9	-46.6/-49.9
<b>Mean Wtd</b>	-42.6/43.9	-43.9/-44.8	-42.7/-52.9
<b>MOL 3% ref 0dB</b>			
<b>1kHz</b>	-4.3/-5.9	-4.8/-6.4	-3.8/-5.4
<b>Distortion (THD+N) @ +8dB %</b>			
<b>100Hz</b>	15.9/16.0	19.9/19.5	16.3/16.4
<b>1kHz</b>	11.2/13.2	18.4/19.6	11.5/13.6
<b>6.3kHz</b>	3.60/3.56	4.48/5.87	2.94/4.02
<b>Distortion (THD+N) @ -8dB %</b>			
<b>100Hz</b>	0.409/0.466	0.784/0.858	0.442/0.440
<b>1kHz</b>	0.438/0.358	0.828/0.722	0.427/0.351
<b>6.3kHz</b>	2.11/0.658	2.62/1.03	2.01/0.646
<b>Dimensions</b>	42 x 13.5 x 25 (w x h x d) cms		
<b>Average wind/rewind time (C90)</b>	2mins 48sec		
<b>Typical Retail Price</b>	£200		



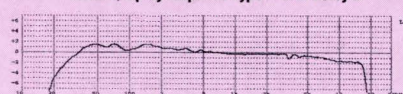
Record/replay response Type I



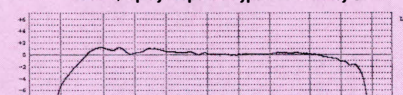
Record/replay response Type II



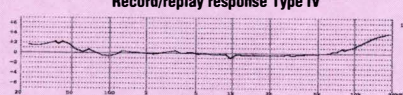
Record/replay response Type II with Dolby B



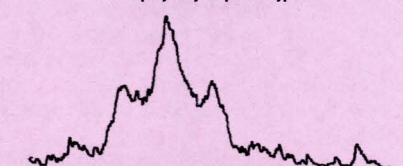
Record/replay response Type II with Dolby C



Record/replay response Type IV



Replay only response Type I



Spectrum analysis 3.15kHz signal



# Pioneer CT-S610

Pioneer High Fidelity (GB) Ltd, 1-6 Field Way, Greenford, Middlesex UB6 8UZ. Tel: (081) 575 5757



**P**ioneer has a good track record of using expensive models to introduce new ideas, components and engineering processes which subsequently seep down into cheaper models.

The £270 *CT-S610* is one example of this policy, coming equipped with the impressive Reference Master closed loop, dual capstan 'Z' mechanism from the *CD-900S* along with a package deal of structural measures designed to reduce self-resonance and microphony. It is a three head deck of course, with automatic off tape monitoring in record mode, and Super Auto BLE (one button bias, level and equalisation adjustment at 400Hz, 3kHz and 12kHz in about ten seconds). The display — which includes an awful BLE-related animated graphic — can be turned off, and a wide variety of simple search and counter modes are supported, not including the time remaining display of the *CT-S410*, unfortunately.

## Lab report

Metal tapes give a well extended if somewhat treble forward balance which can be bought back into line quite easily with the fine bias adjust control. The standard setting sounds fine with or without Dolby though, and gives a little extra 'bite' which will prove beneficial in many systems, though the other two tape groups do fit the machine more accurately. Dolby B processing is essentially transparent as measured, but Dolby C processing gives an interesting kink in the curve in the extreme treble which was made up by the Dolby circuits and which therefore amounts to a departure from the straight and narrow.

MOLs are poor, even the Type IV (metal) test tape achieving no better than -0.4dB (worst channel), but some impressively quiet electronics in the record and replay chain keep overall system noise well in check. Background noise is well suppressed due to

quiet record amps, and taking all these things into account, the Pioneer *CT-S610* is clearly best used with high grade Type II (chrome bias) tapes rather than metals.

As promised, the *CT-S610* has a first class transport (albeit one with very slow wind speeds), which yields a beautifully clean frequency spectrum (shown) and some impressive numbers to match.

## Sound quality

The *CT-S610* made some recordings of a very high standard, incidentally quite different in character and musical value to those made by the *CT-S410*. Bass quality, so often anaemic and sloppy when reproduced off tape with other decks, was deep, solid and provided a firm foundation for the music. Imagery, another common weakness of the medium, was impressively three dimensional. Best of all was the Pioneer's supreme clarity and expressiveness, though in the usual fashion the greater the noise reduction employed, the more subtly opaque and less responsive the sound became. The vagueness and meandering central image that spoils so many other decks was not an issue here, and large scale musical dynamics and smaller scale expressive shadings alike were well captured. It was one of the few decks in this project capable of reproducing Beethoven string quartets with a real sense of occasion and without squashing the close, vibrant sound.

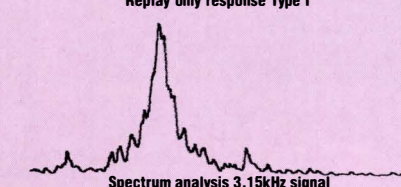
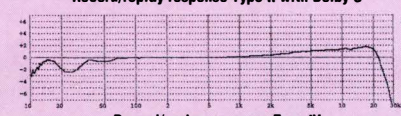
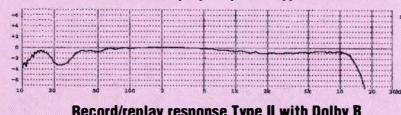
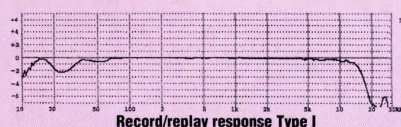
Counting against the *CT-S610* is its inability to make good use of Type IV tapes, and a certain coloration that swathed the music.

## Conclusion

The *CT-S610* teeters on the brink of excellence, and merits a firm Recommendation. It sounds perceptibly synthetic at times, yet comes closer than most to capturing the spirit and essence of fine performances, even with difficult to record chamber music.

## TEST RESULTS

<b>Wow &amp; flutter IEC386 Q-Pk %</b>	
<b>Pk Wtd</b>	0.065%
<b>Mean Wtd</b>	0.053%
<b>Crosstalk ref 0dB</b>	
<b>100Hz</b>	-49.4dB/-49.8dB
<b>1kHz</b>	-49.5dB/-51.5dB
<b>6.3kHz</b>	-35.1dB/-37.1dB
<b>10kHz</b>	-33.7dB/-41.0dB
<b>Phase (mean) 0dB</b>	
<b>40Hz</b>	+1degrees
<b>100Hz</b>	0degrees
<b>1kHz</b>	-7degrees
<b>6.3kHz</b>	-35degrees
<b>10kHz</b>	-53degrees
<b>15kHz</b>	-50degrees
<b>Line input sensitivity/overload</b>	104mV/>13V
<b>Mic input sensitivity/overload</b>	n/a
<b>Line output for 0dB/maximum</b>	532mV/2.1V
<b>Tape running speed</b>	+0.45%
<b>IM distortion 10kHz/11kHz</b>	2.8% 0dB peak, 1kHz product
<b>VU indication at IEC 0dB</b>	0dB
	<b>IEC Type I IEC Type II IEC Type IV</b>
<b>Noise CCIR 468-3 Q-Pk IEC L/R dB</b>	
<b>Peak Wtd</b>	-40.7/-40.8 -45.3/-45.4 -44.4/-44.0
<b>Peak Unwtd</b>	-46.0/-46.1 -49.1/-48.7 -48.6/-48.6
<b>Mean Wtd</b>	-40.9/-41.0 -45.6/-45.6 -44.6/-44.2
<b>MOL 3% ref 0dB</b>	
<b>1kHz</b>	-0.4/-0.3 -2.6/-2.5 -0.4/-0.5
<b>Distortion (THD+N) @ +8dB %</b>	
<b>100Hz</b>	9.93/9.08 11.7/0.0 6.65/6.42
<b>1kHz</b>	7.36/7.03 10.6/10.3 6.06/5.81
<b>6.3kHz</b>	2.64/1.86 2.17/2.35 6.25/5.29
<b>Distortion (THD+N) @ -8dB %</b>	
<b>100Hz</b>	0.914/0.865 0.048/0.513 0.570/0.574
<b>1kHz</b>	0.981/0.949 0.497/0.481 0.576/0.582
<b>6.3kHz</b>	1.09/1.11 1.08/1.06 1.11/1.01
<b>Dimensions</b>	42 x 13 x 32.5(w x h x d)cms
<b>Average wind/rewind time (C90)</b>	2min 32sec
<b>Typical Retail Price</b>	<b>£270</b>



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# Panasonic SV-3700 Pro DAT

Panasonic UK Ltd, Panasonic House, Willoughby Road, Bracknell, Berks RG12 4FP. Tel: (0344) 862444.



As you would expect of a truly professional DAT deck, this Panasonic model comes equipped with balanced AES/EBU XLR analogue in and output connectors plus of course the usual S/PDIF digital I/O. The AES/EBU interface, which is compatible with only a small (though increasing) number of high-end preamplifiers, is *de rigueur* in studios. Balanced to unbalanced leads can be assembled to allow interfacing with conventional equipment.

Serial copy management doesn't apply through AES/EBU lines, but rear panel switching allows the subcode flag to be set as desired, to either allow or prohibit digital copying, or to allow a single digital copy as for a normal commercial release. The SV-3700 can be used with a wired remote control for basic operations, but a full function infra-red remote is supplied.

The centrepiece of the control system is an impressive piece of modern electronic flummery in the form of a large spring loaded 'shuttle search' knob which allows fine control over audible cueing. Automatic fades can be performed at the press of a button, and a range of edit play options are also available. Backing up the control system is an informative display and an unusually quick acting transport.

## Lab report

Analogue sources can be recorded at 44.1 or 48kHz, and digital recordings track the input, be it 32kHz, 44.1kHz or 48kHz. The ADC is a 1-bit MN6624 processor with 64 times oversampling, and D/A conversion is handled by four 18-bit Burr Brown PCM56P ICs.

The Panasonic gets a clean bill of health from the lab bench. The measured frequency response is flat and linearity is absolutely accurate, the transfer characteristic being completely accurate down to -100dB, with only a mild departure below that, largely due

to system noise. The IM distortion plot shows no obvious IM products in band, and little out of it, while the output out of band is effectively filtered.

## Sound quality

For test purposes, and because the two decks are designed to fulfil similar functions, the Panasonic was closely compared to the Tascam DA-30. The results were, to say the least, intriguing.

First impressions are all the Panasonic's way. Superficially at least, the SV-3700 is unusually dynamic and clean, with a great range and depth of tonal colour when dubbing digitally, and a lighter, more agile feel with certain jazz and other material where such qualities go a long way to defining the performance. It is almost inevitable that there be a quid pro quo, however, and here it takes the form of a lack of substance, of tangibility to the sound. Although the bass goes down a long way, it palpably lacks substance and weight, and as a direct result fails to project itself with authority. Vocal material is handled with fine expression, but again is projected rather flatly from the background. Large scale orchestral sounds are not fully credible, and neither is the close up dynamic interplay of a well recorded string quartet, a notoriously hard subject to deal with properly.

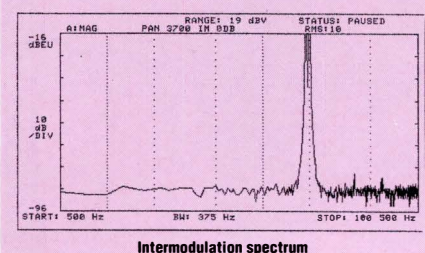
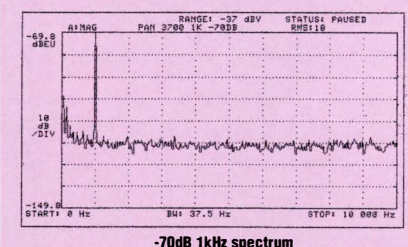
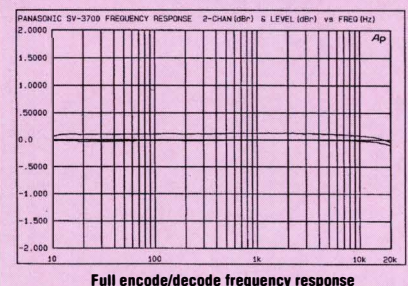
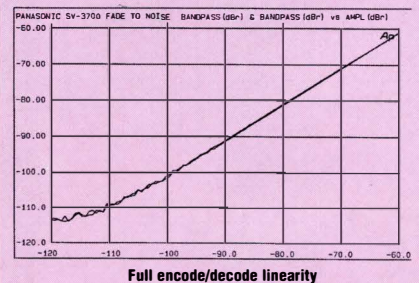
## Conclusion

Although the 3700 is a fairly uncompromising piece of pro kit, it carries some conviction as a domestic DAT due to its reasonable price, its slick user interface (including an I/R remote control, which is unusual with this class of equipment) and its even more accomplished tape handling. Sound quality is a little above average for DAT by virtue of its colourfulness and speed, but although it can huff and it can puff, it does not carry enough raw conviction to be fully convincing

## TEST RESULTS

Test resolution	15.5 bits
Output level, dB rel 2V, Source [digitalin] (10.5V)	14.69
Line input sensitivity/overload	0.94mV/>13V
Level meter indication at full level (digital in)	0dB
Effective dyn. range (-70dB thd + N + dither)	111dB
	20Hz 1kHz 20kHz
Pure harmonic distortion	
Full level ref 0dB	-87dB -87dB <-95dB
(20kHz in-band products only)	
	0.0045% 0.0045% 0.0018%
at -70dB encode + dither	-41dB or 0.891%
Stereo separation	106dB 73/84dB 59/64dB
Stereo balance L/R	0.05dB 0.07dB 0.05dB
Frequency resp. (ref 1kHz) 20Hz - 20kHz	+/-0.11dB
Audible high frequency intermodulation	-101dB or 0.0009%
Audible elect. noise (CCR, ARM wtd, 1kHz)	-86dB
Audible mechanical noise	low
Ultrasonic noise	-117dB
Deemphasis	+/-0.06dB at 5kHz
White noise overload test	OK
Dimensions (w x h x d)	43 x 12 x 33.5cm
Typical Retail Price	£1,411

Tested with analogue in/analogue out unless otherwise stated



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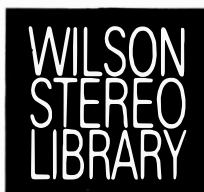
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Facsimile: Oxford (0865) 791665

# Revox Professional Series C115

Revox UK Ltd, 1 Berkshire Business Centre, Berkshire Drive, Thatcham, Berks RG13 4EW. Tel: (0635) 876969



To provide a slightly different perspective on the cassette deck market, we decided to assess the £843 Revox C115, a deck aimed at the professional user.

The focus of the design is unfamiliar. Just enough attention has been paid to cosmetics to produce something recognisably Revox, but ergonomics have received a great deal of attention. The on/off switch has been relegated to the back because professionals can't be trusted not to press 'off' instead of 'play' in the heat of a session, and the most prominent front panel features — eject, pause and play — are operated by large, strategically positioned square buttons. A compact bank of controls invokes the usual transport functions, track and intro search, and a second bank provides Dolby B/C and MPX switching, a single track repeat and so on. Screwdriver adjustment of bias and sensitivity is fitted: Revox suggests using external 400Hz and 12kHz oscillators for setting up, but the task is quite easily accomplished by ear using a white noise source such as FM interstation hiss.

## Lab report

Although balanced working provides superior common mode rejection, it has little bearing on the overall measured performance of the deck, which as usual was dominated by the inherent limitations of tape and heads.

The closed loop, dual capstan transport mechanism has only a couple of mild discrete wow artefacts and a strong central peak, implying very stable pitch, but a highish generalised level of wow and flutter.

Rather than the usual hell for leather pursuit of the extreme treble with a high Q roll-off to follow, the deck is adjusted for a smooth response through the mid treble with a relatively slow decline thereafter, associated in this case with very low mid

level distortion and modest saturation effects at higher levels. MOLs are acceptable with Type I and II tapes, if very slightly below par with metals.

## Sound quality

The 'professional' tag is slightly misleading: the deck is not meant for mastering or other critical quality applications. The Revox will serve for quick check purposes, or in outside broadcast vehicles, community stations and perhaps even for broadcast purposes where a genuinely high grade signal feed is not a strict necessity. Cassette tape offers approximately the bandwidth and dynamic range of the FM band II system.

The deck feels a little crude and sounds clonky changing transport modes, but at other times it works quietly and sweetly enough. Pre-recorded tapes are handled extremely accurately and to great effect, which is important if the deck is used to assess mixes for balance, but even with bias and sensitivity optimally adjusted, music off tape tends to sound exposed and a little wispy in the extreme treble, though the bass had a near perfect blend of depth and control.

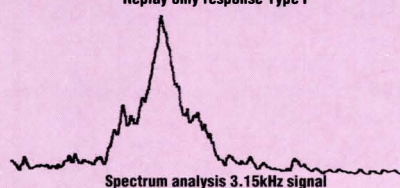
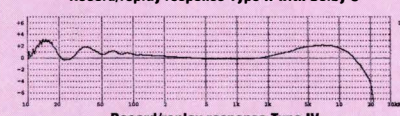
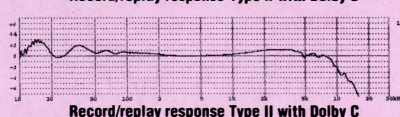
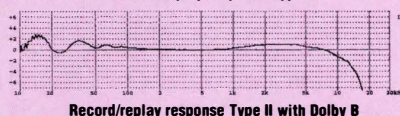
There was some loss of adrenalin with energetic material, and to an extent this tendency was exaggerated with lower bias tapes. Small signal behaviour was not quite in the top class, ambience sometimes sounded muted, and transient waveforms were slightly slugged, all of which certainly owe something to both the rounded off treble and the residual wow and flutter.

## Conclusion

The appeal of this deck to the domestic tape enthusiast is limited, but it is readily tweaked, and highly serviceable, both physically and musically. Revox has a good track record for reliability, though it is possible to get better musical performance for less outlay from elsewhere.

## TEST RESULTS

<b>Wow &amp; flutter IEC386 Q-Pk %</b>			
<b>Pk Wtd</b>			0.13%
<b>Mean Wtd</b>			0.11%
<b>Crosstalk ref 0dB L/R</b>			
<b>100Hz</b>			-49.3dB/-50.3dB
<b>1kHz</b>			-48.7dB/-49.5dB
<b>6.3kHz</b>			-43.1dB/-43.1dB
<b>10kHz</b>			-39.1dB/-42.8dB
<b>Phase (mean) 0dB</b>			
<b>40Hz</b>			-2degrees
<b>100Hz</b>			-3degrees
<b>1kHz</b>			-14degrees
<b>6.3kHz</b>			-88degrees
<b>10kHz</b>			-140degrees
<b>15kHz</b>			+148degrees
<b>Line input sensitivity/overload</b>			79mV/>13V
<b>Mic input sensitivity/overload</b>			n/a
<b>Line output for 0dB/maximum</b>			94mV/5.9V
<b>Tape Speed</b>			-0.21%
<b>IM distortion 10kHz/11kHz</b>		0.71% 0dB peak, 1kHz	product
<b>VU indication at IEC 0dB</b>			
			2dB
<b>IEC Type I IEC Type II IEC Type IV</b>			
<b>Noise CCIR 468-3 Q-Pk IEC L/R dB</b>			
<b>Peak Wtd</b>	-38.8/-39.1	-44.6/-45.0	-43.0/42.8
<b>Peak Unwtd</b>	-44.6/-44.8	-48.4/-49.2	-48.7/-46.6
<b>Mean Wtd</b>	-39.0/-39.3	-44.8/-45.2	-45.2/-42.9
<b>MOL 3% ref 0dB</b>			
<b>1kHz</b>	+6.1/+5.5	+4.0/+5.0	+2.4/+4.1
<b>Distortion (THD+N) @ +8dB %</b>			
<b>100Hz</b>	3.20/3.66	8.52/7.80	8.93/8.26
<b>1kHz</b>	1.62/1.97	7.76/6.92	7.75/6.33
<b>6.3kHz</b>	1.76/2.26	1.87/1.72	4.28/5.40
<b>Distortion (THD+N) @ -8dB %</b>			
<b>100Hz</b>	0.909/0.855	0.538/0.485	0.661/0.604
<b>1kHz</b>	1.01/0.963	0.517/0.481	0.684/0.619
<b>6.3kHz</b>	1.05/1.01	0.577/0.63	0.670/0.694
<b>Dimensions</b>	44 x 10.5 x 36.5(w x h x d)cms		
<b>Average wind/rewind time (C90)</b>	2min 12sec		
<b>Typical Retail Price</b>	<b>£843</b>		



# Sansui D-X117WR

Sansui (UK), Stonehill, Huntingdon, Cambs PE18 6ED.  
Tel: (0480) 451777



The £200 *D-X117WR* has the typical mixture of one recording and one play only transport, both auto reverse capable. It comes with Dolby B, C and HX Pro, normal and high speed dubbing and also a headphone socket fed by a volume control, which is not quite yet standard practice with mid price twins. As usual, the deck is at its most convincing when plumbed into an own-brand system, using rear panel bus sockets which enable it to respond to a system remote control, and make recordings off CD with a single button press, handling side breaks and track programming automatically.

The Sansui is modestly engineered, its essential simplicity showing in the noisiness with which transport modes are engaged and by the rather crudely designed central display area.

## Lab report

The chief measured anomaly on test was a loss of LF output, though the precipitous decline starts off gently enough near 125Hz, dropping to around -3dB at 50Hz, which in effect means there is no deep bass at all. The treble responses are reasonably smooth and accurately set with all three tape groups, and are quite well extended with Type II and Type IV stock. Little variation was noted in the reverse direction.

Note the kink in the Type II Dolby C plot, which is almost certainly a side effect of the antisaturation network. The playback only curve is uneven, with quite strong loss of output evident at the frequency extremes, which is hardly likely to escape notice on audition.

It is not unusual to find that wow and flutter varies strongly between sides with auto-reverse transport mechanisms, and this is a case in point, the forward direction giving about double the wow and flutter levels of the flip side. However, the spec-

trum analysis at least shows no obvious discrete wow sidebands, which is a small comfort.

There is some measured advantage in using metal tapes rather than chrome bias ones, though the extra cost may be hard to justify in most cases. MOLs are well below the standard of unidirectional decks in the same price band, but bias noise levels are satisfactorily low.

## Sound quality

The auditioning started with prerecorded material, and it was quickly apparent that something was dreadfully wrong — or that the New York Phil really was playing inside an outside paper bag. There was little weight or gravitas to the orchestral sound, yet where demands were made on the LF the sound became blowsy and overhung. The treble was uneven and smeared, though less dull than the frequency response plots implied, and to add insult to injury, the sound was palpably unstable, with clear signs of modulation noise. In short, the whole experience was thoroughly unedifying.

The stability problem wasn't cured when recording and playing back on the same machine; in fact it was marginally worse, and the unsettling effects of programme wow were clearly audible with sustained notes. The other very obvious feature of the sound was the thin, coloured bass which sounded muddled when it sounded at all. The mid and treble were quite well balanced, but again the loss of transparency and stability were always obvious. It hardly needs adding that high speed dubbing performance was not inspiring.

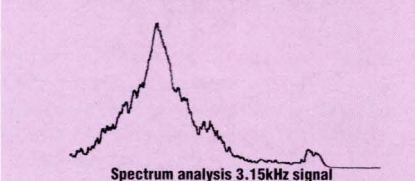
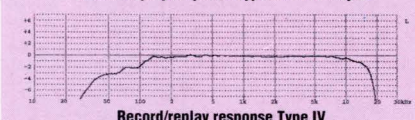
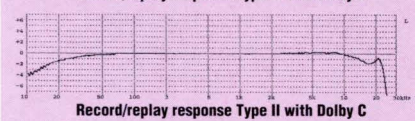
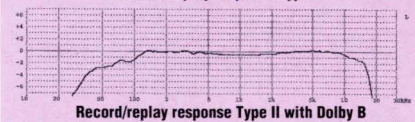
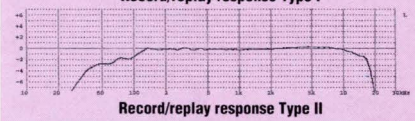
## Conclusion

The *D-X117WR* smacks of expediency: it is a machine designed to do a particular job at a particular price point, but it is quite devoid of flair or design integrity. Not recommended.

## TEST RESULTS

<b>Wow &amp; flutter IEC386 Q-Pk %</b>	
<b>Pk Wtd</b>	0.29/0.14%
<b>Mean Wtd</b>	0.24/0.11%
<b>Crosstalk ref 0dB L/R</b>	
<b>100Hz</b>	-37.9dB/-36.7dB
<b>1kHz</b>	-52.5dB/-55.7dB
<b>6.3kHz</b>	-37.1dB/-40.3dB
<b>10kHz</b>	-31.9dB/-35.6dB
<b>Phase (mean) 0dB</b>	
<b>40Hz</b>	+2degrees
<b>100Hz</b>	-4degrees
<b>1kHz</b>	-2degrees
<b>6.3kHz</b>	-13degrees
<b>10kHz</b>	-22degrees
<b>15kHz</b>	-22degrees
<b>Line input sensitivity/overload</b>	111mV/>13V
<b>Mic input sensitivity/overload</b>	n/a
<b>Line output for 0dB/maximum</b>	682mV/3.3V
<b>Tape Speed</b>	-0.38%/+0.24% FWD/REV
<b>IM distortion 10kHz/11kHz</b>	6.0%0dB peak, 1kHz product
<b>VU indication at IEC 0dB</b>	6dB

	IEC Type I	IEC Type II	IEC Type IV
<b>Noise CCR 468-3 Q-Pk IEC L/R dB</b>			
<b>Peak Wtd</b>	-40.0/-40.6	-43.1/-43.7	42.1/42.5
<b>Peak Unwtd</b>	-45.1/-45.3	-45.9/-46.9	45.7/46.2
<b>Mean Wtd</b>	-40.2/-40.8	-43.2/-43.9	42.2/42.8
<b>MOL3% ref 0dB</b>			
<b>1kHz</b>	-1.5/-2.6	-4.1/-5.1	-2.4/-3.5
<b>Distortion (THD+N) @ +8dB %</b>			
<b>100Hz</b>	9.86/12.1	11.5/14.3	7.94/9.95
<b>1kHz</b>	5.19/7.28	7.51/10.7	4.91/7.07
<b>6.3kHz</b>	3.19/3.04	2.66/3.08	2.72/2.80
<b>Distortion (THD+N) @ -8dB %</b>			
<b>100Hz</b>	1.09/1.22	0.746/0.707	0.773/0.764
<b>1kHz</b>	1.04/1.02	0.574/0.554	0.995/0.632
<b>6.3kHz</b>	1.03/0.980	0.598/0.581	0.823/0.761
<b>Dimensions (w x h x d)</b>	43 x 13.5 x 27.5cms		
<b>Average wind/rewind time (C90)</b>	2min 51sec		
<b>Typical Retail Price</b>	<b>£220</b>		





# Tascam DA-30

Teac UK Ltd, 5 Marlin House, The Croxley Centre, Watford, Herts WD1 8YA. Tel: 0923 819630



One surprise when assembling this group was to discover just how many DAT decks are available, but it soon became apparent that the number of true domestic decks — those with unbalanced phono-based signal socketry and SCMS — is declining, and that the market is increasingly being sustained by professional models. Of course there is nothing to stop professional decks being used in the home. The obvious disadvantage is that professional DAT tends to sell through pro dealers, who tend to be few and far between. The advantage is that you don't get SCMS to inhibit second generation digital dubs.

