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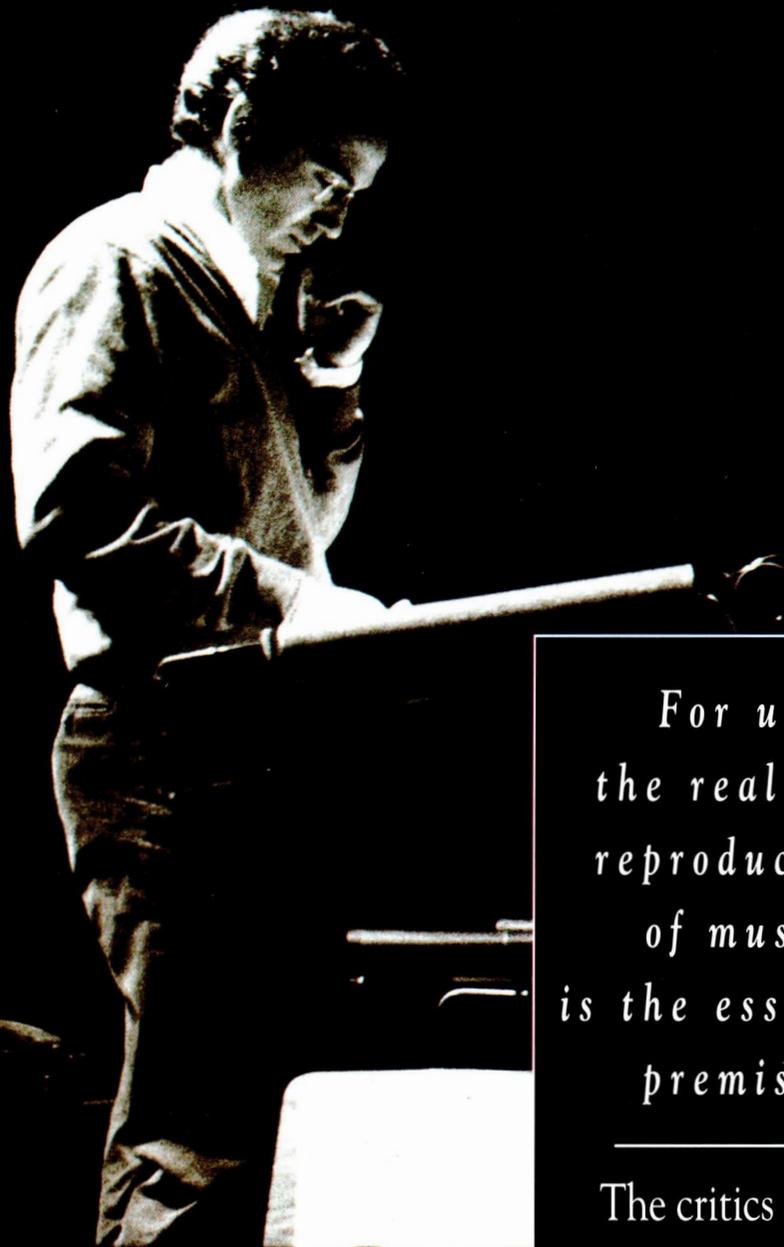


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# HI-FI CHOICE

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PUBLICATION

## PRODUCTS AND EDITORIAL SUBMISSIONS

*Hi-Fi Choice* welcomes all information on new and upgraded products and services, for possible coverage within the news and reviews pages. However, the publisher respectfully points out that the magazine is not obliged to either review or return unsolicited products. The editor is always pleased to receive ideas for articles, preferably sent first in outline form, with details of the author's background, and – where available – samples of previously published work. He cannot, however, accept responsibility for unsolicited copy and would like to point out that it may take time for a reply to be sent

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

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## GUT FEELINGS

# DCC and MD draw a blank

It's official. Well almost. Unless you've been vacationing on a distant planet you'll know that Compact Discs have officially been declared far too expensive. I won't labour the point in this editorial, because Barry Fox has gone into the subject in some detail on page 49, but the point I do want to make is how this recent ruling will affect people's perceptions of the new music carriers, DCC and MiniDisc.

A quick check around the 'Megastores' on nearby Oxford Street was enough to show that neither DCC nor MiniDisc are exactly the fastest moving items on the market at the moment. A spokesperson for Virgin's Megastore, where both DCC and MiniDisc pre-recorded software is on sale for around £14 a go, wouldn't be drawn on the exact numbers that are being sold but said that MiniDisc was selling some "tens of units a month", while DCC was doing around a third of that amount.

A spokesperson for the nearby HMV Megastore, while commenting that neither format is "exactly flying out of the window", said that the situation at HMV was the reverse of that at Virgin, with DCC slightly ahead of MiniDisc in terms of pre-recorded sales. However, HMV stocks some 50 DCC titles as against 40 MiniDiscs, which may account for the difference.

The interesting point from HMV was that DCC blanks are outselling blank MiniDisc by a considerable margin. For each blank MiniDisc that HMV sells at the moment, it is selling roughly one and a half DCC blanks. While sales are slow, HMV points out that they are picking up, and draws a parallel with the launch of CD.

Although these figures are obviously very rough and ready, they do tend to confirm the trends that you would expect to emerge, namely that DCC, based as it is around a home deck, is

proving more interesting to the home recording market than MiniDisc, where it looks as though people are buying pre-recorded software to use in the portable players that are currently on the market.

Philips desperately needs a portable machine to sell against Sony's MiniDiscman, and a machine is promised for September, although whether it will record or not has yet to be discovered.

Furthermore, the £400 asking price seems a little high for what is being billed as a mass market format.

Whichever format succeeds will be the one consumers decide is best for copying their CDs or albums, as no one is going to start to build another software collection at £14 for each tape or MiniDisc. They might buy the odd one or two, but most people want to use this sort of product in the car or on the move. While you might buy a compact cassette at a motorway service station, you're unlikely to blow £14 on an impulse purchase. Mr Average is far more likely to record some material at home before he starts his journey.

Whatever the reason, £14 pre-recorded software for either format is an absolute non-starter, and the record companies, by their greedy pricing structure, are actually driving people towards using the new technologies as home recording devices rather than buying new software, the very thing that they have been desperate to avoid. Rather ironic, ain't it!



**Andy Benham  
legs it down to  
Oxford Street to  
find out how the  
latest formats  
are selling.**

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*Hi-Fi Choice May 1993*



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# HI-FI CHOICE

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# Update

CHOICE NEWS FROM AROUND THE WORLD

## CD prices to be investigated

Wednesday 12th May saw the publication of the National Heritage Committee's report into the price of Compact Discs.

Two days after the report came out, Sir Bryan Carsberg, Director General of Fair Trading, asked the Monopolies and Mergers Commission to begin an investigation into the supply of recorded music in the UK. The MMC has until 31st March 1994 to complete its investigation and then submit a report to the Secretary of State for Trade and Industry.



Copyright restrictions were seen to be a major reason for the high price of CDs and the Heritage Committee recommends that the DTI looks into legislation as it now stands, in order to examine its anti-competitive effects.

Major record companies were strongly condemned for their pricing of CDs in the report. The committee believes that a minimum reduction of £2 can easily be made considering the price difference between cassettes and Compact Discs — however, it acknowledges that

another way to reduce this difference would be to increase the price of cassettes!

The committee also recommended that the major retailers should exert whatever influence they can over record companies as well as making their own price reductions.

The committee's final recommendation was to the consumer: "It is now time for consumers to show that they will no longer bear the prices currently charged for full-price Compact Discs." If all the political action fails to reduce prices, then the ball is well and truly in our court.



### Roberts' retro revival

Roberts Radio has recreated its post war R200 model with end of the century technology and price-tag. The £100 Revival is a faithful replica of the popular radio from the Fifties and Sixties. It has the same leatherette finish but with the up to date advantage of FM reception.

Roberts has a Classic range of radios, each one available in a choice of five colour finishes: grey, black, parchment, pillar box red or claret.

The £90 R701 has switchable automatic frequency control, while the top of the range £120 R737 features a ten preset station facility for MW and FM, plus five more on LW.

Its liquid crystal display shows frequency, time and alarm mode. Stereo sound is available via a headphone socket. ☎ 081 979 7474

### Low price LFD launch

LFD Audio is a comparatively little-known Clacton-on-Sea based manufacturer, with one foot in the amplifier high-end and a list of consultants that reads like a Who's Who of audio engineering.

Although its white fronted, battery powered phono stage and up-market amplifier range remain unchanged, LFD has announced a lower-cost range that cuts superfluous circuitry instead of sound or build quality. The new range is identified by a dark marble finish and a smaller, lighter, standardised cabinet.

LFD's dual mono, zero feedback £469 LS0 line stage and 50W £479 PA0 power amplifier are modelled on the bigger LS1 and PA1 designs, but the £369 MM0 phono stage is a completely new circuit. It is suitable for moving magnet cartridges, with an internal toggle switch that gives an extra 15dB of gain for high output moving coils. Finally, LFD has also announced a £479 50W per channel line-only integrated amplifier.

Great attention has been paid to the power supply of each component within the new range, together with LC-OCC and PC-OCC internal wiring and star earthing throughout.

☎ 0255 422 533

## 8000 DAC from Audiolab

Audiolab has improved upon its 8000 DAC. The updated £750 bitstream digital to analogue converter is controlled by a microprocessor and fitted with a programmable logic chip.

Other improvements include a constant audio output level for different sampling frequencies, gold plated BNC connectors for the coaxial inputs and digital outputs, and a balanced AES/EBU input.

Those of you with the pre '93 DAC can upgrade at a cost of £75. The machines must be returned to the factory. The offer only exists until October, when the cost will double. ☎ 0480 52521



### Return of Cyalene

Helius Designs is back with a new Cyalene tonearm. The £1,395 Cyalene 2 differs from its forebear in three main areas.

First, the tube now comprises a cold worked aluminium base over-plated with hard nickel and black chrome. This arrangement, as well as significantly increasing the strength of the arm, provides additional damping, as the second material stops the first from resonating, and so enhances dynamics.

Secondly, the lateral bearings have been strengthened and are now undamped. This increases the range of cartridges that can be used and makes for more secure tracking.

The final modification has been made to the counterweight of the tonearm. A sliding minor weight now changes the downforce, replacing the spring of the original arm. ☎ 0386 830 083

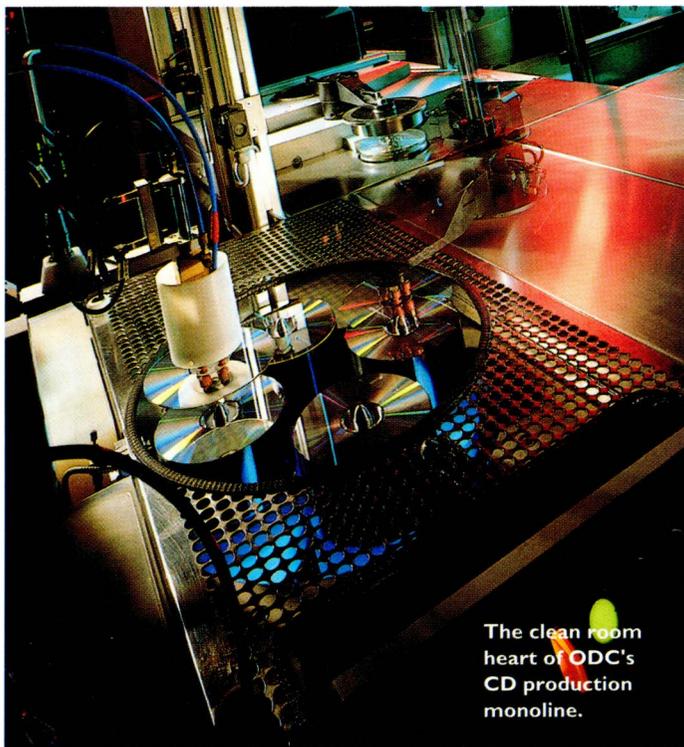
# London's high-tech disc production

Europe's most up-to-date CD production centre has been opened in north London. One of only seven disc manufacturers in the country, the newly-formed Optical Disc Company has installed the latest £1 million Data Disc Systems CD monoline in its Islington factory.

Those used to seeing large, clean rooms for CD manufacture, like the white-suited manufacturing line that used to be in the Virgin Megastore in London, might be surprised at the size of the monoline process. With its robot arms and built in clean areas, it could be squeezed into a single domestic garage without great difficulty.

In addition to conventional audio CDs, the new monoline is capable of producing a wide variety of disc based formats including Full Motion Video, HDCD and MiniDisc.

Just two operators run the monoline, which is expected to produce and box ten CDs per minute, with stricter than ever testing procedures and a pass rate of greater than 95 per cent. This compares very favourably with earlier and larger systems, that needed higher staffing levels, ran at half the speed and had a 30 to 40 per cent failure rate. Furthermore, reject CDs are recycled to produce CD cases and recyclable



The clean room heart of ODC's CD production monoline.

packaging is used throughout.

Eventually, it is hoped to increase production by adding two further monolines, to cope with the expected uptake in CD software sales, as formats like CD-I, FMV and CD-ROM

for computers and games machines begin to make an impression on the market. Industry predictions suggest that the sales of Compact Discs will increase from 80million units last year to 135million by 1995.

# Sony will not not leave DAT alone

Although considered by many to be confined to the semi-pro market, Sony has consistently regarded DAT (digital audio tape) as the recording medium for the serious enthusiast, and feels it has a niche in the market alongside CD, LP, MD, DCC and compact cassette.

Sony's two latest DAT machines reflect its support for the medium. The full-sized £549.99 DTC-690 replaces all existing standalone decks and boasts a new, quick loading transport mechanism and improved ergonomics, together with a one bit A/D and Sony's proprietary Pulse D/A convertor.

On the portable front, the new £399.99 TCD-D7 supplements the original TCD-D3 'DATman', but is smaller and more svelte due to a simplified non-tracking transport. It is designed to work from dry cells, has a suggested four hour recording capability and approximately seven hours of playback from four 'AA' alkaline batteries. ☎ 0784 467 000



Another Sony ultragadget, the TCD-D7 DAT recorder.

# Looking Sharp: a new range of LCDs

Sharp has gone LCD crazy, with an innovative compact video projector and a new kind of camcorder display, called ViewCam.

The ViewCam combines the ergonomics of a palmcorder with a portable LCD monitor. The monitor is fitted with a pivot, which allows the user to take shots at difficult angles. It takes narcissism to new heights by turning the monitor through 180° for self portraits. It's also fitted with digital image stabilization, to minimise camera shake, and memory functions to take five-second 'video snapshots'. The price is yet to be fixed, but the ViewCam should be available from the early autumn.

The £1,800 XV-710P LCD projector is designed to be as portable as it is simple to set-up, and it weighs only 4.3kg. The single LCD panel viewer has a reverse image button for back projection images and is capable of playing video software from PAL, SECAM and NTSC standards. Although the XV-710P can be used with up to 100inch screens, Sharp supply optional high brightness 40inch and 60inch screens, which are claimed to be useable even in a fully lit room. ☎ 061 205 2333



## In Brief

The *Biasbug* cassette deck tweak has switched supplier as Richard Morgan, trading as Loughborough Hi-Fi Exchange, has taken over from Matrow Ltd. The Matrow *Biasbug* will now be known as the *Biasbug* by BUG Audio Products. ☎ (0509) 239 521

Robin Marshall has joined Monitor Audio as Design and Technical Chief. He returns to Monitor Audio from Epos, where he started ten years ago, having worked on the R252/R352. He will be in charge of all new designs at the Tottenham Plant.

Van den Hul has set up its own distribution company in the UK; van den Hul UK Ltd, based in Maidstone, Kent. For the last 15 months van den Hul products have been distributed by Teac UK Ltd, but with the lessening trade restrictions across Europe, the time was judged right for vdH to go it alone.

Grahams Hi-Fi in London is celebrating the 21st birthday of the Linn LP12 turntable by holding a series of open days this summer. By way of celebrating the occasion, and the arrival of the *Cirkus* update, they are offering a free case of champagne to the owner of the oldest LP12 brought in for updating. ☎ 071 226 5500

New Jersey based KAB Electro-Acoustics has introduced the Nitty Gritty clone *EV-1* record cleaner, that connects to a domestic vacuum cleaner. Currently only available by mail order, the *EV-1* costs \$120 by air to the UK. KAB Electro-Acoustics at PO Box 2922, Plainfield, NJ 07062-0922, USA. ☎ 0101 908 754 1479

Maplin has designed a £90 omni-directional outdoor aerial for use where TV and FM radio feeds are required — boats, caravans, even limousines. The aerial comes with an amplifier and connecting cables. ☎ 0702 2 911

Lyon Audio in Colchester is holding an Arcam week from June 21st to 26th. There will be daily demonstrations of the full Arcam range, advice on systems and upgrading, a cable and interconnect clinic and special musical evenings. ☎ 0206 560 259

Live '93 will be held in the Grand Hall and Hall Two at Olympia on 16th-20th September. The exhibition covers everything to do with consumer electronics. The hi-fi roadshow will have trekked up the M4 to join companies covering, among other things, TVs, videos, home computers, photography and musical instruments. Tickets are £7 (families of four £16) and are available on the hotline. ☎ 071 373 8141

# "WE WERE IMPRESSED"



## The Bose® Acoustimass®-7 Home Cinema Speaker System

### Bose speaker technology turns an evening at home into a night at the movies

The near invisible Bose Acoustimass-7 loudspeaker system recently achieved a BEST BUY in What Video. The very nature of reproducing a film in the home as the producer intended in the movies involves using

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\*Dolby Pro-Logic surround sound. This means extra cables and speakers. Ultimately this involves more encroachment on your living space. Most of the home cinema systems have the television in the centre along a wall with conventional sized speakers in each corner, but how many homes have their televisions so positioned? With the Bose Acoustimass-7 Speaker System you can position the speakers and the



bass module to suit your room. If your television is in the corner, by using Bose Direct/Reflecting® speaker technology you can achieve staggering results. Bose have pioneered the sub bass approach with their

#### "OVERALL, AN IMPRESSIVE OUTFIT"

Acoustimass technology and are recognised as the leaders in this field. Take a tip from What Video and audition the Bose Acoustimass-7 Home Cinema Speaker System for yourself and see if you agree. Rather than compromise domestic harmony try the invisible sound of Bose. For full details of your nearest authorised Bose dealer call (0795) 475341.

**BOSE®**  
Better sound through research.

All quotes from Feb. 1993 issue of What Video by Bob Tomalski.

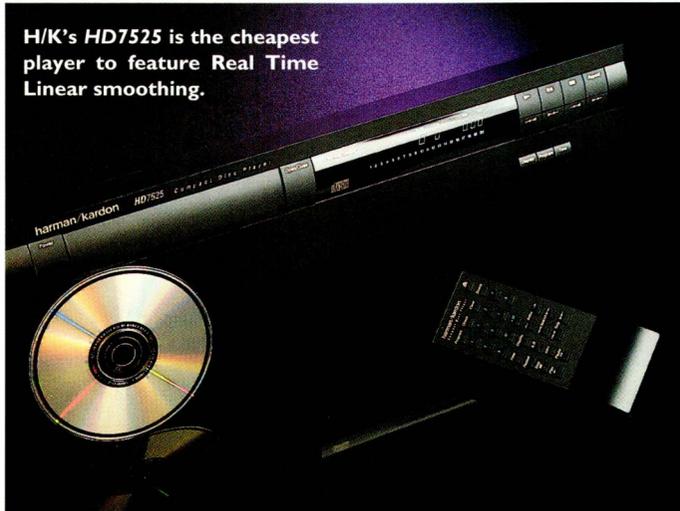
\* Dolby is a trademark of Dolby Laboratories Licensing Corporation.

BOSE (UK) LIMITED, TRINITY TRADING ESTATE, SITTINGBOURNE, KENT ME10 2PD

## Harman CD players get real smooth

Harman Kardon has introduced its very own digital to analogue conversion process into three CD players; the £800 HD7725, £550 HD7625, and the £450 HD7525.

Real Time Linear Smoothing (RLS) is an integration process that is claimed to reduce ultrasonic noise during D/A conversion, allowing HK to use simple first order filters. It uses two Burr-Brown PCM61-P converters per channel, each being separated by one sample length from the other. This means that the analogue circuits only have to track the difference between consecutive samples, rather than the full signal each time. H/K claims this results in a smoother waveform which is less prone to phase shifts and noise. ☎ 0753 576 911



## Autumn launch for Panasonic DCC player

Matsushita's first portable Digital Compact Cassette player is to be launched under the Panasonic brand name. The RQ-DP7 is expected to cost around £400 when launched in September. It will be a playback only portable measuring 12x3.5x12cm and weighing 485 grams.

A single line LCD title display has a scroll function for titles that are longer than 12 characters. Battery life is two hours of continuous use between recharges. As with all DCC players, the RQ-DP7 allows existing analogue tapes to be replayed, and has a Dolby B circuit to reduce tape hiss on such tapes.

☎ 0344 862 444

## Maximizing on a Goodmans

Leading the way for a range of speakers from Goodmans, the £120 Maxim moves onwards from the Maxim 3. It incorporates a revised 120mm polypropylene cone bass/mid unit while the high frequencies are tackled by a 19mm ferro-fluid damped and cooled



Goodmans has dropped the suffix and tweaked up the Maxim with a new tweeter.

metal dome tweeter with additional Delayed Resonance Damping, DRD.

High quality film capacitors are used on the crossover and mid/bass drive unit, and the rear firing port has been revamped so it can be positioned near a wall quite happily. The new Maxim is available in a Black Ash finish. ☎ 0705 492 777

## Competition winner

Steve Shelmerdine from Blackpool is the lucky winner of the £2,200 Mission system in January's Hi-Fi Choice.

## Curve the way with JVC compacts

The Adagio compact component systems from JVC feature a curvaceous and easy to use design that almost

leans towards the hand.

The range starts with the £350 S2, extending onwards and upwards via S3, S4, S6 and G7 to the £1,000 ADAGIO-G9. The £570 S6 incorporates a 'Sound Space' digital processor, and systems from the S6 upwards incorporate not only this digital processor system but a radical pano-

ramic three-way speaker system, one driver of which is motorised and can be tilted to various angles.

Five different settings can be chosen to emulate the acoustics of a concert hall, dome, cinema, or dance club. When selected, the processor sends a signal to the speakers and the driver orients itself to the optimum angle to create the selected effect, avoiding the extra expense, bulk and wiring of rear speakers.

The £1,000 ADAGIO-G9 and £800 G7 move towards complete AV sound systems, the G9 providing Dolby Pro Logic Surround, for home theatre sound from video sources.

☎ 081 450 3282



## That boggle eyed look is back

Goldstar's distinctive three strong range of portable CD/twin cassette/radio players has hit the streets.

The CD 630 retails for £150 and will be on sale in July. This is a boxy portable without the streamlined styling now common among most portable CD players. It features auto loudness, tone control and a bass booster. All the functions are remote controllable.

Described as a 'rounded boggle eyed' machine, due to its fly-face-like appearance, the £180 CD 640 has all one normally expects from a portable stereo. This includes the well rounded,

aerodynamic styling to keep you up to speed on roller-skates, flashing lights and graphic equalizer.

The portable £180 CD 940 is a slightly larger radio cassette with a horizontal loading CD player that has a 20 programme memory as well as detachable speakers for those sedentary sideboard moments.

☎ 0753 691 888

**Bug out with Goldstar's CD 640 portable stereo: flying the flag for boggle eyes everywhere.**





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# Update

## A T2 without Arnie

Audio Innovations has finalised the £400 T2 step-up transformer that provides the necessary voltage gain, electrical damping and control to ensure that the load from a moving coil cartridge matches an amplifier's moving magnet vinyl disc input.

The tastefully encased T2, with its 20 and 80ohm loading options, was designed to make the most of top notch moving coil cartridges with amplifiers not equipped with an MC phono stage.

☎ 0305 761 017



Michael Cooper and Michael Ameson have drawn on over thirty years combined experience in the professional recording world to produce a range of high quality audiophile valve amplifiers under the Ameson-Cooper brand.

The amplifiers range from the £1,300 Twin 44 monoblocks, based on the Groove Tubes 6L6 valves, to the £200 244 Phono Stage Module. Also in the range are the £650 444 line only preamp with four inputs, and the £850 644 preamp, incorporating three line inputs and an RIAA phono stage. Groove tubes are standard with all the units apart from the solid state 244. ☎ (0902) 620 156

## Cutting out the middle man

Anston's new Elite turntable heads up a range of products sold via Hi-Fi Direct, a mail order company recently set up by Julian Richer of Richer Sounds fame.

Hi-Fi Direct claims to offer high quality hi-fi separates to the customer at factory prices. Its products will also be available through a limited number of high street shops.

The company owns all the designs and assets of Ariston and by selling direct, aims to provide savings of up to 30 per cent off the normal price. The £170 Elite comes complete with Audio Technica's AT95E cartridge and is designed along similar lines to the Rebel turntable from Revolver.

The company has also purchased the Gale loudspeaker brand. At the moment research and development work is being undertaken together with a number of cabinet manufacturers. Hi-Fi Direct hopes the first Gale products will be on the mail order list by the end of the summer. It aims to produce a speaker to compete with the Mission 760s and Mordaunt-Short MS 310sin the keenly contested budget market.

Products already available from Hi-Fi Direct include the full Sherwood range and the JPW Mini Monitor.

☎ 071 827 9827

## Kenwood AV receivers gain RDS

Kenwood's latest £330 KR-V6050 and £400 KR-V7050 receivers have RDS (Radio Data System) tuners as well as the Dolby Pro-Logic decoding that's de rigeur for the modern AV

system. Based on the now defunct KR-V7040 and KR-V8040, the 30 preset tuner section adds sophisticated RDS search facilities to the born-again receivers.

Both tuner sections can search

the airwaves for similar programme type stations, such as rock music, classical or news. Both also have comprehensive remote handsets.

The two receivers have identical 3x65W front and 2x20W rear power outputs. On the DSP side, however, the KR-V7050 sports additional circuitry that can add simulated ambience to conventional stereo signals without the benefit of Pro-Logic decoding. ☎ (0923) 816 444

**Kenwood's KR-V6050 receiver has RDS and Dolby Pro-Logic.**



## Beyer gets infra-active

Beyerdynamic's award winning DT311 headphones are now available in an infra-red version. The £170 IRS 790s are lighter than previous IR models but offer an extended frequency response and higher maximum sound pressure level.

Other features include left and right volume controls with switchable stereo, mono left and mono right options. The headphones use 1.5 volt 'AA' batteries and the transmitter unit can be interconnected with others for multi-room applications.

☎ 0273 479 411

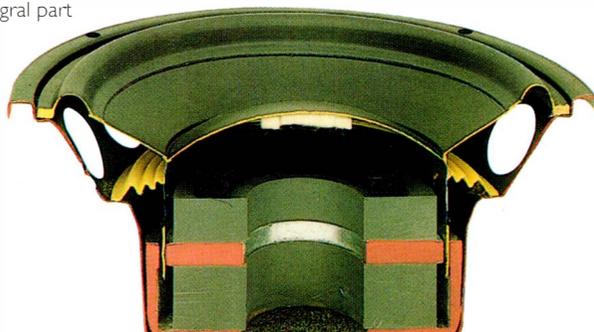
## Morel mixes up a cone material

Morel has developed a new formulation of damped polymer compound loudspeaker cone material to increase the internal damping of its drivers. This together with felt damping pads, is claimed to produce a flatter frequency response and smoother high frequency roll-off.

The formulation is used in Morel's four, five and six inch bass units. The first drive units to benefit from the new cones include the £43 MWI166 which is an integral part

of the Morel Bassmaster 602 loudspeaker, and the recently released £49 MWI114-S, the £38 MWI142 and the £34 MWI113, all tailored for the DIY speaker enthusiast as well as larger manufacturers. ☎ 0635 298 574

**Morel's damped polymer compound is used in both the MWI113 (left) and MWI116 (right) bass units.**



## Beefed up Celestions

Celestion's bookshelf loudspeakers 3, 5 and 7 have been pumped up without growing an extra centimetre. Celestion claims to have improved the loudspeakers' bass response, given them higher sensitivity and increased their power-handling capability.

The Mark II 3s 5s and 7s retail at £129, £169 and £219. Although content and price may have risen, Celestion has made sure that they remain compact. ☎ 0473 723 131

# Choice Sessions

The latest products, the best recordings and our own points of view on the most interesting developments to hit the hi-fi scene. Tests by Alan Sircom, Jason Kennedy and Jimmy Hughes.

## D/A CONVERTER

### Pink Triangle Ordinal

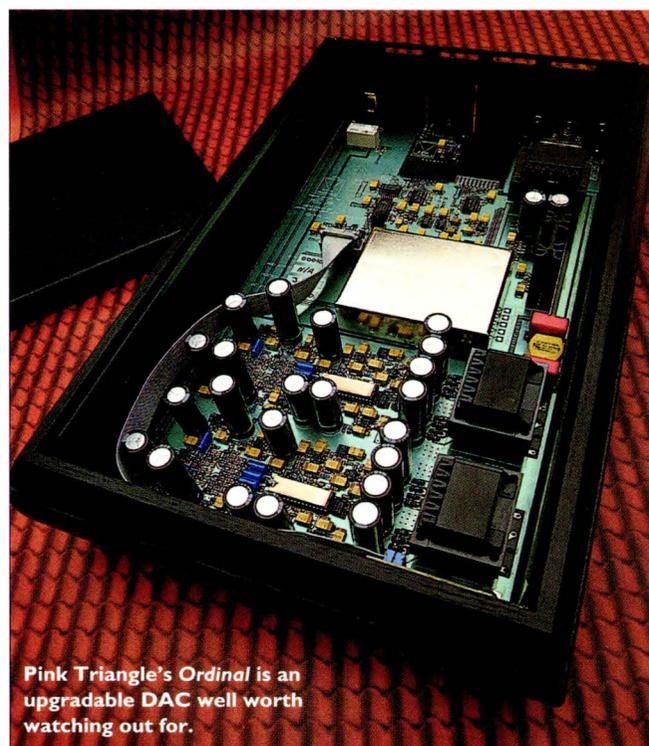
A quick listen to Pink Triangle's latest £699 *Ordinal* D/A converter suggests this is a product to watch out for.

Culled from PT's flagship *DaCapo* DAC design, the pared down *Ordinal* sports many of the bigger converter's features, but lacks the expensive discrete converter circuit and battery power option. Internally, it uses one Philips TDA-1547 (DAC-7) converter chip per channel, in common with the Marantz *CD-10*, also on test in this month's *Sessions*.

Common to both converters is PT's unique reclocking system that drastically reduces data jitter. Rather than enslaving the DAC to a master transport, *Ordinal* reclocks the datastream within the DAC during processing itself, using a separate internal master clock. As a by-product, however, this reclocking circuit means that the DAC doesn't favour one particular digital source or sampling frequency and will reclock CD, DAT and satellite with equal aplomb.

Prior to conversion, it offers the same plug-in filter/noise shaper modules as the bigger DAC. It comes fitted with an 18-bit filter module as standard, with an optional £189 20-bit box. Not only does this 'future proof' the DAC, it also allows the user to match the DAC to a specific system. This module's steel case will mean fewer static problems, and makes filter changes swift and easy.

The half-size box only has room for two digital interface cards, instead of the four Input/Output ports in the *DaCapo*. These cards increase the flexibility of the converter by allowing a choice of interfaces. The I/O cards also divorce the DAC's motherboard from the outside world, reducing the chance of



Pink Triangle's *Ordinal* is an upgradable DAC well worth watching out for.

static damage to the delicate DAC circuit. Any digital output options are fully reclocked, though I didn't have the means to test whether this actually improves the recorded datastream.

All this technology would be worthless without sound quality to match. Fortunately, PT appears to have another runaway success on its price lists. It was clear that this DAC is a bit special, with the sort of detail that is rare without digital stridency.

Playing it alongside the tonally similar Marantz *CD-10* (itself quite a detailed and transparent player) was a revelation. Switching over to the *Ordinal* it was possible to hear the instrument decay and pick out ambient details not present with the Marantz. Adding the *Ordinal* pushed the Marantz *CD-10* a step forward.

Changing over filter modules, I found the 18-bit filter to be smooth and refined, but the 20-bit unit had a greater sense of

rhythmic integrity and had more 'groovability'. If I were a choral fan, I would probably choose the 18-bit filter, but my rock discs forced me into foot tapping with the 20-bit device.

My main criticism of PT's *Ordinal* DAC is that it's no longer in my system. With more time I might have found shortcomings, but its flawless performance on this occasion gives me good reason to believe that the *Ordinal* may well be the ultimate D/A converter in its class.

## VERDICT

Pink Triangle Ordinal



£700.00

**PROS:** Detailed, good value and upgradeable; well made.

**CONS:** None.



**PINK TRIANGLE PROJECTS LTD,**  
4 Brunswick Villas,  
Camberwell SE5 7RR  
Tel: (071) 703 5498

## AMPLIFIER MODIFICATION

### Pioneer A-400/GTE

The Pioneer *A-400* integrated amplifier has become something of a legend over the last couple of years, the inexpensive giant killer your system couldn't survive without.

Not surprisingly, the celebrated black box has sold in bucket loads. Every post-bag that *Hi-Fi Choice* gets contains at least one letter from an *A-400* owner in search of the absolute sound. So it's interesting to find an after market modification which makes a sensible alternative to the high cost of complete replacement.

The modification under consideration is called *GTE* and is carried out by Tom Evans, the man behind the Michell range of electronics and something of a clever geezer if components like the *Iso* phono stage are anything to go by.

It costs £141 including return carriage — a carrier will charge you about £14 including insurance — and what you get back looks ostensibly like the amp you sent in the first place. There are no external changes whatsoever.

Internally, it doesn't look that different either. At first, I could only spot four capacitor changes, one cap removal and one changed resistor per channel. Then I peaked under the amp and discovered a small PCB hard-wired into the main board. It features a microchip, something of an Evans speciality.

So the question is, how does the *GTE* compare with the standard *A-400* and is it worth the time and expense? The answer, when listening to a standard *A-400* and then a *GTE* in quick succession, has to be a resounding 'yes'. The modifications have a dramatic and positive effect on this already competent little amplifier's sound, moving it several rungs up the high

fidelity ladder in one go.

The first three words that hit the notepad as I listened were 'clean', 'solid' and 'space'. The *GTE* makes the standard model sound remarkably murky and cluttered as by contrast it allows the music to develop a better sense of spaciousness — it becomes more three dimensional.

What's more, you don't lose the fundamental sense of life that made the amplifier's reputation in the first place. It still has the same spirit that brings out the soul in the music.

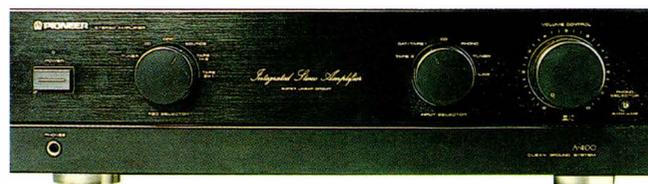
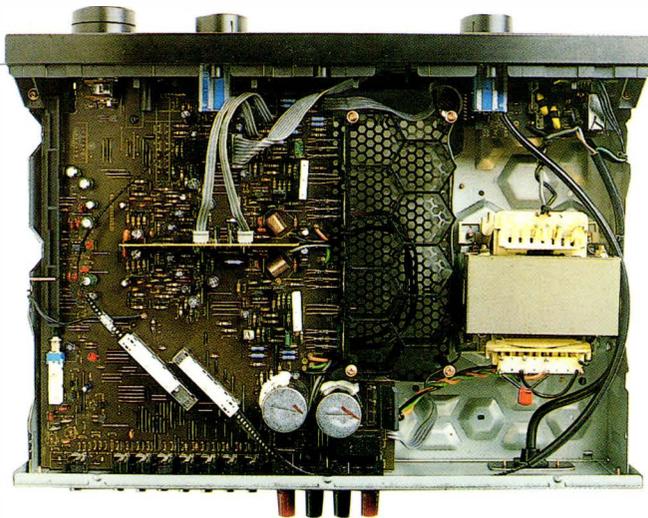
By the standards of decent tube amps, it's a tad forward and dynamically limited. That said, it's necessary to remind yourself that this is still only a £400 amplifier.

The literature accompanying the modification highlights the fact the *A-400's* main strengths lie in its power amp, and that the addition of a good preamp such as the *Argo* will improve its performance. I tried an Audio Note *M7* preamp, turning the *GTE* up to 12 o'clock and using the CD input. This improved matters, relaxing the slightly brash midrange and creating a deeper soundstage.

Probably the most dramatic difference was that you could play music louder, for longer, with less fatigue.

Comparing the standard and *GTE* versions with the *M7* stressed the latter's openness and expressiveness. Further listening revealed that the *A-400's* slightly bloated bass had disappeared, to be replaced by something altogether more solid and extended.

Overall, I'd call this modification a definite winner. If you already own an *A-400* (preferably one that's outlived its warranty, as the *GTE* will invalidate it) and have a hankering for still more expressive music making, the *GTE* conversion is an extremely cost effective upgrade.



The *GTE*, a Tom Evans modification to Pioneer's popular *A-400* amplifier, adds more expression and openness to music.

## LOUDSPEAKERS

### ATC SCM 10

ATC pioneered the soft dome speaker principle that currently dominates the quality studio monitor scene, and the company's *grand fromage*, Bill Woodman, was one of the co-designers of the first Goodmans *Maxim*. No less impressive is the ever-expanding list of professional musicians, composers and conductors who use ATCs at home and in the studio.

The £995 ATC *SCM 10* is a weighty, stand-mounted two-way sealed unit with a massive front grille designed to be permanently fixed to the speaker, mechanically rolling off the treble. Compared to many loudspeakers at the price, the ATC sets the reference for build quality, with a simple, single-wired, solid box — little larger than two loaves of bread laid end on end — that could be brutally manhandled without serious damage.

A look at ATC's own bass driver magnet behind the bolted front baffle is enough to convince any doubters that this is no ordinary mini monitor. It is as large as the bass cone itself and has a vast 20mm cone excursion. This is then partnered to a modified and selected 26mm Vifa dome tweeter via a complex crossover circuit, with an attendant efficiency rating of 80dB.

Think of it as a battlefield version of the Celestion *SL600*.

It is built for near indestructibility. A common cause of speaker damage comes from driving an underpowered amplifier too hard, but with the *SCM 10* it is possible to hear the amplifier clipping and pushed to its limits, without damaging the speaker one jot.

Purely slotting the speaker into a typically British high current, low wattage system is not enough. In such a system, the *SCM 10* is so hampered by the amplifier that it remains as quiet and inarticulate as a good Victorian schoolchild. It makes a moderately well-balanced and mannered noise, but the crossover point is readily apparent and the speaker sounds bland and repressed. For its part, ATC recommends a minimum power amplifier rating of 100W.

Feed the *SCM 10* copious

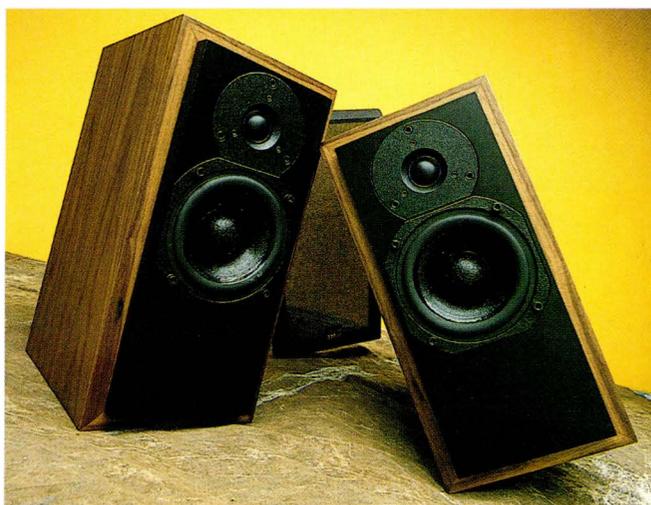
amounts of good quality watts and it really comes alive. With suitable amplification, the *SCM 10* makes a very passable impression of the Quad *ESL-63* electrostatic loudspeaker. The box disappears sonically and the transition between the treble and bass units becomes seamless once again. Where it is unlike the *ESL-63* is in its wide dispersion and incredible dynamic scale, easily coping with the endless headroom needed with a Mahler Symphony.

There is a lack of bottom end, which will rule out the speaker for manic bass freaks, but as a near-field monitor it has no rival at the price, for any genre of music. The bass is unlike that of its peers, as it rolls off smoothly and cleanly. This gives the *SCM 10* a correct-sounding tightness to bass notes, but one that can sound thin with poorly equalised rock music.

In addition, in domestic rooms, the most insurmountable acoustic problems often occur at low frequencies and an overhang-free bass is no bad thing.

It is the uncolored sound and its need for vast amounts of watts that set the ATC apart from most loudspeakers. ATC claims that most music happily burbles along at well under 15W, but large dynamic swings can demand hundreds of watts of instantaneous power. Even a string quartet will soak up surprisingly large voltages at times. It is felt that music demands a large, but fast reacting, power amplifier, combined with a speaker that is engineered solidly enough to cope with such swings of voltage and current.

Most hi-fi does not have such



"One of the finest mini-monitors around", the ATC *SCM 10*.

### VERDICT

GTE A-400 Modification

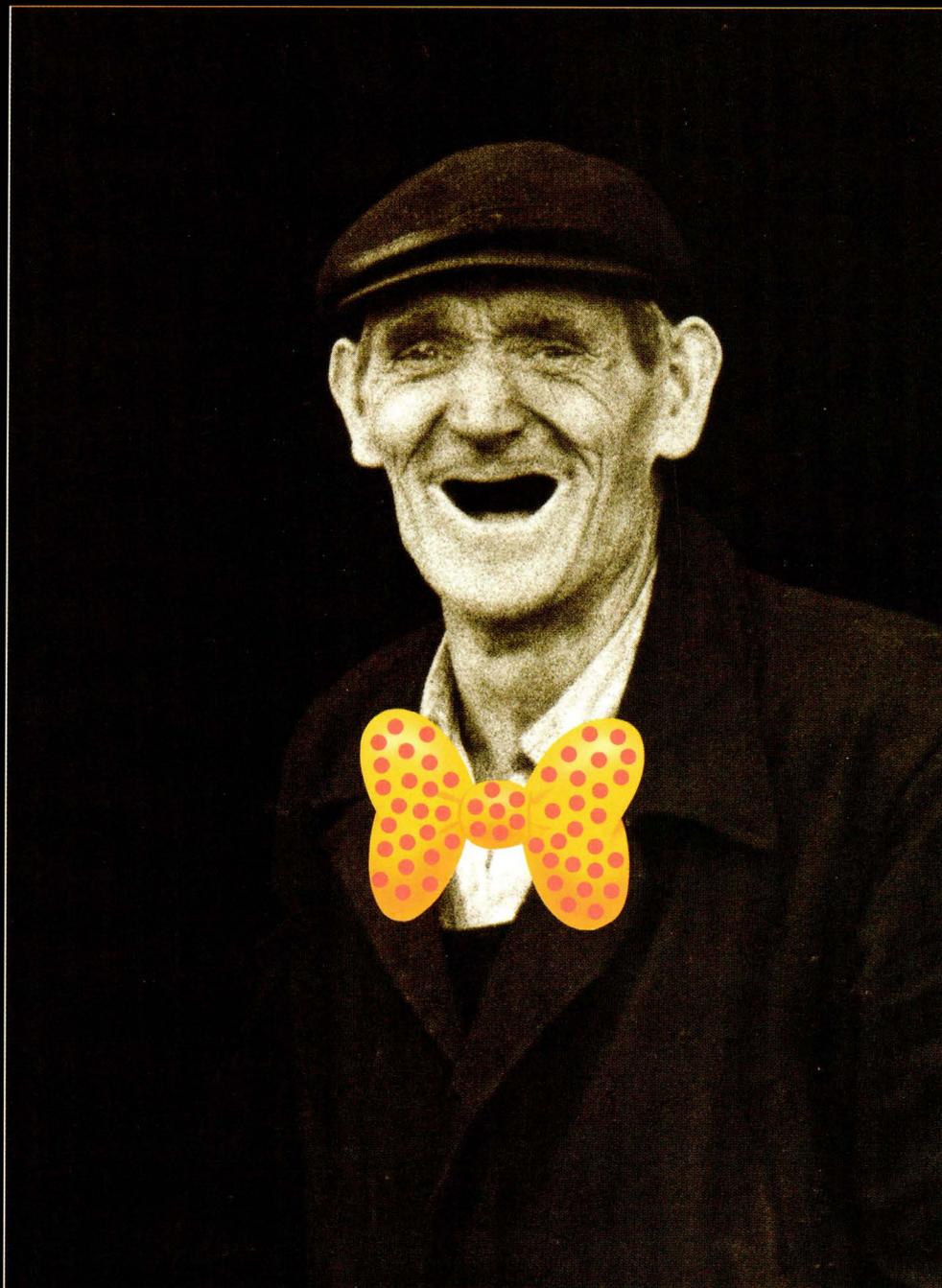
£141.00

**PROS:** Radically cleans up the sound; a cheap upgrade.

**CONS:** It voids the warranty, Pioneer may not service it.



**TOM EVANS**  
50 Bedwlyn Rd,  
Ystrad Nynach,  
Hengoed, Mid Glam, CF8 7AE  
Tel: (0443) 816 856

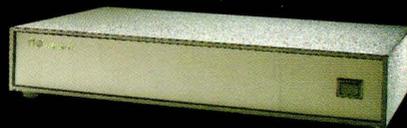


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Tel: 0302 321421  
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284 Glossop Rd, Sheffield, S Yorkshire. Tel: 0742 737893  
**The Sound Organisation**  
28 Gillygate, York. Tel: 0904 627108

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102 Murray St, Montrose, Tayside. Tel: 0674 73765

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**Lyric Hi-Fi**  
163 Stranmillis Road, Belfast. Tel: 0232 381296  
**Lyric Hi-Fi**  
84 Bridge St, Portadown, Co. Armagh. Tel: 0762 358059

# Choice Sessions

dynamic headroom, it is claimed, and therefore we acclimatise ourselves to dynamically limited systems. This is particularly true for the rock listener, as the instruments are electronically amplified in the first place. Listening to a system with less dynamic compression should be closer to the real event and may prove to be an unsettling experience at first.

In truth, my first reactions to the ATC SCM 10 were less than positive, but as I began to delve further, my respect for the design and what it can do grew exponentially. It also became clear that any difficulties I encountered were a function of the amplifier and not the speaker. I still believe that the speaker requires careful system matching, but it is well worth persevering to get the best from one of the finest mini-monitors around.