The £1,200 Tascam DA-30 is a prototypical pro DAT machine. With about the same proportions as a full size domestic component, the Tascam's overhanging frontage facilitates rack mounting, and in accordance with standard studio practice the remote handset is hard wired to the rear panel: infrared beams would be a liability in a busy studio. Socketry includes unbalanced (phono) and balanced AES/EBU (XLR) sockets. AES/EBU doesn't recognise SCMS, and the unbalanced sockets don't write SCMS flags on recordings made from analogue or non-SCMS digital sources, but the deck does respond to SCMS protected copyright sources in the usual way.

This is a pretty straightforward implementation of the DAT standard with the usual subcode edit and powerful tape handling/track selection facilities. Analogue recordings can be made at 44.1kHz which would be handy if mastering onto CD-I, or 48kHz which gives a little extra HF bandwidth (domestic DAT hardware is limited to 48kHz). Long Play (32kHz sampling) mode is not available when recording.

## Lab report

The DA-30 employed 64 times oversampling Delta-Sigma ADCs and 18 times 8-bit

DACs, a fairly typical arrangement that performs well in this case. There is some low level asymmetry between channels, but even the worst case shows little departure from the straight and narrow below about -95dB, though system noise changes the picture at around -110dB. The measured frequency response has been tailored, the HF roll-off of about 0.8dB at 20kHz being more like a deliberate target response than an inadvertent error.

IM products are low and noise above the anti-aliasing filter frequencies strays off at about -1.25dB, and falls slowly thereafter, which is extremely satisfactory. The inband distortion spectrum shows few if any discrete artefacts, which is even more satisfactory.

## Sound quality

The Tascam is not the cleanest sounding DAT around. Especially when recording in the analogue domain, but to a lesser extent when recording digitally, this deck has an unmistakably colourless, slightly fuzzy treble. The bass, however, is exceptionally firm and deep, and provides a solid underpinning for the music.

Despite more than occasional suggestions of middle and high frequency coloration which at times degenerated into something approaching muddle, the Tascam had an engaging strength, and was more capable than most at recreating the architecture and palpability of the original performance.

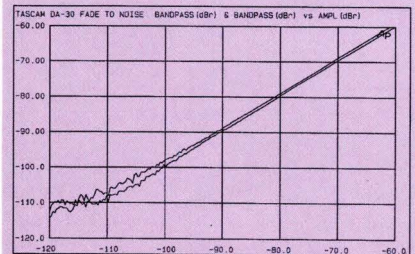
## Conclusion

On balance, the good doesn't totally outweigh the bad, not least because the quality that lends music tangibility at one instant can leave it sounding a little slow and opaque the next. This Tascam does have tremendous authority and drive, but the loss of transparency and colour cannot be ignored. Sum up: interesting.

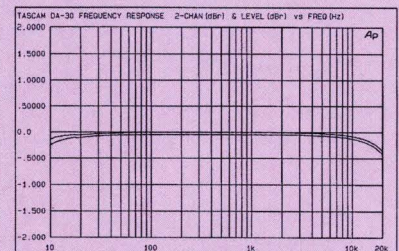
## TEST RESULTS

Test resolution	15.8bits		
Output level, dB rel 2V, Source (Balanced)	2.08V(digital in) - 9.68V		
Line input sensitivity/overload (Balanced)	5.38mV/>13V - 1770mV		
Level meter indication at full level (digital in)	0dB		
Effective dyn. range (-70dB thd + N + dither)	113dB		
	20Hz	1kHz	20kHz
Pure harmonic distortion			
Full level ref 0dB	-91dB	-90dB	<-90dB
(20kHz in-band products only)	0.0028%	0.0032%	0.0032%
at -70dB encode + dither	-43dB or 0.708%		
Stereo separation	120/110dB	105dB	85dB
Stereo balance L/R	0.08dB	0.08dB	0.08dB
Frequency resp. (ref 1kHz) 20Hz - 20kHz	+/-0.4dB		
Audible high frequency intermodulation	-97dB or 0.0014%		
Audible elect. noise (CCIR, ARM wtd, 1kHz)	-87dB		
Audible mechanical noise	low		
Ultrasonic noise	-115dB		
De-emphasis	+/-0.06dB at 5kHz		
White noise overload test	OK		
Dimensions (w x h x d)	48.2 x 15 x 35.6cms		
Typical Retail Price	£1,199 inc wired remote.		

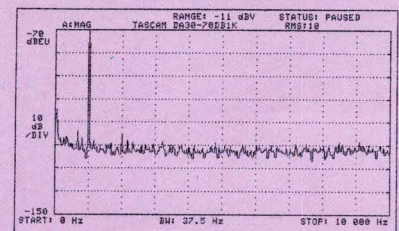
Tested with analogue in/analogue out unless otherwise stated



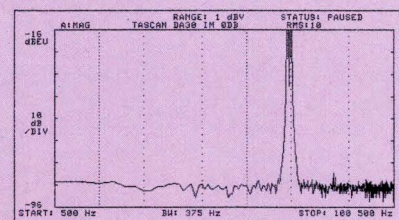
Full encode/decode linearity



Full encode/decode frequency response



-70dB 1kHz spectrum



Intermodulation spectrum



# Technics RS-BX626

Panasonic UK Ltd, Panasonic House, Willoughby Road, Bracknell, Berks RG12 4FP. Tel: (0344) 862444



**T**he RS-BX626 is bad news for RS-BX606 owners: the new model is said to be the same as its 606 predecessor, except that it has a built-in infra-red receiver, and is therefore remote control ready. Other details are as per the review in issue 105, the short version of which is that it includes a quartz locked, direct drive power plant, independent record and play heads, real time off-tape monitoring (but with manual source/tape switching — a petty irritant), Dolby B, C and HX Pro, excellent dual-range meters, a memory counter and track search. By any standard, this is a powerfully equipped deck for £180.

## Lab report

Changes in the lab test regime for this issue make it impossible to compare the 626 to the RS-BX606 directly, but the two models are nominally identical under the skin, and this model therefore acts as something of a 'bridge' between the two different test regimes. It seems certain that the new model is at least as good as the old (the spectrum analysis, which is about as close as you can get to fingerprinting a cassette deck, strongly underlines the common heritage), and taking due account of price, there are no quarrels with the performance of the transport or of the electronics.

There are some notable differences however, the most striking of which is the much smoother high frequency response. The earlier model suffered from significant levels of random fluctuation that implied poor tape to head contact, perhaps due to inadequate tape tensioning across the head path and this has been cured in the new model. The Type I replay only response shape is also a little more accurate; there is none of the former excess of output at the frequency extremes. Finally, IM distortion on high level signals is vastly improved. The 40 per cent figure measured with the RS-BX606

has come down to 0.63 per cent here (10/11kHz dual tones, 1kHz product 0dB — measured the same way in both tests), so either the earlier machine was below par or an unannounced change has indeed been made.

## Sound quality

The RS-BX626 builds nicely on its (possibly sub-standard) predecessor, with scarcely a hint of the steeliness and homogenised treble noted in the test of that model. There remains a vague suggestion that the sound was processed when monitoring off tape while recording, and this was reinforced when playing the tape back later.

This is one of the least costly designs capable of making good use of metal tapes. It gave a bolder, firmer, less smudged sound than most when recording music as varied as Beverley Craven and Andy Sheppard, which share a richness of information in the mid and high frequency areas, sometimes at quite high levels. The Technics' capabilities were, however, broad enough to give a ravishing account of another test recording, the Adagio from Mozart's *Clarinet Concerto*, an exquisite if elderly recording that sounds diminished in scale and a little flat and distant with most budget and even mid price cassette decks. The only obvious giveaway here was some thickening and coarsening of textures in the upper bass and midband, but the fundamental expressiveness of the interpretation remained intact.

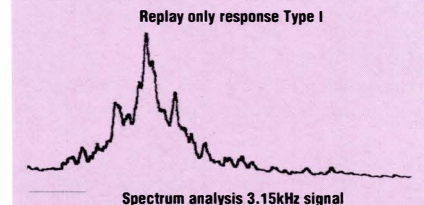
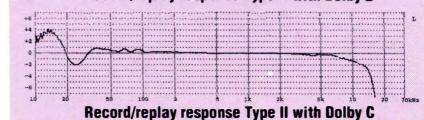
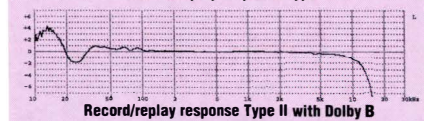
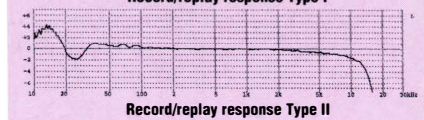
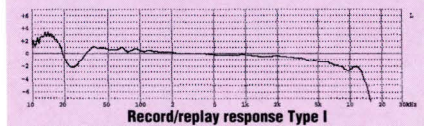
## Conclusion

The RS-BX626 is a deck with wide ranging capabilities and no obvious weaknesses (apart from a lack of automatic tape/source monitoring), but as usual the Dolby noise reduction circuits contribute some opacity. Taking price into account, however, the results are little less than remarkable, and a Best Buy rating is consequently *de-rigueur*.

## TEST RESULTS

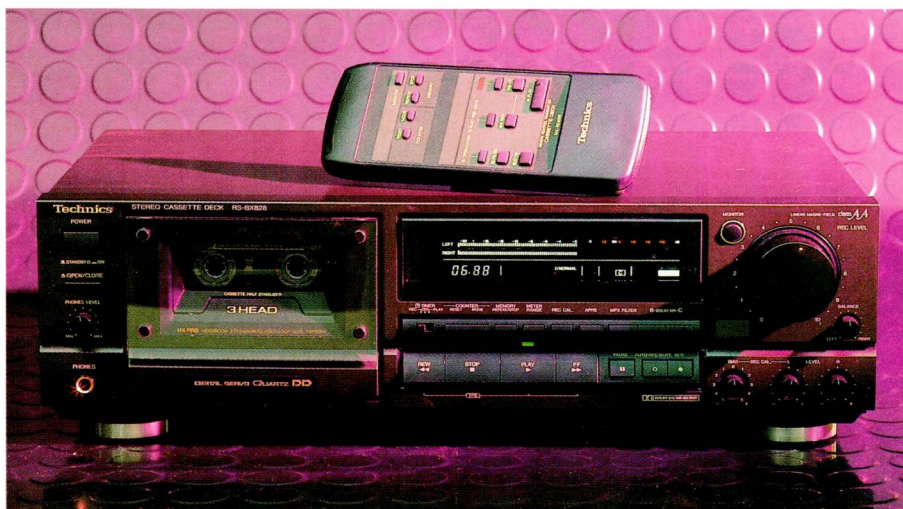
<b>Wow &amp; flutter IEC386 Q-Pk %</b>	0.079%
<b>Pk Wtd</b>	0.062%
<b>Mean Wtd</b>	
<b>Crosstalk ref 0dB L/R</b>	
<b>100Hz</b>	-47.9dB/-47.0dB
<b>1kHz</b>	-56.1dB/-58.9dB
<b>6.3kHz</b>	-36.6dB/-39.0dB
<b>10kHz</b>	-35.1dB/-35.0dB
<b>Phase (mean) 0dB</b>	
<b>40Hz</b>	0degrees
<b>100Hz</b>	-2degrees
<b>1kHz</b>	-15degrees
<b>6.3kHz</b>	-79degrees
<b>10kHz</b>	-117degrees
<b>15kHz</b>	-12degrees
<b>Line input sensitivity/overload</b>	126mV/>13V
<b>Mic input sensitivity/overload</b>	n/a
<b>Line output for 0dB/maximum</b>	621mV/3.5V
<b>Tape Speed</b>	+0.23%
<b>IM distortion 10kHz/11kHz</b>	0.63% 0dB peak, 1kHz
<b>VU indication at IEC 0dB</b>	+4dB

	IEC Type I	IEC Type II	IEC Type IV
<b>Noise CCIR 468-3 Q-Pk IEC L/R dB</b>			
<b>Peak Wtd</b>	-38.7/-38.3	-43.1/-43.0	-40.5/-40.7
<b>Peak Unwtd</b>	-42.3/-41.6	-44.8/-44.6	-43.2/-43.1
<b>Mean Wtd</b>	-38.9/-38.4	-43.3/-43.1	-42.7/-40.9
<b>MOL 3% ref 0dB</b>			
<b>1kHz</b>	+4.1/+4.0	+2.8/+2.6	+5.7/+5.6
<b>Distortion (THD+N) @ +8dB %</b>			
<b>100Hz</b>	5.27/4.77	5.28/5.17	3.17/3.32
<b>1kHz</b>	1.28/1.14	2.22/2.29	1.02/1.06
<b>6.3kHz</b>	1.29/1.08	1.69/1.22	6.26/5.70
<b>Distortion (THD+N) @ -8dB %</b>			
<b>100Hz</b>	1.07/1.08	0.693/0.670	0.235/0.263
<b>1kHz</b>	1.34/1.32	0.795/0.793	0.282/0.275
<b>6.3kHz</b>	1.61/1.54	0.983/0.924	1.24/1.27
<b>Dimensions</b>	43 x 12.5 x 30(w x h x d)cms		
<b>Average wind/rewind time (C90)</b>	2mins 19sec		
<b>Typical Retail Price</b>	<b>£180</b>		



# Technics RS-BX828

Panasonic UK Ltd, Panasonic House, Willoughby Road, Bracknell, Berks RG12 4FP. Tel: (0344) 862444



The £300 *RS-BX828* is almost the same as its *RS-BX808* predecessor, except that remote control facilities have been included. There has been no corresponding price increase.

This is a three head deck, with manually controlled source/tape monitoring. Engineering standards are par for the course, that is apart from a TNRC (Technics Non Resonant Compound) reinforced base. Fit, finish and operational feel are first rate, though aesthetics are uncompromisingly technical.

The tape is driven by a high grade closed loop quartz-locked direct-drive transport which also features dedicated capstan and reel drive motors. The heads are mounted on a solid diecast zinc block with ceramic composite tape guides. The powered cassette door has integral cassette shell damping. Special features of the record and playback circuits include measures based on proprietary amplifier technology designed to eliminate phase errors caused by head coil inductance.

Operational features include a wide range of search and memory options, Dolby B, C and HX Pro, and built in 400Hz and 10kHz oscillators to help align bias and sensitivity.

## Lab report

The three tape groups yield near indistinguishable frequency response plots, there's scarcely a trace of the usual variation in treble bandwidth, though part of the reason for this is negative: even with metal tapes, the response doesn't extend all that far. More important, however, is that LF output is well extended, and the deck is extremely well adjusted to any kind of tape that notionally fits one of the three IEC tape groups slots. Playback compatibility is near perfect, and Dolby NR processing imposes no measurable response change whatsoever. The transport is also excellent, with lowish absolute wow and flutter levels, and a complete

absence of identifiable modulation noise, a particular benefit of the dual capstan drive arrangement. In the final analysis this last probably counts for more than the raw wow and flutter figure.

Operating dynamic range is very good, particularly with metals, which can be pushed to very high levels without problem, a fact mirrored in the excellent MOLs attainable with this tape type in particular.

## Sound quality

Prerecorded cassettes benefited from the Technics' underlying neutrality and stability, and were considered a significant success. As a recorder, the *RS-BX828* is well enough endowed to make good use of metals, and made a series of recordings that were palpably more stable and solid sounding than Type IIs when extended, and with greater apparent resolution at other times. But clarity, stability and a solid, stable image were constants with this deck, irrespective of the tape group.

Having recognised all these positive qualities, the Technics was less than wholly convincing in action. Despite a wide measured dynamic range, the *RS-BX828*'s ability to discriminate fine nuances of expression, to separate similar sounding instruments, and to keep the picture in focus when the going became frenetic, lagged behind expectations. Additionally, the *828* had a slightly raw quality that tended to emphasise high frequency information unduly even when the frequency response was flat.

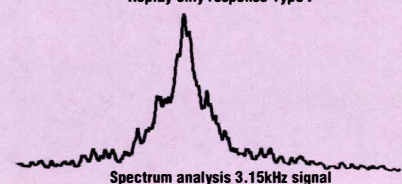
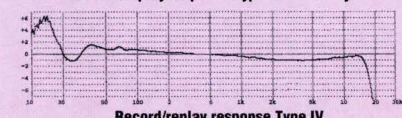
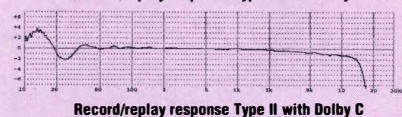
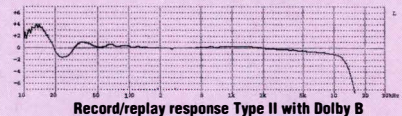
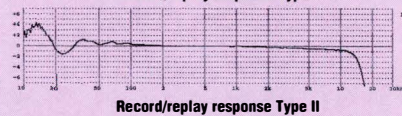
## Conclusion

The parts are greater than the whole: the *RS-BX828* has a quick and detailed sound with fine control and clarity, but its ability to hold onto the structure of complex musical signals was impaired by a cool presentation that was lacking in the qualities that allow music to breathe in a convincing manner.

## TEST RESULTS

<b>Wow &amp; flutter IEC386 Q-Pk %</b>	
<b>Pk Wtd</b>	0.081%
<b>Mean Wtd</b>	0.064%
<b>Crosstalk ref 0dB L/R</b>	
<b>100Hz</b>	-45.3dB/-47.5dB
<b>1kHz</b>	-61.1dB/-64.3dB
<b>6.3kHz</b>	-37.2dB/-41.7dB
<b>10kHz</b>	-35.4dB/-35.8dB
<b>Phase(mean) 0dB</b>	
<b>40Hz</b>	0degrees
<b>100Hz</b>	0degrees
<b>1kHz</b>	-1degrees
<b>6.3kHz</b>	-21degrees
<b>10kHz</b>	-32degrees
<b>15kHz</b>	-7degrees
<b>Line input sensitivity/overload</b>	136mV/>13V
<b>Mic input sensitivity/overload</b>	n/a
<b>Line output for 0dB/maximum</b>	660mV/3.7V
<b>Tape Speed</b>	+0.24%
<b>IM distortion 10kHz/1kHz</b>	6.3% 0dB peak, 1kHz product
<b>VU indication at IEC 0dB</b>	-4dB

	IEC Type I	IEC Type II	IEC Type IV
<b>Noise CCIR 468-3 Q-Pk IEC L/R dB</b>			
<b>Peak Wtd</b>	37.0/-37.4	-41.4/-42.3	-40.5/-41.2
<b>Peak Unwtd</b>	-39.5/-39.0	-41.0/-40.7	-40.9/-40.0
<b>Mean Wtd</b>	-37.1/-37.6	-41.6/-42.5	-40.8/-41.4
<b>MOL 3% ref 0dB</b>			
<b>1kHz</b>	+4.4/+4.7dB	+3.0/3.6dB	+6.0/+6.3dB
<b>Distortion (THD+N) @ +8dB %</b>			
<b>100Hz</b>	3.88/3.71	3.75/3.98	3.08/2.95
<b>1kHz</b>	0.968/0.940	1.73/1.71	0.994/1.03
<b>6.3kHz</b>	1.59/1.56	1.68/1.78	3.14/2.97
<b>Distortion (THD+N) @ -8dB %</b>			
<b>100Hz</b>	1.22/1.14	0.824/0.760	0.779/0.767
<b>1kHz</b>	1.41/1.36	0.815/0.736	0.869/0.806
<b>6.3kHz</b>	1.65/1.48	1.10/0.966	1.16/1.21
<b>Dimensions</b>	43 x 13.5 x 30(w x h x d)cm		
<b>Average wind/rewind time (C90)</b>	2min 34secs		
<b>Typical Retail Price</b>	<b>£300</b>		



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# Yamaha KX-260

Yamaha Electronics UK Ltd, Yamaha House, 200 Rickmansworth Road, Watford, Herts WD1 7JS. Tel: (0923) 233166



## TEST RESULTS

<b>Wow &amp; flutter IEC386 Q-Pk %</b>	0.088%		
<b>Pk Wtd</b>	0.066%		
<b>Mean Wtd</b>	0.066%		
<b>Crosstalk ref 0dB L/R</b>			
<b>100Hz</b>	-47.4dB/-49.1dB		
<b>1kHz</b>	-52.4dB/-52.1dB		
<b>6.3kHz</b>	-40.2dB/-37.8dB		
<b>10kHz</b>	-36.3dB/-33.9dB		
<b>Phase (mean) 0dB</b>			
<b>40Hz</b>	-2degrees		
<b>100Hz</b>	-1degrees		
<b>1kHz</b>	+1degrees		
<b>6.3kHz</b>	+10degrees		
<b>10kHz</b>	+13degrees		
<b>15kHz</b>	+25degrees		
<b>Line input sensitivity/overload</b>	95mV/>13V		
<b>Mic input sensitivity/overload</b>	n/a		
<b>Line output for 0dB/maximum</b>	544mV/4.25V		
<b>Tape Speed</b>	-0.04%		
<b>IM distortion 10kHz/11kHz</b>	1.6% 0dB peak, 1kHz		
<b>VU indication at IEC 0dB</b>	3dB		
	<b>IEC Type I</b>	<b>IEC Type II</b>	<b>IEC Type IV</b>
<b>Noise CCIR 468-3 Q-Pk IEC L/R dB</b>			
<b>Peak Wtd</b>	-44.7/-44.3	-48.5/-48.1	-47.0/-46.4
<b>Peak Unwtd</b>	-48.4/-46.3	-51.1/-50.1	-49.4/-48.1
<b>Mean Wtd</b>	-44.9/-44.6	-48.7/-48.2	-47.3/-46.6
<b>MOL 3% ref 0dB</b>			
<b>1kHz</b>	+0.5/0.4	+0.1/0.0	-0.5/-1.8
<b>Distortion (THD+N) @ +8dB %</b>			
<b>100Hz</b>	18.3/18.3	15.8/15.4	18.1/17.2
<b>1kHz</b>	8.84/9.70	10.0/11.5	13.5/13.2
<b>6.3kHz</b>	1.68/1.63	1.57/1.63	3.10/3.01
<b>Distortion (THD+N) @ -8dB %</b>			
<b>100Hz</b>	0.795/0.841	0.415/0.409	0.729/0.831
<b>1kHz</b>	0.896/0.902	0.473/0.479	0.590/0.687
<b>6.3kHz</b>	1.10/1.12	0.664/0.676	0.981/0.984
<b>Dimensions</b>	43.5 x 13 x 28.5(w x h x d)cms		
<b>Average wind/rewind time (C90)</b>	2 min 7 sec		
<b>Typical Retail Price</b>	<b>£150</b>		

The £150 KX-260 replaces the KX-250, a design which was ranked a Best Buy when tested in *Hi-Fi Choice* issue 93. For the KX-260, the rather fussily complex control system has been thinned out a little, and the engineering fundamentals have been upgraded. Cosmetics and finish have been refashioned in the current Yamaha corporate style, with rounded edges and soft lines, but the KX-250's price has been held.

The range of features is still impressive, and includes Play Trim, which compensates for losses due to head azimuth differences between record and playback decks. Because Play Trim is fitted in front of the Dolby replay processor, any Dolby tracking errors due to incorrectly matched levels can be avoided. The Yamaha also has track and intro search, Dolby B/C/HX Pro and a fine bias adjust feature. An infra-red receiver is built in, and a handset is available as an optional extra. Headphone monitoring, however, is at fixed level, and the meters are poor in appearance, legibility and resolution.

### Lab report

Internal changes introduced for this model include a new two motor drive system in which the capstan motor is totally dedicated to that task, and a record chain that offers improved bandwidth with lower bias tapes as part of a package of improvements.

The most obvious feature of the lab test programme is the bass response, which has a slightly kicked up appearance near 50Hz, prior to an early LF roll-off, which implies some mid bass prominence and a lack of real depth. Treble behaviour is well tailored — the test plots were run at the standard bias setting in each case — but bandwidth is limited here too, the -3dB point falling between 12.5kHz - 18kHz depending on the tape type. The effect of the Play Trim control was plotted out at its extremities (the plots

are not shown for space reasons): it gives a smooth boost or cut hinged around 1kHz with a  $\pm 6$ dB range which should be enough even for the least compatible prerecorded material.

Wow and flutter is quite low, but the spectrum analysis is somewhat marred by severe sidebands indicative of capstan wow. Signal/noise is quite good, with MOLs about average for a tape deck in this price band.

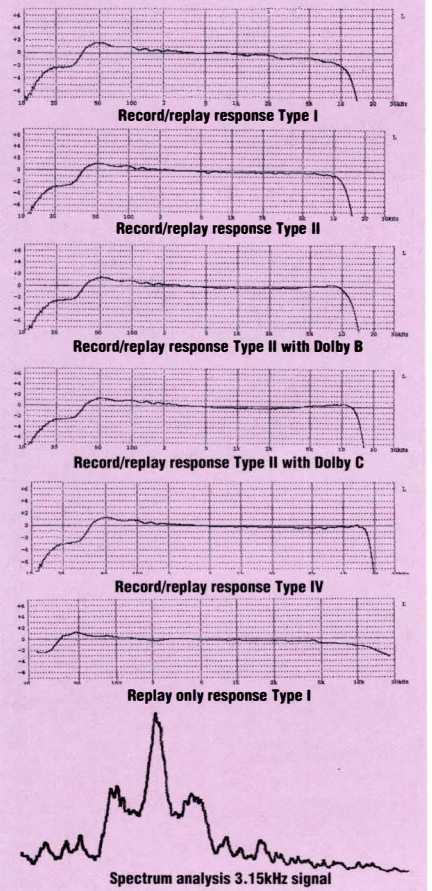
### Sound quality

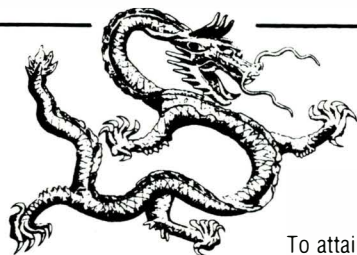
The long and short of it is that the Yamaha upholds the good showing of its predecessor and even goes a little further. There are some shortcomings, of which the most obvious is a certain flatness, a lack of the three dimensionality that comes with more costly designs, and a somewhat limited expressive range, again by comparison with higher price machinery. At the price, however, the Yamaha has little competition.

The bass is light, just as the measurements promise, yet it sounds tidy enough and is well integrated, so that although large scale forces sometimes sound rather dry and lacking in body, the bass is otherwise quite credible. The midband and treble are substantially pure and surprisingly expressive, with plenty of presence and detail to delight the ear. Pitch integrity is not a problem with this deck, and the crisply defined sound off prerecorded tapes was well up to scratch.

### Conclusion

In the context of a suitable budget or middle price medium resolution system, the KX-260 is just good enough to pass muster as a secondary source (secondary to CD or records that is) without drawing undue attention to itself. The concentration on sonics to the detriment of the usual electronic baubles is to be applauded, and at £150, this model is a real achievement. Best Buy.