## VERDICT

ATC SCM 10 Loudspeaker

■■■■■■■■ ■■■■■■ **£995.00**

**PROS:** Excellent mini-monitor; detailed sound; solid build.

**CONS:** Needs huge amp; too revealing; lacks bass.

**ATC LOUDSPEAKER TECHNOLOGY LTD,**  
Gypsy Lane, Aston Down,  
Stroud, Gloucs, GL6 8HR  
Tel: (0285) 760 561

## TURNTABLE

### Projekt 6

Unlike other turntables in the Czechoslovakian Projekt range, the £350 Projekt 6 has a spring decoupled subchassis. This is a skeletal affair sat on three springs located on the baseboard, and as it's not hidden from view, it resembles a matt-black Michell *Micro*. Projekt's standard lid is not deep enough to cover both turntable base and subchassis, so it sits on a raised lip at the rear and uses two small spacers at the front which, despite the description, actually looks elegant and understated.

A little transparent tub of silicon is located at the centre of the baseboard, just to the right of the main bearing. This dashpot, in conjunction with an adjust-



a b l e screw fitted to the subchassis, acts as a primitive but effective damping system. Vary the depth and the screw dips into the silicon pot adjusting the suspension damping. The combination of this damping and three adjustable cone feet makes the ensemble remarkably resistant to structure-borne feedback.

Although Projekt's tonearm lacks the micrometer precision of an SME, it is possible to adjust almost all the principal movements, including the tension on the bearings — although over-enthusiasm could damage the arm, and even the cartridge, cantilever and records.

The Projekt 6 has great scope for tweakability but doesn't demand the constant maintenance that typifies serious tweekery, and will perform well enough after just a 10 minute set-up. The UK sales agents, Ortofon (UK) Ltd, supply the Projekt 6 as a £400 package, combined with the excellent Ortofon MC15 Super II moving coil cartridge, saving some £50 on the price of the components separately. The two are well matched, and at the same time innately flexible.

With or without the MC15, the Projekt 6 fills a gap in the turntable market, left when the Linn *Axis* and the Pink Triangle *Little Pink Thing* started rising in price. Its most serious price competition comes from the top-flight Systemdek IIXE/900 AP, but even here the Projekt wins out with its sheer unflapability, as the Systemdek demands a good dedicated table or wall-shelf.

Sonically, the Projekt 6 acquits itself well, especially with light acoustic music such as John Martyn's *Solid Air*. Acoustic bass has good depth and clarity,

**A little Czech turntable that can re-whet a vinyl appetite.**

while the overall performance is one of easy, fluid grace, with good, if not stunning, imagery. The turntable has problems with dense, dynamic classical music, alleviating some of the angst in Mahler's *Second Symphony*. It is also unhappy with full monté heavy metal, groaning under the weight of AC/DC's *Whole Lotta Rosie*. Even when under serious groove pressure, however, the 6 remains deeply rhythmic and musical, never sounding like its modest price tag would suggest.

Given a cookin' jazz riff the Projekt 6 quickly sprouts the appropriate goatee beard, shades and polo-neck sweater. Rock also benefitted from the solid, dynamic nature of the 6, sounding well defined and rhythmic.

Although some might suggest that it is a little late in the day for turntables, the Projekt 6 represents a good counter argument. This little Czech turntable can play music in a manner that is rare at the price.

## VERDICT

Projekt 6 Turntable

■■■■■ ■■■■■■ **£350.00**

**PROS:** Excellent isolation; a pleasant, musical sound.

**CONS:** Tonearm; can get confused with complex music.

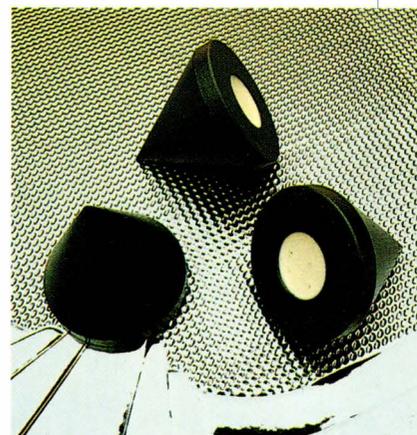
**KRONOS DISTRIBUTION,**  
35 Farlough Road,  
Newmills, Dungannon,  
N Ireland, BT71 4DU  
Tel: (0868) 748 632

## ACCESSORY

### Goldmund cones

Perhaps I'm getting old and cynical, but I question the logic behind paying £200 for a set of three black anodised cones, even if they have the auspicious Swiss Goldmund company backing them.

They are squarely aimed at the high-end market, to 'mechanically ground' Rolls-Royce hi-fi components. In such a market, conventional values (such as price) are often overlooked in favour of the all-pervading quest for the ultimate in sound quality, and £200 (per component) would be considered a trifling sum to reap those last few lost nuances.



**A good tweak for high-end systems, the cones may be too subtle for more modest kits.**

The cones are accompanied by a white paper on mechanical grounding, with electrical and optical analogies. Goldmund calls the cones 'mechanical diodes', as vibrations are channelled in one direction alone. It is claimed that considerable research has gone into the design and manufacture of these cones, and while some of the scientific suggestions in the literature are best described as 'off the wall', in fairness it is not just another Mod Squad *Tip-Toe* or Michell *Tenderfoot* copy.

If you look closely at the Goldmund cone, the spike is made from a different material to the rest. It uses a hard steel, against the mild steel of the cone body. Goldmund suggests that this aids the transfer of

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# Choice Sessions

vibrations away from the component, but it could as easily be to prevent the spike from buckling under the weight of heavy power amps.

In the centre of the cone there is a small hole filled with an epoxy-like elastomer, which is claimed to damp the resonance of the cone itself, preventing this resonance interfering with or eliminating (in Goldmund's words, 'evacuating') certain frequencies. The cones are designed to be used spike down. Goldmund suggests that two cones are positioned to the front of the supported product, one to the rear.

My first difficulty with the cones, following Goldmund's logic and philosophy, concerns most tables and wall shelves. If the cones 'ground' the component they sit under, and if both component and cones sit on an MDF shelf on a set of upward facing spikes, surely the two cancel each other out? Put simply, the cones root the component into a ground of thin chipboard, with the rest of the world one stage divorced from this equation by the spikes under the shelf itself.

My initial experiments seemed to confirm this, making the sound of a Pink Triangle *Anniversary* on a wall shelf unreasonably thin and weedy. Moving the deck on to a high mass Alphason table that was spiked into the floor improved the sound somewhat, giving a slightly less cluttered midband and marginally increasing the dynamics of the turntable.

Further experimentation on CDs, amplifiers and speakers proved the Goldmund cones worked in a consistent manner. Each time they were called upon,

with components on directly coupled tables, they worked subtly in the dynamic domain and marginally increased the overall transparency of the system. The effect was more pronounced on some products than others. It was also cumulative as the good work performed by using the cones with a CD player is enhanced by adding cones to pre and power amplifiers, or speakers.

Perhaps my system is too far removed from the extreme high-end, unable to resolve the subtle differences the Goldmund cones add. Or it may be that my in-built value for money monitor was unusually sensitive at the time of this test.

They are unquestionably the finest cones on the market, but I would hesitate to recommend their use in a system costing less than £20,000. Without such a seriously high-end system, the improvements are just too subtle to justify the cost.

## CARTRIDGE

### Ortofon MC15 Super II

Ortofon's *MC15 Super* cartridge was first tested by *Hi-Fi Choice* in issue 103. No sooner had it achieved Best Buy status than it was upgraded to *MkII*, though the price remained at £100. In that review the *MC15 Super* stood head and shoulders above its competitors at the price. Less than eighteen months later recent adversaries, like the Sumiko *Blue Point*, have made the cartridge market more challenging. As a result, Ortofon has decided to implement developments already in the pipeline.

The specifications for the two generations of *MC15* have changed little save for the internal wiring and a new Super Fine Line stylus. Ortofon found that the diamond tip could be improved without incurring heavy costs and that the sonic benefits more than justified the move. The internal wiring is made from a higher purity copper than before, something Ortofon has been investigating as it developed a new range of interconnects and cables.

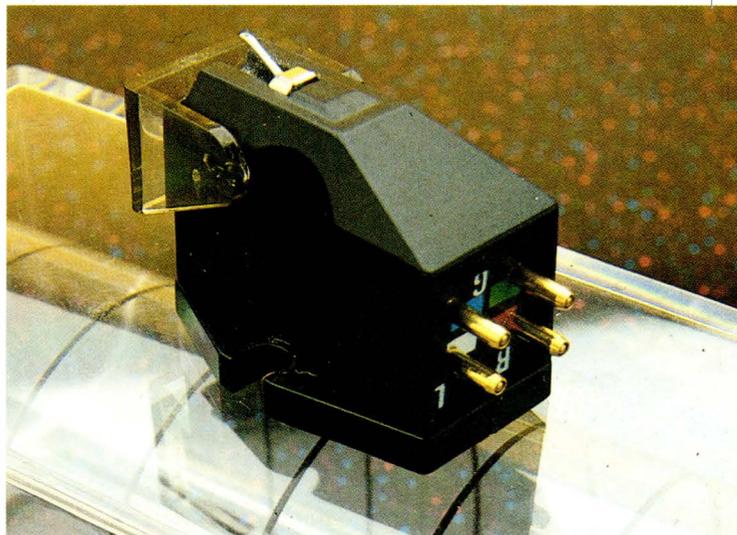
The cartridge is still as fussy as ever to set up. Downforce, in

particular, is critical. A difference as small as a tenth of a gram can make or break the performance of the cartridge. I found it worked best at 2.2g, right in the middle of the *MC15 Super II*'s recommended range. Using an arm like the *SME Series V*, such an exacting set-up is easy, but it could be frustrating with arms lacking the *Series V*'s precision adjustment.

Given that the *MC15 Super* needs about 40-50 hours playing before it is properly run in, this is not the sort of cartridge that shines straight out of the box. It remains a revealing and informative design, however,

far outside the normal confines of a £100 cartridge. Here, the high frequencies lack the sparkle of truly exotic designs and that other low(ish) cost cartridge, the Denon *DL-304*.

Place the Ortofon in a clean sounding mid-priced system, however, and the cartridge begins to show its worth. Its clarity and informative nature are well suited to the task of extracting incredible detail from turntables like the Systemdek, Michell *Mycro* and Projekt 6, though it sounds appreciably better in a deck like the Pink Triangle *Anniversary*. But with such a turntable, it seems logi-



The *MC15*; back to top the mid-priced cartridge tree as *Super II*.

and the improvements do appear to enhance the *MC15 Super II*'s tracking ability during dynamic passages. The treble lift that Richard Black commented on is still present, but without aggressive brightness. Rather, it adds treble detail while detracting only slightly from the midband ambience.

The difference between the *MC15* and cartridges like the Sumiko *Blue Point* is akin to comparing a landscape photograph by Ansel Adams with a Turner watercolour. The Ortofon's clarity and informative nature is no better or worse than the more romantic and euphonic interpretation made by the Sumiko, but I imagine that the two will find very different markets.

Ultimately, the *MC15 Super II* has limits, especially when slotted into a high-end system

cal to move one stage further and aim for a better cartridge.

The *MC15 Super II* is only subtly improved over its predecessor, but still enough to push it back to the top of the £100 cartridge tree. Although not completely neutral, the *MC15* remains as heartily recommended as before.

## VERDICT

Goldmund cones

■ ■ ■ ■ ■ £200.00

**PROS:** Well made; best of the cone breed.

**CONS:** Price.

▶ **PPIC (PHOENIX) UK LTD,**  
Unit 1, PO Box 59,  
Sunbury-on-Thames,  
Middlesex, TW16 7EA

## VERDICT

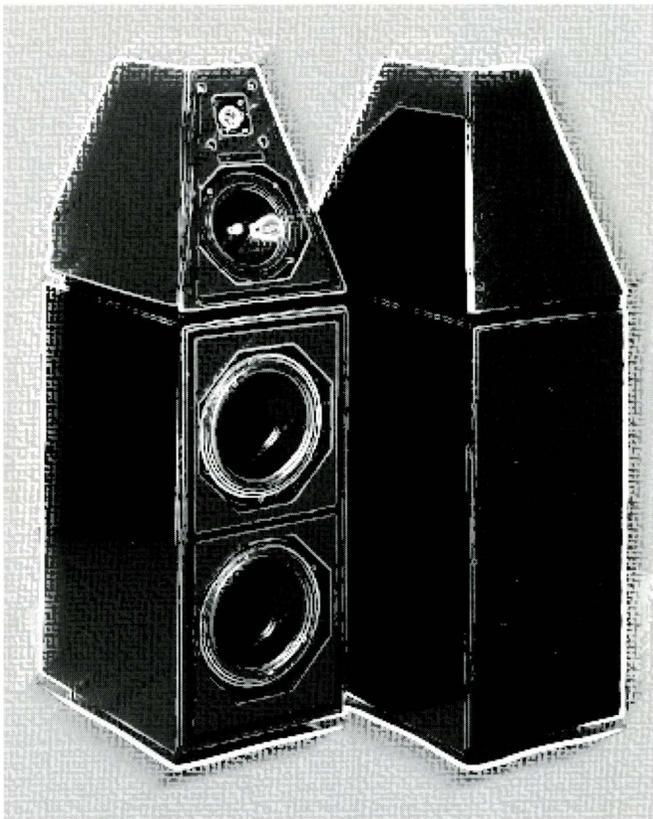
Ortofon *MC15 Super II* cartridge

■ ■ ■ ■ ■ £99.95

**PROS:** Clear; detailed and informative; great value.

**CONS:** Tricky to set up; slightly veiled mid-range.

▶ **ORTOFON UK LTD,**  
Chiltern Hill, Chalfont St  
Peter, Bucks, SL9 9UG  
Tel: (0753) 889 949



**Wilson WATT III/Puppy II**

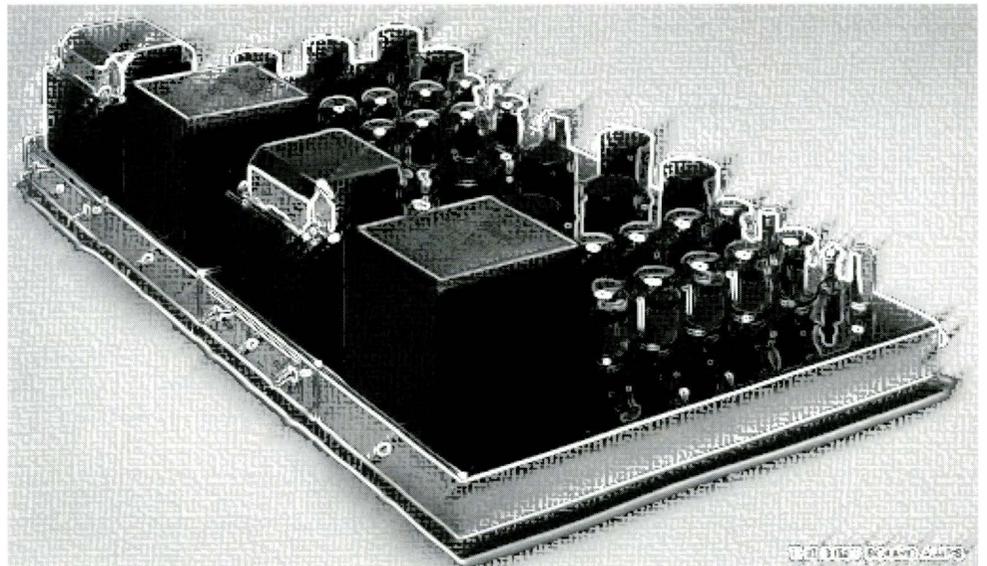
**is an Art**

monitoring system for Wilson Audio and has graduated to become one most sought after and best selling audiophile products. In July 1992 Ken Kessler wrote in *Hi-Fi News*: "Once you own a pair of WATTs/Puppies you're unlikely ever to need consider another pair of speakers".

Martin Colloms (*Hi-Fi Choice* May 1992) remarked on the "big, full, naturally balanced sound" and the "drive, energy and rhythmic precision which leaves many 'good' hi-fi systems sounding tired and anaemic".

**Jadis** is a specialist tube-amp manufacturer operating from a small town in France. These striking chrome and gold designs offer remarkable performance by blending traditional vacuum-tube design with the latest solid-state thinking. The Jadis JPL line pre-amp offers outstanding low level detail retrieval while Jadis power amplifiers offer a

**Jadis JA-200 power amplifier**



True harmony can be hard to achieve. A group of recommended high-profile components does not necessarily make a good system. There is an art to creating the finest hi-fi systems that few have mastered as well as **Absolute Sounds Ltd**. When others describe even modest performance as 'high-end' rely instead on the expertise of the company that first brought true 'high-end' to this country. Drawing on over 15 years of experience Absolute Sounds recommends consideration of these outstanding components. The Wilson WATT/Puppy is the exciting combination of the **Wilson Audio** Tiny Tot miniature monitor and the compact Puppy bass extension package. Integration is by an internal crossover. The WATT was born as a location



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choice of mono and stereo chassis and output powers suitable for every application.

*Hi-Fi News* concluded its August 1992 review of the Jadis DEFY DA-7: "If you can afford it, you should buy it". Of the Wilson/Jadis marriage Martin Colloms wrote (*Stereophile* April 1993): "The massive strengths of the DEFY-7 are its natural, transparent, unfailingly musical sound coupled with an astonishing ability to play loud... The synergy exhibited between the WATTs and the Jadis is quite a phenomenon". Contact Absolute Sounds for details of its dealers demonstrating music's finest arts.

# Choice Sessions

## LOUDSPEAKERS

### Ruark Templar

The success of speakers like Mission's 753 and the Linn Keilidh recently suggests that the public no longer wants expensive stands that look like oil rigs or Doric columns in their living rooms, but are quite prepared to have half a rain forest of pretty veneer wrapped around a floor-standing box.

The front baffle veneer of Ruark's new £479 Templar floorstander is made from sustainable Lombardy poplars, so you can play Sting records with a clear conscience. This ebony, rosewood or burr walnut faced baffle extends half way round the sides of the speaker, but the rear of the cabinet is finished in a black textured lacquer, which is both hard-wearing and saves trees. As ever, Ruark's cabinet work is superb.

Like many British manufacturers, Ruark has recently moved back to fabric tweeters, after a fleeting romance with metal domes, following developments in fabric dome technology. The Templar uses a 25mm dome tweeter and a 165mm treated fabric bass driver working with an eight element

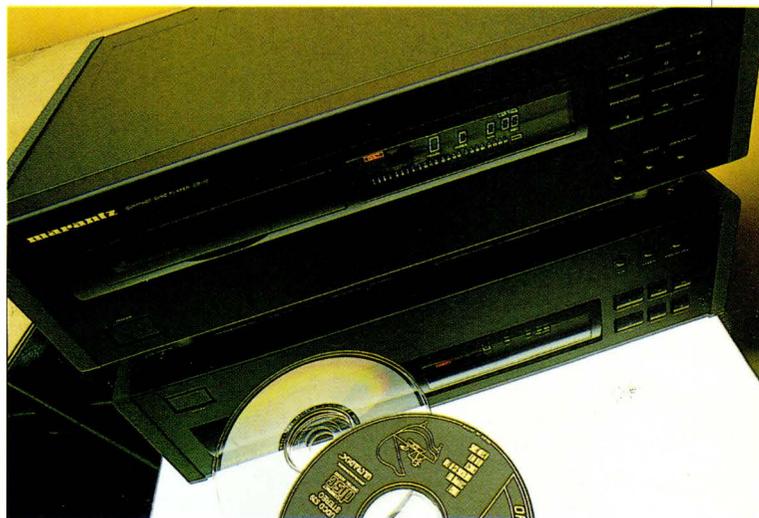
second-order crossover.

Ruark claims that the Templar is an easy to drive, eight ohm, 87dB efficient load. This is borne out in practice, as the speaker easily partners most decent 20-100W amplifiers on the market without strain. The speaker also has the capacity to play a bass line, without encountering the low frequency problems that beset many domestic listening rooms.

The Templar could be called a bonsai speaker, as it stands just 70cm high, with an inclined front baffle to correctly aim the drive units at the listener's ears. At first sight, the hole at the rear of the speaker looks like a port, but the Templar is an infinite baffle design and the hole leads to a compartment which allows the speaker's mass to be tuned to suit a particular room.

At this price point, considering the wide variety of systems the speakers could join, it's important the design treads the middle path between allowing too much detail and being bland.

The Templar, has been designed from scratch using the MLSSA speaker evaluation programme. I used the speaker with modest through to immoral amplifiers yet it never once disgraced itself. It is also unfussed



Definitely not flabby, the Marantz CD-10 is well a toned winner.

## CD PLAYER

### Marantz CD-10

as to its position in the listening room, although a free-space site is recommended.

Ignoring extremely high and low cost applications, the Templar is ideally suited to systems built around the likes of the Audiolab 8000A and John Shearne's Phase Two integrated amplifiers. Its strongest points are a neutral midrange and seductive, widescreen soundstage. A well-recorded disc like k d lang's *Ingenué* has the vocalist clearly separated from the rest of the band, without sounding either shut in or diffused. There are no aspects that immediately detract from the speakers' performance, with instruments sounding natural and well-focused, rhythm sections easy to follow and bass lines suitably deep.

It doesn't have the absolute transparency of the ATC SCM 10 loudspeakers, but at half the price and possessing far greater versatility, the Templar bears the comparison well.

### VERDICT

Ruark Templar loudspeaker

★★★★★ £479.00

**PROS:** Easy to drive and to live with; good sound-stage.

**CONS:** Could be too well mannered for a head-banger.



**RUARK ACOUSTICS LTD,**  
Anwood Lodge Ind Estate,  
Arterial Road,  
Rayleigh, Essex, SS6 7AU  
Tel: (0268) 728 890

Among expensive Japanese CD players, big is clearly regarded as beautiful. The hefty two box Accuphase in last month's *Statements* weighed in at over 40kg of transport/DAC backbreaker. By comparison, the 17kg of this £1,099 Marantz CD-10 might seem a mere bagatelle — until you try to carry it any distance.

Although heavy, the CD-10's bulk is mostly muscle, not flab, as it has a thick alloy chassis and bulky side panels. Such mass loading is claimed to reduce the influence of vibration, which Marantz says is a potential source of coloration. The black front panel, with just ten buttons and a display that can easily be switched off, is understated. The whole package comes over as purposeful.

Inside, the player uses the Philips/Marantz CDM-4 Pro die-cast transport mechanism. The single beam laser is reputed to have greater reading accuracy and faster track access than current transport mechanisms and be near silent in operation. Although access to the harder to reach tracks on discs does seem faster than most, I found it no quieter in use than any other top end players, and the drawer itself is slow compared to the lightning-fast Linn Karik.

Between this and the phono plugs, Marantz has opted for the latest in Philips' Bit Stream

# VRDS-10

\* Bitstream Conversion is a trademark of Philips Corp.

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Hi-Fi Choice, March 1993

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# Choice Sessions

technology, using its SAA-7350 D/A converter chip as a noise shaper, feeding into two DAC-7 (TDA-1547) chips, one per channel, running in dual differential mode.

The old *CD-94* and *CD-94II* both had a forceful bass weight that was difficult to find elsewhere in digital audio and it seems that the *CD-10* has inherited this trait. Playing through the four-disc Bob Marley retrospective, the dub-like bass of his Seventies recordings lost none of its drive or impact, unlike the performance of many a lesser player.

Impact is frequently generated at the expense of the mid-band, which sounds cloudy and indistinct. The *CD-10*, however, makes no such sacrifice, as it has a genuine bass weight and a

powerful dynamic, allied to a neutral midband. This gives it a stability and a precise, focused three-dimensional soundstage that readily projects itself beyond the boundaries of the two speakers. There is also a level of detail, admirably free of digital harshness, that is rare in one-box players outside of the very silly money price band.

It is also transparent to a fault. Given a well recorded disc of any musical genre, the *CD-10* will try to disappear, leaving behind only what was on the disc. Unfortunately, not every disc is of audiophile quality, and the faults of those that fail to come up to the mark are described with microscopic detail. It is especially hard on bright discs; they are still listenable, but nonetheless hard work.

If the player has a flaw, it is in the treble. Although it does not have that harshness which vinyl enthusiasts often consider a digital fingerprint, it lives on the edge of brightness, and in the wrong system, or with the wrong disc, the *CD-10* could tip over the edge.

It was the perfect foil for the Jadis *Defy 7*, in this month's *Statements*, where the rose-tinted softening effect of a big valve amplifier took the sting out of all bar the brightest recordings. Conversely, I can imagine the *CD-10* sounding unacceptably strident if used to feed a Pioneer A-400 amp and Cyrus 753 loudspeakers.

There were those who felt that the old *CD-94* players were the best around, capable of over-turning many a high-end star of

the day. The new Marantz *CD-10* is cut from the same cloth, although some care has to be taken in choosing the rest of the system and the discs. Given the right combination, however, the clarity and stripped bare detail can be an astonishing, ear-opening experience.

## VERDICT

Marantz CD-10 CD player

■■■■■ □ £1,099

**PROS:** Solid build; detailed and dynamic; great bass.

**CONS:** Can be too bright with certain discs and systems.



**MARANTZ HI-FI UK LTD,**  
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## RECORDING

### Testament

American music for male chorus and concert band. The Turtle Creek chorale; Dallas Wind symphony. Reference Recordings RR49 92LPs) RR 49 CD (1 CD).

The dictionary defines testament thus: Will — written statement of one's beliefs; statement of belief or conviction — a credo. From such a description you'd expect music of dignity and purpose, framing powerful words. Music that evokes Man's nobler aspirations. *Testament* fulfills such expectations. A most unusual and valuable issue, it gathers together a broad tapestry of modern American choral music by composers both familiar and unfamiliar.

Leonard Bernstein and Aaron Copland are undoubtedly the best-known names, followed by Howard Hanson. But Randall Thompson has the lion's share of music including the four movement *Testament of Freedom*, with text by Thomas Jefferson, lasting nearly 24 minutes. Written in 1943 to commemorate the 200th anniversary of Jefferson's birth, it is a direct, powerful work that exudes an Elgarian grandeur — an American equivalent perhaps of Elgar's *Spirit of England*, al-

beit starker and more austere.

Three other pieces by Thompson feature, including his beautiful *Alleluja* and two excerpts from the choral cycle *Frostiana*; superbly crafted. Howard Hanson's *Song of Democracy*, with words by Walt Whitman, is the next most substantial work, nearly 14 minutes long.

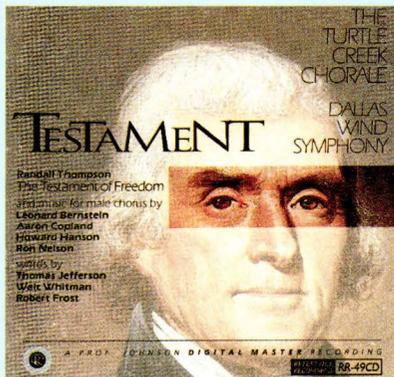
Hanson, a composer of considerable depth, writes music of great dignity and weight. Certainly his *Song of Democracy* is worth getting to know; it is restrained yet powerful, with weighty climaxes that capture the spirit of Whitman's visionary text.

By comparison, Copland's *Simple Gifts* provides a little light relief. This, probably the best known piece on the disc, is given here in an effective arrangement that brings out its folksy piety and sincerity — two minutes of sheer magic. Comparably brief but much tougher is Ron Nelson's *Behold Man*; a powerful work

for unaccompanied choir that impresses with its beauty.

Both choir and band are superb, performing this taxing music with great skill and accuracy; it would be hard to imagine technically better or more idiomatic performances.

The CD is rather special. Recorded with Reference Recordings' new HDCD process, it offers stunning dynamics and some huge weighty climaxes. HDCD (High Definition Compatible Digital) has been co-developed by RR's engineer



Keith Johnson and computer whizz Michael Pffaumer to deal with the problems that afflict conventional digital recordings — specifically, poor resolution and a lack of subtle detail.

The HDCD process works during record and playback, needing a special decoder (avail-

able soon) in the CD player to deliver its full potential. But the disc plays perfectly well on standard machines. RR claims the full HDCD process gives results that are at least the equal of the very best analogue systems.

Even without a decoder this HDCD disc from RR is one of the finest ever. Dynamic range is quite awesome, with some thunderous climaxes. There is plenty of air and space around singers and instrumentalists, while the bass drum has truly staggering weight and power. Yet overall the sound remains smooth and natural, with no false highlighting of the dark timbres produced by brass, winds and male voices.

The LP spreads the music over three sides — sides three and four being identical. Unlike the CD, taken from digital master tapes, the LP is pure analogue. Usually, RR LPs are more than a match for the equivalent CD, but not here; the LP sounds good but lacks the focus and sheer range of the CD and its inky-black silences in the quiet passages.

If adding an HDCD decoder produces the kind of improvement RR promises the result really will be a breakthrough. But even on standard CD players, *Testament* is sonically one stupendous CD.

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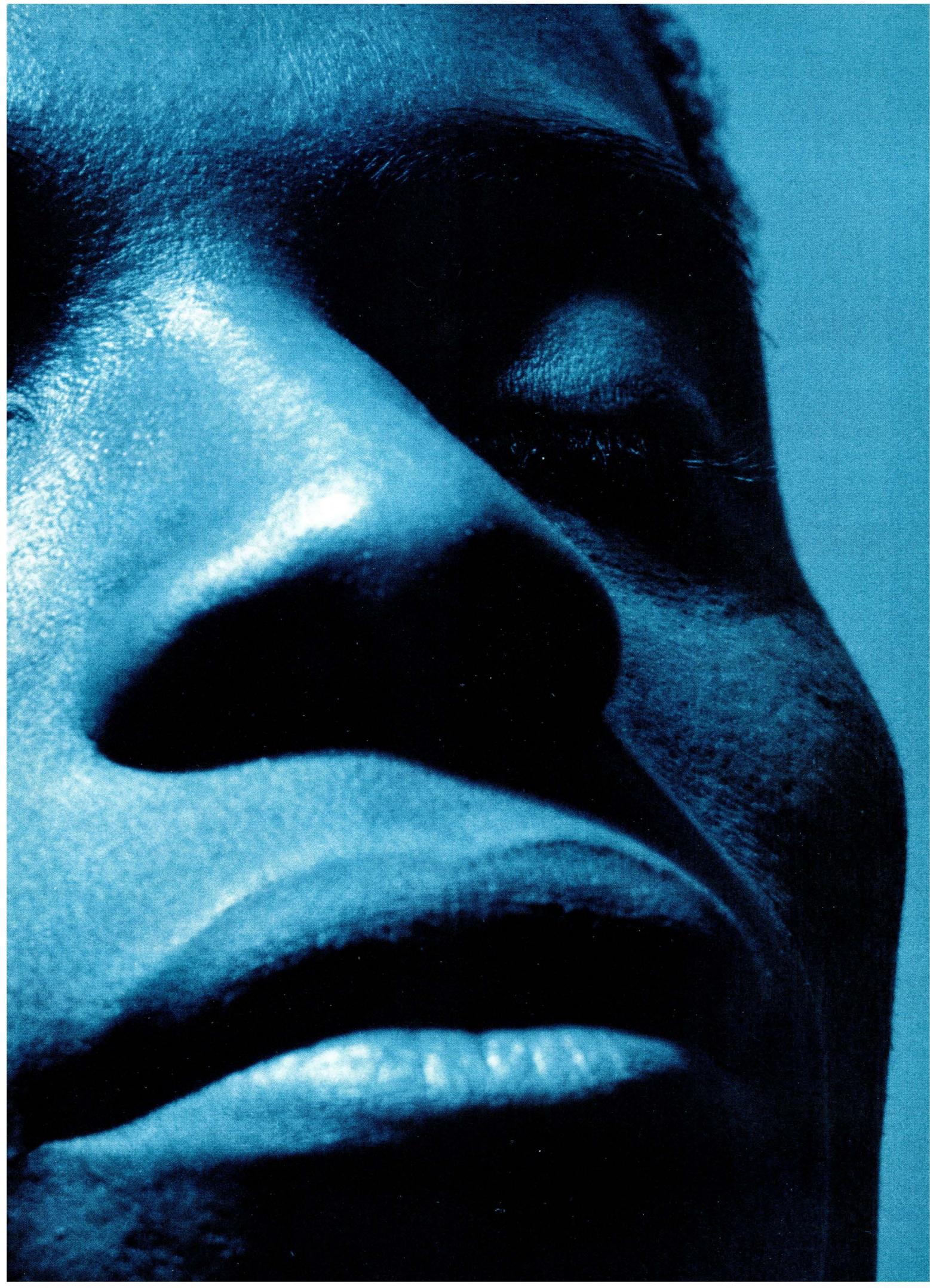


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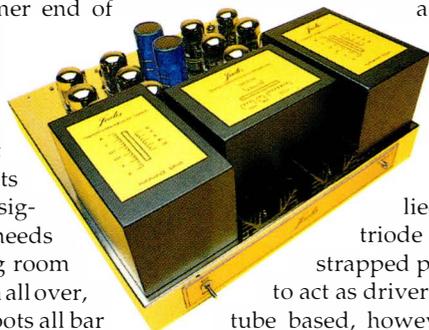
# Jadis Defy 7

*Forget ice cream, shades and beaches; summer means valve amplifiers to hi-fi folk. Alan Sircom has been listening to the £4,999 Jadis Defy 7 power amplifier, one of the season's first.*

**D**ifferent people have their own ways of determining the start of summer. Country folk listen for the first cuckoo, while city dwellers look out for early sunglasses and people in suits drinking outside pubs. Personally, I await the first valve amp of the summer season. For, as soon as the weather turns bright and sunny, the biggest and hottest tube amp is guaranteed to arrive sweltering at my door.

This year's model is bigger and heavier than ever. The £4,999 Jadis Defy 7 power amplifier arrived in the sort of box that could stash an entire childhood of toys and games, swamping most of the ample boot space of a Toyota SpaceWagon. It also weighed an admirable 32kg—that's five stone in old money—most of which lives at the transformer end of the beastie.

The monster within the box is no less impressive externally. Not only is it a heavyweight, but its overall size presents a significant problem. It needs to sit above the living room carpet, as it runs warm all over, but the Defy 7 overshoots all but the largest of equipment tables. I tried to manhandle the beast onto a Sound Organisation table without a mediate shelf, but the table struggled under the weight and the amp looked pre-



carious perched on top. Eventually, after some experimentation, it found solace on two shelves sandwiched together, but it seems that Target's large PSF1 table will hold the Defy 7 safely with only a little overhang.

It comes fitted with a cover to hide the valves from prying fingers, but this is easy to remove, using the four Allen bolts at the top of the cage. In fact, I feel that this child-proofing is a little too easy to remove, unless the bolts are tightened hard and fast. The valve cage is almost perfectly sized to act as a handy cat heater, so owners should remember to clean the cat hairs out before playing.

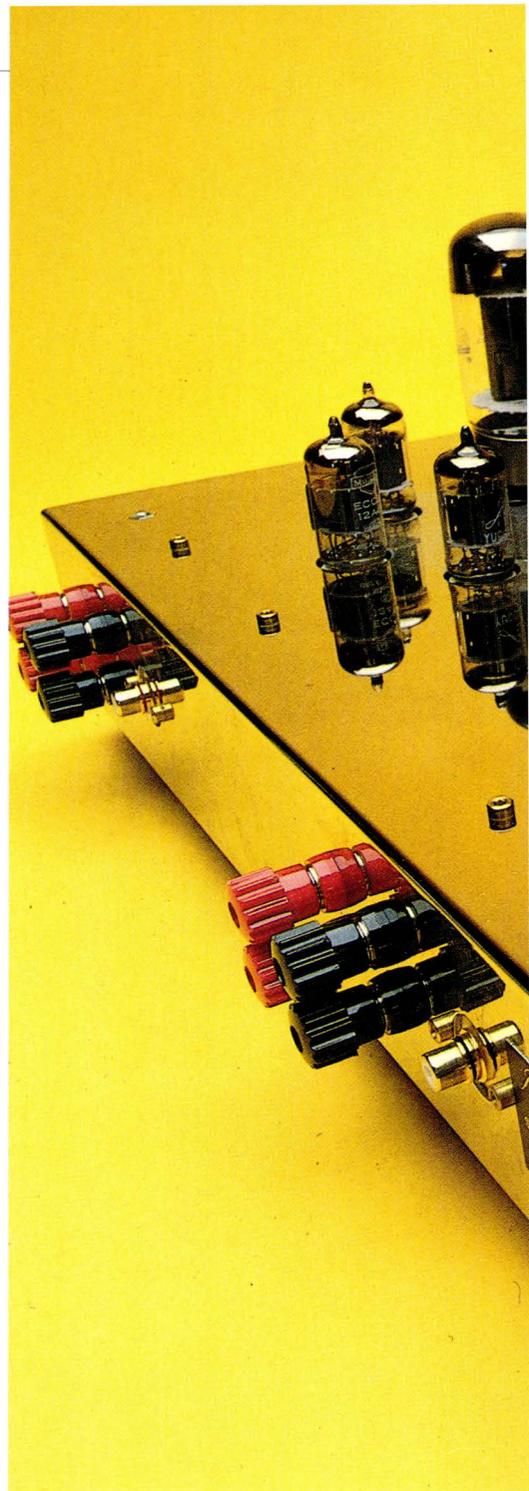
Beneath the cat cage, the layout of the valves gives the chassis a dual mono appearance. It sports an impressive array of 12 General Electric 6550 output valves, two sets of three per side that sandwich the two large 1000µF reservoir capacitors, allied to an ECC 82 double triode as input valve and a strapped pair of ECC 83 triodes to act as driver stage. It's not totally tube based, however, as a few stages outside of the signal path use solid state devices.

Three large potted transformers at the front of the amplifier give it a purposeful demeanour. These transformers

are tapped, with a Meccano-like arrangement of screws and metal bridges beneath the baseplate, to allow the amplifier to drive nearly any loudspeaker load around. It is also possible to under-run the amplifier by connecting the transformer to the next tap up. In this setting, it runs at around 60 per cent of its normal power.

## Glowing up

For an amplifier that is promoted as one of the World's Finest, it is less than aesthetically built on the underside. The circuit board and components are thick enough to withstand the vagaries of life inside a hot valve amplifier, but attention to detail is poor, with scrappy, badly





**The Jadis Defy 7: an impressive looking beast of a valve amplifier that makes beautiful sounds.**

selected wiring and glued, poorly ventilated components. I can only imagine that these devices have been selected on sonic virtues alone. Considering this example of the *Defy 7* has been Absolute Sounds' demonstrator for some time, and treated with as much care as a Marshall valve amp in the back of the roadies' van, I feel sure that it will last far longer than the internal build quality suggests.

There is little else to the amplifier. It has a large on/off switch and glowing green LED on the orange front panel, and an IEC mains socket, a single set of

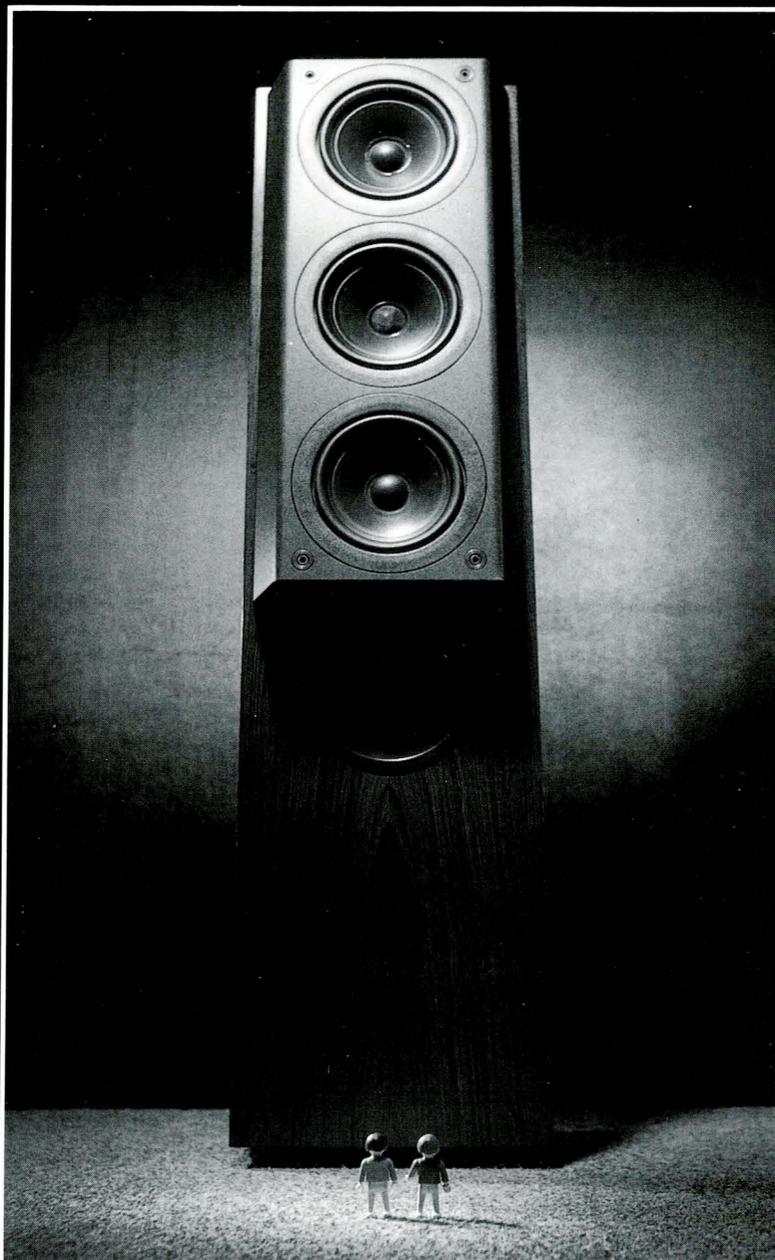
phono input plugs and two sets of gold-plated speaker terminals on the rear. All of the tubes stand tall and proud from the chrome plated chassis and the combination of this, the black transformer caps and the gold glow of the valves gives it an elegant, if rather garish appearance, the sort which does not help the *Defy 7* to shy away from view.

**The Nirvana *Nevermind* LP proved to be the start of repeated arguments with my neighbours, as the preamp volume control was cranked higher and higher.**

It is not the sort of amplifier that benefits from objective tests. Other magazines have found that its external measurements are far more impressive than its internal ones. Neither is it an amplifier for technocrats, as it sounds like a subjectivist's dream — in certain systems. Trying to be scientific but subjective is about as difficult as juggling soot underwater, but using the amplifier with as wide a variety of front ends, preamplifiers and loudspeakers as possible adds the semblance of credibility. Starting with a pair of distinctly easy to

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drive, bass limited but superb sounding ProAc *Response One 'S'* speakers and the more full-range Audio Note *AN-Es*, this Jadis produced a quality of sound that has seldom graced my system.

After warming up for 15 minutes, the *Defy 7* gave the sort of midband information that most other systems aspire to. It made the first few listening sessions last well into the early hours of the following morning. Disc after disc was played, crossing into every musical territory from Allegri to Zappa.

It was particularly noteworthy on well-loved recordings; even my overplayed copy of Nirvana's *Nevermind* LP revealed previously hidden information. It was possible to listen into the recording with greater clarity than before, hearing the precise moment phasing was added to the hi-hat and the over-equalisation of the bass guitar. Most of all, it showed just how clean and unprocessed the vinyl version of this recording really is.

### Chickening out

This LP also proved to be the start of repeated arguments with my neighbours, as the preamp volume control was cranked higher and higher. In the war of attrition that followed between the amp, the speakers and my ears, I confess that I chickened out first, turning the volume control down before it reached its end stop. The *Defy 7* is capable of being driven seriously, no make that viciously, loud.

When my ears had recovered and were fed less raucous music, the *Defy 7* had one of the most easy, dynamic and rosy coloured sounds around. Although it had the gorgeous musicality of an archetypal valve amplifier, the bass had most of the slam and impact associated with solid state devices and extreme highs that transcend either technology. If there is one word that sums up the performance of the *Defy 7* within my own system, it is 'lucid', as music flowed from the speakers with an unforced naturalness. Rather than producing a wide and expansive

soundstage, the amp focuses and projects an image into a tight ball just in front of the listener. Within this crash-helmet of sound, individual images are tightly focused, but those looking for majestic landscapes of sound should look elsewhere.

It had an almost unique ability to express the dynamics of individual instruments within a recording. Instruments of similar volume and tonal range often tend to blur together, in what might be seen as a rudimentary justification for the PASC and ATRAC data compression systems. With the Jadis, however, it is remarkably easy to determine first and second violins, lead from rhythm guitar and all the horns within a brass section in a blues band.

The *Defy 7's* character is not a neutral one, however, as it adds a glow to the sound, dulling the razor sharp edges in 'music' like Einstürzende Neubauten. But the colorations it produces don't detract from its performance. They add to the entire listening experience. The sound the Jadis produces is everything you would expect from a large, powerful valve amplifier: rich, lush, warm and soft, with a superb airy midband.

All of this is par for the course with an amplifier that is claimed to be one of the world's best. However, swapping easy, bandwidth limited speakers for a pair of hard to drive Apogee *Calipers*, or full range KEF *107s*, with a passive preamplifier and a high-end CD source at Doug Brady Hi-Fi in Covent Garden, proved less than successful. Given a difficult load like the Apogee, the Jadis can be heard struggling in the bass and the soundstage effectively collapses under

the load when the music becomes the least bit dynamic or forceful. In fairness, Apogees are not amplifier-friendly loudspeakers, and partnering any valve amplifier with the *Caliper* is an act of optimism, at best.

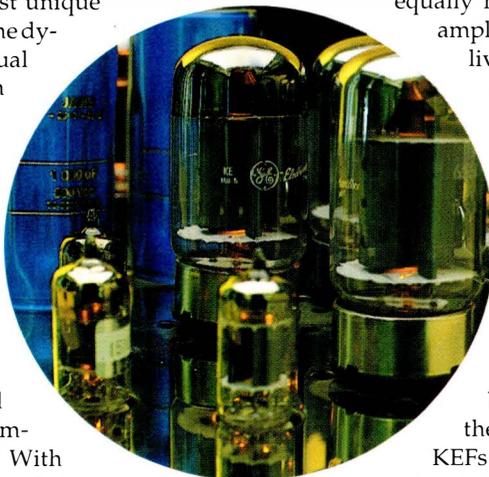
Moving over to the KEF *107* was equally memorable, as the amplifier failed to deliver that last octave in the bass. Although the KEF is one of the easiest full-range speakers to drive, it is likely to manifest any difficulties, however slight, in the deepest bass regions. With the Jadis driving, the KEFs failed to sound quite as full-range as expected

and comparison to a solid state amplifier of a similar quality proved the point by adding the lost bass notes.