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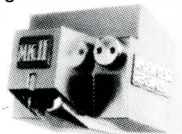
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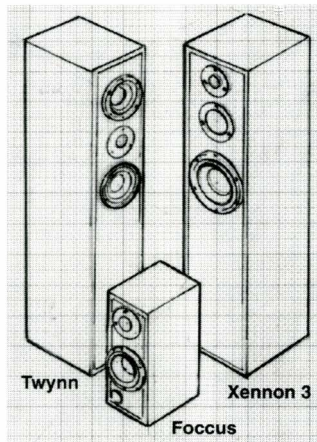
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# Yamaha KX-360

Yamaha Electronics UK Ltd, Yamaha House, 200 Rickmansworth Road, Watford, Herts WD1 7JS. Tel: (0923) 233166



**D**ressed in the current Yamaha corporate style, rounded panel edges give this £179 replacement for the *KX-330* a less aggressive appearance than most. More important under-the-skin changes have been achieved at the expense of some of the more abstruse (and confusing) trick play modes, which attracted some criticism in the original *KX-330* review.

This is a two head, two motor deck with the usual Dolby B, C and HX Pro, plus Play Trim, adjustable headphonem monitoring, track search, and a memory counter. There has been some upgrading of the exterior fittings, which now include improved resolution meters, a four digit tape counter instead of three, and a new solitary Dolby switch which toggles through the various selections with MPX filter engaged and disengaged options. The most significant changes, however, are to the audio board, which boasts an upgraded bias circuit and a redesigned amplifier chain. Remote control is available using an *RS-KX1* accessory handset.

## Lab report

The Yamaha has perfectly satisfactory noise figures, but in the final analysis its operating dynamic range is hampered by indifferent MOL figures for all three tape groups. Even the cheaper *KX-260* was no worse than the *360*, and the Yamaha's nearest price competitors in this issue — the Denon *DRS-610* and the Technics *RS-BX626* — average around 3dB better, which suggests that they will record complex high level signals that much further into the red before audible compression and loss of articulation set in.

The transport is a little wobbly, returning wow and flutter figures inferior to the cheaper *KX-260*, and an almost identical spectrum analysis that shows capstan wow as a prominent feature. Frequency responses are consistently a little bright at the standard bias,

which is quite easily correctable by adding a little extra bias. Standard IEC metals, however, need very little correction, though perversely the bias control needs to be turned further to achieve any given degree of corrections. In common with most sub-£200 cassette decks, the bass is well reined in, loss of output setting in below 50Hz.

## Sound quality

The *KX-360* shares much with the *KX-260* on audition, and there were occasions when it was all but impossible to tell them apart. The bass was a particular giveaway as it had the same dryness and lack of warmth, though the midband was also comparable in its precision and clarity. At the same time the sound failed to 'breathe' convincingly, piano transients were constrained and vocal expression sometimes seemed wooden. Very occasionally a rapid fluctuation of pitch would rub home the message that, with some program material at least, capstan wow was an important part of the picture.

In contrast to the *KX-260*, metal tapes gave a useful performance advantage at medium signal levels by sounding more punchy and dynamic than even high class Type IIs, but the margin of advantage was small and confined to the HF region.

Compatibility with prerecorded cassettes is excellent, and is further enhanced by using the Play Trim feature which operates as per the *KX-260* (see page 75).

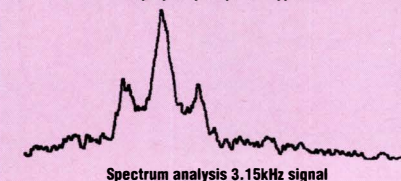
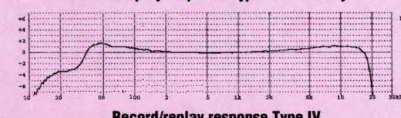
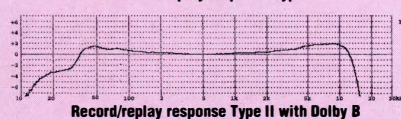
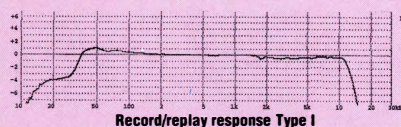
## Conclusion

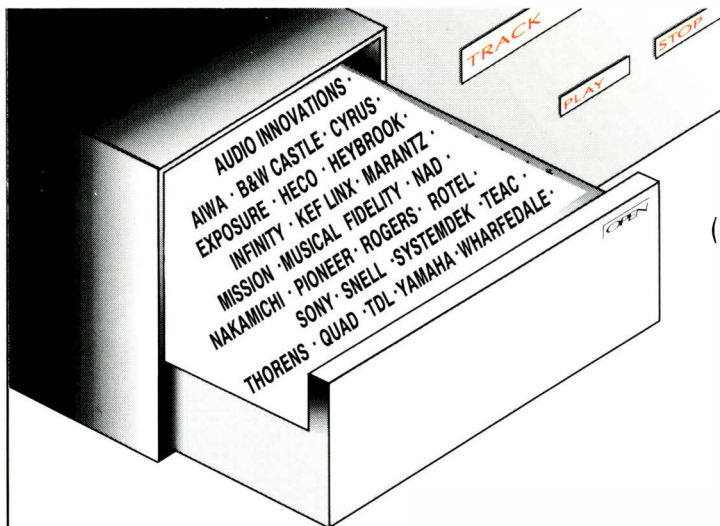
One sure way of distinguishing the *KX-360* from its *KX-260* sibling, is by the bottom line. It costs more. The *KX-360* is a perfectly respectable cassette deck, but it offers little that the *260* doesn't also offer at a lower price apart from a slightly more convincing performance with metals. Overall I felt that the cheaper model offered the more balanced performance.

## TEST RESULTS

Wow & flutter IEC386 Q-Pk %	
Pk Wtd	0.101%
Mean Wtd	0.0845%
Crosstalk ref OdB L/R	
100kHz	-53.5dB/-49.8dB
1kHz	-52.5dB/-51.2dB
6.3kHz	-40.4dB/-34.0dB
10kHz	-37.1dB/-29.2dB
Phase (mean) OdB	
40Hz	0degrees
100Hz	+2degrees
1kHz	-2degrees
6.3kHz	-18degrees
10kHz	-1degrees
15kHz	-9degrees
Line input sensitivity/overload	101mV/-13V
Mic input sensitivity/overload	n/a
Line output for OdB/maximum	534mV/3.1V
Tape Speed	+0.55%
IM distortion 10kHz/1kHz	1.26% OdB peak, 1kHz product
VU indication at IEC OdB	2dB

	IEC Type I	IEC Type II	IEC Type IV
Noise CCIR 468-3 Q-Pk IEC L/R dB			
Peak Wtd	-41.5/-41.2	-45.0/-44.8	-43.5/-43.5
Peak Unwtd	-45.7/-45.2	-47.0/-47.2	-46.8/-46.7
Mean Wtd	-41.7/-41.3	-45.2/-45.1	-43.6/-43.6
MOL 3% ref OdB			
1kHz	+0.9/0.0	+0.2/-0.5	-2.2/-2.0
Distortion (THD+N) @ +8dB %			
100Hz	7.59/8.13	8.87/9.27	11.7/12.2
1kHz	2.57/2.98	5.30/6.21	8.11/8.72
6.3kHz	1.75/1.86	1.16/1.48	1.96/1.97
Distortion (THD+N) @ -8dB %			
100Hz	0.774/0.781	0.526/0.559	0.737/0.720
1kHz	0.875/0.925	0.577/0.603	0.663/0.707
6.3kHz	1.03/1.01	0.622/0.645	0.895/0.967
Dimensions	43.5 x 13 x 28.5 (w x h x d) cms		
Average wind/rewind time (C90)	2min 18sec		
Typical Retail Price	£179		





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# Yamaha KX-W362

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The £250 twindeck KX-W362 has the usual combination of one recording and one playback auto reverse transport (with optical end of side changeover - on the record side only), Dolby B, C and HX Pro, one-button dubbing (normal and double speed) and separate tape counters for each transport. Unusual additions to the rollcall include a single set of major controls assignable between decks (automatically if only one tape is inserted) and Play Trim to ensure playback compatibility with tapes recorded elsewhere (see Yamaha KX-260, page 75).

Most players in this category are tacky beyond belief; the Yamaha by contrast is stable and solidly built, and sports such refinements as cassette shell clamping. The record head is an unusually elaborate 12 layer amorphous alloy design and the tape is driven at a 160kHz bias frequency, which avoids much of the downband intermodulation associated with the usual 85-105kHz bias frequencies.

## Lab report

The KX-W362 is an electrically well sorted deck, with frequency responses that would look comfortable on a unidirectional deck at the price, and quite good alignment, though some treble loss is noticeable with ferric (Type I) tape stock.

In common with the Sansui D-X117WR, the Yamaha gives quite different wow and flutter figures in the two directions. The printed results show that the reverse direction was favoured, but there was considerable variation on test, as the transport appears to be a little over-sensitive to the type of tape inserted.

One point that isn't obvious from a simple examination of the figures is that the transport exhibits considerable drift, largely outside the scope of the wow and flutter test, though it was obvious simply by watching the test equipment display when run-

ning a 3kHz test tape, and also by listening to the tone, which sounded all over the place. Measured variation over about 30 seconds was of the order of 1.2 per cent, with no obvious improvement at the end of the test. On the credit side, azimuth errors were well controlled, signal/noise figures were fine, and MOLs were only moderately poor, which is about as good as twin transport decks get.

## Sound quality

Musicassettes were handled with a touch of air, life and quite reasonable analysis. The bass sounded a little raw and lacking in weight, but this wasn't always noticeable in practice. The Play Trim feature helped revitalise some old tapes which had lost much of their treble with age, though background hiss was boosted along with the signal, and the results tended to be somewhat unstable in level. This is no criticism of Play Trim, but does show some of its limitations.

I had expected something special from the high speed dubbing circuit due to the high bias frequency but was disappointed to find that losses of musical information and structure were as severe as ever, and that transport integrity goes down the toilet in high speed mode, with rapid wavering in pitch.

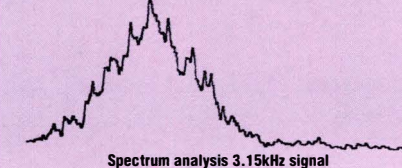
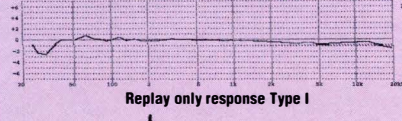
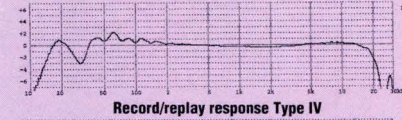
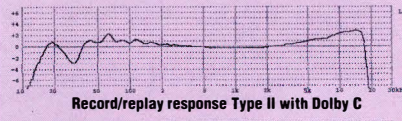
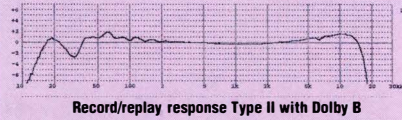
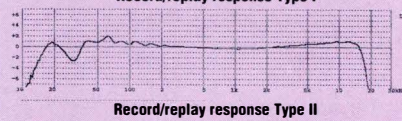
High speed dubbing and an iffy transport aside, the Yamaha was quite successful. As a recorder, it offered a slightly loosely controlled but otherwise detailed and transparent account of the music, with some suggestion of cluttering up only as the music becomes denser and more complex.

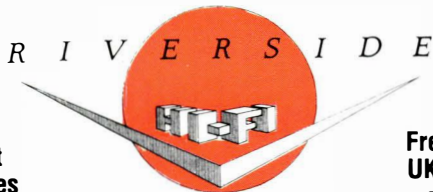
## Conclusion

A curate's egg this one. The electronics are clearly of a high standard, but performance is let down by a transport that is simply not good enough to ignore. Reluctantly this deck receives the thumbs down.

## TEST RESULTS

<b>Wow &amp; flutter IEC386 Q-Pk %</b>			
<b>Pk Wtd</b>	0.250/0.159%		
<b>Mean Wtd</b>	0.229/0.130%		
<b>Crosstalk ref 0dB L/R</b>			
<b>100Hz</b>	-41.2dB/-44.5dB		
<b>1kHz</b>	-57.0dB/-53.4dB		
<b>6.3kHz</b>	-44.5dB/-43.6dB		
<b>10kHz</b>	-38.9dB/-37.9dB		
<b>Phase (mean) 0dB</b>			
<b>40Hz</b>	+2degrees		
<b>100Hz</b>	-1degrees		
<b>1kHz</b>	-1degrees		
<b>6.3kHz</b>	+14degrees		
<b>10kHz</b>	+4degrees		
<b>15kHz</b>	0degrees		
<b>Line input sensitivity/overload</b>	104mV/>13V		
<b>Mic input sensitivity/overload</b>	n/a		
<b>Line output for 0dB/maximum</b>	571mV/2.28V		
<b>Tape Speed</b>	0.21%/0.44% (FWD/REV)		
<b>IM distortion 10kHz/11kHz</b>	0.18% 0dB peak, 1kHz product		
<b>VU indication at IEC 0dB</b>	20dB		
	<b>IEC Type I</b>	<b>IEC Type II</b>	<b>IEC Type IV</b>
<b>Noise CCIR 468-3 Q-Pk IEC L/R dB</b>			
<b>Peak Wtd</b>	-42.2/-43.0	-44.2/-45.0	-43.4/-44.5
<b>Peak Unwtd</b>	-41.9/-46.1	-41.2/-45.6	-41.3/-45.4
<b>Mean Wtd</b>	-42.3/-43.2	-44.4/-45.2	-43.7/-44.7
<b>MOL 3% ref 0dB</b>			
<b>1kHz</b>	+0.6/-0.3	-2.2/-2.8	-0.7/-1.1
<b>Distortion (THD+N) @ +8dB %</b>			
<b>100Hz</b>	14.3/16.9	12.8/14.3	11.4/12.3
<b>1kHz</b>	6.13/7.42	8.91/10.7	6.75/7.59
<b>6.3kHz</b>	3.66/3.30	3.81/3.20	2.91/2.42
<b>Distortion (THD+N) @ -8dB %</b>			
<b>100Hz</b>	0.883/0.904	0.665/0.576	0.652/0.672
<b>1kHz</b>	1.07/1.09	0.678/0.656	0.683/0.676
<b>6.3kHz</b>	1.84/1.84	0.952/0.945	1.20/1.22
<b>Dimensions</b>	43.5 x 13 x 27.5 (w x h x djcms)		
<b>Average wind/rewind time (C90)</b>	2min 14sec		
<b>Typical Retail Price</b>	<b>£250</b>		





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# Tech Talk

**F**rom this issue, the analogue cassette deck lab tests have been revamped and extended. The changes result from the use of new improved computerised test equipment, namely the Lindos LA-101/LA-102 generator and analyser, for the main core of the tests. The Lindos has become something of an industry standard in the last few years, and provides highly repeatable results to a high standard of accuracy, which moreover were cross-checked against the old equipment.

It is common practice to measure three-head decks in real time, that is from the monitor output while recording is taking place, but certain errors are self-cancelling, and there are potential interactions between record and play sides of a Siamese head, so all measurements were performed by first recording, then replaying the tape, in the same manner as with a twin head deck. The test sequences are as follows:

**Wow & flutter:** This test complies with IEC386, DIN45507 and BS4847-1972. Pitch variations recorded

*Alvin Gold explains the test procedures used to examine the cassette decks.*

onto tape frequency modulate the applied signal, spreading it out in the frequency domain, an effect that can be seen graphically in the spectrum analysis (see later). The higher the figure, the coarser the sound tends to be, with extreme cases resulting in overt pitch imprecision.

**Crosstalk:** Measured at four frequencies, L on R and vice-versa using a 0dB test signal.

**Phase:** A measure of head azimuth, a reading of +xdegrees meaning that the left channel leads the right hand channel by that amount. The figures up to 6.3kHz are the most important and were the most consistent when measured repeatedly, but even at 15kHz variations between test runs were not too severe, and the result therefore remains valid. Accurate phase (ie zero degrees) alignment is important for compatibility reasons, errors resulting in erratic playback response and possible Dolby tracking errors with 'foreign' tapes.

**Line input sensitivity/overload:** Will it match your amplifier tape output?

**Mic input sensitivity/overload:** For microphone matching, where available.

**Line output for 0dB/maximum:** For amp matching.

**IM distortion:** A measure of the level of 1kHz difference signal when recording two high frequency signals 1kHz apart, and related to MOL (see below).

**VU indication at IEC 0dB.** A flux level corresponding to IEC 0dB (=250mW/m) will usually produce a record level meter reading in the range 0dB  $\pm$ 1.5dB

**Noise:** Measured according to CCIR 468, peak and mean weighted, and peak unweighted which is normally in proportion to the weighted figures unless there is disproportionately high or low level of noise

outside the ear's main area of sensitivity.

**MOL:** MOL is the output level at which the tape generates 3 per cent THD, which roughly corresponds to audible saturation. Combined with the noise figure it gives a true indication of the available signal/noise from maximum input, rather than from the semi-arbitrary 0VU. The test measurement frequency is 315Hz.

**Distortion +8dB:** These figure indicate THD levels when recording 'into the red' at different frequencies, and give good idea of how the deck and tape respond to difficult high level signals.

**Distortion -8dB:** Well inside the saturation curve of any half way decent cassette deck, and close to the average level of most programme material these figures represent the inherent THD levels of the combination of deck and tape.

In addition, a number of plots are included with each review. Frequency response plots were run at -10dB ref 0VU (a stiffer test than the traditional -20dB) with a high resolution readout of level, corresponding to the way most other high fidelity components are assessed. Also included are similar comparable plots showing the effects of the noise reduction systems in the frequency domain.

The playback only plots were run in exactly the same way giving an indication of the frequency response available with prerecorded material.

We also performed spectrum analysis tests to investigate the mechanical behaviour of each of the decks, though space prevented the publication of more than one of these. The noise modulation spectrogram graphically illustrates the mauling endured by a 3150Hz sinewave when recorded and replayed by the deck under test - there are close parallels with a similar analysis carried out in last year's edition. The central peak should be as fine and as thin as possible, any problem here being heard as a lack of pitch stability. With auto-reverse decks, all data refers to Side One, but the reverse side was checked in the same way, and again discrepancies were reported as they arose. In the case of decks with automatic tape alignment, the alignment procedure was followed, and where a bias adjustment facility was fitted, the setting recommended for TDK AD, SA and MA-X was used if available. Otherwise, the central setting was adopted.

## Listening tests

As usual, listening tests were run in two parts, the first of which involved patching each into a high-grade system. Some changes were made during the test period, but in the main this consisted of a Roksan Xerxes record deck, Technics 1000 series and Pioneer PD-S801 CD players, Mission Cyrus 2/PSX amp and Mission 702 speakers, with a Krell preamp for balanced operation where necessary. A slightly simpler system using headphones as well as speakers was used for further listening and for the functional tests, namely determining which button did what.



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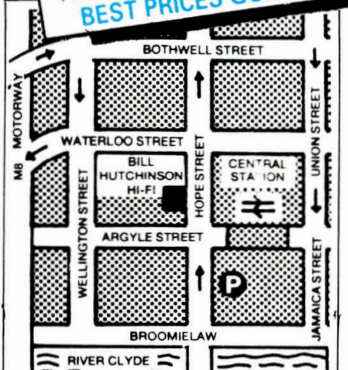


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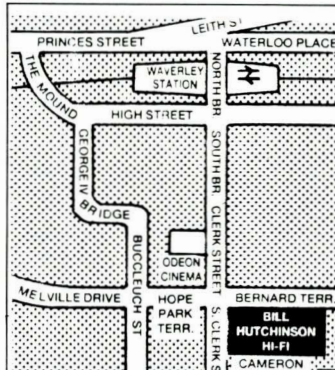
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# Conclusions, Best Buys & Recommendations

**A**s I write, DCC isn't yet available in the flesh, but like the guest of honour that has failed to turn up for a party, the new tape medium ranks alongside the recession as the dominant fact in the cassette deck market. Cassette deck sales have remained roughly constant in the last couple of years, but they have taken a dip in the last few months as potential buyers have held off, waiting to see what DCC and, increasingly, Mini Disc have to offer.

This project is notable for including the first formal review of a production ready DCC machine, the *DCC900* from Philips which at the time of writing is formally scheduled for launch on the 1st of October. The *DCC900* turns out to be quite a box of tricks, and by the by is the first new sound carrier designed from

elderly, but the pocket size *DA-R100* (Recommended) is a cracker, being both flexible and eminently listenable.

This test group is also a notable for xenophobes by including a review of the first British cassette deck since Neal (for those with very long memories). The *Arcam Delta 100* is a high spec three head, dual capstan machine, with tape lineup facilities and Dolby B. It is not cheap, but it has an understated excellence on audition that is not fully explained in the figures. It would not be a surprise however if the real raison 'd'être for the *Delta 100* was to act as a testbed for the development of DCC. If it isn't, and we have to wait for the British hi-fi industry to swing behind DCC as enthusiastically as it has done with compact cassette, we'll be applauding the first home made DCC deck some time around the year 2020!

This test saw another crop of excellent relatively low cost models from three producers with excellent track records, namely Yamaha, Technics and Denon. The *Yamaha KX-260* (Best Buy), which at £150 is the cheapest of the three, is a replacement for the popular *KX250*. A two head deck, it has improved engineering and finish at the expense of slightly fewer bells and whistles, but you still get Play Trim, which varies the treble playback equalisation ahead of the Dolby processor so that those old, faded tapes can be replayed accurately and with minimal Dolby mistracking. One step up the price ladder, at £180, is the *Technics RS-BX626II* (Best Buy), a very high spec machine for the money with three heads/off tape monitoring and a quartz-locked, direct drive capstan motor which delivers wow and flutter figures and freedom from modulation noise only routinely associated with decks costing at least 50 per cent more.

Also recommended in this price range is the *Denon DRS-610* (£180) which is notable for its slide out motorised drawer mechanism. I felt slight ill at ease with a machine in which the approximate tape position can't be seen by eye (despite the time remaining tape counter), but old irritants like the lack of timer standby have been resolved, and apart from a rather dry bass, the deck auditions well.

Pioneer provided the next and last Best Buy with its £200 *CT-S410*, a three head deck with an effective press button tape lineup facility (of bias, equalisation and sensitivity!), which turns out to be one of the first decks to make sensible use of the dynamic capabilities of IEC Type IV (metal) tapes. The other standout model in this test was the *JVC TD-V1010* (£410 - Recommended), the chief surprise given the standard of engineering involved being the fact that the price is as low as it is, though the features list is modest (only manual tape lineup for example and no Dolby S). The *JVC* features what must be one of the finest transports in serial production, and gives a fluff free precision quite out of the ordinary for cassette.

*Alvin Gold sums up the tape decks tested in this issue and picks out the winners.*

the outset to allow the previous generation of recorded material (ie compact cassettes) to be replayed using the same hardware. This is one in the eye for that bane of the 20th century - planned obsolescence.

Inevitably, certain question marks remain over aspects of the *DCC900's* performance, but the deck succeeds in producing something similar to DAT type sound from a low tech tape, which will stand up to the heat inside a parked car, and which along with the hardware should in due course be available at prices well below those accessible to DAT. The main reason for the differences of course is the PASC coding engine that forms the heart of the system (see cover mount) which is fundamentally different to the linear 16-bit convertors in existing digital carriers.

This half years' crop of tape machinery was also notable for the number of DAT decks submitted - six, of which five were selected for test. Two of the five (and the single deck omitted from the tests) were studio DAT machines, and although it is not exactly standard practice to review such machinery in a consumer publication, there are obvious reasons why pro DAT recorders could prove attractive to the buying public. DAT was originally conceived as a domestic system, and even when dressed up in studio garb, the system remains user friendly and relatively attractively priced, though the *Panasonic's* lack of standard unbalanced socketry will flummox many users. The lack of the usual SCMS copy protection will also make life easier for the keen recording enthusiast.

Of the others, the two *Casio* machines now sport new, reduced prices apparently in preparation for their withdrawal. The larger *DA-7* now seems a bit



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10-6pm (10-7pm Friday) ★ 3 GREAT SHOWS IN 1

# The big audio-visual explosion

The TV and video market has exploded over recent years, with each new year throwing out new and exciting products for professionals and amateurs alike.

The Northern Video & Hi-Fi Show has all the latest and best in the field, as well as a glimpse at some future products.

Perhaps the most eagerly awaited entry at the show is **Philips'** Entechdome. This structure houses audio visual products as they will be known in a living room of the future, but Philips' widescreen TV has already made its way into the present.

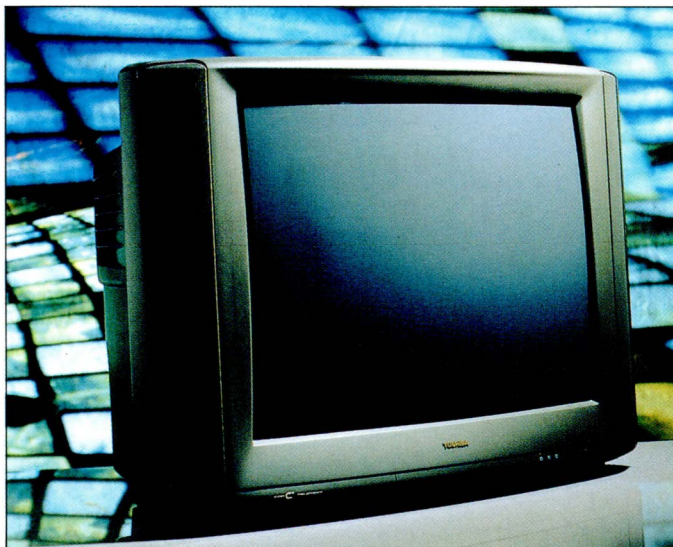
The widescreen TV has, as you might expect, a cinema-shaped TV screen so that it's now possible to see films as they were intended. In addition, TV programmes take on a movie-like appearance.

Perhaps the most impressive exhibit in the Entechdome will be CD-I (Compact Disc-Interactive). This audio/visual development is designed to fundamentally change the way we view television.

The system combines sound, pictures, graphics and moving images under the viewer's interactive control. Playing the world's golf courses or touring a museum will be possible without leaving home!

**Toshiba**, meanwhile, is pushing back the boundaries of home entertainment with its new 2927DB Nicam Super Deluxe TV. It's the first TV in the UK to feature a built-in digital sound processor, as well as Nicam stereo and Dolby Surround sound.

This facility will provide 'home cinema' and be the first to bring acoustic simulation to the mainstream TV



● **Toshiba** will be showing its £859 2927DB 29in. Nicam TV with onboard Surround sound decoder and Digital Sound Processing

market. The sound system features four audio modes which can be set to emulate the true atmosphere in halls, stadiums, discos and theatres.

In a similar vein, **Yamaha** is exhibiting its Yamaha Home Theatre, designed to introduce visitors to the unique Cinema DSP experience. This integrates audio and video systems by expanding, upgrading and 'upsizing'.

The end result is to bring the sound quality of films and TV programmes up to the standard of their visual impact.

Until recently this has been hampered by audio technology moving at a slower pace than video technology.

Yamaha's Video DSP has been created to close this gap. Judge the results for yourself at the show.