All of which leaves me in somewhat of a quandary. In my own system, the Jadis gave a passable impression of the finest power amplifier in the world, lacking the pin-you-to-the-wall detail of the Tesseract *TAMP-60* or the musical lucidity of the better Audio Note power amplifiers, but with a grace and a character that puts it in the top class. Trying the amplifier with more demanding speakers, however, showed the chinks in the *Defy 7's* armour, which would not be my first choice among amplifiers to partner those speakers used.

I feel that the amp fell victim of the synergy syndrome in my tests. The Jadis *Defy 7* represents superb value in the serious high-end valve amp world; if you bought it instead of an *Ongaku*, you could buy a decent Mercedes with the money you save. Using the amplifier with speakers like the ProAcs, Sonus Faber or similar is a partnership made in heaven; other speaker designs may not match so successfully. But when it is good, like the children's poem, it is very, very good, and correctly partnered it would be at the top of the list to produce glorious, musical sounds.

*Jadis is imported by Absolute Sounds Ltd, 58 Durham Road, London SW20 0DE. Tel: (081) 947 5047*



**Although it had the gorgeous musicality of an archetypal valve amplifier, the bass had most of the slam and impact associated with solid state devices.**

*Dan Houston visits Jim Rogers, one of the founding fathers of British hi-fi, and discovers the superb sound of the Rogers speaker system that never was.*

# Rogers raises the roof

**W**e're in Hastings at the home of one of British hi-fi's early entrepreneurs, Jim Rogers, who has had his name on amplifiers, loudspeakers and tuners since the Forties.

We're here to listen to a system which, in many ways, is Jim's definitive hi-fi statement after spending more than half a century developing audio products.

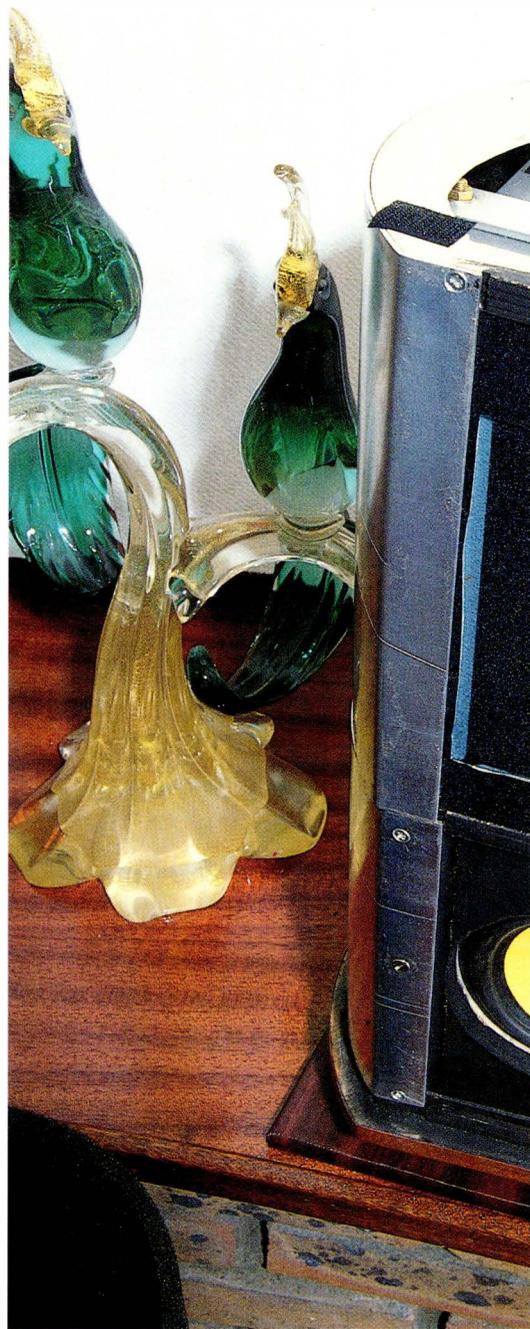
It features his last loudspeaker design, already part of hi-fi folklore as the ultimate speaker Jim never produced. In contrast to their large reputation, these speakers look fairly small, being a hybrid ribbon design with drive units enclosed by what looks like a wood-veneered magnet. The flux from the magnets must exert phenomenal power over the driver units — each weighs 33 pounds and would probably pull your fillings out if you got too close.

The speakers provide bass-midrange and treble for a fully active three-way system with Jim's subwoofer installed behind the bar in his listening room. The amplification is all his own, made up from six monoblocks. The working part of these is about the size of a matchbox, backed up by a huge (six inch tall) electrolytic capacitor and one toroidal transformer for the lot. They are based around a Philips chip, and are specifically designed for a CD-based system like Jim's.

As Jim Rogers was in his forties when the transistor was introduced, I had half expected him to be riding resplendent on the renaissance of valve amplification, with a circuit based around some gorgeous old Mullard or Ediswan bulb he'd tucked away for the purpose.

But having listened to his Marantz CD75SE through this set-up I concluded that there's nothing you could teach JR about speaker and amplification design.

The size of the speakers is really surprising as the scale of their replay is that



usually associated with very big box dynamics. But then Rogers was the company that introduced the bookshelf speaker in the early Seventies, producing the first BBC-developed LS3/5A which spawned a generation of small-box transducers, and changed the face of hi-fi.

Rogers won the BBC design after producing a run of successful valve amps, stereo tuners and corner horn loudspeakers in partnership with Stan Macadie. They based themselves in Woolwich, South East London, where Jim had worked in the arsenal during the war, boosting morale by installing a sound system to pipe music around the factory during tea breaks.

By 1958, Rogers Developments had expanded to new premises in Greenwich,

**Jim's system provides a whole new excuse for being under the bar — the Hi-Fi Choice dream combination, ale and audio.**



Straight out of hi-fi folklore, speakers that form 'a picture of sound'.

and when we compared it with Sugden Class A designs or Quad amplifiers nobody could tell the difference." The amp became the *Ravensbourne* and formed the basis of the *Panthera* range.

The company launched the BBC bookshelf speaker and its larger cousin the *LS3/6* in 1974. The success of the *LS35/A*, still in production by Spendor and Harbeth today, should have secured the company's future. After all, the *LS3/6* provided the benchmark all aspired to when trying to create a simple two way box and cones design using an eight inch bass-midrange driver. However, a year later hi-fi sales went into free fall and Rogers Developments was wound up.

Looking back on it now, Jim blames mismanagement. At the time, the company was by then running two factories with a workforce of 55. Rogers Developments was eventually bought by Mr O'Brien, a Tottenham Court Road dealer, who renamed it Rogers Swisstone. Rogers loudspeakers are still made by Swisstone Electronics.

Jim's next loudspeaker was the popular cylindrical *JR 149*, made in partnership with the late George Tughan of Teletape Industries under the JR brand name. The cylindrical shape was a serious hi-fi concept as the rounded cabinet sides cut down resonance and standing wave reflections. "You could move anywhere in the room and still get a good image," Jim maintains.

where the *Junior* mono horn speakers and the *Junior* range of amplifiers were produced. The advent of stereo fuelled the business in the late Fifties, and by 1962 Rogers had moved to Catford with a factory producing the likes of a switched FM tuner and variable FM tuner as well as the famous *Cadet* pre and power amplifiers. The *Junior* loudspeaker was improved with Lowther and Goodmans Axiottedrivers, and the *Cadet* loudspeaker was introduced. This was closely followed by the *Senior* and *Master* valve amplifiers, sold in the US along with the *Cadet* as the *Eton*, *Oxford* and *Cambridge*.

Jim Rogers remembers attending a Philips and Mullard demonstration of the first transistor amplifiers in London and being impressed by the sound quality: "I had a friend, an expert at transistor design, who suggested a form of transformer drive with both halves of the output stage driven directly by the transformer. It was a class A/B design,



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The *JR 150*, together with the smaller *Metro* and *Magna* speakers plus a subwoofer, were added to the *JR* range at this time.

By 1978, Jim had begun work on his pièce de résistance, a ribbon design with three-way electronic crossover and three-way amplifier to match. The system was to be the flagship model but in 1982, due to economic pressures and overstaffing, the company was forced to close and Jim was once again made redundant.

During the Eighties, he developed the *Phobos* wall-hanging speaker, which looks like a big brown tambourine, and sold them in the Far East, Australia and Italy. As a designer, he was in popular demand producing one off projects such as wall and ceiling speakers in a multi room system for a St Johns Wood millionaire — a long way from the Woolwich arsenal.

In 1989, he moved to Hastings and began work on his own hi-fi system using his now completed speakers. These sit slightly tilted back, on medite slabs either side of his fireplace, next to a petal horn loudspeaker from the Twenties. The room has reasonable dimensions and acoustics for hi-fi.

Jim has reduced reflections from behind the speakers with boards of insulating material and uses a second pair of small matching satellites at the back of the room. These supplementary cylinders use a couple of Bando drive units each and are run through a Marantz delay unit. Jim considers 40 milliseconds the optimum delay for a classical concert hall sound, but changes this for jazz.

His main speakers use an extremely light five micron thick aluminium magnesium alloy ribbon tweeter with a frequency extension of up to 50kHz, theoretically way above the audio spectrum. The alloy is more tensile than pure aluminium and so returns to its position quickly. It is backed by a damping film of polypropylene. The ribbon works in a gap some 150mm or six inches high, by 15mm wide, surrounded by the horse-shoe magnet itself.

The 110mm bass-midrange unit is a sandwich cone design from Focal and handles a signal from 1kHz down to 110Hz. It works within its own airtight enclosure with the magnet clamped on top to reduce vibration. The whole cabinet has a double aluminium skin with a half inch gap in-between, filled with a felt damping material. The grille slips over the cabinet like a sock with a removable wooden disc placed on top.

Jim's subwoofer uses a push-pull pair of ten inch low resonance Spanish Vietta units which can reproduce signals of 18Hz

in free air. "They're the best woofers I've ever found," he enthuses. "The voice coil is very long at 25mm and measures 40mm in diameter." In the enclosures here, they can reproduce signals of 32Hz, something you observe in the occasional bass notes of a recorded cathedral organ, but it is more noticeable when the subwoofer supplies the wonderfully expansive and natural timbre of a saxophone or clarinet.

Jim uses an advanced three-way electronic Thompson-Butterworth transitional filter placed after the preamplifier in the system to filter the signal between

you can measure differences between cables but I've never been able to hear a difference. A low resistance is all that is required," argues Jim.

While the equipment, except for the loudspeakers, looks rather crude, it is sound quality which counts and even though he is 76 this year, Jim displays a keen ear for getting it right.

Listening to a variety of music, from Kenny Davern's *Mood Indigo*, to Solti and the Chicago Symphony Orchestra playing Mahler's *Third Symphony*, we were surprised by the system's almost limit-



**Top: Nakamichi 582 cassette deck. Left: What no speaker stands? Right: Jim's own preamp with rare lime green Smarties.**

two ranges, 20Hz to 2kHz and 200Hz to 20kHz, giving a good deal of overlap. It operates like an extremely specialised equaliser and provides a seamless response across the speakers' margins.

His control unit is simply laid out with inputs for TV, tuner, CD and tape, plus a switch for the front and rear channels. The large volume potentiometer works in 2dB steps all the way up to 60dB.

All the equipment is housed on a shelf underneath the bar at the back of his room. Shelves behind contain his CD collection. The power amplifiers are encased in a nine inch aluminium cube and positioned close to his right hand speaker. With a nod to simplicity, he uses QED 79 strand cable to the loudspeakers. "I know

less grace and unfathomable bass. You don't hear these speakers. Rather, you are confronted by a picture of sound.

And yet the system eschews high-falutin cables, speaker stands and spikes. It is a fantastic example of what a singular approach to system design can achieve. I asked how much the amps and speakers would cost today. "If it was marketed it would be priced at around £15,000," Jim replies. You could pay more, for less.

**The system:**  
 Marantz *CD75SE* CD player  
 Quad *FM4* Tuner  
 Nakamichi 582 Cassette deck  
 Jim Rogers amplification  
 and loudspeakers.



# Back to the future

*Having made more comebacks than Status Quo, LaserDisc is at it again. Geoff Pflaumer studies the breed and reviews three new generation models from Philips, Pioneer and Sony.*

**B**ack in the Seventies, Philips Electronics became licensees of technology developed by Discovision Associates (DVA) and used it as the basis for a system to reproduce video and hi-fi sound, using a laser tracking a 30cm reflective disc. Pioneer (a DVA backer) produced the first commercial LaserDisc player in Japan in 1978 and a consumer version for the American market in 1980.

## Launch problems

Near-broadcast-quality pictures, hi-fi stereo sound, fast access time, special playback effects, durable and potentially very cheap software made LaserDisc technology an attractive proposition.

Both Philips and Pioneer introduced domestic players in Britain in 1983. The

idea did not catch on, however, for a number of reasons. First, the video cassette revolution was under way at the time. With the relatively high standard of broadcasting in the UK, the benefit of being able to record (which LaserDisc cannot) outweighed the advantages of LaserDisc for many consumers.

Second, VCR hardware and software were available through an established rental market while LaserDisc players and discs were not. Third, the supply of videodiscs was both limited and sporadic. Fourth, a rival disc system, VHD, was launched and crashed spectacularly at almost the same time causing some confusion among customers as to the viability of pre-recorded disc formats in general. Fifth, there was a recession going on

(what's new? — Ed) which restrained consumer spending. Sixth, the AV concept did not exist in this market at that time and without the willingness to graft the TV and hi-fi together, the real benefit of LaserDisc was lost.

Finally, and perhaps most crucially, neither Pioneer nor Philips were in a position to commit the resources necessary to launch the format properly.

But while it did not succeed, LaserDisc didn't exactly fail either. Philips extended its range with a new high-end player and Pioneer introduced a much-improved second generation model in 1985. Then, after a two year hiatus from 1986-88, LaserDisc was relaunched under the CD-Video (CD-V) banner. These machines would play ordinary CDs as well as the new CDs

with video clips, old analogue LaserDiscs and the new versions with digital audio soundtracks. As the players would not accept the new digital LaserDiscs, both companies offered trade-in allowances against the purchase of a CD-V machine for their original customers.

LaserDisc took off — with the alacrity of a blancmange sliding down a pantile roof. People were still reluctant to spend money for a player with little to play on it, so it wasn't until Pioneer introduced the *CLD-1450* in 1989 that things began to get interesting. The *CLD-1450* had one feature which eliminated the software problem at a stroke — it would accept and play on most ordinary British TVs discs replicated in the US/Japanese NTSC format, thus increasing the number of available titles by a factor of more than ten.

People are at last beginning to realize that there may be something to be gained from the integration of sound and vision after all, and the time now seems ripe for LaserDisc to claim its place in the world of home entertainment. So it is that we have a new generation of multi-system LaserDisc players from Philips and Pioneer, now joined by an offering from Sony, to evaluate.

**Features**

Philips <i>LDP-600</i>	■ ■ ■ ■ □ □
Pioneer <i>CLD-1750</i>	■ ■ ■ ■ □ □
Sony <i>MDP-650D</i>	■ ■ ■ ■ ■ ■

The first job was to unpack the three players and spread them out with their accessories on the floor. The Philips made an immediate impression both for its relatively great weight and because it's not black but a rather pleasant soft grey.

While the Pioneer and Sony players fairly bristle with buttons, the Philips' fascia is positively spartan, lacking even a headphone socket, and front panel controls are limited to drawer Open/Close, Play, Pause, Stop, Random Access, Skip and Search buttons. These controls, plus programming and jog/shuttle facilities, are available on the remote handset.

There are also Display Mode selector and Display Off buttons on the control panel, although in the case of the latter there isn't a great deal to defeat — the semi-curved blue-green read out measures only 12.5cm wide by 1.5cm high, and its tiny black LCD numerals are impossible to read from more than a few feet



away. The *LDP-600* is also the only one of the three which does not feature the Columbia CX Noise Reduction system.

The front panel of the Pioneer appears more cluttered at first glance, this being largely due to the bank of track access buttons on the right. Having said that, the controls are laid out clearly and large enough to manipulate without too much bother. A 'System' button permits the user to select for PAL or NTSC formats and a CD Direct facility disables all video processing circuits when audio-only CDs are being played, thus reducing HF interference. To the left of the track access buttons is a large, easily read fluorescent panel which displays the usual disc information and includes a music calendar. Next to this, there's a headphone socket with analogue output level control.

With the exception of several removeable stickers, the front panel of the Sony is neat and tidy thanks largely to the Play and Pause controls being integrated into the Jog/Shuttle ring.

Switches for Open/Close, Stop, Track/Chapter Search and a headphone socket with level control are the only ones in evidence until one flips down the front panel to reveal a further assortment for programming and track access operations. All of these facilities are duplicated on the remote handset.

At the back of the players, the Philips is quite well endowed, having two sets of phono audio/video outputs, a single SCART socket, an optical digital audio output, remote in/out jacks and a voltage selector for supplies from 110 to 240 volts. In common with the other two players, no RF output is provided, which means

**The Philips LDP-600: scoring points for construction and colour as well as being a Rolls-Royce of a player.**

that it must be used with a TV or monitor having line inputs. Unlike the Sony and Pioneer models, however, the Philips does not produce a modified-NTSC signal from American discs, and so must be connected to a true multi-system display. For suitably equipped monitors, the SCART socket is wired for RGB (red, green, blue) output.

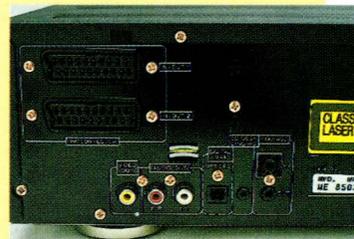
Connections on the Pioneer are essentially the same as the Philips except that two SCART sockets and a single set of phono AV ports are provided. The former are not wired for RGB inputs, but with its

**Video Terminology**

A few handy definitions to explain those annoying acronyms and techno-terms.

**NTSC (National Television Standards Committee):** the method by which colour TV signals are produced and modulated onto broadcast frequencies in North America, Japan and a few other countries. Pictures are constructed of 525 lines stacked vertically, generated at a rate of 30 frames per second.

**Composite (or 'Line') Video:** the pure video signal without audio and not modulated onto an RF carrier frequency. Most VCRs, all



LaserDisc players and many modern TVs have CV inputs and/or outputs which permit components to be linked together for better quality video reproduction.

**Modified NTSC:** a video processing system which permits the reproduction of 525 line/60Hz (NTSC) source material on a 625 line/50Hz (PAL) TV. Both the source component (VCR or LD player) and the TV require appropriate circuitry although, in the case of the latter, most sets have been so equipped for some years.

**PAL (phase alternation by line):** the colour TV system used for transmissions in most of Europe, Africa, parts of Asia and South America. Pictures are constructed of 625 lines stacked vertically and generated at a rate of 25 frames per second.

**RF (Radio Frequency):** this is the type of signal transmitted by the television station or constructed within a VCR/LaserDisc player for link to the TV via the aerial cable. It consists of the composite video and audio signals modulated or mixed together on a carrier frequency.

**RGB (red, green, blue):** composite video signals carry electronic information which triggers electron emissions in the picture tube for each of these three primary colours. Depending on the balance of each, virtually the entire visible spectrum of colour can be produced on the screen. As the most fundamental form of signal, RGB offers the potential for the highest quality video reproduction.

**SECAM (sequential colour a memoir):** similar to PAL in some respects, this system is used in France, Greece and parts of Africa, Asia and South America.

**S-Video (Super-Video):** in addition to the RGB components of a composite video signal, information is also encoded which establishes the relative levels of chrominance (colour or 'C') and luminance (brightness or 'Y'). Unfortunately, optimising one usually degrades the other, so compromise values need to be used for both. With S-Video, Y and C elements are processed and sent between components separately. This results in less colour 'smearing', better contrast and improved shadow detail. Both the video component and the TV need to have suitable S-Video connectors for the system to be used.

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modified NTSC signal, this player can be linked via line inputs to most TVs.

While spartan by comparison, the Sony offers adequate rear panel facilities with its single SCART, a set of line sockets, a co-axial digital output and remote in/out. The relatively limited number of ports is more than made up for by the fact that the Sony has both the RGB facility of the Philips and the modified NTSC capability of the Pioneer.

**Construction**

Philips LDP-600	■ ■ ■ ■ ■
Pioneer CLD-1750	■ ■ ■ ■ □
Sony MDP-650D	■ ■ ■ □ □

Lifting the lid on the Philips revealed why this player is so heavy. The chassis is a full-width, full-height, heavy-gauge steel pressing which makes the LDP-600 a very rigid piece of kit. The loading tray and mechanism are also the most substantially constructed and quietest in operation of the three. Critical circuits are carefully shielded against potential HF interference.

The Pioneer also boasts a steel platform — although lighter in construction and only half height on the sides — but the use of honeycomb pressings for the base plate and large disc clamber bar add to the rigidity. The loading mechanism was the noisiest of the three by far, but mechanically smooth and quick in operation. There was little by way of shielding between internal circuits, but the video defeat facility for use with CDs probably obviates the need for some of this.

It was a surprise to find that the Sony was constructed on a one-piece injection-moulded plastic chassis — not always a bad thing in itself, but this means that the structural rigidity of the player is left to the steel bonnet and base plate. About the only piece of metal inside is a lateral cross-member which supports the disc clamber. Unlike the other machines, the spindle rises to lift the disc off the tray and presses it against this fixed clamp.

**Sound quality**

Philips LDP-600	■ ■ ■ ■ □
Pioneer CLD-1750	■ ■ ■ □ □
Sony MDP-650D	■ ■ ■ □ □

Assessing the audio performance of any component has to be a largely subjective matter but, as has been demonstrated by the RATA-modified Pioneer CLD-1750,

LaserDisc machines can make exceptional CD players because of the stability offered by the high-torque drive systems needed to spin heavy LaserDiscs.

All three players utilize low-bit PDM-type D/A conversion circuits of their own design, and as acceptable as the offerings from Pioneer and Sony were, the 7321 BitStream chip set (as featured in the Rotel RCD-965BX and other fine CD players) employed in the Philips gave it a warmth and smoothness which set it above its competitors. The sound from the Pioneer and Sony was harder — with the former verging on brittleness at times — but depth and soundstaging were good on both, very good with the Philips.

**Picture quality**

Philips LDP-600	■ ■ ■ □ □
Pioneer CLD-1750	■ ■ ■ ■ ■
Sony MDP-650D	■ ■ ■ □ □

To put these players through their video paces, I used a variety of analogue and digital LaserDiscs in both PAL and NTSC formats, including an ancient American pressing of Disney's film *Tron* with a bad case of 'laser rot' on side two. When I changed my own Pioneer CLD-700 NTSC player for the same company's first multi-system CLD-1450 off the boat, I was impressed by how much better the new machine managed to 'paint in' the speckles on this disc and restore the picture to a semblance of watchability.

The new CLD-1750 is even more impressive in this respect, and it manages to produce more saturated colours on American discs. With the CLD-1450, one

**The Pioneer CLD-1750 really makes its mark with superb picture quality and very fair price.**

needs to wind up the colour control on NTSC pressings. Overall performance was excellent, producing pictures as good as I have seen on a domestic TV.

The Sony came a very close second, exhibiting good video error correction, shadow detail

and control of 'herringbone' patterning in scenes with tightly-packed horizontal lines.