VCRs on display will be many and varied. There will be a number of new models, with many surprises in store.

Some of the popular products to look out for are **JVC's** HR-S4700 and HR-S5800. From **Aiwa** we can expect a good showing in the budget range, with models including the HV-G71, HV-G75 and HVF125.

**Akai** should have a showing across the price spectrum with the VS-F310 and VS-A650, with Dolby Surround sound and intelligent HQ (both one-time *What Video Best Buys*).

**GoldStar** is showing its complete range of video and television products. This stretches across all price bands, from the CIT4175 usually retailing at £169.99, right through to the £499 CIT2570F.

All these prices have a good chance of being cut considerably if equipment is bought at the show.

On the VCR side, **GoldStar** will again show its complete selection, including the GVH94001 with Nicam, four-head, twin-speed facilities.

**Sony's** stand is well worth a look. Its list of products in both TV and video has always been extensive. The company is expected to show its wide range and there will be special show deals.

**Samsung's** SI-3260 and SI-3240 are two impressive budget models.

Samsung's more advanced models, the VI3560 and VI1860, represent recent developments and the show will offer many the chance to see these for the first time.

**Pioneer** will be demonstrating its 50in. rear projection colour TV, alongside its new CLD-1750 laser disc player and VSA-740 AV amplifier.

There will be more than machines on display at G-MEX. **Fujifilm** is showing a comprehensive range of tapes which covers all formats and includes a choice of grades and lengths to suit everyone.

The company has also introduced a two-hour 8mm video tape and maker: VHS and 8mm head cleaners.



● **Pioneer's** 50in. rear projection TV



● See **Philips' CD-I** in the Entechdome



# Hear the best sounds in hi-fi

If it's hi-fi you're into, expect to be spoilt for choice! Both G-MEX and The Holiday Inn will boast a wide selection of audio exhibits.

Want to hear the new format that its manufacturer claims is the most exciting audio innovation since the compact disc?

Then check out the **Philips** stand and get an earful of Digital Compact Cassette, a tape that apparently sounds identical to a CD. Philips will also be showing its new range of hi-fi products including CD players, conventional cassette decks and systems.

**Wharfedale** will be showing, among other products, its 'C' class range of speakers. These feature a ceramic dome tweeter which delivers better harmonic reproduction.

The range also boasts advanced driver technology, cast aluminium chassis, and sandwich-mounted bass units. Also on show is the 2000, Performance and Precision series of speakers.

**Yamaha** will be demonstrating its latest range of CD players. At the budget end are the CDX460 and CDX560, featuring SL-Bit technology.

Further up the scale are the CDX660 and CDX880 with Yamaha's new output system digital to analogue converter.

In addition, Yamaha will feature its latest range of hi-fi components and new mini components series.

Over at the **Castle Acoustics** stand, listen to the York and Chester ranges of speakers. The Chester units are interesting for their unique Quaver loading bass technique.

**KEF** is showing its Q and K series, as well as its Reference speakers. The Reference series ranges from KEF's flagship model 107/2, which retails at over £3,000 to the entry level 101/2, at



● Will Philips' DCC be the star of the show?

less than £500. The Q series also features KEF's Uni-Q drive unit.

**NAD**, a well known name in hi-fi circles, is due to launch some new products at G-MEX, but is keeping them firmly under wraps until the show.

NAD is famous for its no-frills products. Its minimalist approach has struck a chord in a marketplace filled with impressive lights and buttons which do nothing for sound quality. To date, all NAD will say is that its new products remain true to this philosophy and will be well worth seeing!

**Celestion** is showing its prestigious range of speakers, including the DLP-600, its first with a digital processor to enhance sound performance, and the Celestion 300, with transmission line technology.

Celestion will also be exhibiting products from US company Adcom's range of amplifiers, tuners, compact discs and multi-room systems.

**Kenwood** will not only be displaying AV products at G-MEX, but will also exhibit hi-fi systems including the UD-900 mini system with DSP and Dolby Pro-Logic Surround and the M-76 Midi.

As well as **Arcam's** established, award-winning products like the Alpha 3 amplifier, the company will be adding several new additions to its range.

Since **Bose** claims to be the largest



● Hear Castle Acoustics' latest speakers

loudspeakers manufacturer in the world, it isn't surprising the firm has made it a priority to exhibit at G-MEX.

Top billing goes to Bose's Lifestyle system. The company will be demonstrating how it can provide two different listening sources to two separate listening zones simultaneously.

In addition, Bose is showing its Acoustimass loudspeakers, as well as some 'unannounced' additional components to enhance the system.

**Heco**, meanwhile, will show its wide range of speakers and accessories from Alphason.

**B&W Nakamichi** will bring its distinctive styling to the show, so check out its uniquely designed speakers and hi-fi components.

Also on show is the new Aura VA-100 Evolution, an exciting amplifier which its manufacturer claims combines superb sound with an attractive price.

**Canon Audio** has claimed the first real breakthrough in loudspeaker technology for 60 years with its Wide Imaging Stereo format.

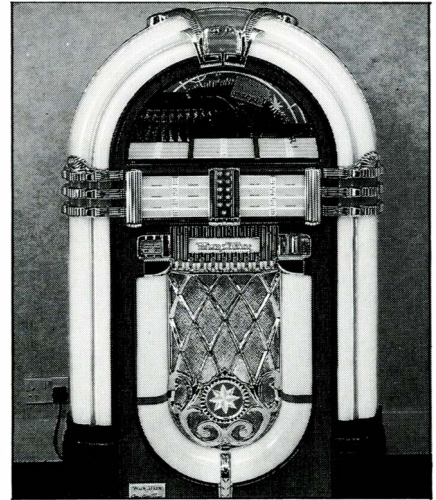
There will also be the S-50 and S-70 speakers and a selection of pro-audio gear on display.



● Kenwood will be displaying its range of AV gear

# Great Family Entertainment!

- AKAI ● AIWA ● ALPINE ● APOLLO ● A&R ● ARCAM ● BANDRIDGE
- BANG & OLUFSEN ● BEYER DYNAMIC ● B&W ● BOSE ● CANON AUDIO
- CASTLE ACOUSTICS ● CELESTION ● CLARES MICRO ● DENON
- FUJI ● GOLDSTAR ● GENLOCK ● HECO ● JAMO
- JOHNSONS PHOTOPIA ● JVC ● KEENE ELECTRONICS ● KEF AUDIO
- KENWOOD ● J. KERR ● LASERLINE ● LIPSINGING KARAOKE
- MARANTZ ● MAXELL ● MISSION ● MORDAUNT SHORT ● NAD ● NAIM
- AUDIO ● NAKAMICHI ● NEW DAWN ● PATH ● PHILIPS ● PIONEER
- RELIANCE AERIALS ● REVOLVER ● ROTEL ● RSD COMMUNICATIONS
- SAMSUNG ● SENNHEISER ● SONY ● SOUND ORGANISATION
- SRB FILM SERVICES ● TARGET AUDIO ● TDK ● TECHNICS ● TOSHIBA
- TRACKLINE ● U-VU SYSTEMS ● VIVANCO ● WHARFEDALE ● YAMAHA ●



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## £1 OFF ADVANCE TICKETS FROM G-MEX OR CLEARSTONE

- 1 Advance discount tickets (£2.50 rather than the on-the-day price of £3.50) are available from the G-Mex box office, in person, at G-Mex, City Centre, Manchester M2 3GX. Tel: 061-832 9000.
- 2 Discount (£1 off the on-the-day price of £3.50) advance tickets for the great 1992 Northern Video & Hi-Fi Show, incorporating The Satellite Show, are also available from branches of CLEARSTONE, the North's big name in hi-fi and video. Phone 0204 31423 for your nearest store.

## SEMINAR LINE-UP

Don't miss our unique series of seminars at The Northern Video & Hi-Fi Show

### 1 The Future of Audio 11.00am each day

DCC vs Mini Disc: the battle lines are drawn up in the format fight to replace the conventional audio cassette.

Sony has Mini Disc to promote while Philips is pinning its hopes on Digital Compact Cassette.

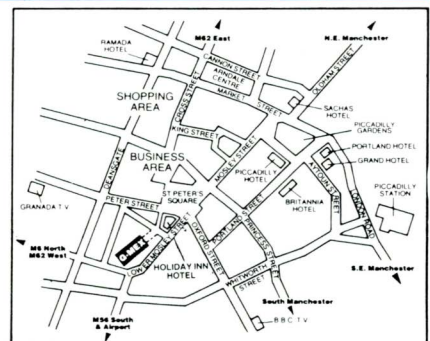
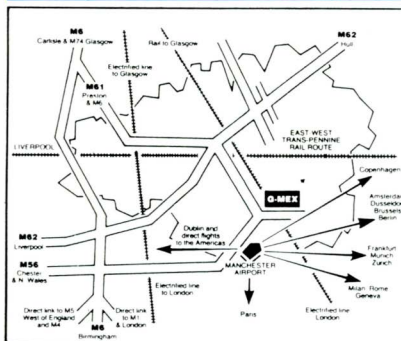
But do we need two new formats? Representatives from both companies will be on hand, along with independent technical experts.

### 2 The World of Satellite TV 12.30pm each day

Multi-satellite explained: setting up a multi-satellite dish system can be complicated and, if you aren't careful, it's easy to spend money on the wrong equipment.

Experts from *What Satellite's* Trouble-

## HOW TO GET THERE



● Manchester is ideally situated at the junction of the M6 (the North and Scotland, and South and South West). The M62 is also convenient and the M602 link from both motorways is just one mile from G-Mex.

shooter team will guide you through the minefield, from the equipment you'll need, to the channels currently broadcasting.

### 3 Movie Masterclass 2.00pm each day

Editing techniques: shot your footage but confused about the best way to edit it?

Come and listen to members of the *Camcorder User* team as they explain how, with the aid of a VCR, you can turn your videos into mini-movie masterpieces.

### 4 Cinema In Your Home 3.30pm each day

Setting up an integrated audiovisual system? Want to re-create a cinema in your home? You need to consider carefully how to put a complete AV system together.

Writers from *What Video*, assisted by leading AV companies, will explain all you need to know.

● Seminar tickets cost £2 each and will be sold on a first come, first served basis.

# Choosing and Using . . . Headphones

**B**ack in the spring we scheduled a batch of a dozen headphone reviews for this issue. Had yours truly known just how humid the summer was going to be we might have postponed it until more temperate weather arrived. But as it turned out I learned the warm way about which headphones make the best ear muffs.

The important factors to consider when buying headphones are primarily sound quality and comfort, though the latter is perhaps the more important. A pair of 'phones may sound great on first impression but if they become uncomfortable after a short while one is unlikely to carry on using them.

To a large extent comfort is related to the size of your head and ears. There are quite a few ostensibly circumaural headphones, ie, with ear pads that rest on the side of the head (such as the more expensive Sennheisers or Sonys) that aren't really large enough to avoid pressing on some part of the ear, especially if your shell-like ain't so shell like.

*Feeling fazed by the gaggle of eargoggles on the market? Jason Kennedy has been testing out 12 pairs of headphones, with the help of the Choice comfort crew.*

Some circumaurals create problems with pressure but this is more obvious with supra-aural designs, those which press on the ear itself and which are more predominant at the budget end of the market.

However, if your head is of average or more width many supra-aurals tend to press rather hard and prove ear bending after little more than five or six minutes.

## The comfort crew

Our comfort ratings are based on the collected opinions of the *Hi-fi Choice* comfort crew, made up of both sexes and a good variety of ear sizes — the higher rated phones being those that felt good on everyone. There was definitely a difference of opinion on some models though, so make sure you try before you buy even if you can't listen.

As far as sound quality is concerned, the headphones were auditioned at the end of a reference system which this time around consisted of two different types of drive. Because impedance mismatches between 'phones and headphone amplifiers can lead to alterations in frequency response, I needed a low output impedance drive to give each model a chance of performing optimally.

I mentioned that I needed a high quality headphone amp which had low output impedance to designer

Tom 'Iso' Evans (the man behind Michell's range of electronics) and he just so happened to be experimenting with one that I consequently borrowed. Though only in prototype form this did an excellent job and if you are interested in a serious can amp contact Tom and pester him to build you one. Price is likely to be in the region of £300 and you can usually find him on (0443) 816856.

The second option consisted of the headphone amp on a Pioneer *A-400* integrated amp, which is probably more representative of the average listening situation.

## Sensitivity

When matching headphones to an amplifier or CD player consider the sensitivity of the phone and how it relates to the gain range available. Some 'Walkman' oriented models proved very sensitive to the hum on the headphone sockets of several amplifiers.

At the opposite extreme, some cassette decks have quite low outputs at their headphone sockets which may prove a minor problem with some inefficient models. As ever, the *Hi-Fi Choice* advice is to have a careful listen before you buy, which might involve a bit of dealer persuasion, but dealers are there to help you after all.

The sources used for the listening tests consisted of a Voyd turntable fitted with an Audio Note arm *Io* cartridge feeding an Audio Innovations *Series 1000* step-up with equalisation/preamplification from an Audio Note *M7* silver preamp. The digital source was a Pioneer *PD-S801* and speaker cables were mainly Audio Note silver.

## What we heard

Source material on vinyl included the Black Crowes' *Southern Harmony and Musical Companion*, Tommy Bolin's *Teaser*, Martin Simpson's first album *Special Agent* and some Mozza from the *Amadeus* soundtrack.

On silver disc a copy of Frank Zappa's largely live *The best band you never heard in your life* was used as well as Steely Dan's *Gaucho*.

A trend which has been evolving in the headphone market is the fitting of dual sized jack plugs, a 3.5mm plug fitted to the cable with a standard 6.3mm plug screwing or pushing over the top. In this bunch they were almost universal, a result no doubt of the increasing popularity of better quality personal stereos and portable CD players.

Another area of development that follows in the footsteps of domestic audio is the use of better quality cables — virtually all the Japanese phones encountered had adopted oxygen free copper cables. This undoubtedly has something to do with the above average standards that they managed to achieve.

# AKG K500

AKG Acoustics Ltd, Vienna Court, Lammas Road, Godalming, Surrey GU7 1JG Tel: (0483) 425 702



**T**he AKG *K500* and its *K400* brother are the first affordable fruits of the work that went into creating the *K1000* ear speakers reviewed in our last headphone survey (October 1991, issue 99). The *K1000s* (£500) have the absolute practical minimum of protection between the diaphragm and the outside world in order to maximise clarity. They also have capsules which don't come into contact with the ear or head. The *K500* takes this principle and applies it to a more conventional headphone shape with circumaural, open back phones. There is still only a mesh and a plastic brace between the diaphragms and your ears on the inside and a highly perforated capsule on the outside.

The ear pads are your usual doughnut shape but have a particularly summer friendly covering made out of a 'hard' synthetic material that doesn't induce sweating, which is an important factor where long term comfort is concerned. The frame is made out of a pair of plastic covered metal tubes which support the central part of each phone, the main capsule swivelling on this and allowing limited but adequate movement.

The headband is made out of leather or a synthetic something very similar; in traditional AKG

style it has elastic cords attaching the band to the capsules, which means that there's no need to fiddle around adjusting them. The fit feels cool but is quite tight under the ear which can get a bit tedious in the long run. They don't feel as claustrophobic as most cans, though, and are practically transparent to external noise.

The *K500's* sonic performance was quite distinctively open and clear. It reproduced music with impressive definition, somehow giving the attack and decay of individual notes plenty of time to happen. As a result music sounded more live and spacious. The bass performance was less obvious, however, the overall balance being quite light compared to something like the Sony *MDR-CD750*. The *K500* majors on the mid and high frequencies, leaving the lower octaves a bit under exposed. I was impressed by this model. The clarity is good for the price and merits Recommendation.

## GENERAL DATA

<b>Type</b>	circumaural, open back, dynamic	
<b>Mass</b>	240g	
<b>Size rating</b>	very large	
<b>Impedance</b>	120ohm	
<b>Comfort rating</b>	good	
<b>Sound quality rating</b>	very good	
<b>Price</b>	£119	

# A-T ATH-308

A-T, 2 Royal London Trading Estate, Old Lane, Beeston, Leeds LS11 8AG. Tel: (0532) 771 441



**T**he Audio Technica *ATH-308* is the least expensive headphone in this group, although you'd be hard pressed to discern this fact from its appearance alone. It doesn't look any cheaper to make than the little Beyers or Sennheisers, but it is put together in Taiwan which usually has an influence in matters of price.

Constructionally the *ATH-308* is traditionally Japanese in style. Adjustment is provided by stainless steel sliders which can be pulled out of a padded headband and extend down to swivel joints on the yolks. The capsules are small and semi-open-backed, with fairly thin removable pads that are covered in a cosy synthetic material.

The connection cable is a run of the mill 'Y' type that terminates in a dual jack, its length, however, seems at odds with the apparent purpose of the *ATH-308*; who wants to use a three metre lead with a personal stereo?

The fit is remarkably relaxed for a supra and I wouldn't recommend you attempt to jog in them. However, for more leisurely users comfort isn't bad, as long as the temperature's not in the high twenties.

Listening to the track selection via the *ATH-308* wasn't exactly inspiring but it wasn't bor-

ing either. This headphone has a fairly forward balance which helps perceived clarity but can get a bit wearing over the time it takes for an album to play. It has enough bandwidth to put some meat onto the music's bones and with a boogie down track, it can make a fair stab at boogying on down. But not to the extent that you can't sit still.

The *308* is transparent enough to reflect the differences in sources, the Pioneer CD player and amp sounding considerably less fleet of foot than the vinyl/Evans special set up. In both cases the *ATH-308* suffered from a lack of spaciousness which is very common with supra-aural types but is still a limitation nonetheless.

The Audio Technica *ATH-308* is an inexpensive and competent sounding headphone that is well suited to use with personal stereos. Recommended.

## GENERAL DATA

<b>Type</b>	supra-aural, semi-open, dynamic	
<b>Mass</b>	139g	
<b>Size rating</b>	small	
<b>Impedance</b>	30ohm	
<b>Comfort rating</b>	good-	
<b>Sound quality rating</b>	average-	
<b>Price</b>	£26	

# A-T ATH-9000

A-T, 2 Royal London Trading Estate, Old Lane, Beeston, Leeds LS11 8AG. Tel: (0532) 771 441



**T**he Audio Technica *ATH-9000* comprises the headphones themselves and an adaptor to which they are connected. The reason for this arrangement is that the *ATH-9000* uses electret drivers rather than the more usual dynamic devices. Such an adapter more usually signifies an electrostatic design, with the black box supplying the polarising voltage used by the electrostatic drivers. In this case, however, the black box is a step up transformer to boost the signal voltage to the level required by the relatively insensitive electret drivers.

The *ATH-9000* adaptor is intended to be hooked up to the speaker outputs on your amplifier and a set of rather cheesy spring clip input terminals are provided for your speaker leads. Unless your amp has two sets of speaker outputs this represents a bit of a compromise for those that listen to both loudspeakers and headphones.

The headphone unit is pretty conventional looking; a polypropylene band supports the yolks and the earpads are rather mundane plastic covered items that are bound to induce sweating. It also feels quite shallow, and you don't get the usual circumaural impression of space when wearing it. Comfort-wise it was pleasantly relaxed in its

grip, and but for the warmth factor I could happily have worn it for the duration of several albums.

For listening purposes I hooked the adaptor up to a Pioneer *A-400*. It sounded very smooth and relaxed, a bit like the fit, but with a reduced sense of spaciousness compared to some of the better dynamics in the bunch. Bass was well represented with better depth than usual and had nice drive, although like the rest of the spectrum it could have been more nimble. Overall it lacked a sense of life, which could be put down to the less exotic amplification being used to drive it, though this hasn't been a criticism of the *A-400* in the past.

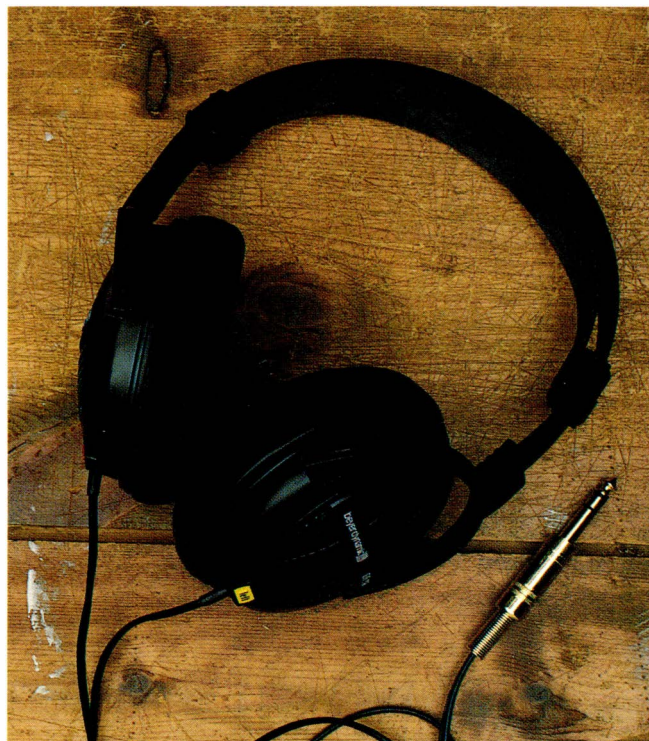
If you have a lively amplifier with no headphone socket but you want to get canned, then this is certainly one option, but considering the rather high asking price, you might be able to get better results with a more conventional design.

## GENERAL DATA

Type	circumaural, open-back electret	
Mass	240g	
Size rating	large	
Impedance	4-32ohm	
Comfort rating	very good	
Sound quality rating	good	
Price	£246	

# Beyer DT 411

Beyerdynamic, Unit 14, Cliffe Industrial Estate, Lewes, Sussex BN8 6JL. Tel: (0273) 479 411



**T**he Beyerdynamic *DT411* is rather an insubstantial looking headphone considering its £49 asking price, but of course mass is not necessarily a desirable thing in a headphone. After all, carrying less phone around on your head is theoretically going to be a more comfortable experience.

The *DT 411* is a supra-aural, open-back design that's very similar in appearance to several models from Beyer's main German competitor Sennheiser. The almost indestructible plastic headband incorporates a fillet of padding at the top and rails for the capsules to slide up and down on at either end. The foam earpads have a soft, warm, cloth covering, the pad being held in place with double sided tape. It can be removed and replaced if it gets worn out or clogged with ear wax.

There are no claims made about the connecting cable so it's pretty safe to assume that it's a stranded copper affair, sheathed in a lightweight rubber dielectric and connected to the capsules in the traditional 'Y' configuration. The other end is terminated in a minijack which is covered with a full size jack; both are gold plated.

Wearing the *DT411* is a pleasant if warm experience (in July). The pressure exerted is as de-

finied by *DIN 45581*, which seems to be acceptable, at least if your head is the same width as mine or less. I have to admit a preference for the really loose fit of big circumaurals; supras have to exert a degree of pressure which becomes uncomfortable over time, but they do tend to be less expensive.

Sonically the Beyer was pretty competent if a little lacking in inspiration. Clarity is about average and tonally it seemed quite pure with no subjective peaks or troughs.

The Tommy Bolin track retained much of its funky rock character with nice bass weight underpinning it. There was the usual supra-aural lack of air/spaciousness around notes, but it managed to reproduce much of the rhythmic and dynamic life in the music.

The *DT 411* is a reasonable but not very thrilling headphone offering average sound and comfort for what is, unfortunately, a relatively a high price.

## GENERAL DATA

Type	supra-aural, open-back dynamic	
Mass	120g	
Size rating	medium	
Impedance	250ohm	
Comfort rating	good	
Sound quality rating	good	
Price	£49	

# Beyer DT 911

Beyerdynamic, Unit 14, Cliffe Industrial Estate, Lewes, Sussex BN8 6JL. Tel: (0273) 479411



**A**t £179 the Beyerdynamic *DT 911* is the most expensive dynamic headphone in this group. This isn't immediately obvious on first inspection, although the model number does have certain aspirational overtones . . . The basic design doesn't appear to be that different from models costing around the £100 mark, but, as we are so fond of saying, appearances are not really that critical issue with hi-fi; it's what's under the skin that counts.

The carcass is a plastic affair, the main strap being polypropylene or similar and supporting an internal adjustable headband made out of a substance that looks like an imitation suede.

The strap is attached to large yolks via swivelling joints with the usual thirty degrees or thereabouts of freedom, and each capsule is marked with both Braille characters and coloured blocks to ease channel identification.

The circumaural earpads are covered in a velvet like material which feels nice but has the potential for getting warm if the weather's hot.

These can be removed for washing or replacement, although to put them back you need to prise off the grille, which gets you pretty close to the deli-

cate operational parts of the beast, so a little care and attention is the order of the day. The aforementioned delicate operational parts are powered by decent sized, triple neodymium magnets.

In use the *DT911* was largely comfortable though the pressure under the ears was a bit high for my liking. Listening to it turned out to be a more enjoyable pastime than wearing it, if that makes sense. The *911* proved extremely competent at resolving subtleties within the music that other cans glossed over; whether it was Johnny Guitar Watson or Wolfgang Amadeus Mozart, it brought out nuances that others pretended weren't there. It had both nice juicy bass lines and well extended high frequencies with a good sense of timing thrown in as well.

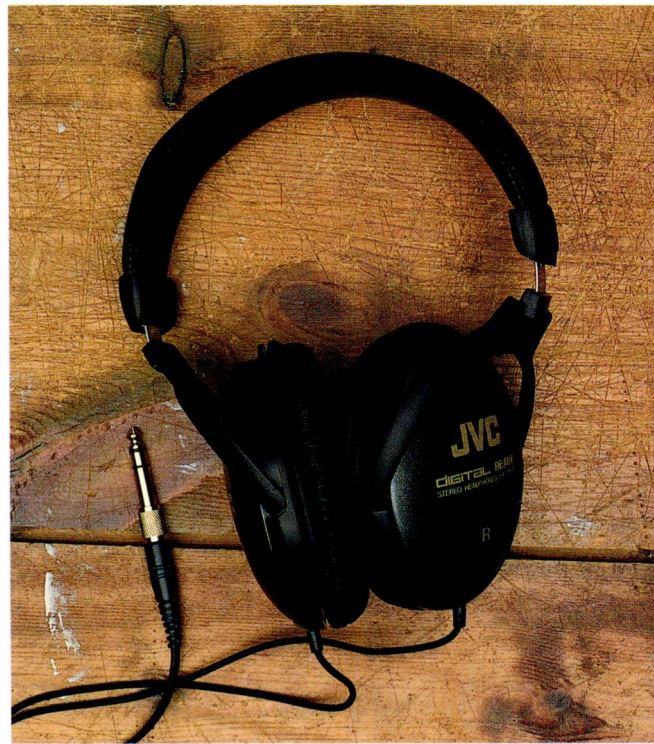
Perhaps too revealing for some headphone amps, the Beyer *DT 911* is nevertheless a fine if expensive pair of headphones. Recommended.

## GENERAL DATA

Type	circumaural, open-back, dynamic
Mass	275g
Size rating	large
Impedance	250ohm
Comfort rating	good
Sound quality rating	very good
Price	£179

# JVC HA-D690

JVC (UK) Ltd, JVC Business Park, 12 Priestley Way, Staples Comer, London NW2 7BA. Tel: (081) 450 3282



**T**he JVC *HA-D690* is a £40 closed back headphone that has been designed with an eye on the personal stereo market.

The phones are quite shallow pseudo circumaurals (which look like circumaurals but sit like supras), with plastic covered foam pads.