The Philips coped least well with the bad disc, sometimes coming close to losing video sync altogether, but both runners-up did equally well on modern, clean pressings.

**Verdict**

Philips LDP-600	■ ■ ■ ■ □
Pioneer CLD-1750	■ ■ ■ ■ ■
Sony MDP-650D	■ ■ ■ ■ □

LaserDisc players boast strengths and weaknesses. The greatest failing is common to all three: the absence of an RF output. Such an omission can be justified by saying that the only way to get the best from any video component is by line outputs at the very least. But for the AV enthusiast, plumbing the video signal for multi-room viewing is made more difficult and costly without RF.



**The Sony MDP-650D: excellent all-round performance and plenty of gadgets to amuse enthusiasts.**

On a more positive note, Philips, as the company that established the LD standard, has gone to a great deal of trouble to produce a Rolls-Royce of a player in its LDP-600. For my money it has succeeded, the LDP-600 proving solid, reliable, smooth in operation, subtle in sound reproduction and sophisticated in style.

The Sony MDP-650D oozes high-tech elegance. It boasts slick finish, very good all-round performance and an abundance of up-to-the-minute gadgets to delight the enthusiast.

While lacking a few of the facilities offered by the Sony and being forced to give second best to the smooth sound of the Philips, the Pioneer CLD-1750 still has the edge on its competitors thanks to a standard-setting video performance, perfectly acceptable sound and very good build quality. What's more, it actually costs between £70 and £120 less than its rivals. This makes it exceptionally good value, and the machine I would take home to meet mother.

Philips LDP-600 Price: £699 Distributors: Active Laser Distribution, 133 Totenham Lane, London N8 9BJ. Tel: (081) 292 1136

Pioneer CLD-1750 Price: £579 Distributors: Pioneer High Fidelity (GB) Ltd, 1-6 Field Way, Greenford, Middlesex UB6 8UZ. Tel: (081) 575 5757

Sony MDP-650D Price: £649 Distributors: Sony UK Limited, Sony House, South Street, Staines, Middlesex TW18 4PF. Tel: (0784) 467 000

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**Denon DCD600** used £95; **Rotel RCD955AX** (£280) £199; **Rotel RCD 965BX** (£299) £250; **Nakamichi OMS7E** top of the line player used £395; **Micromega Logic** (£570) £469; **Teac VRDS 10** (£769) £650; **Micromega Duo CD3** transport latest spec (£1,200) £959; **Micromega Duo BS** converter (£600) £449; **Micromega Duo Pro** converter latest spec (£1,200) £959; **Roksan DP1** transport and **DA1** converter (£1,690) £1,349; **Roksan DS4** power supply (£495) £399.

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**Rega Planar 3** with Bias cartridge (£283) £239; **Planar 3** with Elys cartridge (£323) £270; **Roksan Xerxes** used, immaculate 1987 spec with 1 yr old Roksan Tabriz, used but immaculate £449; **Roksan Xerxes XPS3** in rare natural ash finish (£1,045) £795; **Roksan Touraj Moghaddam Signature** player only, perfect, (£2,500) £2,100; **SME Model 20A** with Series V arm (£3,762) £3,198; **Linn LV11 Ittok** in rare black finish £329; **Roksan Artemiz** arm used but immaculate £359; **Roksan Tabriz** (£190) as new £139; **SME Series V** used but immaculate (£1,232) £995; **Linn Karma** m/c cartridge s/hand but virtually unused £299.

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## Loudspeakers

**Heybrook Solo** (£179) £139; **Rogers LS4A** black, used but immaculate £159; **Heybrook Trio** new model (£359) £295; **Epos ES11** slightly marked cabinets (£350) £279; **Rega ELA** black finish (£405) £345; **Epos ES14** slightly marked cabinets (£515) £399; **Neat Petite** (£525) £399; **Naim IBL** black ash in near perfect condition £595; **Linn PMS** active Isobarik with stands black £695; **Shahanian Super Elf** compact, oak finish (£790) £649; **Sonus Faber Minuetto** (£898) £749; **Shahanian Arc**, light oak finish (£1,195) £949; **Martin Logan Aerius** hybrid electrostatic (£2,198) £1,799.

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# HELP!

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## Mismatch conundrum

**Q** I started out on the so-called budget hi-fi trail back to front, with an AV set up containing an Akai VSF-600 hi-fi VCR, Marantz SP-50 Dolby surround decoder and a Denon PMA-350 amplifier with two pairs of Goodmans Maxims 2s for front and rear channels. To this excellent basic system, I've added a Systemdek 1/920 turntable with a Rega arm and Ortofon 510 cartridge, a Marantz CD72SE CD player and a pair of Rogers LS2a/2 speakers. My problem now is that the sound doesn't match the credentials or cost of the equipment.

The turntable gives clear stereo and good detail but is lacking in 'oomph'. The bass is all but missing. I use the tone controls to liven it up but this causes sibilance on vocals. With the CD player the problems are reversed. I get a full sound with good bass but stereo image separation and detail is very poor. Things get worse if I turn the volume up to a moderately loud level, the bass filling out and becoming blurred while the mid/treble loses its 'bite'.

Everything is set-up correctly, the turntable on a Target wall shelf, the speakers on 24inch Al-phason stands with good quality cable and interconnects.

I think the problem is with the amplifier, as when I use my Sony MDR-CD850 headphones with the CD player, I hear magnificent stereo detail that I don't get from the speakers. This tends to absolve the CD player from blame. I do, however, get stereo and detail from the turntable when it is played through the amplifier/speakers, so I don't know what to make of it. Can two inputs sound that different on the one amplifier?

If the amplifier is at fault, what do I go for as a replacement? I want the turntable to sound lively and bouncy, and the CD player to produce the detail and stereo separation I'm sure it's capable of. I also want the amplifier to



The Akai AM-47 should fulfill the criteria John requires in an amplifier.

have enough inputs and facilities to accommodate a tuner and cassette deck as well as my existing gear, including the decoder, so that's three tape loops for £300. I may go to £400 but only for something that's really exceptional.

**John Slevin, Stockwell.**

**A** Initially, we found this as perplexing as you have but after a little research into the products concerned a possible cause has come to light. The CD72SE was considered a little too relaxed when we reviewed it last November and the PMA-350 has similar characteristics. It's not im-

## Almost happy

**Q** Although I am quite happy with my Pioneer A-400, Thorens TD166/RB250, Akai GX-65 and Meridian MCD, I'm not so happy with my Technics ST-600L tuner and my Corus Blue cartridge, the stylus on which my sister kindly bent. And I wouldn't mind extra bass from my Wharfedale 505.2 speakers.

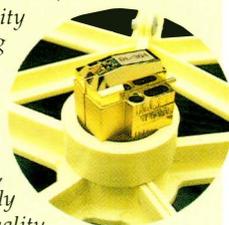
I will soon have up to £1,000 to spend on improving the situation and purchasing a new set of interconnects. I am already using Vampire Wire doubled up for the speakers.

**Chris Dobson, Southampton, Hants.**

**A** We guess what's most immediately required here is a cartridge or at least a new stylus. If you like the Corus Blue then replace the stylus. If you want something better, see if you can track down a Denon DL304 or a Sumiko Blue Point Special.

As for that extra octave, we suspect that the only way to get it will be to upgrade the loudspeakers for something larger. However, there's a danger that you could unbalance the system if you go too far. It might be sensible to split your budget between upgrading your preferred source component and a new pair of speakers. We would suggest you audition some of the following speakers: Tannoy 609s (£270), B&W 620s (£370), Cyrus 753s (£700) and Infinity Reference 30s (£330), not forgetting to take along your organ records.

As for the front-end, a CD player of the Rotel RCD-965BX (£300) or Technics SL-PG520A (£200) ilk would be best, as the MCD has no digital output. The turntable is more problematic, however, as aside from a new cartridge the only alternative to complete replacement is a high quality support. The Mana table would add an extra octave to the player's output. Don't worry about interconnects — you've just won some.



plausible, therefore, that the combination could lead to such a lacklustre sound that it's robbing the sense of stereo image from your CDs.

Imaging relies largely on high frequency information and two laid back sounding products will be seriously lacking in this department when used together. The turntable is relatively open because it's a pretty bright deck with a lively cartridge. You may find that a more transparent amplifier makes it a little too strident, but a rather sombre cartridge such as the Arcam E or P77Mg would make for a relaxed balance.

There are, remarkably enough, a couple of amplifiers in our listings that might be able to deliver exactly what you are looking for and at the right price too. They are the Akai AM-47 (£230) and the Kenwood KA-5020 (£250). Both have three tape loops, three line inputs and a vinyl disc stage. See if you can listen to one or, better still, both of these with your CD player.

## With the best intentions

**Q** I intend to buy a new system within a month. I'm pretty sure about the Compact Disc player, (Rotel RCD-965BX) and tape deck, (JVC TD-V1010), but I am uncertain about the amplifier and the loudspeakers. My budget for them is something like £1,000.

I like rock and roll, and rock (not hard rock) from the Sixties and the Seventies. I also like a very rich and detailed sound.

My amplifier options are the Arcam Delta 290 and Audiolab 8000A, and the speakers I'm interested in are the Cabasse Bisquine, Castle Chester, Epos ES11, Epos ES14, Acoustic Energy Aegis, Linn Keilidh and Mission 753. Please tell me your recommendations for the best combination in my price range.

**Amir Cohen, Hollon, Israel.**

**A** No. The best combination is the one that you like best. It's probably not the one we like best, even if our musical tastes were to overlap.

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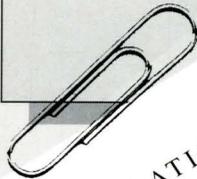
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# HELP!

You really must try to audition as many of the options as possible. Based on the shortlist provided, we would suggest that the Audiolab might work well with the Linn Keilidhs and Epos ES14s, whereas the Delta 290 would make a good partner for the Chesters and Mission 753s. Alternatively, try combining the Musical Fidelity A1 amp with the Cabasse Bisquine, it will make an interesting contrast.

## On the wire

**Q** I have £300 to spend on cables. Can you advise me on a good quality interconnect and five metre lengths of loudspeaker cable suitable for bi-wiring? My system is as follows; Meridian 206B CD player, Audiolab 8000A integrated amplifier and Mission 753 loudspeakers.

**Mark Norton, Gloucester.**

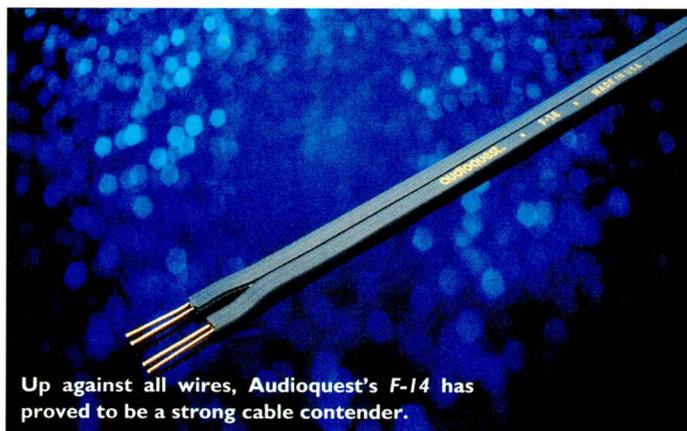
**A** You say speaker cable suitable for bi-wiring, which means you have two options. Either you can go for a cable which can be used on its own and has four separate conductors, or pick from a far wider range of cables that can be doubled up in the conventional way.

In our cable supplement last year (issue 109), a couple of examples of option one made a pretty good showing. One was Audioquest's solid core F-14 (£1.95/m unterminated) and the other was Straight Wire Flex 4 (£5.49/m). Alternatively, double up a good standard cable such as Rotel Supra 10 (£11.50/m plus £17.95 termination per pair), Audio Note AN-B (£14.50/m unterminated), or Kimber 4TC (£128 for a 5m terminated pair).

There's a school of thought that suggests that you should use interconnects and speaker cables from the same company, which might help narrow down the options. Restricting the range to the brands suggested above, we would advise you to consider Audio Note AN-A (£35), Audioquest Hyperlitz Ruby (£69.95) and Kimber PSB (£57.10).

## Making plans for Nigel

**Q** My hi-fi system is made up of the following components: a Manticore Mantra/Musician S/AT OC9 record player mounted on a Target wall shelf (a very underrated turntable by the way — great foot tapping sound); an original Meridian 206 CD player with a DAC7 203 converter using



Siltech cable; a Musical Fidelity Rainbow preamp; a pair of Typhoon power amps and a pair of six year-old Musical Fidelity MC2 speakers bi-wired with Exposure cable and supported by filled Target stands.

My listening room is 14x11ft, and I wish to replace my speakers. I would also like your comments on whether my turntable or CD player would benefit from the purchase of a Townshend Seismic Sink, and whether I should replace the speaker cable?

I have up to £1,000 to spend and would prefer a floorstanding speaker which could be used within 15 inches of the wall. My dealer has suggested B&W Matrix 805s as being preferable to floorstanders. I plan to audition these as well as Royd Abbots and Linn Keilidhs.

I listen to a varied range of music including Led Zeppelin, Gary Moore and Mary Black. My wife listens to all types of classical music even Nigel Kennedy!

**P C F Scott, Southgate, London.**

**A** It looks as though you know what you are doing to us, even if your wife's tastes are a bit radical. There

are a couple of other speakers which it might make sense to add to your list, namely the Castle Chester and Cyrus 753. Neither should be placed very close to a wall, but depending on room layout they may work well. I suspect, however, that you will end up enjoying the Keilidhs most of all as they have a great sense of timing and are remarkably civilised.

As for the Seismic Sink, it will improve the sound of both your turntable and your CD player, but I would expect the most impressive results to be had with the silver disc spinner. Either way, it's a worthwhile upgrade and you can experiment to find which source appreciates it the most.

Your cables might start to hold the system back once you've got the speakers and supports sorted out, and I would refer you to the suggestions made to Mark Norton on this page.

## One box or two?

**Q** I am a separate beginner and need help.

My current system consists of a Technics SU-VX700 amplifier, ST-G90LK tuner, SL-PG 520A CD player and Mission Cyrus 781 speakers connected with Cyrus speaker cable and QED Incon P1 Gold interconnects.

The system lacks sharp detail

and subtlety which has convinced me to change my rather bassy amplifier. I've picked out the Rotel RC/RB-960BX combination, but will this give me the transparency and extra detail I need? Other options include Pioneer's A-400 and the Marantz PM-40SE. In short one or two boxes? I have a budget of £350. Can you point me in the right direction?

**Gary Holland, Birchwood, Lincoln.**

**A** The answer really depends on the sort of results that you get when putting these amps into your system. If we had to pick the best amp in your list, it would be the Pioneer and, given the well rounded character of your CD player and loudspeakers, it looks like a good match on paper and is well worth auditioning. The Rotel combo doesn't rate quite so highly in the sound quality stakes but does, of course, have greater flexibility when it comes to future upgrading.

## The wrong link

**Q** At the moment, my system comprises JPW P1 loudspeakers with Linn K20 cable, a NAD 3225 PE amp and a Rotel RCD-965BX CD player, with Monster interconnect and Audioquest feet. I also have a Denon TU-260L tuner, Yamaha KX-330 cassette deck and a Dual CS-505.4 turntable.

I am pretty happy with the sound but after borrowing a Deltec Little Bit DAC I am considering adding an off-board converter of my own. I am interested in the QED Digit, as funds are tight. But I'm also looking for a second-hand Meridian 203/Audio Alchemy DDE. Would the Digit make sense at the moment or should I wait until I can afford something more substantial?

Also, I have thought about using the NAD as a preamp only



**What the Rotel RC/RB 960 BX lacks in sound quality is made up in upgrade flexibility.**

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# HELP!



Speaker supports should bring more bass out of the Denon DCD-890.

and buying a Rotel power amp. I would greatly appreciate some guidance.

**Jon Moss, Cardiff.**

**A** Upgrade fever seems to have set in rather seriously. Presumably, you want your system to sound better but are not sure exactly how to achieve this. We know the problem.

Looking at your system as it stands, we would be inclined to reconsider the amplification and loudspeakers before you try to improve on what is a very good CD player. Look at amplifiers first. Apart from the ubiquitous (but not that suitable in this instance) A-400, there's Marantz' PM-40SE (£250), the Denon PMA-450 (£250) or the interesting Moth Series 30 which could be phased in power amp first (£239), followed by the passive pre (£149) at a later date, using the 3225 as you suggest.

To hear a significant speaker improvement you are going to have to move up to something in the Heybrook HB1 S3 (£250), Tannoy 609 (£270) or Epos ES11 (£350) league. When you've got the latter two thirds of the system sorted, you can look at the front-end. At the moment, it's the strongest link in the chain.

## A very keen reader

**Q** My system comprises a Denon DCD-890 CD player, Cyrus II amp, Heco Reflex 20 speakers on Target stands, Kelvin K2 interconnects and Audio-Technica AT 6502 speaker cable.

As a first time buyer in the hi-fi market, I purchased the above system totally on the advice of my local dealer. However, I feel that the system lacks serious bass and also sounds muddled with certain tracks, especially those with several instruments being played.

I would be very grateful for your advice on the above system

with regard to improving its sound quality.

I have been a very keen reader of *Hi-Fi Choice* since buying my first copy in December, and I admire your honesty when reviewing products. If something is no good then you say so, and to this end I will be reading your reviews and your opinions before buying products in the future.

**Danny Lyden, Bearsden, Glasgow.**

**A** We haven't tested the Heco Reflex 20 as yet, so it's difficult to pinpoint the limiting factor in your system. However, the CD player isn't exactly a classic and is prone to ignoring fine detail and subtlety, preferring to emphasise the enthusiasm in music. It's unlikely to be the cause of limited bass power. We're inclined to assume this is down to the speakers, which, given their price, are going to be limited in this respect. Possibly matters could be improved with better support and placement. Read the various reviews in last month's supplement on stands and experiment with speaker positioning. Both have a significant effect on the degree of control and bass extension that a speaker can produce.

If this doesn't do the trick, you may have to trade the speakers in for a pair that we do recommend. The Directory lists them all.

## Vinyl fever

**Q** I'm afraid I'm suffering from a severe case of upgrade fever, and so hope you can suggest a remedy for £3,000.

My symptoms include a craving for well extended bass, and for a sound that's

as transparent, dynamic, and life-like as possible in a room measuring 14x12ft with a suspended floor. I enjoy most music, classical and jazz in particular.

My main system comprises a Townshend Rock Reference turntable with *Excalibur* tonearm and Audio-Technica OC9 cartridge, sitting on a *Mana Reference* table. This is connected to a *Michell Iso* phono stage straight into a pair of *Stax Lambda Signature/SRM-T1* headphones, all of which I am very happy with. I also use a *Kelvin Labs Integrated* amplifier and *Infinity RS2000* speakers with solid core cables.

I am considering high sensitivity speakers and top quality cables and interconnects. The best speakers I've heard so far are the *Townshend Glastonbury*, *Linn Isobarik*, *Infinity Kappa 9* and *Quad Electrostatics*. Would the *SD Acoustics* or *Impulse* horns also be worth an audition?

At a later date, would it be worthwhile adding another *Kelvin* amp and using them as monoblocks, or even using two *Pioneer A400s*? Or should I go the whole hog and acquire the *Michell Argo/Alecto* amplifiers? Finally, could I use the *Iso/SRM-T1* as a temporary preamplifier, using the spare headphone output on the *SRM-T1*, which would produce a pure moving coil record only system?

**J. Harwood, Doncaster, South Yorks.**

**The Heybrook Sextet could quench upgrade fever.**



**A** Although the *SRM-T1* has two pairs of phono plugs, it is designed to be used in the tape loop of a preamplifier, not as a preamplifier itself. The level control on the front panel does not affect the signal through the tape loop, so using the *Iso/SRM-T1* straight into a power amp, without any kind of preamplifier to attenuate the signal, is very unwise. We also feel that it would be better to put the *Stax* headphones through the tape monitor circuit on the *Kelvin* as the performance may be fractionally degraded when played straight through the loudspeakers.

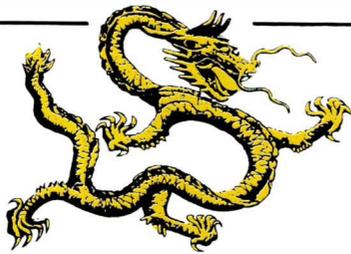
Ultimately, the *Michell Argo* preamplifier and *Alecto* stereo power amplifier are good partners for the *Rock Reference/Iso* front-end you currently own. We would strongly suggest adding a *Hera* power supply for both the *Iso* and *Argo*. This could be done in stages, opting for the *Hera* first, then adding the *Argo/Hera* combination and finally upgrading to the stereo *Alecto*. As an alternative to the *Alecto*, a pair of *A400* amplifiers is possible, but we would be cautious of adding a second *Kelvin* amplifier into the system. The equipment has changed since *Kelvin's* chief designer moved over to *AVI*.

Regarding speakers, the discontinued *Townshend Glastonbury* is well suited to your system, though the alternatives could easily be accommodated. The *Glastonbury* is a unique and much missed design, though it should be possible to find a second-hand pair. If not, the *Impulse* horns, the *SD Ribbon* and the *SD1*, together with speakers like the *Heybrook Sextet* or the *KEF 104/2*, would be worth considering.

Until the rest of the system is sorted out, don't bother to change cables and interconnects. When your upgrade is nearing completion, look at *Cogan-Hall* cables, or alternatives from *Silver Sounds*, *vdH Source* and *Wind*, and *Isoda*. Finally, it may be worth experimenting with *Mana* tables or *Townshend Seismic Sinks* throughout the system, in addition to the turntable, as they do seem to help each component in the chain.

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## Back to the future with recordable CD

A hundred years ago the makers of phonograph and gramophone machines were encouraged to combine forces to make a better music storage system.

Today, in the midst of the DCC and MiniDisc battle, we already have a single superior format, CD-R, which, it seems to me, is the clear choice for any consumer.

The head of Micromega said over a year ago that mass production of CD-R would make the cost of a CD-R player just 10 per cent higher than a normal CD player — even at 30 per cent higher it would still be cheaper than either DCC or MiniDisc.

Other advantages are that a CD-R disc is playable in all CD players, it has no data compression, the format makes it possible to put all your LPs (I have 1,000) onto CD, and a recordable CD (the Kodak) costs only £5, and could cost less (far less than a DCC tape or MiniDisc).

Finally, CD players can be upgraded so that in a few years from now we could see a 20-bit CD played on a CD player that could also play the current 16-bit CDs.

I've made my decision and now I'm just waiting for the tech-

nology to become affordable. The only obstacles to domestic CD-R machines are the hi-fi companies themselves that want desperately to cash in on the new formats, although this is not necessarily what the customer wants.

I believe that in two years time there'll be CD-R machines at £300 or less, and that MiniDisc and DCC will be distant memories.

**Moshe Benarroch, Jerusalem, Israel.**

## Tracking down Edelweiss

I thoroughly enjoyed the performances on the Edelweiss CD sampler given away with the April edition of *Hi-Fi Choice*. Unfortunately, apart from the advert on pages 27-30, there was no other information about them. The advert doesn't even give a contact address for Edelweiss.

Can you supply an address or phone number through which I could obtain a current Edelweiss catalogue?