It has the sort of styling which the less self-conscious might consider wearing out on the street, its closed backs and dual size jack being well suited to this application.

The three metre lead will be somewhat less handy, trailing along behind you and tripping up all and sundry.

Construction is fairly classical, a padded headband concealing sliding stainless steel shafts which connect to the plastic yolks by means of rather limited range swivelling joints.

The yolks are offset so that the phones are angled backward but the band sits at the top of your head. The ear pads can be removed but are held in place with double sided foam tape. The lead is a common or garden rubber insulated, presumably copper cored affair that terminates in a gold plated dual size plug.

In use the *HA-D90* is reasonably comfortable. It presses a little harder than one might like

but you get used to it, and such factors are obviously related to headsize and the degree of security desired.

The first sonic impression was of a degree of veiling. High frequencies didn't have their usual edge and definition suffered as a result.

The opposite end of the spectrum was quite full and punchy which was nice, but the midrange took precedence as is often the case.

The effect this had on music was reasonably enjoyable but ultimately uninspiring, a pretty average result given the price.

When there was plenty of energy coming out of the socket this headphone set gave the impression of being dynamic enough but the reference managed to sound clearer and more natural in every instance.

The JVC *HA-D90* proved to be competent but undistinctive headphones, a bit middle of the road and thus better suited to more aggressive sources.

## GENERAL DATA

Type	supra-aural, closed back, dynamic
Mass	220g
Size rating	medium
Impedance	32ohm
Comfort rating	average
Sound quality rating	average
Price	£40

# Sennheiser 480II

Sennheiser UK Ltd, Knave's Beech Business Centre, Loudwater, Bucks, HP10 9QY. Tel: (0628) 850 811



**T**he Sennheiser *HD 480II* looks almost identical to Sennheiser's *HD 480 Classic II*. Indeed the two designs share a lot of the same components

But there's one major difference to account for the £10 price variation between the two, and that's the material which is used for the voice coil. The more expensive *Classic II* uses aluminium, while the model under scrutiny here has a copper coil. (Copper coils are generally heavier and therefore require more force to get them moving.)

The *HD 480II* is otherwise a pretty straightforward supra-aural pair of headphones. A pair of capsules are attached to tracks at either end of a polypropylene band which has a fillet of plastic covered foam at the top.

In the usual Sennheiser style the capsules can virtually be taken apart by hand. The simple foam pads unclip and the leads are plugged in; go any further and you're into delicate diaphragms and coils territory which is best left alone.

The fit of this particular Sennheiser design has always been good, especially for a supra-aural. It doesn't press too hard, or at least it doesn't press on the parts of your ears that are most sensitive, and it can be worn for reasonable periods without dis-

comfort. The only drawback in this summer weather is that the man-made earpad covering is quite warm. Has anyone ever considered using cotton for this purpose I wonder?

Listening through the *HD 480II* turned out to be a most enjoyable experience. It doesn't have the clarity of dearer models but it makes up for the fact with a relaxed yet quick sound that works extremely well with rock music.

It's probably a case of clever response tailoring but in any case I found myself getting more enthusiastic about the Black Crowes' *Sting Me* than I had about any other track that day, and this was about the fifth or sixth time round. With the digital source things were less thrilling but the same, essentially midrange, insight nearly wove its spell. Not perhaps the most accurate cans on the market but certainly among the most enjoyable, the *HD 480II* is nonetheless a worthy Best Buy.

## GENERAL DATA

Type	supra-aural, open-back, dynamic
Mass	135g
Size rating	medium
Impedance	60ohm
Comfort rating	good+
Sound quality rating	good
Price	£50

# Sennheiser 540II

Sennheiser UK Ltd, Knave's Beech Business Centre, Loudwater, Bucks, HP10 9QY. Tel: (0628) 850 811



**B**ased near Hanover in Germany, Sennheiser is Europe's largest headphone manufacturer. The *HD 540 Reference II* to give its full and rather excessive name is a £100 model that sits close to the top of the standard hierarchy. (I say standard because the company produces the *Orpheus* electrostatic model which, complete with its valve amplifier/energiser, weighs in around the £9,000 mark.)

The *HD 540* is a pretty simple looking beast compared with the far eastern competition; no fancy shaped capsules or clever suspension systems, just a basic polypropylene band with an adjustable padded headband inside it. The capsules hang onto this with little plastic ball joints that allow a fair amount of lateral and vertical movement and ensure that the big circumaural pads sit comfortably around your ears.

The pads themselves are doughnut-shaped and covered in what seems to be velvet. They provide a snug and comfortable fit that's a bit tighter than some and can in the long run become a bit less comfy.

The low weight has an appreciable positive effect compared to models like Sony's *MDR-CD1000*, or for that matter the reference *AKG 340*.

The *HD 540*'s sonic character is quite benign and dependent to a greater extent than average on the amplifier being used to drive them. With the special Evans headphone amp it sounded light, almost bright, but with the *A-400* this balance smoothed out and became relatively mellow.

In any case, the results were good, the *HD 540* giving an excellent sense of space and very good definition which in turn gave a very attractive sense of speed. The midrange particularly is very transparent and allows much of the fine detail that gives music its life and ambience to come through. Compared to the reference they sound faster and brighter with limited bass extension, a balance that suits some music well.

The Sennheiser *HD 540 Reference II* is a good but not great headphone that due to its high impedance and efficiency should work well with most sources. Recommended

## GENERAL DATA

Type	circumaural, open-back, dynamic
Mass	195g
Size rating	very large
Impedance	300ohm
Comfort rating	good+
Sound quality rating	good+
Price	£100

# Sony MDR-CD750

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



Visually Sony's *MDR-750* appears to be virtually identical to the £150 *MDR-CD1000*, reviewed opposite.

The main difference is internal with a 50mm biocellulose diaphragm replacing the 40mm plastic one used in the more expensive design, while closer examination of the exterior reveals that the *750* has a plasticky earpad covering rather than the (breathing) collagen design used for the *1000*.

So in effect what you are getting is the fundamental structure of the *1000*, though Sony has sawn off 40g somewhere, for half the price.

This is a chunky closed back pair of headphones with a self adjusting internal headband and two substantial capsules that are angled internally and externally to place the diaphragm in the same plane as your ear.

Most circumaurals end up at an angle to your ears, the back being closer than the front. The *750* counters this with its tapered earpads.

With the *MDR-750* perched firmly on top of my head I was not entirely unaware of its highish weight and a higher than usual pressure level in front of the ear. I wouldn't call it uncomfortable but it doesn't seem to be as finely balanced as its more

costly brothers, and one soon appreciates the advantages of the collagen material on the *1000*'s earpads.

The *750* is less sonically enthralling than the *1000* but pretty good nonetheless and obviously of the same school. Bandwidth is good but the general tonal character is on the dark side with an emphasis on the low frequencies and a slight softening of the high ones. The bass was particularly enchanting with good recordings. It could make notes sound natural which helps, though the laid back presentation suggests that this might be a side effect of toning down the high treble.

With the Pioneer combo the sound became more relaxed and almost fat in the bass, with some low level info being lost.

The Sony *MDR-CD750* is a reasonably comfortable and eminently listenable set of headphones, which in my books makes it prime Recommendation fodder.

## GENERAL DATA

Type	Circumaural, closed back dynamic
Mass	200g
Size rating	Large
Impedance	24ohm
Comfort rating	good+
Sound quality rating	good+
Price	£73

# Sony MDR-CD1000

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



The Sony *MDR-CD1000* headphone is a direct descendant of the *MDR-10 King* that costs an arm and a leg and has wooden capsules, goat-skin pads etc. It shares the shape of its closed back capsules and headband system with the *10* but the use of rather more affordable components has reduced the price tag to a still pretty substantial £150, placing the *CD1000* third from the top of Sony's extensive range.

Designwise it's a pretty chunky thing, with large ear capsules that are made of a plastic and ceramic composite and a large but lightweight flexible headband. This, however, doesn't sit directly on your head as it's supported by means of a self-adjusting band that's very flexible and uses sprung/friction loaded tapes to enable the phones to sit comfortably on most heads. The main band attaches to the yolks via a limited travel swivel allowing the ear pads to sit comfortably around your ear. The pads themselves are covered with a soft imitation leather that is designed to breathe in the same way as the original.

Wearing the *1000* is a pleasant experience by headphone standards. It exerts minimal pressure yet feels quite secure, and the self-adjusting band means

that you can set it at the optimum height with the minimum of hassle. The three metre LC-OFC cable is attached to the left capsule making both putting them on and using them easier than 'Y' cord types.

Listening to the vital selection on the *1000* proved to be a most enjoyable pastime. It was probably more revealing than the reference but had a slightly darker balance with very good bass extension. It managed to reproduce low level detail with considerable aplomb resolving the acoustic environment, be it real or synthetic, of notes and presenting music in a relaxed yet detailed fashion that encourages prolonged listening. Where it lost out to more expensive models was at high frequencies which lost some of their sparkle and expressiveness.

The Sony *MDR-CD1000* is a fine sounding and comfortable headphone that's likely to work well with most sources. Recommended.

## GENERAL DATA

Type	circumaural, closed back, dynamic
Mass	330g
Size rating	very large
Impedance	32ohm
Comfort rating	very good
Sound quality rating	very good
Price	£150



# Technics RP-F3

Panasonic UK, Willoughby Road, Bracknell, Berks, RG12 4FP. Tel: (0344) 862 444



**T**he Technics *RP-F3* is one groovy looking pair of headphones. I think robophones would be a more suitable description; since this is certainly very reminiscent of robots as depicted in certain well known movies.

The shape and finish is quite unusual by can standards; the capsules and the legs that they attach to are sculpted and have a metallic finish that gives them that science fiction feel.

There is also a novelty here for our delectation in the form of the 'Sound Control Mechanism' which is a switch on the side of each phone that turns the XBS on and off.

XBS is, as you might already have surmised, a bass booster (or a high pass filter in the off position perhaps), but in this case it appears to be entirely mechanical. I couldn't get inside the capsule but get the impression that the switch acts as a valve increasing or decreasing the capsule's volume.

The *RP-F3*'s construction is pretty standard for a Japanese model at this price point. Stainless sliders sit in a fat padded headband and attach to 'L' shaped arms; each capsule attaches to these arms by means of a metal ball joint. The cable uses LC-OFC copper and extends three metres to a dual size

gold-plated jack plug.

Wearing the *RP-F3* was not a particularly pleasurable experience. It not only looks like robophones but grips like one as well. The unusual shape combined with vice like pressure served to make them unduly ear crushing.

The sound quality was more appealing though not exactly inspiring. You've got two options, fat bass or none at all. The latter option is said to be best suited to long term listening, if you could wear it that long.

Generally a little too much bass was preferable to none but it tended to make the sound closed in and lacking in air.

Ignoring factors like tonal balance and comfort, the *RP-F3* put in a reasonable performance, reproducing the rhythmic qualities of tracks with a slightly forward presentation.

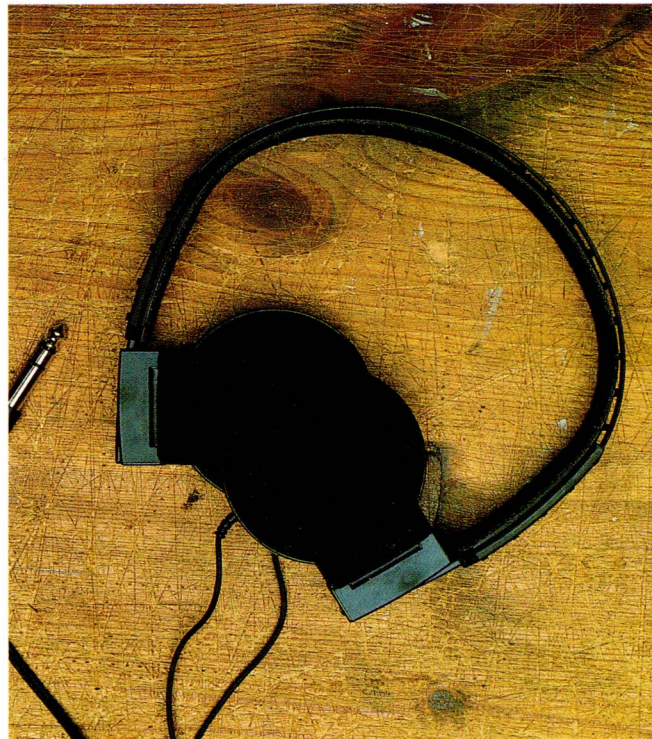
Not my kind of headphones, but they look wacky and might suit personals; price seems a tad high, however.

## GENERAL DATA

Type	supra-aural, closed back, dynamic
Mass	320g
Size rating	large
Impedance	32ohms
Comfort rating	poor
Sound quality rating	average-
Price	£100

# Yamaha YHD-1

Yamaha UK Ltd, Yamaha House, 200 Rickmansworth Road, Watford, Herts WD1 7JS. Tel: (0923) 233 166



**T**he stylish Yamaha *YHD-1* follows in the footsteps of Yamaha's past headphone design exercises, although this is not quite as eye-catching as the Porsche designed *YHL-006*.

The visual appearance of the *YHD-1* was conceived by one Malio Bellini (or possibly Mario as it's written in the French description!) who has come up with a very neat pair of semi folding, black headphones. The folding in this instance means that the phones hinge vertically on the headband and can be turned in so that the whole assembly becomes less than an inch thick.

The *YHD-1* is built around a metal strap that supports the phones and an imitation leather headband which can be adjusted internally to suit different head sizes. The transducers themselves are very flat supra-aural affairs with open backs and thin earpads. Rather suprisingly, given the design, it's not that uncomfortable. In fact I was pleasantly surprised at just how well balanced it was. The pressure was just right and proved easy to adjust for a good fit.

One somewhat odd factor with these (and indeed other small headphones that appear to be made for use with personal stereos) is that the minijack terminated leads are three me-

tres long, which seems rather at odds with outdoor use.

Listening to the selection of test tracks with the *YHD-1* proved to be a pleasant, occasionally enjoyable experience. It had remarkably good bass power for such small phones and made the most of bass guitar and drum lines on the various test selections. The rest of the spectrum was adequately represented as well, though the highest frequencies could have been more obvious. Presentation was if anything a little forward and lively and it made a better match with the relatively relaxed Pioneer drive system than with the Evans special. It wasn't too fatiguing though and liveliness was a definite plus point with some material.

I like the design, the fit and, under most circumstances, the sound of the Yamaha *YHD-1*. But in absolute hi-fi terms, although great fun, it's not quite good enough for formal *Choice* Recommendation.

## GENERAL DATA

Type	supra-aural, open-back, dynamic
Mass	145g
Size rating	small
Impedance	125ohm
Comfort rating	good+
Sound quality rating	good
Price	£46



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Nad 8225e Celestion 5 B&W DM600 Kef K120 Tannoy 605 MoniAudio One	Nad 3225 PE Marantz PM30SE	Marantz CD42II Marantz CD52 Marantz CD52I Marantz CD62 Marantz CD72 NAD 5420 NAD 5425 NAD 5440 Philips CD604 Philips CD634 Philips CD850 Mk II	Pioneer PD201 Pioneer PDS501 Pioneer PDS601 Pioneer PDS701 Pioneer PDS801 Rotel RCD955AX Technics SLPG320AK Technics SLPG420AK Technics SLPG620AK Technics SLPS700AK Technics SLPS900AK
MoniAudio R7 Heybrook Solo Mission 7611	Rotel RA 930AX Pioneer A300 Dual CV 5600	Marantz CD42II Marantz CD52 Marantz CD52I Marantz CD62 Marantz CD72 NAD 5420 NAD 5425 NAD 5440 Philips CD604 Philips CD634 Philips CD850 Mk II	Pioneer PD201 Pioneer PDS501 Pioneer PDS601 Pioneer PDS701 Pioneer PDS801 Rotel RCD955AX Technics SLPG320AK Technics SLPG420AK Technics SLPG620AK Technics SLPS700AK Technics SLPS900AK
Castle Warwick Mission 762 Rogers LS2A-2 JPW AP3 Kef 140	Technics SUVK500K	Marantz CD42II Marantz CD52 Marantz CD52I Marantz CD62 Marantz CD72 NAD 5420 NAD 5425 NAD 5440 Philips CD604 Philips CD634 Philips CD850 Mk II	Pioneer PD201 Pioneer PDS501 Pioneer PDS601 Pioneer PDS701 Pioneer PDS801 Rotel RCD955AX Technics SLPG320AK Technics SLPG420AK Technics SLPG620AK Technics SLPS700AK Technics SLPS900AK
Castle Durham Heybrook HB1/3 Tannoy 609	Marantz PM40SE Yamaha AX550	Marantz CD42II Marantz CD52 Marantz CD52I Marantz CD62 Marantz CD72 NAD 5420 NAD 5425 NAD 5440 Philips CD604 Philips CD634 Philips CD850 Mk II	Pioneer PD201 Pioneer PDS501 Pioneer PDS601 Pioneer PDS701 Pioneer PDS801 Rotel RCD955AX Technics SLPG320AK Technics SLPG420AK Technics SLPG620AK Technics SLPS700AK Technics SLPS900AK
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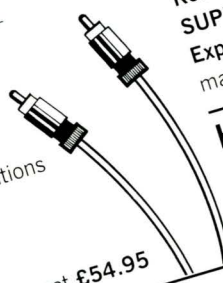


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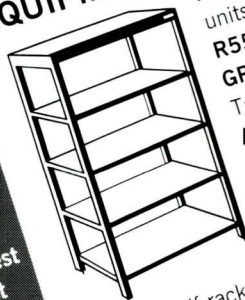
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- TECHNICS SBSC60K £69.95

**DEDUCT 50% OFF THESE PRICES**

- AIIWA DXM77 £149.95
- CAMBRIDGE C70 £249.95
- KEY Cube104 £109.95
- CR250 £274.95
- Quattro 15 £409.95
- KENWOOD LS74 £99.95
- NAD 8225 £149.95
- 8100 £299.95
- ROKSAN HOTCAKES £199.95
- Including selected cartridges, speaker stands, equipment stands, headphones & other assorted paraphernalia.
- ORACLE Alexandra TT £499
- GOLDRING GL75 TT £39
- B&W DM22 £99
- KEY 101/2 (pr) £249
- DENON DCD800 £79
- PMA520 £99
- MARANTZ CD65 CD £139
- NAD 5240 CD £129
- MERIDIAN 203 £199

**USED BARGAINS**  
 Available at Sevenoaks Branch only

- AUDIOLAB 800CC&P (pr) £499
- QUAD 34 PRE £199
- 44 PRE £249
- 306 PWR (Grey) £199
- 405.1 £199

**MARANTZ CD52**  
 Brand New  
**£164.95**  
 SAVE £35

# Hi-Fi Choice

## mail order offers

### The Purifier £16.90 per pair

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

The clamps will accept single or multiple cables of up to half an inch 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.

### Nagaoka Anti-Static Record Sleeves no.102 £6.99

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

The sleeves keep records dust free and eliminate static, 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!

### Mk 10 Carbon Fibre Brush with Velvet Pad £9.99

The carbon fibres efficiently remove dirt from the record grooves, which is then collected by an integral felt pad. This can be easily cleaned with the supplied tool after use.

### System Cleaning Kit 1 £15.99

Everything needed for maintaining a hi-fi system, all contained in one handsome wallet pack.

Stylus cleaner, auto reverse wet tape head cleaner and cleaning fluid, manual CD cleaner and cleaning fluid and a carbon fibre record cleaning brush.

### Milty Work Mat £7.99

The Milty Work Mat is a large rubber mat that has been designed to support records, Laser Discs and CDs when they are being cleaned. It's covered in 1mm long tentacles which gently grip the disc during cleaning. 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.

### Technics Auto Compact Disc Cleaner £39.95

The Technics RP-CL300 is a powered wet/dry CD cleaner that can be run off batteries or the

*Our Mail Order Section this month features, among the old favourites such as Furukawa interconnects, some great new accessories to help improve the performance of your system. We've been reviewing some new and interesting products and have selected some that we thought you should know about.*



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

### Kontak cleaning solution £19.90

Kontak is a two stage contact cleaner for all audio and mains connections. All connections are susceptible to

oxidisation and dirt which impairs electron flow and thus affects sound quality. Here's what PM had to say when he tried some out; "The effect on the power amps was so astonishing I had to do the whole system. By the time I was finished it was utterly transformed. Timing and coherence were back with a vengeance; surface noise and coloration were both much less audible and the soundstage liberated itself from the boxes".



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

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

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.

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

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

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

### Audio Technica CD lens cleaner AT-6078 £16.95

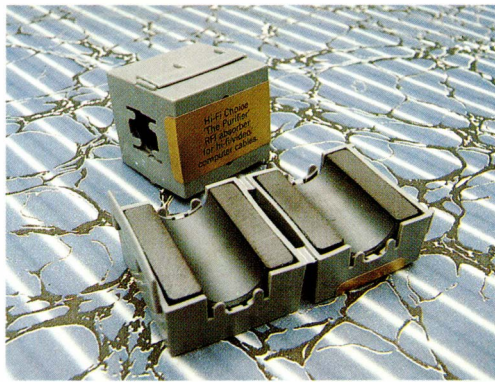
The focusing assembly for the laser head of a CD player is a very delicate affair and yet it requires cleaning from time to time.

Rather than fumbling about with cotton buds we would suggest you employ an A-T lens cleaner. This is a standard size disc with 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.

### Gold plated 4mm banana plugs £7.95

Top quality solderless gold plated banana plugs for use with speaker cables. Simply push the speaker cable into the body of the plug and tighten for a perfect connection.

This Furukawa plug accepts cables up to 4mm in diameter. Sold in packs of four.



*Top left: A selection of accessories from the Last range. Top right: The Hi-Fi Choice Purifier. Left: Furukawa banana plugs.*

This month we are pleased to introduce the Last range of cleaning and protection fluids and accessories.

**Last SF-100 Extra Strength Record Cleaner £19.95**

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

**Last SF-200 Record Preservative £21.95**

Without going too deeply into the technical details, Last *SF-200* is absorbed into the surface of the vinyl and stabilises the vinyl to prevent gouging and fracturing of the groove wall that can occur during playback. A single

application can keep records sounding 'brand new' for 200 plays or more.

**Last SF-300 All Purpose Record Cleaner £15.95**

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



In order to let you try out the Last record cleaning and protection system we

have negotiated a special price to enable you to purchase a full size bottle of both the extra

strength cleaner and the preservative for just £34.95. We have also secured a limited number of trial samples of all three products which are available at only £21.95 but as stocks are limited we must restrict this offer to one sample kit per reader.

**Last SF-500 Stylus Treatment £13.95**

As the stylus is the point at which the music enters the replay system it is essential that it is kept clean. Last *SF-400* will remove even the most stubborn deposits, yet, when used correctly, will not damage even the most delicate of stylus assemblies.

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

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

**CD cleaner and protection kit £17.95  
Cleaner only £13.95**

## Improve the sound of your hi-fi 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.



## Furukawa cables

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

**Speaker cables Furukawa FS-2T14**

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



**Furukawa FS-2T20P**

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



**Furukawa FS-2T35P**

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



**Digital Interconnects Furukawa FV-1010**

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



**Furukawa FO-1110**

Voted a "must for 'optical only' transports" *1110* employs a PMMA fibre. Glass and multi glass versions, the *FO-1210* and *FO-1310* respectively, are also available and both merited *Hi-Fi Choice* Recommendation.



**Analogue Interconnects Furukawa FD-1010**

One of Furukawa's 'unbalanced' coaxial range, manufactured from PCOCC and intended for use between the analogue output of a CD player and the preamplifier.



# 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. Surpassingly 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 Harnes 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 Lacefield, 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 Clabash - 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

### Prof Johnson's Sound Show:

Ref RR-7 (LP only) (£18.50)

### Berlioz: Fantastique

Ref RR-11 (double) (£24.99)

Ref RR-11CD (£18.50)

### Tafel Musik: Baroque

Ref RR-13 (£18.50)

Ref RR-13CD (£18.50)

### Respighi: Church Windows

Ref RR-15 (£18.50)

Ref RR-15CD (£18.50)

### Stravinsky: L'Histoire

Ref RR-17 (£18.50)

Ref RR-17CD (£18.50)

### Copland: Apalacian Spring

Ref RR-22 (£18.50)

Ref RR-22CD (£18.50)

### Helicon Ensemble: Vivaldi

Ref RR-23 (£18.50)

Ref RR-23CD (£18.50)

### Nojima Plays Liszt:

Ref RR-25 (£18.50)

Ref RR-25CD (£18.50)

### Nojima Plays Ravel:

Ref RR-35 (£18.50)

Ref RR-35CD (£18.50)

### Mike Garson: Serendipity

Ref RR-20 (£18.50)

Ref RR-20CD (£18.50)

### Walker & Garson: Reflections

Ref RR-18 (LP only) (£18.50)

### Marni Nixon: Marni sings..

Ref RR-19 (£18.50)

Ref RR-19CD (£18.50)

### Star of wonder:

Ref RR-21 (£18.50)

Ref RR-21CD (£18.50)

### Chicago Pro Musica: Weill

Ref RR-29 (£18.50)

Ref RR-29CD (£18.50)

### Eileen Farrell: Torch Songs

Ref RR-34CD (£18.50)

### Dick Hyams Plays Fats Waller:

Ref RR-33 (£18.50)

Ref RR-33CD (£18.50)

Ref RR-33DCD (£29.99)

### Opus 3 test record 1

Ref OP-7900CD (£17.99)

Ref OP-7900LP (£17.99)

### Opus 3 test record 2

Ref OP-8000LP (LP only) (£17.99)

### Opus 3 test record 3

Ref OP-8300CD (£17.99)

Ref OP-8300LP (£17.99)

### Opus 3 test record 4

Ref OP-9200CD (£18.50)

Ref OP-9200LP (£18.50)

### Thelma Houston: Music in me

Ref CD-2 (£18.50)

### Eileen Farrell: Sings Arlen

Ref RR-30 (£18.50)

Ref RR-30CD (£18.50)

### Jim Brock: Tropic Affair

Ref RR-31 (£18.50)

Ref RR-31CD (£18.50)

### Eileen Farrell: Sings Johnny Mercer

Ref RR-44CD (£18.50)

### Eileen Farrell: It's Over

Ref RR-46CD (£18.50)

### Malcolm Arnold/RPO:

Ref RR-48 (£18.50)

Ref RR-48CD (£18.50)

### Robert Farnon/RPO

Ref RR-47 (£18.50)

Ref RR-47CD (£18.50)

### William Walton: Facade Suite

Ref RR-19 (£18.50)

Ref RR-19CD (£18.50)

### Reference Jazz Sampler

Ref CD94 (CD only) (£12.99)

### Reference Classical Sampler

Ref RR-S1CD (CD only) (£12.99)

# Choice Offers Order Form

## Accessories

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

<input type="checkbox"/> JE8A	Mk 10 Carbon Fibre Brush with Velvet Pad	£9.99
<input type="checkbox"/> JE9A	System Hi-Fi Cleaning Kit 1	£15.99
<input type="checkbox"/> JE14A	The Purifier	£16.90
<input type="checkbox"/> JE15A	Anti-Static Record Sleeves	£6.99
<input type="checkbox"/> JE16A	Milty Work Mat	£7.99
<input type="checkbox"/> JE17A	Kontak Cleaning Solution	£19.90
<input type="checkbox"/> JE18A	Newnes Audio and Hi-Fi Engineer's pocket book	£10.95
<input type="checkbox"/> JE19A	The Art of Digital Audio	£49.50
<input type="checkbox"/> JE20A	Technics Auto CD cleaner	£39.95
<input type="checkbox"/> JE21A	Audio Technica CD lens cleaner	£16.95
<input type="checkbox"/> JE24A	Gold plated 4mm banana plugs	£7.95
<input type="checkbox"/> JE25A	Last SF-100 extra strength record cleaner	£19.95
<input type="checkbox"/> JE26A	Last SF-200 record preservative	£21.95
<input type="checkbox"/> JE27A	Last SF-300 record cleaner	£15.95
<input type="checkbox"/> JE28A	Last SF-500 stylus treatment	£13.95
<input type="checkbox"/> JE29A	Last SF-600 CD clean and protect	£17.95
<input type="checkbox"/> JE30A	Last cleaner only	£13.95
<input type="checkbox"/> JE31A	Trial pack, SF-100 and 200 (full size)	£34.95
<input type="checkbox"/> JE32A	Trial pack, SF-100, 200 and 300	£21.95

## Furukawa Price Table

	0.5m	1.0m	1.5m	2.0m
<i>Please circle the cables you require.</i>				
<i>Interconnects - RCA to RCA</i>				
<b>FV1010 (each)</b>	50.00	55.00	57.50	60.00
<b>FD1010 (pair)</b>	85.00	92.50	97.50	NA
<i>Fibre optics - TOSLINK</i>				
<b>FO1110 (each)</b>	NA	45.00	50.00	NA

### Speaker cables

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

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

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**Exposure 15** £385 Cyrus 2 + PSX £425, Concordant Excelsior £540, KEF 104 AB speakers with stands £170, Dual 704 turntable £80, Yamaha CA1000II amp £120. Tel: 0977 643629

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**Linn** active system Isobarik X'over, 3xLK280's LK1/DIRAK £2450 ono, Meridian 200/203 £1100, Linn Kremlin tuner £1200 ono Ekos tonearm £750 ono, Troika cartridge (6 months) £495 ono, Linn lingo £395 All excellent condition. Phone Chris on 02406 6487

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**Meridian D600** active speakers vgc. Recently factory serviced £1200. Tel: 0480 413417.

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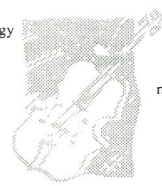
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# The Choice Dealer Directory

762485/9. Bang & Olufsen, Denon, Dual, Mission, Mordaunt-Short, Pioneer, Sony, Technics, Yamaha, Celestion etc. In store dems, free install, service dept. Access, visa. Open 8.30-5pm 6 days

## HAMPSHIRE

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

**BADA**

HAMILTON ELECTRONICS, 35 London Rd, Southampton, Tel: 0703 228622/3 Fax: 0703 332141. Hi-Fi and Surrounding Sound and theatre Specialists. Harman Kardon, Marantz, Denon, QED, Tannoy, Celestion, B&W, Quad, Aiwa, Technics, JBL, Heco. Studio Demonstration No appts nec, Home trial facilities, Free Install, Full service and installation Open 9-5:15pm Mon-Sat. Access and Visa

HAMPSPHIRE AUDIO LTD, 2-12 Hursley Rd, Chandlers Ford. (0703) 252827/265232. Quality CD and analogue agencies. 5 dem studios. Large free car park. **BADA** TRU-FI SOUND & VISION, 10-12 Grosvenor Road, Aldershot, Hants. Tel/ Fax: (0252) 26390/332424, Aiwa, Audio Technica, B&W, Nakamichi, Mission, Mordaunt-Short, Nagaoka, Sony, Technics. Dem fac. Free install. Service dept. 0% finance. Access, Visa. Mon-Sat 9.30-6.

## HEREFORDSHIRE

ENGLISH AUDIO, 95 Whitecross Road, Hereford HR4 0DG. (0432) 355081. Musical Fidelity, Arcam, Pink Triangle, Denon, Marantz, Mission-Cyrus, 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.

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.

## HERTFORDSHIRE

ACOUSTIC ARTS LTD, 101 St Albans Rd, Watford, Herts. (0923) 245250 Fax (0923) 230798 Absolute Sounds, Acoustic Energy, Audiolab, Denon, Marantz, Meridian, Quad, Rel Imports, TDL., Teak, Tues-Sat 9-6:00

**BADA**

RADLETT AUDIO, 141 Watling Street, Radlett, Hertfordshire, WD7 7NQ. (0923) 856497. Mark Levinson, Proceed, PRO AC, Magnepan, Albany, Martin Logan, Tube Technology, Audiolab, Rotel, Rega. Home trial facilities, Free Install, Service Dept. Visa, Access 9-5:30 Mon-Fri 10-5:30 Sat

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. **BADA**

THE AUDIO FILE, 27 Hockerill St, Bishops Stortford, Herts CM23 2DW. (0279) 506576. 9.30-5.30 open 6 days. Dealer Of The Year 1988/89. Linn, Naim, Quad, Cyrus, Arcam, Roksan, Denon, Epos, Rotel, KEF, Pro-Ac. 0% credit. **BADA**

## NORTH HUMBERSIDE

JUST AUDIO, 24 Foston Lane, North Frodingham, Driffield. Tel 0262 488700, call for details. SUPERFI, 4 Dock Str, Queens Gardens Hull, HU1 3DL. (0482) 24051. See main entry under Nottinghamshire for full details.

## KENT

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

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

KIMBERLEY HI-FI, 193 Broadway, Bexleyheath, Kent. (081) 304 3272. Pioneer, Technics, Kenwood, Denon, NAD, Aiwa, Tannoy, Mission, Wharfedale, Castle. Separate dem room, no appt nec. Free installation. Service Dept. Instant credit facilities. 9.30-5.30. No early closing PANATEC SOUND & VISION CENTRE, 83b High St, Gillingham. (0634) 5731141 B&W, Bose, Dual, Kenwood, Marantz, Pioneer, Philips, Sony,

Tannoy, Technics. Dem room facilities. 0% credit, Service Dept. Free Installation. Pioneer Reference Point Dealer. PANATEC SOUND & VISION, 17 Week St, Maidstone. (0622) 661488. See above for details.

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. **BADA**

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.

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 V J HI-FI, 119 High Street Margate. (0843) 226977. Mon-Sat 9-6. NAD, Yamaha, Marantz, Cambridge Audio, Denon, Kenwood, Rogers, Dual, Musical Fidelity, Pioneer. Dem and home trial facilities, free installation, credit to £1000. Amex, Diners, Visa, Access. Service dept

## LANCASHIRE

NORMAN AUDIO, 216 Church Street, Blackpool FY1 3PT. 0253 295661 For details see Preston branch entry ( below). Open 9-5.30, Closed Wed.

**BADA**

ROMERS HI-FI CENTRE, 94-96 High Street, Rishton, Blackburn, Lancs, BB1 4LQ.

Tel: 0254 887799. Musical Fidelity, Technics, Pioneer, Marantz, Revox, Tannoy, Celestion, Sony, Panasonic, Mission. Single Speaker Dem Room. Also wired for pro logic. No appts nec. Home trial fac by arrangement. Free Install, Service Dept. Access, Visa, Switch, Interest free on selected products. Open 9-5:30 Wed 9-1:00

## LEICESTERSHIRE

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

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

**BADA** SOUNDADVICE, 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.

## LINCOLNSHIRE

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

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

## LONDON

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

AUDIO T, 190 West End Lane, West Hampstead, London NW6 1SQ (071) 794 7848, Fax (071) 431 3570. Great hi-fi from Linn, Arcam, Audiolab, Cyrus, Denon, Meridian, Mission, Philips, Rotel, Proac, Micromega, Yamaha, and many more Tue-Sat 10-6pm. 3 yr gntee on Hi-Fi. Free del & instal. 30 day

upgrade scheme. Home dems. PX. 2 dem rooms. A/V Dept. **BADA** BILLY VEE SOUND SYSTEMS, 248 Lee High Road, London SE13, (081) 318 5755. Arcam, Linn, Naim, Quad, etc. 2 dem rooms. Int. freecredit, Access. Visa. Closed Thurs, **BADA**

CORNFLAKE SHOP, 37 Windmill St (just off Tottenham Court Rd), London W1. (071) 631 0472. (domestic) (071) 323 4554 (multiroom) Fax, (071) 323 4554 (multiroom) Fax. (071) 436 7265. Tues -Sat 10-7 Rega, Roksan, Naim, Monitor Audio, Arcam, Nakamichi, Rotel, Epos etc. 3 dem rooms. (incl. home cinema) Friendly, professional service. Home trial facilities. Appointments preferred. Full delivery and repair service. Multiroom specialists. Access & Visa

COVENT GARDEN RECORDS, 84 Charing Cross Road, London WC2 HOJA. (071) 379 7635 , Fax (071) 836 1345. London's premier digital audio centre, Photo CD, DCC, CD, & 10x9 TV'S, Audio Labs, B&O, Marantz, Mission, Cyrus, Philips, Rotel, Rogers, Quad, Sony. 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. **BADA**

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 **BADA**

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

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

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

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

NICHOLLS HI-FI, 430-434 Lee High Rd, Lewisham, London, SE12 8RW. 081 8525780, Sony, Technics, Harman, JBL, Mordaunt Short, Kenwood, Panasonic, Hatler, S/umo, B&W. Demo facilities, no appt. nec. Home trail facilities. Free Install. Service Dept. Credit available, Access, Visa. Open 9.30-6 Mon-Sat, Thurs 9.30-1pm SOUND SENSE, 350 Edgware 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.

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

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

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

VOLUME ONE, 41 Upper Wickham Lane, Welling. (081) 304 4622. For full details see entry under Kent

ZEBRA, 18-24 Brighton Road, South Croydon CR2 6AA, 081 688 2093 Mission, Pioneer, NAD, Rotel, Marantz, KEF Reference, Audiolab, Arcam, Tanoy, Sony, 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.

## GREATER MANCHESTER

THE AUDIO COUNSEL, 12 Shaw Road, Oldham, Manchester OL1 3LQ. (061) 633 2602. Linn, Yamaha, Rega, Rotel, Arcam, Micromega, EPOS, Creek, Nakamichi, Denon. 2 dem rooms. Free install. Visa, Access, Licenced credit brokers up to £1000 instant credit. 10.00-5.30 Tues, Weds, Sat. 10.00-7 Thurs & Fri. Closed Mon.

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 HFIDELITY, 12 Chapel Street, Cheadle. (061) 428 7222. Arcam, Denon, Kenwood, Marantz, Nad, Cyrus, Rotel, Pioneer, Mission, Tannoy Demo room. 9.30-6. Closed Wed **BADA**

# The Choice Dealer Directory

## MIDDLESEX

AUDIO T, 159a Chase Side, Enfield, Middx EN2 0PW. (081) 367 3132, Fax (081) 367 1638. Great hi-fi from Arcam, Audiolab, Cyrus, Denon, Meridian, Micromega, Mission, Philips, Rotel, Yamaha and many more. Tue-Fri 10-6pm. Sat 9:30 - 5:30 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 3 dem rooms. AV Dept.

**BADA**

HARROWAUDIO, 27SpringfieldRd, Harrow, (081)8630938, 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, Edgware (081) 952 5535, fax (081) 951 5864 and 45 High St, Hounslow. Tel (081) 569 5802, fax (081) 569 6353. Most brands available - see full page advert in Product Directory. Interest free credit available, ask for details. Demo Room, Repairs & Service, Mail Order facilities

**BADA**

**BADA**

RIVERSIDEHI-FI LTD, 422Richmond 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, Spenhard, 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.

## 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 Nicam surround sound dem room. Free delivery, installation (Merseyside) Service dept, Mon-Sat 9 - 5.30 Half day Tues, Access, Visa, Lombard

**BADA**

## 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.

**BADA**

GRIFFIN AUDIO LTD, 94 Bristol Street, Birmingham. (021) 692 1359/ (021) 622 2230. Arcam, Castle, Cyrus, Denon, Linn, Marantz, Naim, Quad, Rega, Rotel. Tues-Sat 10-6.

**BADA**

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. 9.5-5.30 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, Spondor, Exposure, Audio Technica, Creek, Rega, Epos, etc. 2 comprehensive dem rooms Home trial. Free installation. Visa, Access, HP facilities. Tues-Sat 9.30-1, 2-5.30.

MARTINS HI-FI, 5 High Street, Kings Lynn. (0553) 761683. Est. 1968

**BADA**

MARTINS HI-FI, 85/91 Ber Street, Norwich. (0603) 627010. Est. 1968

**BADA**

## NORTHAMPTONSHIRE

AUDIO CRAFT 23-25 Dergate, Northampton, NN1 1TY. Tel: 0604 36291Bang & 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.

LISTEN INN, 32 Gold Street, Northampton. (0604) 37871 (Fax) (0604) 601430. Linn, Naim, Epos, Royd, Mission, Cyrus, Arcam, Audiolab, Neat, Creek, Quad, Denon etc. 2 Dem Rooms

**BADA**

## NOTTINGHAMSHIRE

CHANTRY AUDIO, Chantry Walk, 18a Eldon Street, Tuxford, Nr Newark, Notts NG22 0LH. (0777) 870372. Pink Triangle, Delttec, Rotel, SD Acoustics, Ruark, NVA, Michell, Ion Systems, Croft Acoustics, Kelvin Labs, and much more. 2 dem rooms. Home trial, free installation. Access, Visa & credit facilities and mail order. Mon-Fri 9.30-5.30pm Sat 9.30-5.30. Sun & evenings home dem by appt

DEFINITE AUDIO, (0602) 813562. For a carefully considered approach to building a true hi-fidelity audio system with components derived from the following manufacturers; Audio Innovations, Snell, Wadia, Micromega, Delttec, Voyd, Systemdek, SME, Revox, 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) 660415. Great hi-fi from Arcam, Audiolab, B&O, Cyrus, Denon, KEF, Meridian, Mission, Rotel, Sony, Yamaha and many more. Open M o n Fri 10-6pm, Sat 9.30-5.30. 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms. AV Dept

**BADA**

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-Sa 110-6 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. Naim, Roksan, Pink Triangle, A+R (Arcam), ION, NAD, Pioneer, Rotel, Denon, etc. Dedicated listening lounge, for relaxed and unpressured demonstrations. Appts not usually nec. but best to phone first. Home trial facilities on request, free installation, service department. Instant credit, Access & Visa, etc. 9-5.30 closed Mondays

## STAFFORDSHIRE

GRANGE HI-FI LTD, 153 Branston Rd, Burton-on-Trent, Staffordshire DE14 3DQ. (0283) 33655. Audio Innovations, Arcam, Castle, Denon, Pink Triangle, Marantz, Rotel, Rogers, Systemdek, SME, Tannoy. Dem fac, appts nec on Sat, Free Install. Service dept Access, Visa. 9.00-5.30pm. Closed Mon & Wed aft, open until 7:00pm Thursdays. Closed for lunch 12.00-12.30

## 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, Rothwell, Michell, Finlux, Meridian, JPW. Seperate Demo room No appointments, Home trial facilities, free instal, 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, Delttec, 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.

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 instal. 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 GU14 9YU. Tel: (0483) 504801. 9-6 Mon-Sat. Linn, Meridian, Creek, Arcam, Quad, Revox, Musical Fidelity, Rotel, NAD, Nakamichi, Marantz.

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)



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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

ZEBRA 18-24 Brighton Road, South Croydon CR2 6AA. 081 688 2093. See main entry under London.

## SUSSEX (EAST)

JEFFRIES HI-FI, 69 London Road, Brighton, East Sussex, Tel 0273 609431. 2 Dem Rooms, closed Mon. Late night Wed. Free parking. Bus route. Credit Facilities. **BADA**

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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

RED RADIO SHOP AND HI-FI CENTRE, 11 Olive Street, (Off Park Lane), Sunderland. Tyne & Wear SR1 3PE (091) 567 2087. Castle, Carver, Denon, JVC, Kenwood, Mordaunt-Short, Michell, Teac, Tannoy, Monitor Audio etc. Dem room, large with comparator facility. No appts nec, Free install. Service dept. Interest free credit and no deposit 9am-5.30pm daily

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FRANK HARVEY HIFI, 163 Spoon Street, Coventry, Warwickshire, CV1 3BD. Tel 0203 525200. Arcam, Mission, Cyrus, Musical Fidelity, Marantz, Rotel, NAD, Tannoy, Yamaha, KEF. Open 9.30-5.30 closed Thursday. **BADA**

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.

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WEST MIDLANDS AUDIO, 158 Ombersley Road, Worcester WR3 7HA. (0905) 58046. Nakamichi, Naim, Rega, Absolute Sounds, Meridian, Arcam, Ion Systems, Roksan. 3 dem rooms for budget & high end audio Appointments necessary. Free installation. Service Dept. Access, Visa, Amex, Diners, Lombard/Hitachi. Mon-Fri 9.30-8.30 by appt Sat 9-5.30

## YORKSHIRE (NORTH)

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**

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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 demos. Home trial. Free installation. Licensed credit broker, 2yr guarantee on all equipment. Service available. Access, Visa. 10-8pm 6 days. Phone for further info. & FREE fact pack.

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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**

AUDIOVISION (BRIGHOUSE) LTD, 5 Bethel Street, Brighouse, (1 mile from junction 25, M62) W. Yorks. HD6 1JR. Tel 0484 713996. Largest range of Technics Hi-Fi in Yorkshire. Aiwa separates, Castle, Tannoy and Mordaunt Short speakers. Panasonic Nicam TV's, VCR's and camcorders. Philips widescreen TV's, CD-Interactive Players. Dolby Pro-Logic Surround Systems. Audiovisual Reproduction Furniture. CD- Audio, CDI and DCC. Demo's. Free expert install. Panaservice in-store service dept. Access, Visa, credit charge. Mon-Sat 9-5.30.

CLEARSTONE (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 Beacroft Rd, Castleford. (0977) 553066/556774. Celestion, Kenwood, Marantz, NAD, Pioneer Reference Piont, Rotel, Technics, Quad. Car audio specialists. Demo facilities. No appts nec. Access, Visa, Lombard tricity credit chrgae. Mon-Sat 9-5.30, closed Wed.

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IMAGE HI-FI, 17 The Springs, Wakefield, WF1 1QE. (0924) 200272. Arcam, Linn, Meridian, Mission, Quad, Rotel, Etc. 2 Listening Rooms Free Parking, DeLl & 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, Revox, 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, Revox, 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

## COUNTY DOWN

ASTON AUDIO, Unit 8, Kings Road Shopping Centre, Kings Road, Belfast. Tel: 0232 402220. Akai, Technics, JVC, Mitsubishi, Samsung, Toshiba, Panasonic, and many more. Demos available, Open Mon-Fri 10-8pm Sat 10-5pm

## 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** 10-5pm

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## Ireland

### DUBLIN

LAFAYETTE HI-FI, 50 Wellington Quay, Dublin, Tel: 353177 0443. Technics, Denon, Marantz, Sony, Pioneer, Aiwa, Cyrus, Mission, Cerwin 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., 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.

STEREO STEREO, 278 St. Vincent St, Glasgow G2 5RL. (041) 248 4079. Linn, Naim, Rega, Arcam, Creek, Epos, Castle, Shahnian, Denon and Sehring etc. Closed Tuesdays Mon-Sat 10-6.

## GRAMPIAN

HOLBURN HI FI Ltd, 441 Holburn St, Aberdeen (0224) 585713. Arcam, Audiolab, B&W, Celestion, Denon, Dual, Epos, Heybrook, ION, Kenwood, Linn, Creek, 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.

## TAYSIDE

J.D. BROWN, 28-36 Castle St, Dundee DD1 9NZ. (0382) 26591. Rotel, Denon, Pioneer, Technics, Aiwa, Mission, Castle, Mordaunt-Short, Celestion, Bose, Infinity. All equipment ready for demonstration. No appt nec, free installation, service dept. Mon-Sat 9-5.30. 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 North Wales LL28 4RN. (0492) 548932. Rotel, Yamaha, Harman Kardon, Teac, Alphason, Heco, Infinity, JBL, Musical Fidelity, Tannoy, Rotel, Michi etc. Dem room. Appts preferred. Home trial. Free installation. Access, Visa. Open 9.30-1.00, 2.00-5.30 Mon-Sat.

ACTON GATE AUDIO, 4 Ruabon Rd, Wrexham, North Wales, Tel: 0978

364 500, Arcam, B&W, Marantz, Mission, NAD, Quad, Rega, Rotel, Tannoy, Yamaha, etc, Dem Facilities, A.V. on dem, Mail Order. No appts nec, home trial fac, Free install, Service Dept. Access, Visa. 9.30-5.30 closed Weds PM

## SOUTH GLAMORGAN

AUDIO EXCELLENCE, 134 Crwys Road, Cardiff. (0222) 228565. Great Hi Fi carefully selected and demonstrated by friendly, enthusiastic staff. Closed Mon.

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AUDIO EXCELLENCE, 9 High St, Swansea. (0792) 474608. Great Hi-Fi carefully selected and demonstrated by friendly, enthusiastic staff. Closed Mon.

## GWYNEDD

I&HGRIFITHS & SONS, 313 High St, Bangor LL57 1YA. (0248) 370655. Yamaha, Tannoy, Teac, Goodmans, Wharfedale. Demos available, no appts nec, home trial facilities, free installation, service dept. Access, Visa, Lombard credit charge. Mon-Sat 9-5.30, Wed 9-1. Audio Visual Specialists.

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# The Directory

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# The Directory

**T**he *Hi-Fi Choice Directory* was conceived as a reference guide to all the audio products reviewed by *Choice* that are currently available. The products are split into suitable categories, each with its own introduction containing information about the product type and its applications. They are particularly relevant to the uninitiated first time buyer and help sort out the order of priorities when buying a piece of equipment.

Each product along with its current retail price is placed in its respective category in alphabetical order. The prices of the products are updated on a regular basis, although it should be noted that our value rating are based on the product's price at the time of review.

The next column contains the ratings for the standard achieved in laboratory and listening tests, with the exception of certain product groups where lab tests were not carried out. One important point to remember is that they cannot be used to compare products from different categories — for example, a cassette deck rated 'excellent' in sound quality will not usually offer the same standard of fidelity as a similarly rated turntable or CD player (unless you can get hold of first generation copies of the master tape!).

The Comments column contains a potted summary based on the original review, emphasising the

salient points of a product's character and sonic performance. The space available doesn't allow for great detail but in the 20 or so words we have attempted to put across the essence of the review, in some cases using quotes from the review itself. Obviously, important information on compatibility or auxiliary equipment used in the test cannot be included, and we would advise you to refer to the original review for this, of which more later. Please note that these comments are those of the reviewer and not, as is the case with some magazines, those of the manufacturer.

The next column varies from category to category but is usually either features or specifications, the former being facilities available on a cassette deck or amplifier or the type of drive system on a turntable.

Specifications vary with product type but usually relate to suitability or capability. For instance, in the case of arm matching, figures are given with the cartridges, which tie in with the mass figures for the tonearms themselves, making it easier to avoid compliance/mass mismatches.

Perhaps the most influential letters in the *Directory* are those found in the Value column, the Rs and BBs denoting the Recommended and Best Buy ratings that are appended to products we consider meritworthy. The Best Buy tag

means that a product not only offers good sound quality, but is reasonably priced as well. With source components a price limit of approximately £300 is usually used as a guide.

Recommended means that either the performance of a product is particularly good irrespective of price or, alternatively, that a good value standard is achieved but overall attainment falls short of Best Buy classification. Please note that an expensive Recommended product will nearly always sound better than a cheap Best Buy. An ideal situation would be to choose suitably priced Best Buy or Recommended products from relevant categories and create a Best Buy system, but, due to the variety in tonal balance that exists in much audio equipment, system building is unfortunately not quite that simple.

These ratings make a useful guideline for shortlisting components, but only experiencing the actual combination will tell you whether it works for you.

The final column contains a reference to the issue of *Hi-Fi Choice* which featured the complete review. If you wish to get a better idea of a product by reading the complete review it is possible to order a copy (if still in print) through our back issues department. Every *Choice* issue contains a Back Issues page for this purpose.

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## SYSTEM BUILDING

**P**re-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 pre-recorded 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 pre-recorded music cassette material. As a hi-fi medium cassette suffers from pre-recorded material which has been improving but is still patchy in quality and can usually be bettered by a home recording. 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.