**Colin McLean, Peeblesshire.** *I'm glad you enjoyed the free CD. More information on Edelweiss can be found in the April issue on pages 40-41, including a mail order selection and coupon.*

*In case you missed it, the address to write to is: Planetarium Recordings & Music Publishing, Riverside House, Leaside Road, London E5 9LU.*

## Desperately seeking real music

Did Philips get it right first time when they introduced the CD100? I am trying to replace mine (it plays for 10 minutes then stops) but am having difficulty finding a modern equivalent.

## Will hi-fi survive the death of vinyl?

My interest in hi-fi only began a few years ago and so my entire music collection is CD based.

I am beginning to doubt whether I should spend money upgrading, when I've been made aware (through your magazine) of the superiority of vinyl. It seems to me that the CD recording medium is considered flawed by virtue of its sampling rate.

If CD is truly flawed, how can you justify advising readers to spend thousands of pounds on high-end CD systems, which won't improve the sound, if it is still true to say that better equipment is more critical of source material.

Or does this mean that the concept of 'high-fidelity' will disappear with the demise of vinyl, along with hi-fi reviewers, magazines and so on.

**C J Say, Westbury, Wiltshire.**

*While it was undoubtedly true, especially when CD was a new medium back in the the early Eighties, that vinyl was, without question, the superior hi-fi format, technology marches on. It is now possible to gain wonderful results from many of the current CD players which produce sounds on a par with top turntables.*

*Many would argue that the quality of budget CD players is actually superior to that of equivalently priced turntables. Such players can certainly do justice to top quality amps and speakers further down the hi-fi chain in a way that turns accepted hi-fi system building theory on its head. It's only when you start talking about equipment costing 1 a r g e , telephone number sums of money that the debate about whether CD or vinyl offers the ultimate sound really comes into play.*

*There is no reason, as more information is squeezed onto CDs themselves and the players become evermore sophisticated, why the high fidelity of CD players should not one day, in the very near future, far outstrip any sound reproduction achieved by the most expensive high-end turntable. Then there are always the new products like MiniDisc, DCC, and whatever may be lurking around the corner in the major hi-fi companies' development laboratories, not to mention the insatiable demand of the consumer, which will ensure that the concept of 'high-fidelity' will always be alive, kicking and a source of unlimited challenge and debate in the pages of Hi-Fi Choice.*



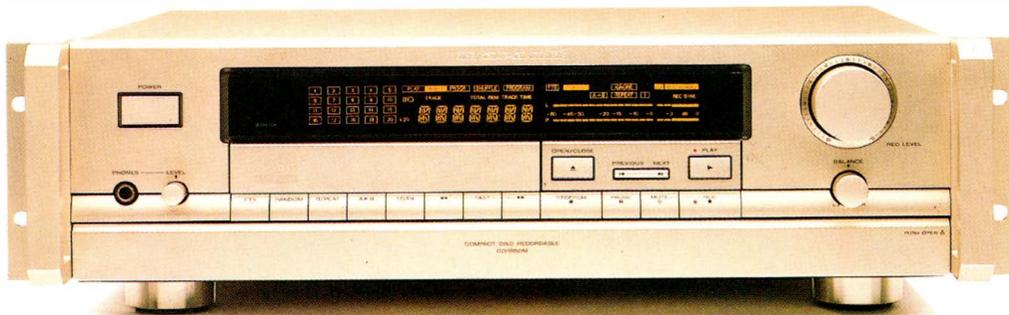
I visited those friendly people at Richer Sounds in Stockport and selected a Philips CD690. However, the sound was really disappointing and so I was upgraded to the Marantz CD4211. This improved the bass and midrange dramatically, but unfortunately

the top end was missing.

These are both players that have received excellent reviews in hi-fi magazines, and I was understandably disappointed. Philips introduced the CD100 with a dead flat frequency response, which gave a very accurate response to the music. Then, those boring people, turntable users, who hadn't heard high frequencies before, accused the CD100 of being too bright. Thereafter, all manufacturers seem to have filtered out the top end, resulting in bland music

The time has come to change the staid people who sit on hi-fi listening panels, or re-educate them to recognise what music actually sounds like.

**Bernard Walker, Newcastle-under-Lyme, Staffordshire.**



The Marantz CD-R, a taste of things to come?

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# HI-FI CHOICE

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# Software price war rages on!

**G**erald Kaufman seems to have done for our hopes of lower CD prices what he did for the Labour party's image, which is why they kept him off TV during the last election campaign. Kaufman's all-party Select Committee of MPs was branded a 'kangaroo court', so its recommendation that CDs should be £2 cheaper will be ignored.

The committee's argument was that CDs are £2 cheaper in the USA, and music cassettes carrying the same music are at least £2 cheaper here. CDs cost the same to press for US shops as they do for UK shops. Music cassettes cost as much to duplicate as it costs to press a CD. So logic dictates that CDs here should be £2 cheaper.



**As the row about the cost of CDs continues, Barry Fox considers a few priceless arguments.**

But logic has no place in any argument with the record industry, as proved by clumsy claims that the high price of CDs is justified by the cost of promoting new artists.

And the record companies are already countering Kaufman's argument on low US pricing by hiking the price in the US. Ballpark price has already gone up \$2 since this whole thing started.

The record industry and its trade body, the BPI, have very convenient memory banks. In April 1992, as the cry for cheaper CDs gathered momentum, the BPI wrote to the *Daily Mail*, claiming that

"when they were launched in 1983, a full price CD cost the same as it does now". Back in 1982, just a few months before CD was launched, the target price for discs was around £8. This was because Jan Timmer, then boss of Polygram and now boss of Philips, wanted CDs to be as close in price to vinyl LPs as possible. This proved impractical and when CD went on sale, shop prices for discs were £9.99. Players initially cost £500, but prices soon fell and have continued to fall.

When the BPI wrote to the *Mail*, a lot of pop CDs already cost more than the £12.49 the BPI quoted. Now watch out for a new argument.

The MCPS, (Mechanical Copyright Protection Society), collects royalties from the record companies on behalf of composers and songwriters, for use of their copyright music in recordings. The royalty rate was first fixed by Parliament in the Copyright Act of 1911, at five per cent of the retail selling price and then raised to 6.25 per cent by the Copyright Act of 1956.

All was fine until RRP (recommended retail pricing) was abolished in 1980, leaving retailers free to charge what the public would pay. There was no longer a reference point for royalty payments. The issue was fudged and royalties paid at the rate of 6.25 per cent of dealer price plus a mark-up (with tax deducted).

In 1988, the new Copyright, Designs and Patents Act abolished the idea of a legally-set royalty, and said that it should instead be set by market forces. The lawmakers saw that disputes would be inevitable so the Act also created the Copyright Tribunal to adjudicate. The Tribunal is a panel of 'great and good', a Chairman and two Deputy Chairmen, usually lawyers.

The MCPS wants the royalty paid to composers by the British record companies to be the same as for the rest of Europe, 9.5 per cent on dealer price. This rate was fixed by agreement between the European copyright agencies and record companies. But the UK rate is lower, around 8.2 per cent. So if the UK falls into line with the rest of Europe, the British record companies will have to pay higher royalties to songwriters. And this means a cut in the poor starving record companies' profits.

Not surprisingly, the British record companies, led by the BPI, are objecting. The BPI has been arguing that the UK is a completely different ball game, so there should be an even lower royalty here, around six per cent on dealer price. The Copyright Tribunal went for the middle ground and in March 1992 set it at 8.5 per cent on dealer price.

Now the MCPS and BPI are in dispute over the new formats, DCC and MD. The BPI wants the songwriters and composers to give a 'new format' discount on royalties, similar to that agreed for CD. The idea of a discount is to help new formats get started. It subsidises the record company's investment in the new technology needed to press or duplicate, and publicise, the new formats. (How much publicity have you seen from the record companies, for DCC and MD formats?)

When the CD system was launched in 1983, the MCPS agreed that the high cost of building the completely new digital pressing plants needed to mass produce discs should be subsidised. So it agreed on a very generous discount. The 6.25 per cent rate was calculated on the price of a vinyl LP, not the much higher price of the CD. The discount then reduced on a sliding time scale and ended in 1990, with composers now getting 8.5 per cent of the dealer price (with VAT taken off, of course) of a CD in the UK and 9.5 per cent in the rest of Europe.

Not surprisingly, artists feel grieved that they are now being told that CD sales have peaked. They feel they have only just finished giving a discount on royalties. So the MCPS is fighting the BPI's call for a discount on DCC/MD. The Tribunal will hear the case at the end of this year. It should be fun because if the BPI loses, the record companies will have to pay out more of their asking price for DCC and MD. And this they will not like.



1987

Path makes carrying tapes around easier than ever with the introduction of the rugged, colourful and capacious *Tape Taxi*. U2, meanwhile, are growing on people everywhere.



1985

The Allsop 0207 Video Head Cleaner is released and immediately wins over video users to the benefits of the Allsop cleaning system. Dire Straits polish up their own video act.



1990

Path's On 'Write on, Wipe off' Video Board memo system allows video enthusiasts to organise their tape collection with the minimum of fuss. Madonna comes up with a pretty immaculate collection too.

# Win £2,000 accessories

Path group PLC is celebrating its tenth birthday this year, and you have over 150

Answer five simple questions and you could win one of the ten Path products pictured here that have helped to make the company such a success since it was first established in 1984.

## How to enter

Write your answers to the five questions below, along with your name and address, on the back of a postcard or sealed-down envelope. Send your completed entry to: Path Competition, Hi-Fi Choice, Computer Mailing Services, PO Box 249, London WC2H 0HS. Entries must be received by first post on Monday, July 19, 1993.

1988

As CD ownership reaches new heights, Path provides portable disc storage in the form of the Posso CD13 Media Box. Fine Young Cannibals are the year's raw new talent.



1993

Path meets the demand for high quality phono interconnects that will not break the bank with the launch of the IXOS 104s, an instant hit with hi-fi enthusiasts. New Order break their own new ground.



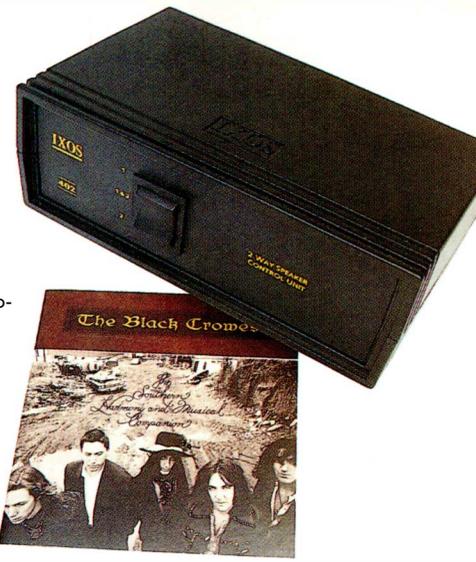
**1991**

The Case Logic CDW/2 disc wallet provides safe storage for up to 12 CDs in a handy carrying pouch, ideal for music lovers on the move. It's Nirvana for many.



**1992**

The introduction of Path's IXOS 402 two-way switching unit provides control over two speaker systems in different parts of the house at an affordable price. The Black Crowes switch on many a new fan.



# worth of from Path!

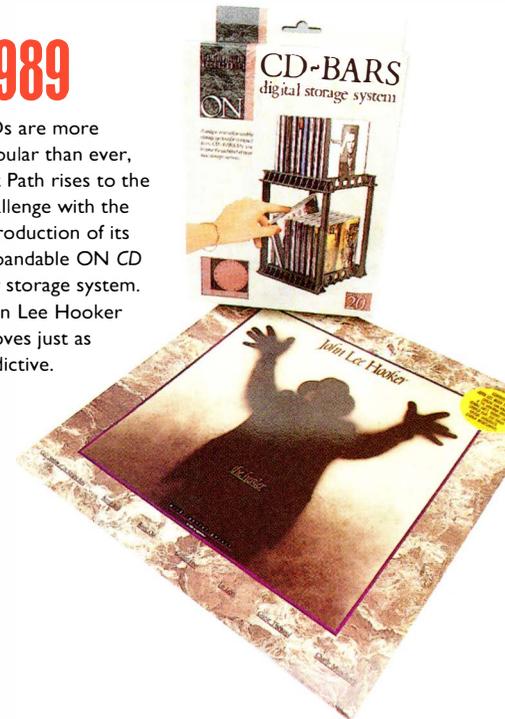
chances to win one of the accessories that has made the company famous

## Questions

- How many speaker systems can be controlled by the IXOS 402?  
(a) 2 (b) 4 (c) 6
- The Nagaoka MP-11 cartridge is a moving magnet design. What is the other dominant cartridge type?  
(a) Moving diamond (b) Moving coil (c) Magnetic coil
- The connections on the IXOS 104 interconnects are coated with which precious metal?  
(a) Silver (b) Gold (c) Platinum
- How many CDs can be stored in the Case Logic CD wallet?  
(a) 8 (b) 10 (c) 12
- The Posso CD13 CD holder has another name. Is it:  
(a) Media Box (b) Tape Taxi (c) Disc Wallet

**1989**

CDs are more popular than ever, but Path rises to the challenge with the introduction of its expandable ON CD Bar storage system. John Lee Hooker proves just as addictive.



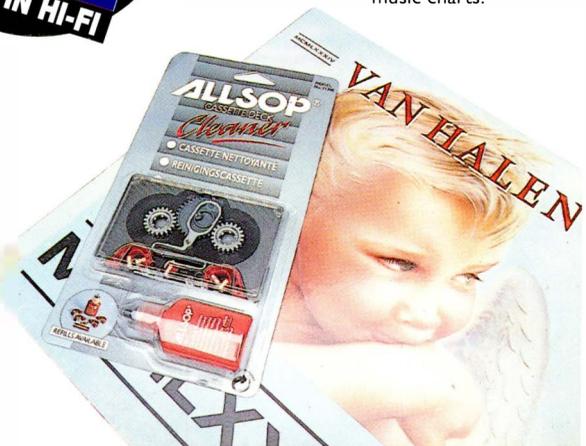
**1984**

Path launches the Allsop 71300 Cassette Head Cleaner. It quickly establishes itself as one of the leading tape care products on the market. Van Halen are cleaning up in the music charts.



**1986**

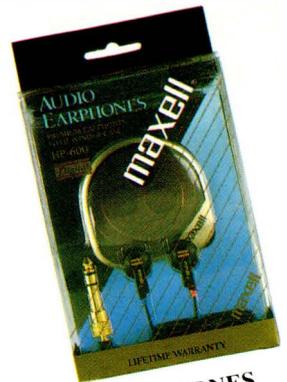
A star is born. One of the hi-fi world's most enduring and best-loved moving magnet cartridges, the Nagaoka MP-11, is launched. It will go on to win countless awards, and appear in many different forms. Paul Simon wins over a new generation too.





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# DESIGNED TO BE BETTER

# On test: CD transports

Recent issues of *Hi-Fi Choice* have reflected the diversification of modern digital audio, which is branching out from conventional integrated CD players to include separate CD transports, D/A converters

(DACs), digital interconnects and associated media like recordable CD, DCC and MiniDisc. One product we've yet to address, however, is the genuine two-box CD player: the one-brand CD transport and DAC combination

specifically designed as a partnership.

In certain cases, we've covered one or other of the components in isolation, including earlier versions of Meridian's 200 and 600-series, DPA's PDM2, the Proceed PDP2 (fore-

runner of the company's PDP3) and even the Linn Karik in its guise as a standalone CD player.

For this project, we've assembled eight of the latest two-box players from what is a restricted and rarified field. A glance at the *Directory* will confirm that



# and DACs

many more manufacturers produce add-on D/A converter units, intended to upgrade the performance of any existing CD player equipped with a digital output, than go to the lengths of designing dedicated transport/DAC combinations for the well-

heeled enthusiast. This is because Philips' licensing agreements only cover the physical handling of the CD, not how data is manipulated once it's been recovered.

Furthermore, all facets of the basic technology are represented equally, including examples of Far Eastern three-beam and European single-beam laser transports. The combinations on test also feature various bitstream and 20-bit DAC technologies, together with the full complement of different electrical and optical digital interconnections. It all brings our coverage of the CD market bang up to date.

Although the technology involved tends to be difficult leading edge stuff, the actual two-box packages themselves have more or less the same capabilities in terms of features and facilities as the conventional single-box player. These were covered in greater detail in last month's 20 player test (issue 119). The major distinction is the greater flexibility of the two-box player for upgrading one or other in the future — to take on board technological improvements — and the very comprehensive input/output socketry fitted in order to facilitate such future possibilities.

## The cast list

Audio Alchemy DDS/DTI/XDP/PS2	£999/£379/£449/£219
DPA Digital T-1/PDM2mkII	£895/£2,350
EAD T-1000/DSP-1000	£1,200/£995
Linn Karik/Numerik	£1,497/£995
Meridian 200/263	£895/£495
Meridian 602/606	£1,750/£1,350
Proceed PDT3/PDP	£2,349/£2,249
TEAC P-700/D-700	£900/£600

## What the tests mean

As you read through this survey of eight combinations, you'll be able to compare the technical prowess of each model revealed by a series of five graphs.

Of these, the frequency response plots are the most obvious, the upper trace being run at an ideal 0dB while the lower trace reveals inaccuracies that occur at a much lower -60dB. Ideally, the upper and lower responses should match one another though any increase in noise or deviation in linearity is immediately revealed by a change in the smoothness and extension of the -60dB trace.

Ripples in either response are often due to something called the 'Gibb's phenomenon', which is a function of the oversampling filter. Advanced digital filters from NPC, Sony and Burr-Brown, for example, suffer very little in-band rippling but budget oversamplers from JVC, NPC and Philips can result in fairly bold 'wobbles'. Do look out for unusual 'blips' or exaggerated ripples in the lower response, which can often point to undesirable digital/analogue cross-coupling within the CD player or DAC.

The plot of a dithered 1kHz tone reveals the spread of distortion, noise and sampling images associated with a low -70dB signal. Dither is a special type of noise that's added to the digital signal to smear or randomise quantisation errors, trading distortion harmonics for a slight increase in noise. The plot from the Teac P-700/D-700 is an almost perfect example of dither in action, for example, whereas the Linn Karik/Numerik combination still betrays a hint of 3rd and 7th harmonics.

Do look out for the accumulation of ultrasonic noise beyond 20kHz. This is a feature of many

bitstream-style DACs whose noise-shapers are used to redistribute huge levels of re-quantisation noise. Traditional 16, 18 or 20-bit converters are often 'cleaner' above 20kHz, and as a result tend to perform more consistently with different amplifiers.

Distortion and sampling images are most graphically illustrated on the 3D plots which use an audio frequency sweep (20Hz-20kHz) to reveal changes in performance across the board, rather than at any one frequency. Distortion harmonics may be seen radiating out to the right of the main sweep while sampling or stopband images are represented as whole or partial V-shaped patterns. Think of the latter as digital reflections — images of the main 20Hz-20kHz sweep that bounce off the 44.1kHz, 88.2kHz or other sampling frequencies. Few modern

players suffer sufficient stopband noise to cause audible problems, however.

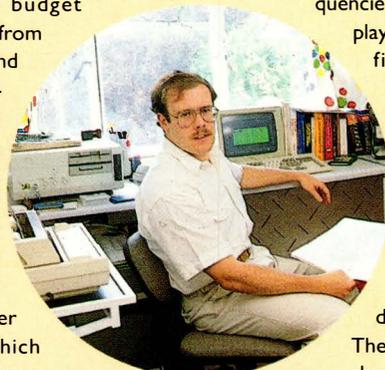
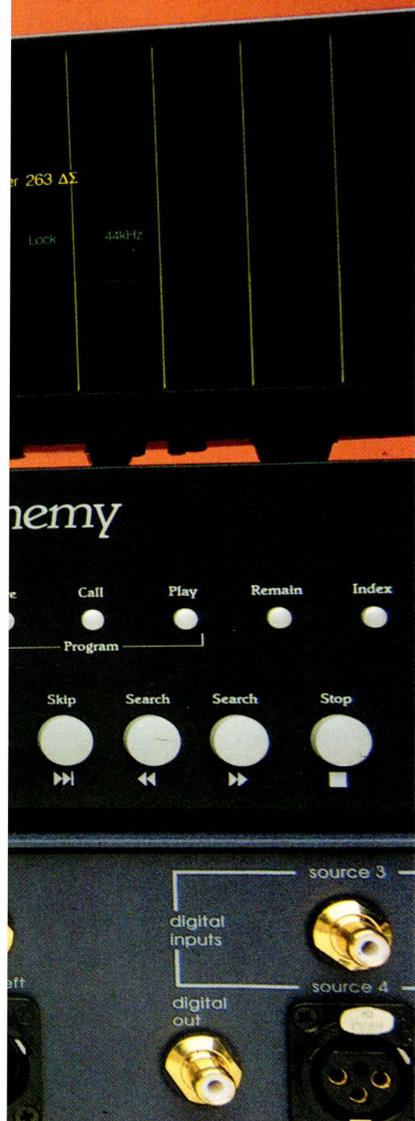
Our other plots relate to the digital interface.

The simplest is the characteristic impedance of the DAC's electrical digital input, a

trend that should remain firmly anchored to 75ohm up to 20MHz and beyond. Impedances that deviate from 75ohm cause the output of the CD transport to be miterminated. In other words, a percentage of the digital signal is being reflected. The reflected portion then sets up standing waves within the cable.

It's important to appreciate that no data is 'lost' by this mismatch but the effects of overshoot (see digital signal trace), circulating interference (a fuzziness on top of the signal waveform) and decreased edge definition may well contribute to digital jitter within the converter itself.

**Digital dilemma.**  
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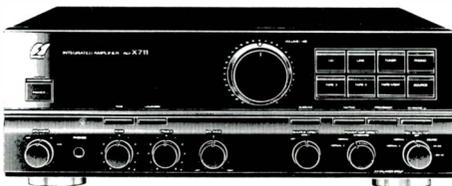
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# Making the right connection

Different digital interconnections all carry the same signal, whether transmitted as pulses of red light (optical) or pulses of electricity (coaxial). In practice, these two groups of digital output and input are further sub-divided into Coaxial, BNC and AES/EBU (Electrical), and Toslink or ST (Optical).



Toslink: the de-facto optical standard, limited by its snap-fit connectors and restricted bandwidth (speed).

ST: the high-speed and higher-powered optical alternative from AT&T and/or Hewlett Packard. ST is the name of its plastic bayonet fitting shielded when not in use.

Coaxial: a conventional RCA-phono style socket, used to transmit electrical signals adhering to S/PDIF (Sony/Philips Digital Interface Format). Also found as BNC twist-to-lock sockets.

AES/EBU: a balanced electrical digital output/input using 110ohm three-pin XLR sockets. These were originally designed for long cable runs in professional installations.



## How the listening was done

In common with our usual procedure for CD players, each of these transport/DAC combinations was auditioned under strict, blind conditions. *Hi-Fi Choice* remains the only magazine to employ an impartial listening panel to audition equipment without seeing it. The panel is thus able to judge the sound of the equipment without preconceptions.

For this group of top-notch players, the panel was treated to a broader repertoire of classical, jazz, folk, pop and rock music than usual, with every track adjusted to a predetermined listening level.

Where supplied, each manufacturer's proprietary digital interconnect was used. Otherwise, we reverted to Audioquest's *Video Z*, the *Hi-Fi Choice* Best Buy from our digital cable survey (issue 108). The remainder of the system comprised DPA 100S pre and power amps driving Audio Note *Jll* loudspeakers on heavyweight Pirate stands.