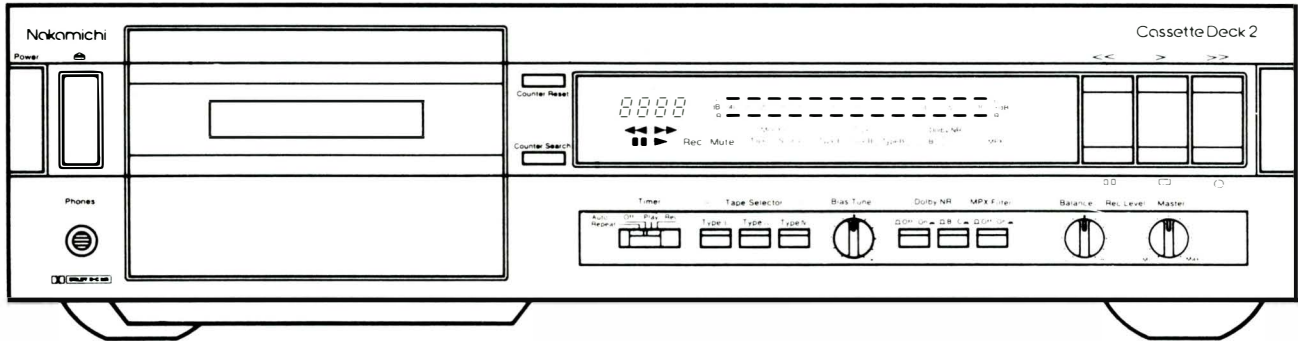
MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Acoustic Research A05</b> £200	Good + Good +	Capitalises on the strengths of the A-03 and A-07 but escapes the ignominy of their deficiencies. The amp for all AR-based systems	67W, 2 tape, 3 line and both MM/MC inputs. Tone defeat	R	97
<b>Acoustic 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>Albary 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 R/- line inputs + coax/opt digital inp		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 1000/2nd AA</b> £1499/£2999	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, monobloks	R	63
<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 inputs. 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 monoblok 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

# Billy Vee

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## 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 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 fine 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 OT/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/POA-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 brilliant!	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 R 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 8ohm tap, better still on 4ohms. The midrange was particularly natural	60W monobloks 8ohms	R	57
<b>Hafner 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>Hafner SE-100/SE-120</b> £370/£380	Good + Good +	The smallest of Hafner's pre/power range but still imbued with the open, sparkling quality of their bigger models. Preamp sounds significantly better via CD than MM or MC	96W, bridging option. 2 Tape, 3 line + Aux or MM/MC	R	97
<b>Hafner 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-Z1010</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>Lescon Quattrra</b> £350	Average+ Good	Underpowered but with the flexibility of four independent power amps. Very deep, captivating sound with 3D soundstaging.	19W via all 4 channels. 5 line and MM/MC inputs.	R	92
<b>Lescon 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 beefy 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 beefy and tactile sound. Great sense of power and control but spatially a little flat	133W, 3 tape, 4 line + MM/MC. Class A option	R	85
<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

## AMPLIFIERS

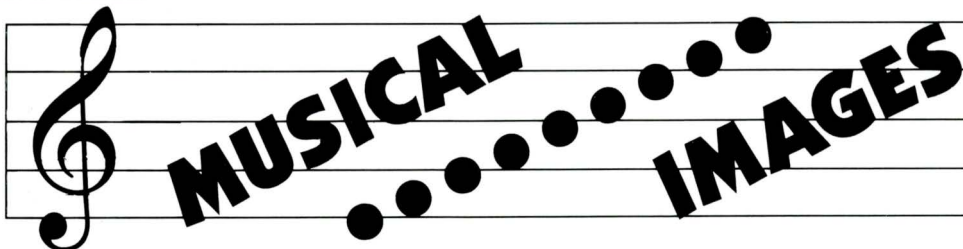
MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Orell SA-040SE</b> £400	Average Average +	Very natural, relaxing if not overly exciting via CD, the sound closed-in to become 'pinched' or fettered via disc	64W, 5 line + MM/MC i/p's. Tweaky components.		71
<b>Philips DFA-888</b> £300	Good Average	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 FA-890</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 FA-960 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> £250	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 monobloks which represent good value. What they lack in musical subtlety they make up for in sheer muscle. And these are Lumley's small monobloks!	75W monoblok		78
<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-X9110G</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 boring	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

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## AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Threshold FET 10e</b> system/ £2995	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>Woodside SC26/STA35</b> Renaiss £2895	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 power amp</b> £2995	Good Excellent	This equally well finished power amp offers front rank stereo staging and transparency, and is capable of driving the most difficult loads	85W	R	62
<b>YBA 1 preamp</b> £2895	Very Good Excellent	A front line French audiophile product. Great stereo and a fine Krell style finish	MM/MC, 3 inputs, straight line	R	62
<b>YBA 2 pre &amp; pwr</b> £1395/£1695	Very Good Very Good	Superbly finished French separates, with very good space and transparency, slightly softened bass. Needs extra transformer ( £300) for MC cartridges	70W MM (MC extra) straight line	R	56
<b>YBA Model 3</b> £995/£995	Good Good	Suited to highish sens. loudspeakers this duo produced see-through, ethereal stereo images that were more convincing towards the centre of the soundstage than at the edges	56W stereo amp MM only with 3 line i/ p's.		72
<b>Yamaha AX-330e</b> £100	Average + Average +	An improvement on earlier efforts but still a little bland or lack-lustre. Very compatible though	48W, MM, 3 line inputs, source-direct option		80
<b>Yamaha AX-550</b> £240	Very Good Good	neutral yet lacks the ability to involve on an emotional level	131W, 5 line + MM/MC. Pure Direct + remote control		97
<b>Yamaha AX-750</b> £399	Very Good Average	Big and bulky with remotely-controlled input and volume. Impressive handling, but two samples split the opinion of our listeners, one sounded squashed the other fast and articulate	149W, 3 line, 2 tape, MM/MC inputs + remote control		104

## 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	Smother 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>Deftec 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>Deftec 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		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	Screened, 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

## 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 unatiguing 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 Gortex 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 unatiguing 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> £54 - 5m pair	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, unatiguing 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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## 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	R	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 adjus	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 hdp	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 XK-S9000</b> £700	Good + Good +	Genuine state of the art in battleship pale gold/wood gloss clothes. Fabulous build, clunky transport and sharp, refined sound quality with Dolby S or B and metal tapes	Dolby B/C/S/HX Pro, built in DAC, tape alignment	R	105
<b>Akai DX-57</b> £200	Good Good	Confident sounding price deck which eschews fancy gadgets for a good transport and decent electronics. Sound quality is firm and tidy under most conditions of use; avoid Dolby C.	3 heads, dual capstans, Dolby B/C/HX Pro, variable bias	R	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	R	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	R	87
<b>Akai GX-95</b> £400	Good Very Good	Well designed and finished cassette deck with features well judged to please the audiophile. The calibration system is simple and effective, and the deck sounds great	Dolby B/C/HX Pro, 3 head, manual tape set-up	R	69
<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	R	99
<b>Akai GX-W45</b> £299	Average Average	Costly but musical high-spec dual deck, doesn't like modern high energy Type IIs and IVs, but with careful tape matching it has all the key attributes, including stability and clarity	Dual auto reverse, record/play transports, Dolby B/C/HX Pro	R	111
<b>Arcam Delta 100</b> £850	Excellent Excellent	Ambitious first cassette deck from Arcam has a superb transport and a ripe, spacious sound. The Dolby S installation more successful than most. Some replay incompatibility	3 heads, dual capstans, Dolby B/C/S, tape calibration	R	111
<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	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	R	105
<b>Denon DRS-610</b> £200	Average+ Good	Unique loading mechanism provides stability, and the deck has a crisp, clean quality. But has occasionally anaemic bass and a channel mismatch with metals	Drawer loading, Dolby B/C/HX Pro, R fine bias, track search,	R	111
<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/	R	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.	R	105
<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	R	105
<b>JVC TD-V1010</b> £400	Good+ Excellent	Very high grade enthusiasts deck with almost-CD like resolution and stability, especially with Type IV tapes	3 heads, Dolby B/C/HX Pro, variable bias, sens, 3 line,	R	111
<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	R	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	R	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	R	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	R	93

## CASSETTE DECKS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<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
<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 1</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 DCC900</b> £500	Average Good-	Intriguingly uneven performer, ranges from grim with prerecorded material to erratically excellent when recording. Analogue cassette replay satisfactory	DCC deck with analogue playback compatibility, Dolby B/C.		111
<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-91a</b> £550	Very Good Very Good	Superb, near state of the art recorder with an excellent dual capstan transport and very capable electronics. At the price, this one is a mould breaker	3-head, tape calibration, Dolby B/C/HX Pro	R	75
<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-S410</b> £200	Average+ Average+	Powerful selection of features, excellent ergonomics and the fine, explicit sound with metals, though some instability was noted and the first test sample was faulty	3 heads, Dolby B/C/HX Pro, automatic tape alignment	BB	111
<b>Pioneer CT-S610</b> £270	Good Very Good	Exactly engineered and highly articulate up-market cassette deck. Electronics are slightly coloured, but imagery and dynamics are finely resolved	3 heads, Dolby B/C/HX Pro, Super Auto BLE, CD Sync	R	111
<b>Pioneer CT-W601R</b> £200	Average- Average-	Mediocre performance attributable to flimsy build and less than stable transport. Frequency responses not wholly accurate even with Auto BLE. Not ideal ergonomics	Dual auto reverse, one records, Dolby B/C/HX Pro, Auto BLE		111
<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>Revox Pro Series C115</b> £843	Good Good	Not for the numbers freaks, it's unobtrusively musical, with a slightly wayward top and a very clean, extended bass	Professional 3 head, Dolby B/C/HX Pro, variable bias & sensitivity.		111
<b>SAE C102</b> £549	Average Good	Looking most unlike a cassette deck designed in the States and proving competitive in its price group. Not sonically that outstanding, however	Real-time counter, track search, Dolby B & C		52
<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-X117WR</b> £220	Poor Poor	Bass is thin and coloured, and the sound lacks dynamics, pitch accuracy and overall stability - the sound is neither stable nor solid. Prerecorded cassette quality is also poor	Dual, one transport records, both auto reverse, Dolby B/C/HX Pro.		111
<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, 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>Sherwood DS-1135C</b> £100	Average Average	Excellent value. There is a low level constant background drone, and Dolby C recordings sound flat and coloured. Elsewhere sound quality exceeds expectations	Dolby B/C/HX Pro	R	87
<b>Sherwood DS-7000R</b> £230	Average Poor	Rough and ready cassette deck in which sound engineering has been sacrificed on the altar of extra selling features, namely three heads for real time off-tape monitoring	3-head Dolby B/C/HX Pro		87
<b>Sony (WMD6C) Pro Walkman</b> £249	Good Very Good	One of the finest sounding cassette decks on the market today. A mandatory Best Buy, which also fits in your pocket	Dolby B, & C	BB	60
<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 + Good	Superb stability and real subtlety from a cassette deck, this must be the best Teac yet. The only disappointment was the Dolby C circuit which was coloured and lacking in transparency.	3 heads, dual capstans, Dolby B/C/S/HX Pro, tape calibration	R	105
<b>Technics RS-BX626 II</b> £180	Good Good	First rate deck at a bargain price. Losses when recording are low and mostly benign, and dynamic range with high energy tapes is excellent. An all-round achiever	3-heads, Dolby B/C/HX Pro, optional remote control	BB	111
<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>Technics RS-BX828 II</b> £300	Good + Good	Fine middle ranking deck, with explicit detail and stability, but which in the final analysis doesn't go much further musically than the cheaper RS-BX626	3 heads, Dolby B/C/HX Pro, tape bias/sensitivity lineup,		111
<b>Yamaha KX-260</b> £150	Average Average	Lively, entertaining deck that trades gadgets for a convincing performance at an attractive price point	Dolby B/C/HX Pro, Play Trim, bias adjust	BB	111
<b>Yamaha KX-360</b> £179	Average Average	Updated KX330, performance has a very KX-260 like dryness and precision. Good - but doesn't 'breathe,' and occasionally sounds unstable	2 heads, Dolby B/C/HX Pro, bias, Play Trim, intro scan,		111
<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-W362</b> £250	Average- Average-	Almost a good deck, it is let down by audible levels of wow & flutter, apparent even with prerecorded material. The audio circuits are good	Two auto reverse, 1 records. Dolby B/C/HX, Play Trim		111

# The Directory

## 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-	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
<b>Acoustic Research CD-07</b> £300	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 +	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+	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, BB midship transport and 7350 PDM DAC		95
<b>Aiwa XC-900</b> £210	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, R midship transport, 7350 PDM DAC		100
<b>Akai CD-52</b> £249	Good	A nice surprise from Akai, genuinely good sound from this mid-priced model. Better linearity will help further	Remote, digital output, headphone BB socket		64
<b>Akai CD-55</b> £230	Good	Budget model which fails to compare with the CD52	Remote, hdph, Good programming		83
<b>Akai CD-57</b> £180	Average +	A very flexible machine with a slightly lumpy but fullsome bass, no model of clarity but very entertaining!	Remote control, motorised volume, R hybrid PWM DAC.		107
<b>Akai CD-62</b> £330	Average	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, BB comprehensive display etc		70
<b>Akai CD-73</b> £450	Good	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	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	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	Latest in a line of Delta 70 CD players and one that offers a distinctly rugged, beely sound. Plenty of power behind individual instruments but lacks a feeling of involvement	Remote control, display dimmer, variable and dig outputs. 7350 PDM		95
<b>Ariston CD1</b> £400	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+	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	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	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	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	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 +	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	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 +	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

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## CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<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
<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 R socket		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 power 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. Tonal 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, FTS and dig 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, R disc file. Sony PLM DAC.		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, R display control, Sony PLM DAC.		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 entre player. Surely the giant Tandy corp. can get a better standard than this?	remote, keypad, multi bit, midi		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 DA05</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-965BXI. 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

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## CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<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
<b>Nakamichi OMS-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 pizzazz 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 pizzazz 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 scart + 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> £230	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> £280	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 OX150</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

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## CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<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 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 eith busier, 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 convertor or DAC. Although at the lower end of the market both of these are contained in a single box, at the top end of the market two box machines consisting of a CD transport and a separate DAC become more common.

Although many of these units will be purchased as two box machines, which are generally considered to sound better than a one box equivalent, a DAC can also be used to upgrade an existing CD player. A good example is where an early machine with a satisfactory drive unit but a rather dated DAC can be brought up to the latest spec by the addition of a new DAC.

When upgrading an existing player best results are usually obtained using the electrical digital output rather than optical, and obviously

to be upgradeable your CD player must have a digital output in the first place.

The choice of interconnect is crucial in linking drives and DACs and conventional interconnects used for analogue signals should be avoided, a dedicated 75ohm digital cable will give far better results.

Mixing and matching transports and DACs from different manufacturers can be a bit of a lottery and readers are referred to the full reviews where this subject is discussed in more detail.

## CD TRANSPORTS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<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 unflattering	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 pizzaz 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>Deltec 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. Deltec's RF mains filter is a must.	Coax and opt. inputs, Deltran sync facility, DAC7 Bit Stream	R	103
<b>Deltec 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 Deltec's 'Power' mains filter.	Coaxial and optical inputs, SAA7350 Bit Stream DAC		101
<b>Deltec 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>Deltec 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>Deltec 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	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
<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>Casio DA-7</b> £400	Average Poor	Below average notebook size portable, and in some ways inferior to Casio's own DA-R100 pocketable due to high noise floor, flat dynamics and poor soundstaging	Portable DAT with case. SP record mode, basic editing		111
<b>Casio DA-R100</b> £410	Average Average-	Somewhat flat sounding and lacking differentiation through the analogue inputs but good via the digital ones, a masterpiece of miniaturisation, wonderful tool where size is important	SP/LP record, optical/electrical in/out, 2.5hr battery life	R	111
<b>Denon DTR-2000</b> £700	Good Very Good	Not cheap, but first rate DAT recorder, good to excellent fidelity in all modes, with a slightly cool detached quality when differences are detectable.	Digital LP/digital & analogue SP rec/play, LP analogue play only	R	93
<b>JVC XD-Z1010TN</b> £1050	Good Average-	Ambitious but ultimately disappointing deck which marries poor ergonomics and an opaque musical delivery to a feature roll call longer than the weekly shopping list	SP/LP record, mic input, remote control, display off, auto fade		111
<b>JVC XD-Z505</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> £500	n/a Average	Sound quality is pretty fair, but a little rougher than the best of the breed. Controls are good, the display however is poor - and most users will require the accessory pack	Mains recorder, LP mode. Optional accessory packs adds battery/ADC		94 Supp.

## DIGITAL AUDIO TAPE

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Kenwood DX-7030</b> £700	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>Panasonic SV-3700</b> £1111	Good Average	Slick, powerfully equipped and reasonably priced, this pro DAT has a clear, quick and colourful sound somewhat lacking in weight and substance	Professional DAT, infra-red remote, S/PDIF & AES/EBU I/O	111	
<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-03</b> £500	n/a Very Good	At the time of writing, this model represents the state of the art, and beats all comers.	DAT recorder, detachable rechargeable power pack, LP/SP	BB	94 Supp.
<b>Tascam DA-30</b> £1199	Good Average+	Interesting pro DAT deck with solid, tangible sound quality which is nevertheless lacking in analysis	Wired remote control, S/PDIF, AES/EBU and standard analogue I/O	111	

## 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
<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 2022</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 superseded 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



## EQUIPMENT SUPPORTS - LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE (H x W x D)	VALUE	ISSUE
<b>Heybrook P55</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 in-fill 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.

## HEADPHONES

MODEL PRICE	FIT SOUND	COMMENTS	TYPE	VALUE	ISSUE
<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>AKG K500</b> £119	Good Very Good	Distinctively open and clear, they reproduced music with impressive definition, balance is on the light side but transparency is high for the price	Circumaural, open-back, dynamic	R	111
<b>Aiwa HP-X30</b> £31	Good Good -	A flashy personal stereo phone which alternatively could be used at home. A slight LF tonal preference slightly colours the response, but it ain't a bad can	Supra-aural, closed-back, dynamic		75
<b>Audio-Technica ATH-308</b> £26	Good- Average-	These small cans have a fairly forward balance which helps perceived clarity but they can become wearing over time, good for personals	Supra-aural, semi-open, dynamic	R	111
<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
<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-9000</b> £246	Very Good Good	These electret cans connect up to the amps speaker outputs via an adaptor, it sounds a little too smooth and relaxed but would suit aggressive amps	Circumaural, open-back, electret		111
<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 DT411</b> £49	Good Good	A reasonable but not very thrilling headphone that doesn't really offer enough at the price	Supra-aural, open-back, dynamic		111
<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 DT911</b> £179	Good Very Good	Probably too revealing for many headphone amps these are very subtle and fine if expensive cans	Circumaural, open-back, dynamic	R	111

## HEADPHONES

MODEL PRICE	FIT SOUND	COMMENTS	TYPE	VALUE	ISSUE
<b>Beyer DT990</b> £102	Very Good	The 990s are definitely a significant pair of dynamic headphones; they have a smooth and yet revealing neutral sound that is hard to criticise	Circumaural, open-back, dynamic	R	55
<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>JVC HA-D690</b> £40	Average	Competent but rather undistinctive cans, a bit middle of the road and well suited to aggressive sources	Supra-aural, closed-back, dynamic		111
<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>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>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>Realistic Pro-X</b> £25	Poor Average -	Robust, unanimously uncomfortable and heavily veiled in sonic terms not a great success	Supra-aural, closed-back, dynamic		75
<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 HD 480II</b> £50	Good+ Good	Not the most accurate cans on the market but amongst the most enjoyable	supra-aural, open-back, dynamic	BB	111
<b>Sennheiser HD 540II</b> £100	Good+ Good+	A good but not great headphone that due to its high impedance and efficiency should work well with most sources	circumaural, open-back, dynamic		111
<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-CD1000</b> £150	Very Good Very Good	A fine sounding and comfortable headphone that's likely to work well with most sources	circumaural, closed back, dynamic	R	111
<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-CD750</b> £73	Good+ Good+	Reasonably comfortable and eminently listenable these Sonys have characteristically good bass power and relaxed hf	Circumaural, closed-back, dynamic	R	111
<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/£2	Very Good Excellent	The Gamma pros are like a stethoscope for your hi-fi, revealing subtleties that many loudspeakers fail to resolve	Circumaural, open-backed, electrostatic	R	63
<b>Stax Lambda Signature/SRM-T1</b> £470/£8	Very Good Excellent	The Signature when combined with the SRM-T1 valve driver must be the most transparent headphone available	Circumaural, open-backed, electrostatic	R	72
<b>Stax SR Gamma</b> £299 (i)	Very Good Very Good	The next model down the Stax range from the Lambda, the Gamma is an excellent headphone with little to criticise but the price	Circumaural, open back, electrostatic	R	55
<b>Stax SR Lambda Pro/SRD-7SB</b>	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> Energis	Very Good Excellent	This combination extracts layers of information that other headphones only hint at. The SRM-1 has more edge than the SRM-T1, but it's good	Circumaural, open-back, electrostatic	R	75
<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>Technics RP-F3</b> £100	Poor Average	Robocop styling coupled with a turbo bass switch and an uncomfortable fit, rhythmically OK but not up to the price	Supra-aural, closed back, dynamic		111
<b>Yamaha YHD-1</b> £46	Good+ Good	Stylish semi-folding design with a slightly forward balance that very nearly scraped a recommendation	supra-aural, open-back, dynamic		111
<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

# The Directory

## 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> £1419	Very Good Good +	Massively built to no-compromise Pro monitoring standards, the SCM20 is invariably informative but the rather forward presentation can be uncomfortable	44 x 24 x 31cm stands close to rear wall	82dB 28Hz (in room)		86
<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> £950	Good Very Good	Dynamic, solid and lively, a great allrounder if a bit small considering the price. AE proves that metal cone/dome drivers really work	39 x 23.5 x 29.5cm heavy stands, free	88dB 45Hz	R	66
<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 23Hz (in room)	R	86
<b>Acoustic Research Pi 3</b> £219	Average- Average	Lively good value box has extra bass driver to give plenty of thump, but lacks refinement and extension	51.5 x 21 x 23cm close to wall	88dB 50Hz (in room)		110
<b>Acoustic Research AR M1</b> £199	Good Good	Cutely shaped miniature delivers splendidly unboxy bass and midrange, but is a little marred by a rather bright treble	27 x 20 x 26cm close to wall	85dB 30Hz (in room)	BB	110
<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 wall	87dB 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 wall	87dB 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 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>Alexander SE11</b> £299	Good Good	Clearly better than its cheaper stablemates, the metal jacket delivers a different – and in some respects superior – sound than the wood-based	52 x 14 x 17.5cm stands close to wall	86dB 25Hz (in room)	R	82
<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 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 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 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 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 close to wall	85dB 50Hz (in room)		106
<b>Alphason Amphion</b> £695	Good Good	This fine-sounding, nicely finished compact wall-mount is just a little too expensive for formal Recommendation, but is a good performer for all that	44 x 23 x 27.5cm high stands against wall	88dB 47Hz (in room)		78
<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 50Hz (in room)		94
<b>Alphason Orpheus</b> £1070	Good Good +	Large hi-tech two-way features unusual, sweet-sounding isodynamic tweeter; well engineered and balanced if a shade odd in appearance	65.5 x 28 x 34cm stands near rear wall	87dB 43Hz	R	71

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## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
<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 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 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 40Hz (in room)	R	94
<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 low stands, free space	91dB 20Hz (in room)	R	106
<b>Audio Note AN-J</b> £799	Very Good Very Good	Light damping and local unevenness adds some coloration, but doesn't spoil the very lively, dynamic and coherent sound. Fine sensitivity and balance.	58.5 x 33 x 24.5cm heavy stands, free s	90dB 25Hz (in room)	R	110
<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 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 25Hz (in room)		102
<b>B&amp;W 620</b> £320	Good Good	Good value floorstander has well balanced, laid back and slightly lazy sound that is pleasantly easy on the ears; could do with its own spikes	74 x 23.5 x 30cm floor, free space	89dB 25Hz (in room)	BB	94
<b>B&amp;W DM600</b> £160	Good+ Average+	Attractive hi-tech appearance and clever engineering makes for an impressively smooth overall balance, but sound is a touch bland with it	35 x 20.5 x 25cm stands 1-2ft from wa	85dB 30Hz (in room)	R	98
<b>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 <20Hz (in room)	R	81
<b>B&amp;W Matrix 805</b> £795	Very Good Good	A genuine compact monitor, stylish, with remarkable imaging properties, good balance and low coloration, though less successful at communicating musical	42(max) x 26 x 22.5cm Slate stands in free	87dB 30Hz (in room)		98
<b>Bose 305</b> £360	Average Good -	A bit of an oddball, fine dynamic liveliness and a good room match more than make up for the strange stereo imaging and treble	28 x 45 x 23cm high stands near wall	88dB 40Hz (in room)	R	78
<b>Bose 401</b> £430	Average - Average	Cheaply built but distinctively styled semi-omni floorstander suffers from heavy midbass but still manages to sound lively and open	78.5 x 30 x 28.5cm clear of walls	89dB 28Hz (in room)		110
<b>Bose 901 MK6</b> £1650	Good Average	Still controversial after all these years, the pre-equalised multi-driver 901 is cleverly engineered to deliver exceptional loudness.	33 x 54 x 32cm rigid stands in free space	(9dB midband) 28Hz (in room)		86
<b>Bose Interaudio 3000XL</b> £160	Average Average -	Lots of perceived value and well enough balanced, but low cost cabinet and driver engineering results in a crude and unsubtle sound	46.5 x 29 x 23cm stands in free space	89dB 45Hz		71
<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 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	88dB 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 30Hz (in room)	R	82
<b>Boston HD5</b> £115	Average Average	Tiny and prettily shaped miniature has an attractive lack of boxiness, but is a little short of drama and dynamic drive	25 x 16 x 18.5cm close to wall	86dB 30Hz (in room)		110
<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 stands in free space	85dB 50/150Hz (in room)		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>Cabasse Bisquine</b> £600	Good+ Good+	Classy French large bookshelf speaker has great coherence and dynamic grip, but a rather mid-forward overall character	48 x 26 x 30.5cm 20-30cm from wall	91dB 30Hz (in room)	R	110
<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 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 67Hz	R	46
<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 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 25Hz	R	90
<b>Castle York</b> £340	Good Average+	Pretty little real wood compact has an engaging transparency, good balance and fine timing, but could do with more authority and welly	43 x 22 x 26cm clear of walls	86dB 30Hz (in room)		110
<b>Celestion 3</b> £115	Average + Average	This attractive little wall-mount gives good balance and stereo imagery, with a character which leans more towards inoffensiveness than excitement	31 x 18.5 x 21cm high stands against wall	86dB 55Hz (in room)	R	78
<b>Celestion 5</b> £155	Good Average	Cunningly conceived and balanced, the 5 may be a little slow for some tastes, but is well suited to CD-oriented budget systems	35 x 20.5 x 26cm heavy stands close to wall	89dB 30Hz		90
<b>Celestion 6000</b> £1510	Very Good Very Good	A genuine fullrange audiophile quality speaker system — with Star Wars styling to suit a high tech environment	Complex, on floor in free space	82dB	R	60
<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 DL8 Series II</b> £205	Very Good Good	A refined middle market speaker has a smooth but slightly dull quality, with good definition and deep, if slightly boxy bass	50 x 27.5 x 27.8cm open, stands	87dB 60Hz	R	59
<b>Celestion SL12Si</b> £615	Average Average	Careful setting up does reveal elements of fine sound quality, but this 'grown up' SL6 variation has a lumpy response alongside its improved power handling	53 x 20 x 27cm matching stands clea	85dB 50Hz		66
<b>Celestion SL600Si</b> £820	Good + Good	This Aerolam high tech miniature has certain remarkable qualities that some will find irresistible, but needs careful system and room matching	27 x 20 x 23cm free air on tall stands	82dB 52Hz		68
<b>Celestion SL6Si</b> £409	Average+ Average+	This stereotype luxury compact can sound a bit dull and congested, but really opens up on Slate Audio stands; favours CD	37.5 x 20 x 25cm stands 1-2ft from wa	86dB 30Hz (in room)		94
<b>Creek CLS20</b> £120	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 30Hz		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 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 well clear of walls	90dB 30Hz (in room)	R	106

## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
<b>Eltax 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> £330	Good Good+	Pretty luxury compact uses integral baffle/driver to give a remarkable combination of low coloration, transparency and speed; bass is a bit shy	37.5 x 20 x 25cm stands 1ft from wall	86dB 45Hz (in room)	BB	94
<b>Epos ES14</b> £485	Good Very Good	Substantial stand mount model delivers delightful midrange focus and delicacy with good bass control. Tends to be system sensitive	49 x 22.5 x 29cm own stands 1-2ft from wa	85dB 25Hz (in room)	R	98
<b>Faraday FS5</b> £589	Good Good	Priced and ugly, but with its own sonic charm nonetheless, thanks to the substantial (largely positive) influence of the concrete enclosure has upon the sound	46x27x26cm stands in free space	90dB 28Hz (in room)		102
<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 48Hz (in room)		94
<b>Genexxa SE100</b> £150	Average Average	Pretty little Tandy-stocked miniature is attractively lively, coherent and communicative, but could do with more grunt and welly and lower coloration	28 x 15.5 x 19cm close to wall	84dB 50Hz (in room)		110
<b>Goodmans B-Max/Maxim 2</b> £100/£9	Poor Average -	Stick with the Maxims on their own until you can afford some real grown up loudspeakers	60 x 21 x 26 see above, suck and see	89dB 55Hz (in room)		78
<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 50Hz (in room)	R	86
<b>Goodmans M300</b> £110	Average Average -	Conveying much of the charm and life which has made the Maxim 2 so popular, the M300 is sensitive, bu hampered by upper bass cabinet coloration	38.5 x 21.5 x 17cm stands close to rear	89dB 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 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	87dB 65Hz		59
<b>Harbeth LS3/5A</b> £379	Good Average	Still a classic miniature, though not to every taste, and none the better for the recent update under our listening conditions. Limited dynamic range	30.5 x 19 x 16cm stands in free space	81dB 60Hz		66
<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 clear of walls	87dB 22Hz (in room)		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 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 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> £300	Average + Good	Well matched for wall siting, the HB100 is a lively and informative performer in the tradition of the popular HB1	47 x 26 x 28cm stands near rear wall	86dB 50Hz	BB	66
<b>Heybrook Prima</b> £120	Average+ Average+	Neat and discreet miniature delivers fine coherence, pace and timing, though balance is a trifle forward and bass a bit light	29 x 19.5 x 18cm close to wall	86dB 50Hz (in room)	R	110
<b>Heybrook Sextet</b> £1079	Good Very Good	Elegant floorstanding 3-way is engagingly coherent and a highly analytical, partly due to distinct and not always comfortable upper-mid forwardness.	96x27x20cm close to wall	85dB 25Hz (in room)	R	102
<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 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	85dB 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 33Hz		72
<b>Infinity Modulus</b> £895	Good Average +	Luxury high-tech miniature, carefully conceived and beautifully built. Undeniably attractive in the mid and treble, it failed to handle the bass as successfully	30 x 18 x 26cm high stands 1ft from wall	84dB 45Hz (in room)		86
<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 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	87dB 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> £206	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 50Hz		90
<b>JBL LX33</b> £270	Average + Good	A bit of a cheat, but a lot of speaker for the money, which manages a better room balance than many 'large bookshelf' rivals, and delivers a fine acoustic	80 x 25 x 21cm floor, 1ft from wall	89dB 48Hz	R	82
<b>JBL LX44</b> £350	Good - Average	This generously built model offers good power handling, bass extension and dynamic range, but suffers from the 'three-way syndrome', with middle middle	58.5 x 30 x 29cm stands in free space	89dB 40Hz		71
<b>JBL LX55</b> £400	Good Average	This big bluff three-way provides lots of speaker, bandwidth and loudness for the asking price, but is ultimately a bit of a dinosaur	66x34.5x29cm stands clear of wall	91dB below 20Hz (in room)		102
<b>JBL XE2</b> £160	Average- Average-	Budget Danish-built 'bookshelf' model has anomalous 'laid back' balance and lacks the genuine JBL spirit	38 x 23 x 23cm stands in free space	88dB 48Hz (in room)		98
<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 57Hz	R	46
<b>JPW Minim</b> £79	Average + Average -	Very civilised but dynamically limited, the Minim is well suited to the smaller room and where limited loudness is acceptable	27.5 x 18 x 19.5cm stands against wall	85dB 28Hz (in room)	R	82
<b>JPW P1</b> £155	Good Average +	Honest and basically articulate if not very sophisticated, resolution is good but it can sound a little wearing in bright systems	44 x 25.9 x 26.1cm free space on stands	89dB 60Hz	R	59
<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 wall	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 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 30Hz		90

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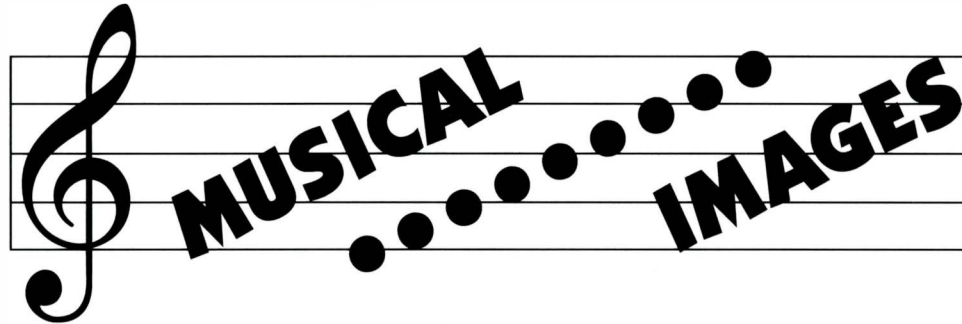
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## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
<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 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 50Hz (in room)	R	94
<b>Jamo Concert II</b> £300	Good Average -	A thoroughly respectable 'bookshelf' performer that needs free space siting but includes attractive cabinetwork and a neat grille	41 x 24 x 25cm stands in free space	85dB 48Hz		66
<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> £800	Average+ Average	Beautifully built large floorstander uses unusual double reflex bass system, unsuccessfully as far as low frequency resolution is concerned	96 x 28 x 31.5cm floor, free standing	87dB 25Hz (in room)		94
<b>Jamo Cornet 40</b> £110	Average- Average	Pretty little Danish-built miniature with respectable rather than exceptional sound quality for the price	32 x 20 x 22cm stands 1-2ft from wall	86dB 48Hz (in room)		98
<b>Jamo Cornet 50</b> £150	Average Average+	Good value bookshelf size speaker has a rough and ready sound but good heart, engaging liveliness and fair timing	42 x 23 x 22.5cm away from wall	87dB 28Hz (in room)	R	110
<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 50Hz	R	60
<b>KEF K120</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> £379	Good Good	Uni-Q co-axial driver provides fine imaging and mid coherence, while magnet decoupling reduces cabinet coloration. Bass not entirely convincing	48x25x27cm stands close to wall	90dB 25Hz (in room)	R	102
<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>Kammerzelt 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	27x17x24cm stands 1-2ft from wa	85dB 50Hz (in room)		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 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> £110	Good Good	Stand and speaker looks and sounds very good for the price, good bass extension and control, fine dynamic range. Clean, clear if a shade slow	44 x 21 x 23.5cm (box only) close to rear	86dB 28Hz	BB	90
<b>Linn Kaber LS500</b> £1198	Average Good +	Wall-mount package trades sensitivity for fine bass extension and midbass performance; little relentless but has prodigious dynamic capabilities	93 x 19 x 28cm floor against rear wall	86dB 28Hz (in room)	R	82
<b>Linn Kan II</b> £495	Average + Average +	A niche product for those prepared to tolerate its strong character for the sake of its fine bass performance and near invisibility	30.5 x 18.5 x 16.5cm Kan stands against	82dB 35Hz (in room)		78
<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 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 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 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 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 45Hz	R	72
<b>Meridian Argent 1</b> £995	Good+ Good+	Beautifully built, finished and shaped but pricey compact has fine bass extension and virtual absence of 'boxiness'; needs a big amplifier	33 x 27(max) x 27(max)cm Slate stan	83dB 28Hz (in room)		98
<b>Meridian Argent 2</b> £875	Good+ Good	Beautiful but pricey high-tech 'large compact' delivers extended, smooth and neutral sound with fair speed. Slate Audio stands are almost essential	48.5 x 21 x 29.5cm stands free space	85dB 23Hz (in room)		94
<b>Meridian M30</b> £950	Average + Average	Pricey but easy on the ears and worth considering especially where space is at a premium	38.5 x 18 x 32cm free space on stands	AcDb 40Hz		46
<b>Mission 760i</b> £120	Average+ Average+	Attractively styled little wall-mount miniature has livelier dynamics and bass drive than most of its type, but sounds as little shut in	29.5 x 18 x 20cm close to wall	87dB 48Hz	R	110
<b>Mission 761i</b> £170	Good Average	760 theme adds an extra main driver for easier amp loading and power handling. Sound judged slightly inferior to its simpler, cheaper stablemate.	38x19x24cm stands close to wall	88dB 48Hz (in room)		102
<b>Mission 762</b> £230	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 55Hz		66
<b>Mission 763</b> £350	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 40Hz	BB	68
<b>Mission 764i</b> £450	Good Average	Despite improvements, this large floorstander still lacks low frequency authority, which is probably a function of its comparatively modest price	88.5x25x32.5 1ft from wall	87dB 20Hz		94
<b>Mission 765i</b> £700	Good Average+	Big heavyweight floorstander has good sensitivity and bandwidth, but somehow lacks agility, authority and dynamic grip	102 x 25 x 33cm clear of walls	91dB 22Hz		110
<b>Mission Cyrus 780</b> £180	Good Average +	Pricey but very pretty miniature based on Mission 760 but with beefed up box and crossover network to enhance sound quality still further	29 x 18 x 26cm light stands close to wall	88dB 50Hz	R	90
<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 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 50Hz		71
<b>Monitor Audio MA700 Gold</b> £400	Good Average	Lovely luxury compact does a good job of voice reproduction, but sounds a bit lazy and off the tempo with faster, busier material	35 x 21.5 x 25cm clear of walls	85dB 50Hz		110
<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 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 48Hz (in room)	R	94
<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 70Hz		74

## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
<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 30Hz		78
<b>Monitor Audio Monitor One</b> £150ewoo	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 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 aint cheap	51x20x26cm free space	87dB 45Hz (in room)	R	102
<b>Monitor Audio Studio 5</b> £700	Average+ Average+	All metal diaphragm luxury miniature has splendid presence coherence but sound can be aggressive and lacks welly.	32 x 18 x 20cm stands close to wall	83dB 28Hz (in room)		98
<b>Mordaunt-Short 5.10</b> £119	Good Average	Plenty of well engineered speaker for the money, and smoother than most of the competition, but lacks timing and enthusiasm	30.5 x 18.5 x 21.5cm c20cm from wall	85dB 50Hz		110
<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 5.40</b> £299	Average+ Good	Elegant near-floorstander has an even balance that makes it very easy on the ears, yet also inviting and informative	64 x 21.5 x 26.5cm low stand clear of walls	85dB 28Hz	R	110
<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>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 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 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 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 28Hz (in room)		78
<b>Naim NA IBL</b> £798	Average+ Good	This tiny floorstanding wall mount delivers outstanding dynamics, speed and detail, marred by pronounced upper mid forwardness	80x18x15-20 against wall	84dB 30Hz		94
<b>Naim SBL</b> £1475	Good Very Good	Impressive scale - full bandwidth coheren an attractively discrete floor standing wall-mount coloured midband very well balanced and agile with it.	88x26.5x17-27cm close to wall	86dB 25Hz (in room)	R	102
<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)		102
<b>Nobis DM7</b> £560	Average+ Good	Pretty but pricey US bookshelf size model has more than enough speed, timing and coherence to make up for a measure of coloration	38 x 21.5 x 28.5cm 30-60cm from wall	85dB 25Hz		110
<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	86dB 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 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 30Hz (in room)		78
<b>Philips FB820</b> £470	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> £700	Good Good	Generous sounding and impressively uncongested for the type, loudness and bass extension don't quite match the large and rather plasticky box	110 x 29 x 41cm on cones clear of walls	88dB 25Hz	R	90
<b>Professional Monitor Co LB1</b> £998	Good+ Good+	Delightful smoothness and transparency distinguishes this classy compact, though bass extension and sensitivity are both limited	53.5 x 18 x 26cm high stand well clea	86dB 33Hz	R	110
<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 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 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 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 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 highish price isn't really justified by the performance	100x21.5x30cm away from walls	88dB 25Hz (in room)		102
<b>Rega ELA</b> £405	Average+ Good	Very compact floorstander with integral stand has serious coherence and dynamics, but a measure of brightness and untidiness	84.5 x 20 x 30cm c20cm from wall	86dB 30Hz	R	110
<b>Richard Allan CD5</b> £176	Average - Average -	This neatly presented small reflex design can sound engagingly communicative, but is flawed sonically and technically and quite expensive too	38 x 19 x 23cm on rigid stands	88dB 80Hz		68
<b>Rogers LS2a/2</b> £220	Good+ Good	Balance is a bit warm and rich but 2a/2 has delightful mid-to-treble coherence and transparency, and more welly than Mk1	35.5 x 23 x 22cm stands clear of walls	84dB 30Hz (in room)	BB	106
<b>Rogers LS4a/2</b> £300	Good Average+	Very civilised but a trifle lazy with it, this large bookshelf size model hasn't quite the timing or agility to be particularly engrossing or exciting	43 x 25.5 x 25.5cm clear of walls	86dB 25Hz		110
<b>Rogers LS8a</b> £450	Average + Average +	This modestly priced floorstander is a mixed bag, with plenty of scale and welly but lacking the subtlety, clarity and agility delivered by some rivals	89x25.5x25cm clear of walls	91dB 48Hz (in room)		102
<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 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 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 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 75Hz	R	53
<b>Royd Apex</b> £500	Average + Good	Not the smoothest sound around, it more than compensates with an impressively communicative and informative musical presentation	85.5 x 20 x 30cm on floor close to wall	87dB 33Hz (in room)	R	78
<b>Royd Eden</b> £245	Average Average +	Delightful mid/treble speed and transparency but determinedly bass light, this oddball miniature threatens cult status but could use a sweeter tweeter	31 x 20.5 x 18.5cm stands close to wall	87dB 85Hz	R	66



## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	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 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 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 30Hz	R	90
<b>SD Acoustics OBS</b> £865	Average Good	Recent changes have added some refinement to a seductive midrange, good timing and fine sensitivity, though bass extension is limited and coloration obvious	102 x 35 x 25cm floor, angled, away from	92dB 30Hz (in room)	R	82
<b>SD Acoustics Ribbon</b> £2295	Average Good +	A little underdeveloped and rather amplifier sensitive, Ribbon is a lively and loud hybrid marred by some colorations; some like it, others don't	152 x 30 x (15-30)cm floor, angled, away	91dB 30Hz (in room)		81
<b>SD Acoustics SD1</b> £1650	Average Very Good	A large scale, airy and unusually detailed system with excellent dynamics. Current model has more civilised top-end and warmer balance than original model	123.5 x 38.2 x 31.9cm free space	90dB 50Hz	R	60
<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 wall	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 28Hz (in room)	R	86
<b>Shahinian Arc</b> £1062	Average Good	Unusual and occasionally wonderful small floorstanding omni; too bright but exceptionally coherent and revealing	69 x 35 x 25cm well clear of walls	85dB 24Hz		110
<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 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 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 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 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	86dB 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 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 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 25Hz (in room)	R	82
<b>TDL Monitor</b> £1999	Very Good Very Good	Fine solidity and good accuracy, with enough bass extension to satisfy even organ freaks. Needs a big room and can sound a bit lazy and a shade tinkly	118.5 x 30 x 47cm 0.5m from walls	85dB 28Hz	R	66
<b>TDL Studio 0.5</b> £450	Average Good	This tiny floorstanding transmission line has good agility but doesn't provide the coherence or even balance of the slightly bigger Studio 1	55 x 20 x 30cm own stand, free space	85dB 40Hz (in room)		94
<b>TDL Studio 1</b> £650	Average + Good	Delivering genuinely extended bass from a compact floorstanding enclosure, the Studio is very detailed but a shade clinical and detached in presentation	76 x 23 x 33cm Free space	84dB 25Hz (in room)	R	78
<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 611</b> £399	Good Average	This compact floorstander would seem to have plenty going for it, but somehow failed to gel musically under our listening conditions	72 x 32 x 24cm clear of walls	92dB 25Hz		110
<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	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 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 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 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>Videotone Minimax 2</b> £80	Poor Average -	Cheap in build and QC as well as price, but cheerful (if coarse) with it - if a little too cheerful after extended listening	27.5 x 17 x 20cm near rear wall	84dB 90Hz	R	74
<b>Visonik David 6001</b> £173	Average - Poor	Sharp styling a classy looking miniature makes, but the complex grillwork worsens a sound which starts off with too much top and not enough bottom	20 x 12 x 13cm against rear wall	87dB 130Hz		74
<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 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 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

## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
<b>Wharfedale 517</b> £400	Good Average	Similar to the 515 but half as big again, the hefty 517 should offer an improvement, but somehow has a less effective overall subjective balance	53 x 26.5 x 34 stands clear of wall	86dB 25Hz		110
<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 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 40Hz	R	46
<b>Zyp A1</b> £199	Average Average+	Cute metal cased micro-miniature is quite coloured but great fun, with surprising dynamics and fine wall-loaded room balance	22.5 x 14.5 x 13 close to wall	85dB 30Hz	R	110

## 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 sat and

sub systems are usually visually unobtrusive.

Positioning of the sub-woofer is usually not as critical as the positioning of a conventional speaker and as a result the largest part of the system can be hidden away entirely, although please refer to the placement notes below as this does not apply to every system

In general the sonic performance of these systems will fall below the performance of a good, comparably priced, conventional speaker. The value ratings given below are judged in the

context of sat and sub woofer systems only and are not judged by the same criteria as the main speakers, thus a Recommended sat and sub system probably won't sound as good as a Recommended traditional speaker.

If you are prepared to compromise slightly in terms of sound quality then a 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 4& 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

# The Directory

## PERSONAL CASSETTES

MODEL PRICE	SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<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, BB plinth, infra-red remote		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-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

## TUNERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Arcam Alpha 2</b> £185	Good Average+	Re-styled to blend in with the Alpha system, Arcam's cheapest tuner makes up for its lack of features with a sensitive front-end and mellow sound.	FM/AM analogue, no presets, manual tuning + AFC	R	93 Supp.
<b>Arcam Delta 80</b> £340	Very Good Very Good	Hi-fi sound on FM, good on AM, a dependable British all-rounder	6AM, 6FM presets. FM/MW/ LW display, manual tune	BB	55
<b>Aura TU-50</b> £230	Good 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	Average+ Average	Creek's FM-only analogue tuner is now in series 3 form, though the aesthetics remain unchanged. Ours was hampered by an obvious bass 'hump' though production units are said to be cured.	FM-only analogue, no presets, manual tuning + AFC		93 Supp.
<b>Denon TU-260L</b> £100	Very Good Good+	A new cheapie from Denon with the bare minimum of features. Careful designwork promises a surprisingly open and vivacious sound, so don't overlook it!	FM/AM digital, 20 presets, manual and auto tuning.	BB	93 Supp.
<b>Denon TU-660L</b> £190	Good Good	Not so successful under 'ideal' conditions, the '660 nevertheless made a fair fist of real reception, if a little muddled and lacking life.	FM/MW/LW digital, 30 presets, switchable IF bandwidth, remote	R	108
<b>Harman Kardon Citation 23</b> £600	Good Very Good	Fine performance, interesting features and ease of use are this tuner's forte, and the sound quality is top notch	FM/AM seek/manual adjustment muting 16 presets remote control	R	60
<b>Harman Kardon TU9200</b> £170	Average Average	The listening panel appreciated its liveliness, but found it a little muddled. Excessive pilot tone breakthrough may be distressing to listeners under 30 and indicates some design slip-up.	FM/MW digital, 16 + 16 presets		109
<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> £765	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>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

## TURNTABLES - CARTRIDGES

Very much the 'slave' of turntable and tonearm and to some extent undermined by the supply of free 'starter' cartridges on many turntables, the cartridge is still worth taking seriously. The quality of both the stylus itself and the cartridge's tracking performance are important in preserving that most important part of the hi-fi system - the records - and the cartridge also plays a significant role in determining the system balance.

Cartridges fall into two groups: high output models, capable of working directly into any amplifier, and more expensive low output models. Stereotypically, low output cartridges use the moving coil principle of operation, have better mechanical integrity and tighter tolerances, and give better performance but at much higher cost. Most under-£150 amplifiers and many valve designs need either an extra head amp or

transformer to cope with the low output. Cartridge/amplifier interfacing can be very subtle, but even basic high output MM designs benefit in overall balance from optimised amplifier capacitance loading. Still more important, the mechanical cartridge characteristic of cantilever compliance ('springiness') needs to be considered in the light of the effective mass of the tonearm.

## TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
<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

## TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
<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
<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>	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

## TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
<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
<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>Milltek 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>Milltek 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 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

## TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
<b>Shure M110HE</b> £60	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	Early reviews of this cartridge complained principally of the price - which has since come down	5-10g Normal, MM		38 Summ
<b>Shure M92E</b> £17	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 -	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 -	Rather bright and splashy in the high frequencies but nevertheless a competent model	5-10g Normal, MM		38
<b>Shure ME97HE</b> £49	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 +	Quite decent sound quality and a generally fine balanced performance	6-18g Normal, MM		48
<b>Shure ML140HE</b> £120	Average +	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	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	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	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	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	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	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	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 +	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	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	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	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	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	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	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 unuddled presentation and good stereo focus perspectives.	Auto-armlift, interlocked cueing, 2 speed, pitch control	R	103
<b>Dual CS-750</b> £300	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	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	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 -	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	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>Goldring Excelda 1</b> £160	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	Average	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	R	67
<b>JVC AL-FQ555</b> £170	Average -	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/£999	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 wooden bass. Good at the price, and requires no complex setting up or fine tuning in service	Solid plinth, inc cartridge, manual speed change	R	103
<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>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 arm tube/weight, 9g	BB	67
<b>Opus 3 Continuo/Oecca London International</b> (Revise) £599/£99	Poor Good	Heavyweight motor unit with many fine properties, but which needs further development. The idiosyncratic arm is a suitable (though not ideal) platform for the Decca cartridge. For all its faults though, the whole transcends the sum of the parts	Belt-drive manual, damped unipivot arm, 12g		67
<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 arm 10g	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</b> Reference/Excalibur £2295/£745	Excellent Excellent	Overall the closest reproduction to master tape we've yet heard, with stunning real bass and excellent neutrality. Front end damping trough improves LF detail significantly	Belt drive, suspended, electronic PSU, front-end damping, 12g	R	79
<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	Coil. '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>Michell 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>Michell 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>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</b> Reference £2495	Very Good Excellent	This big, open and powerful sounding turntable works beautifully with Airtangent arm to give superb 3-D imagery. Recently updated to mk.II form	Manual, belt drive, subchassis, stand	R	60
<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</b> Thing £392	Good + Very Good	Leads the field for clarity and neutrality at this price or a good bit more. It also looks very smart! Excellent value. Arm cut-out suits Rega or Linn style	Belt drive, semi-suspended, electronic PSU	R	79
<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

## TONEARMS

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 targetted 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

**F**or *Choice's* imminent 'high end' *Collection* edition, I had a scant three days with, and a meagre three pages in which to describe, the complete new flagship system from Linn Products, based on the active-only *Keltik* loudspeaker. This regular monthly column is a handy opportunity to explore the wider context.

I shamelessly admit I have a long term obsession with big loudspeakers. Although bigness per se can be a liability, the genuine welly, headroom and bandwidth combination only available from big boxes remain wonderful prizes, well worth a little trial, tribulation and expense.

There's frustration too. Every new model offers some improvement over its predecessor, but the one before invariably had some other performance advantage. Loudspeaker design is truly about contrast and compromise, the following findings to such an extent that a strong case can be made for choosing big loudspeakers first, and then building up the system for optimum net results.

*This month PM is back on his pet topic, big boxes, and waxes lyrically about the latest colossi to pass through his listening room.*

The *Keltik* makes just such a contrast with three other large and serious speakers I've loved and lived with over extended periods. There are big differences between them in all sorts of respects, but all four are particularly distinguished by exceptional low bass extension and quality, alongside the careful avoidance of midbass boom, two characteristics that I find particularly important.

Reductio ad absurdum is a powerful technique for distinguishing the wood from the trees, and the simplest possible analysis of broad frequency balance differences provided some very interesting perspectives, especially to a long-standing Linn/Naim system user such as myself, now that each company is following its own unique direction.

Said simplest analysis merely divides the audio range into the three decades, the bass (20-200Hz), the midband (200Hz-2kHz) and the treble (2-20kHz). Comparison of the relative averaged room energy levels for each band actually says a great deal about the basic sound character, without getting bogged down in the finer detail. Anyone of the three bands may be used as a reference. Since the ear takes most level cues from the bass and midrange, I've quoted two sets, with the bass level at 0dB (allowing relative mid and treble to be compared), and secondly with the midband normalised in order to highlight the relative bass levels.

I used (Naim-driven) active Linn *Isobariks* for a great many years, and still have great affection for this somewhat idiosyncratic design. I can't comment on the current production models (which have recently undergone considerable modification), but the ongoing semi-omni geometry with additional upward-facing midrange and tweeter will always dic-

tate much of the character. The decade-averaged energy of my (actively equalised) samples is 0/-1/-4dB (or +1/0/-3dB), while the relative bass extension is a respectable -5dB at 20Hz, though sensitivity is only modest despite a current hungry load.

The next speaker to take up extended residence was the Naim *DBL*. Twice the price, twice the volume and very different in a whole lot of ways, the overall response trend (0/+1/-5dB, or -1/0/-6dB, passive equalisation) is sufficiently similar to make the transition reasonably painless, though the slight relative increase in mid and decrease in bass levels are certainly audible. The *DBL's* big main driver and enclosure give a worthwhile 2-3dB improvement in both sensitivity and 20Hz in-room output level, while a mild impedance characteristic draws much less current from the amplifier, which is equally significant.

Doubling both size and price yet again, a pair of gargantuan Tannoy *Westminster Royals* are the most recent long term visitors and the current incumbents. Interestingly, the *WR's* specific 20Hz in-room output level is the same as that recorded by the *DBL*, though the horn-loaded Tannoy is typically a substantial 6-8dB more sensitive through the mid and treble (partly thanks to an impedance dip between 1 and 1.5kHz). Analysed decade-by-decade the *WR* registers 0/+4/-1dB, or -4/0/-5dB, so it's hardly surprising that it sounds relatively bass light compared to the *DBL*, and even more so against the *Isobarik*.

As placed and equalised in situ by Linn personnel, the *Keltik* recorded relative figures of 0/-5/-8dB (or +5/0/-3dB) for the three decades, which is not that dissimilar to the *Isobarik* but makes a massive contrast with the Tannoy, while the *DBL* slots into place between *Isobarik* and *Westminster Royal*.

Subjectively the *Keltiks* seemed fairly insensitive and didn't go particularly loud. But this didn't seem too important, since the system was very informative at lower levels and seemed happiest when not driven too hard anyway — partly thanks I suspect to the mild loudness contour imparted by the bass-boosted balance. I find the Tannoys very transparent at low levels, but both these and the Naims sound more happily balanced when playing rather louder, which ties in with the Fletcher-Munson theories of perceived loudness/balance and the *Keltik* findings. Possible implications about the degree to which personal listening level preferences should dictate the choice of a system deserve further exploration on a future occasion if the opportunity arises.

I was also particularly intrigued to discover a remarkable degree of internal consistency within the respective Linn and Naim systems. Both *DBL* and *Keltik* sound very well balanced with their own amps and source components, but the Naim sources sounded a bit rich and heavy when played through the *Keltik* system, whereas the Linn components certainly seemed too dry and tight into the Tannoys (I didn't have time to explore the intermediate options). Which in turn tends to imply that anyone updating a combination Linn/Naim system now has to choose one or the other direction, since cross-breeding between the two is unlikely to provide the optimum solution.



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A black Mission Cyrus Group speaker is the central focus, partially obscured by lush green foliage and purple flowers. The speaker's grille is visible, and the 'MISSION' logo is illuminated with a bright green glow. The background is a dark, textured surface, possibly a wall or another part of the speaker's enclosure. The overall scene is lit with a soft, natural light, highlighting the vibrant colors of the plants and the sleek design of the speaker.

MISSION

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