## How a CD transport and DAC works

The general principles involved in the operation of a two-box player are really no different from those of a conventional integrated machine. First, a laser extracts the randomised digital code from the CD by responding to the transitions between reflective 'lands' and destructive 'bumps' on its surface.

The raw data is then demodulated using a decoder chip (a DAC is not a 'decoder'). This also unscrambles the packets of bits into their correct order. The data on a CD has to be scrambled to avoid scratches or other surface blemishes

masking entire sequences of bits. Error correction, or concealment if necessary, is also performed as part of this digital housekeeping.

Next, the data is reconfigured into a form that's appropriate to send between the transport's digital output and the converter's digital input. Once captured by the converter, the signal is reconfigured back into its original form before passing to the oversampling filter. Here, additional samples are calculated to fit between existing pairs of samples — an extra three intermediate samples effectively increases the sample rate by four times and so

on, pushing unwanted sampling 'images' to higher and higher frequencies.

This datastream is then sent to the DAC itself, where individual bit-words are either used to control multiple current sources (in a multi-bit DAC) or are truncated into small clumps or single bits to modulate the output of a single current source (as with MASH/PWM or PDM bitstream DACs).

Finally, the output of the DAC is filtered to remove as much ultrasonic garbage as possible and reveal the original analogue (music) waveform.

## Why the two-box approach?

A conventional single-box CD player is, from a digit's point of view, a very noisy place. It's a location where many separate digital and analogue processes are taking place simultaneously, threatening to interfere with one another by cross-coupling through common power supplies, circuit boards and enclosures. Such interference can contribute to jitter (a blurring of transitions in the data) which in turn tends to

muddy up the music.

The two-box player seeks to lessen any such interference. The laser assembly, focus, tracking servos and decoder functions are isolated in one box while the oversampling, DAC and analogue filtering circuitry are contained in another. Neat idea. However, before the data is squirted from CD transport to DAC it has to be altered from the internal chip language of I<sup>2</sup>S (Inter-IC Sound) to the formal interface language called

S/PDIF (Sony/Philips Digital Interface Format).

Once captured by the DAC, this data is then translated back into I<sup>2</sup>S, having already recovered both the original data and clock signals. Naturally, a single-box player avoids this potential source of jitter or even corrupted data. Two-box players are therefore no automatic panacea, but do provide an alternative method of skinning a CD.



# Audio Alchemy DDS/DTI/XDP

Imagine a CD player separated into five different parts — clusters of boxes that neither match nor stack neatly on top of one another — and you have a grasp of Audio Alchemy's latest digital venture. At its heart lies the *Digital Drive System (DDS)*, a top-loading CD transport separated into two boxes: the *Digital Drive Controller (DDC)* and *Digital Drive Transport (DDT)*. The *DDC* contains all the buttons for track access, index search, programming and three-way repeat while a red-tinted display features basic track and timing information. This is all fine as far as it goes, but the *DDS* is hampered by poor error-correction and sluggish track access, bugbears whose origins are explained in the accompanying Lab Report.

Two multi-pin umbilicals link the *DDC* with the *DDT*. One controls the pick-up

assembly while the other recovers the CD's data (also known as the RF eye pattern) from the laser itself. Once returned to the *DDC*, this information is demodulated and passed to its coaxial digital output en route to Audio Alchemy's *Digital Transmission Interface (DTI)*.

The *DTI* is designed to complement two Audio Alchemy DACs, the *Digital Decoding Engine (DDE, see issue 101)* and the *Extended Digital Processor (XDP) DAC*. There is a phase-invert facility alongside, while its coaxial and optical digital inputs are joined by conventional S/PDIF and less conventional I2S digital outputs, re-clocking the datastream amidstships. Incidentally, both the *DTI* and *XDP* are fed from Audio Alchemy's *Power Station Two* power supply upgrade, bringing this digital jigsaw to a spaghetti-ridden conclusion.

## Sound quality

The multifarious Audio Alchemy combination kicked-off positively enough, especially with simple recordings whose character, colour and emotion were communicated in a very natural fashion. However, our panellists did complain of an underlying fizz, a graininess that brought extra life to our Lyle Lovett and jazz CDs yet caused more complex tracks to sound jumbled.

The combination attempts to produce a large and grandiose acoustic, one that suits the scale of Mahler's *2nd Symphony* but fails to catch the bite and thrill of strings. It does, however, convey the commanding nature of the music, and musical peaks are impressive, despite layers of instruments sounding flatter and less vivid.

Solo voices were not lacking in colour or subtlety either. Performers sounded

# Laboratory Report

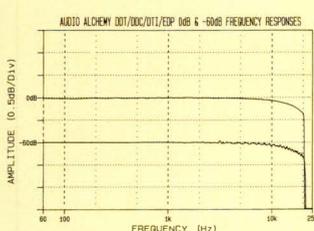
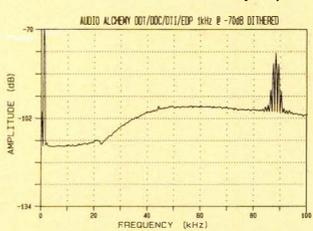
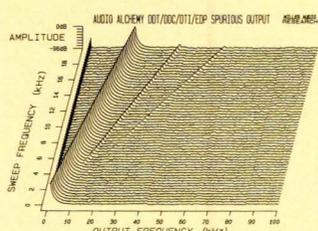
## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.01dB	0.01dB	0.00dB
Channel Separation	110.9dB	110.1dB	90.3dB
THD vs Level, 0dB	-83.7dB	-85.2dB	-74.4dB
-30dB	-85.6dB	-79.8dB	-62.5dB
-60dB	-88.2dB	-52.5dB	-33.1dB
-80dB	-28.4dB	-31.2dB	-13.1dB
Dithered, -90dB	-18.2dB	-22.1dB	-4.50dB
Dithered, -100dB		-18.8dB	
Dithered, -110dB		-12.0dB	
Resolution @ -60dB		-0.01dB	0.00dB
-80dB		-0.16dB	-0.02dB
-90dB		-0.65dB	+0.18dB
-100dB		-0.60dB	-0.20dB
Peak Output Level, L/R	2.528V/2.532V		
Relative Output Level	+2.04dB		
Output Impedance	324ohm		
Radio Frequency Spurious		3.5mV @ 16.9MHz	
1Hz Noise Modulation		+8.5dB	
CCIR IMD, 0dB		-80.8dB	
Suppression of stop-band IMD		92.7dB	
De-emphasis Accuracy, 1kHz		-0.01dB	
5kHz		-0.20dB	
16kHz		-0.57dB	
S/N Ratio (A-wtd), w emp, 0LSB		110.1dB	
w/o emp, 0LSB		107.4dB	
w/o emp, 1LSB		107.4dB	
Digital input/output(s)		Coax (SPDIF) and S-Type (I2S)	
Digital output level		1219mVp-p (from DTI)	
Digital input impedance @ 1MHz		75ohm	
@ 20MHz		70.6ohm	
Digital edge risetime		6.00nsecs	
Clock accuracy		+511.2ppm	
Frequency error at 20kHz		+10.22Hz	
Jitter + noise at -90dB		-24.41dB	
Track Access Time (99)		8.5secs	

Having reduced both the DDC and DDT into small piles of sheet metal, wiring and screws, the latter turns out to be an ordinary linear-tracking three-beam laser assembly sourced from Sanyo and decoupled on four rubber grommets. The insides of the DDS are culled from a basic Korean CD player. Audio Alchemy has simply omitted the DAC (a redundant eight times oversampling filter is left in Yamaha's YM7121 signal processor), cut some tracks and re-routed others via hard links.

This may explain why the digital output that emerges from the DDC is highly asymmetric with a 37.5:62.5 mark/space ratio and sluggish rise time of 29nsecs. Nevertheless, the DTI corrects this distorted datastream, boosting it from 494mVp-p to 1219mVp-p at a faster 6.0nsec. Unfortunately, the original +511ppm clock error still causes a +10.2Hz shift at 20kHz. Otherwise the absence of stop-band noise (3D plot) and excellent low-level linearity all come courtesy of Burr-Brown's DF1700 oversampling filter and the Philips' DAC7 chipset housed in the XDP.

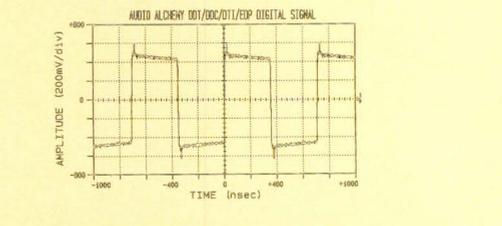
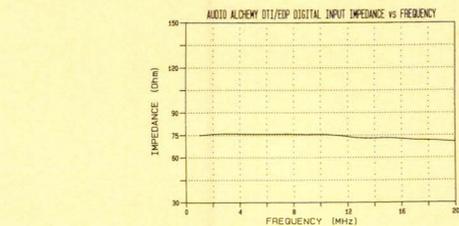
Other specifications are not met, however. Audio Alchemy's discrete analogue filter lifts distortion to 0.0055-0.02 per cent at 0dB (Audio Alchemy claims an impractical 0.00089 per cent) while its '112dB A-weighted signal-to-noise ratio' is actually closer to 107dB. The splurge of ultrasonic noise emerging from the noise-shapers of Philips' SAA7350 is also atypical of a system running at the higher 16.9MHz master clock rate (see -70dB plot).



Excellent performance from the digital filter; THD is still high.

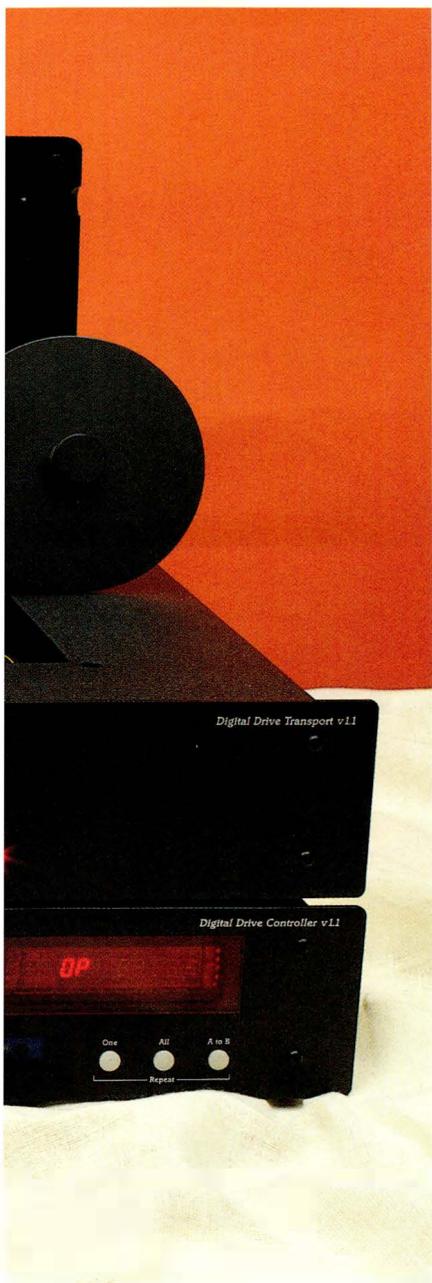
Good response to dithered signals; ultrasonic noise could be reduced.

The gentle treble roll-off will not be audible.



A passive input load ensures a textbook 75ohm impedance trend.

Digital output from DTI corrects the asymmetric output of the DDS.



believable, enabling the panel to picture Davy Spillane surrounded by the gentle rustle of strings, his sultry voice full of emotion as he sang *Shadow Hunter*. There is a hint of grubbiness, a vague digital fog lurking in the background, but with an elegant track of this nature our listeners were not unappreciative of its influence. "You can almost hear his pearl-knitted Aran sweater," remarked one imaginative panelist.

Naturally enough, there is a price to pay for what another listener called "Audio Alchemy's 'dirty digits'", a slight shortfall in the flow of sax or the sense of touch normally associated with clean sounding piano. The DDS/XDP was also criticised during an XTC track, where percussion and synth lacked the cleanliness, crispness and resolution obtained with our better combinations.

### Conclusion

On the basis of the results outlined in the technical appraisal, it would appear that Audio Alchemy's DTI facility is absolutely

essential to the well-being of its rather bizarre DDS transport. Then again, the DDS does neither the DTI nor XDP any favours whatsoever, tainting their combined performance with subtle injections of hash in place of genuine detail.

This is a real pity, for plenty of care and attention has obviously been lavished on both the DTI and the 1-bit XDP —

products that are genuinely 'made in the USA'. The transport, by contrast, is rather poor, badly letting down the rest of the components.

Path Premier, Unit 2, Desborough Industrial Park, Desborough Park Road, High Wycombe, Bucks HP12 3BG.  
Tel: (0494) 441 736



## Verdict

▲ Sounds up-beat and confident with simple rock tracks.

▼ System appears unnecessarily modular.

▶ £1,827.00 RRP





## DPA Digital T-1/PDM2 MkII

**D**eltec Precision Audio is no longer with us, but in its place is DPA Digital, an appropriate acronym for a company that remains at the forefront of CD technology. Deltec's original 'house style' remains, however, for although the cast wraparound alloy facias and glossy finish have been abandoned, the basic look is unmistakable. The PDM2 DAC, for instance, is still separated into two fully-screened enclosures with some six optical datalines running between them.

The top box deals with digital signal processing, and offers two optical and coaxial inputs along with digital phase inversion (which is rather like swopping over the red and black speaker leads) together with an additional Deltran output. This box handles the incoming datastream using two PLLs (phase locked loops),

the second tuned to a tiny 0.5Hz in order to quell any incoming jitter across the entire audio band.

The lower box, or analogue processor, receives the noise-shaped bitstream from one of Philips' SAA7350 chips, keeping its four DAC7 networks free of radiated interference. An incorrect compensation capacitor had been soldered into the sample we received, an oversight on the part of DPA that was identified during our listening tests and lab work.

The T-1 transport is even more recent, and turns out to be a Marantz CD-42 immersed in a carefully earthed and screened aluminium chassis. DPA has added an on-board RF mains filter, a new crystal clock and an equally new direct-coupled digital output. This output is retimed, using a flip-flop circuit, with refer-

ence to the stable clock, before being pumped directly from the sockets without the usual de-coupling transformer.

With Deltran engaged, the transport accepts a clock-feed from the PDM2 which is then locked and multiplied up to 11.3MHz. This synchronises the flow of digital data between the two boxes. It is similar to, though incompatible with, the Sync Lock facility used by Arcam and Audio Synthesis (issue 113).

### Sound quality

According to our panel, this was a combination that "played its music by the book". The T-1/PDM2 has all the 'Deltec' hallmarks of precision, explicit clarity and neutrality, but sadly the emotional warmth has been diluted somewhere along the way. Instead of swinging in his inimitable

# Laboratory Report

## TEST RESULTS

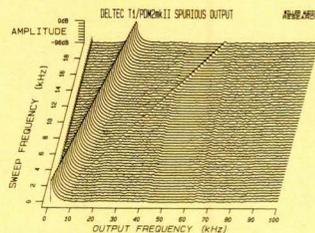
	20Hz	1kHz	20kHz
Channel Balance	0.04dB	0.04dB	0.04dB
Channel Separation	136.7dB	132.5dB	123.8dB
THD vs Level, 0dB	-121.1dB	-112.8dB	-82.3dB
-30dB	-94.4dB	-85.9dB	-61.6dB
-60dB	-60.9dB	-57.9dB	-30.5dB
-80dB	-28.5dB	-31.8dB	-11.4dB
Dithered, -90dB	-18.4dB	-21.2dB	-0.55dB
Dithered,	-100dB		-19.2dB
Dithered,	-110dB		-13.4dB
Resolution @ -60dB		+0.01dB	-0.01dB
-80dB		-0.10dB	-0.05dB
-90dB		-0.44dB	-0.35dB
-100dB		+0.10dB	+1.20dB
Peak Output Level, L/R	2.126V/2.136V		
Relative Output Level	+0.55dB		
Output Impedance	<1ohm		
Radio Frequency Spurious		11.9mV @ 135MHz	
1Hz Noise Modulation		+6.5dB	
CCIR IMD, 0dB		-107.5dB	
Suppression of stop-band IMD		101.5dB	
De-emphasis Accuracy, 1kHz		+0.15dB	
5kHz		+1.21dB	
16kHz		+0.41dB	
S/N Ratio (A-wtd), w emp, 0LSB		106.1dB*	
w/o emp, 0LSB		76ohm	
w/o emp, 1LSB		104.5dB	
Digital input/output(s)		Coax, opt (Tos) + clock return	
Digital output level		562.5mVp-p	
Digital input impedance @ 1MHz		76ohm	
@ 20MHz		85ohm*	
Digital edge risetime		2.75nsecs	
Clock accuracy		-3.5ppm	
Frequency error at 20kHz		-0.07Hz	
Jitter + noise at -90dB		-25.4dB	
Track Access Time (99)		4.5secs	

DPA's recent improvements to the layout, power supply and analogue circuitry of the PDM2 are realised in its superb 124-137dB channel separation and vanishingly low distortion, the latter now setting the digital benchmark of just 0.000088-0.00023 per cent from 20Hz to 2kHz. At higher frequencies still, a trace of third harmonic muscles its way through the noise (see 3D plot), although the action of Yamaha's YM3414 eight times oversampling filter also keeps stop-band noise below -101.5dB.

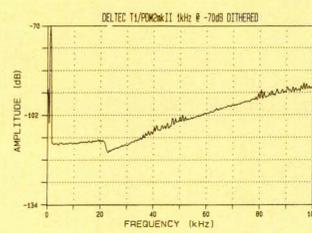
Incidentally, because DPA uses a series of shift registers to delay the datastream by 1/16th of a sample period between the filter and SAA7350 noise-shapers, the final rate (bearing in mind its use of double-differential DAC7s) confers the benefits of some 384 times oversampling. Hence the improvement in signal-to-noise over Meridian's 606 DAC7, even though the presence of hum and noise (-88.3dBV) penetrate the A-weighted curve to reduce its potential 106dB (issue 101) to 105dB.

The -0.52dB treble roll-off should really be closer to -1dB, just as the steep output of ultrasonic noise visible on the -70dB trace is some +8dB higher than expected. These unusual features all point to the mismatched compensation capacitor making its presence felt.

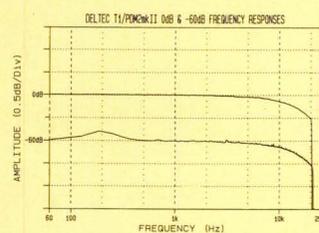
The DPA's digital input is contaminated by an eight times clock component at 135.5MHz, visible not only on the incoming S/PDIF datastream (see top of waveforms) but also as an RF residue at the analogue outputs. The Deltran facility reduces jitter and noise by some 0.45dB — which is meagre in respect of its subjective impact.



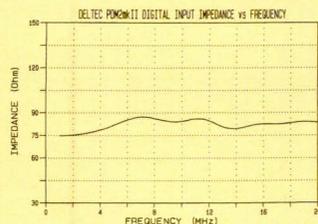
Simple 3rd harmonic is characteristic of Philip's DAC7 converter.



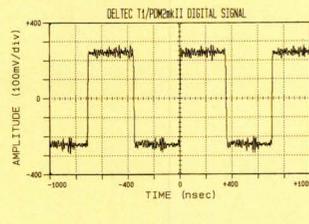
Typical SAA7350/DAC7 pattern, although DPA's error is revealed.



PDM2MkII should feature a more pronounced treble roll-off.



Circulating interference on input confuses its 75ohm impedance.



Clean edges and a wide bandwidth but interference still visible.

## Conclusion

The incorrect surface-mount capacitor marred the performance of DPA's T-1/PDM2MkII DAC. Testament, once again, to the ears of our listening panellists who were unanimous in their criticism of what turned out to be a flawed DAC.

All samples of the offending production batch have since been recalled and

corrected, too late for *Choice* but in time for well-heeled enthusiasts hear the 'genuine' T-1/PDM2 MkII. Though time did not permit us to hear the corrected version, we hope to remedy this in a future issue.

DPA Digital Ltd, Unit 7, Willowbrook Technical Units, Crickhowell Road, St Mellons, Cardiff CF3 0EL. Tel: (0222) 795 621

## Verdict

- ▲ Solid, very transparent and detailed sound.
- ▼ A production fault resulted in a less than involving sound.

▶ £3,245.00 RRP



fashion, Lyle Lovett was described as "slightly plodding and starchy", an inflexible sound that stuck rigidly to the rules rather than flowing in sympathy with the mood of the music.

Even the frenetic sound of XTC's *My Bird Performs* failed to grip or maintain the attention of our listeners. There was no confusion or muddling of one instrument with another, yet neither was there the spark of passion or vitality to really bring the music to life.

Mahler's *2nd Symphony* sounded rather clumsy and wooden, the quicker inflections stifled within a complex mass of instruments. The momentum of the orchestra was oddly slowed just as the acoustic of the venue was muted. The music simply lacked the fire and electricity that had held us transfixed when listening to other competing combinations. Incidentally, without Deltran in tow the resulting sound was derided for its swimmy imagery, which left disembodied instruments moving freely about an indistinct soundstage.



## EAD T-1000/DSP-1000

**W**ith a brand name like Enlightened Audio Designs, the *T-1000* transport and *DSP-1000* DAC could only hail from the good old United States. The accompanying literature is full of the, er, enthusiastic prose I've come to expect from high-end American companies. But strip away the hype and this combination proves that fact can be stranger than fiction.

Switch on this 'Audiophile CD Transport' and a familiar-looking turquoise display illuminates the substantial black alloy fascia. And if the redundant Edit beacon or 19-track music calendar fail to jog your memory, a touch on the eject key will bring a Pioneer Stable Platter mechanism into view. For the *T-1000* is really a *PD-7700/PD-5501* Compact Disc player (see issues 100 and 112) with a propri-

etary re-clocking circuit and 75ohm transformer tacked onto Pioneer's original digital output.

In this instance, EAD is offering both coaxial and optical outputs, the latter serviced by a high-power HFBR-1414 transmitter from Hewlett-Packard. This is equivalent to the AT&T optical link commonly adopted by the likes of Audio Research, Wadia, Proceed and other high-end luminaries, so full compatibility is assured.

The partnering *DSP-1000* DAC has provision for these and standard Toslink optical connections, all three being selected via a row of pushbuttons on the slim front panel. Lift the lid and you'll discover that EAD, along with Teac and Denon, is one of the few manufacturers currently using Analogue Devices' 20-bit

DAC, the principal competitor of Burr-Brown's more popular PCM63P. This, plus a unique combination of AD841 op-amps and Panasonic HFS electrolytics, results in an equally unique sound.

### Sound quality

Having strapped themselves securely into their chairs, our listeners proceeded to dodge the incoming shards of detail that rattled forth from our speakers. There's a hint of brightness or edginess about the EAD's music, but this pales in the light of its fast and furious presentation, a roller-coaster ride of sound that can make a dirge sound jolly.

This hectic rendition brought an attractive lilt to Davy Spillane's *Shadow Hunter* which bobbed enthusiastically from note to note although its lightweight balance

# Laboratory Report

## TEST RESULTS

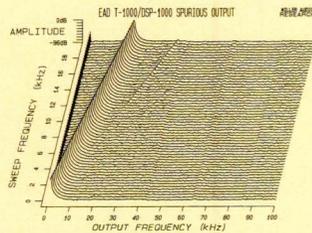
	20Hz	1kHz	20kHz
Channel Balance	0.00dB	0.01dB	0.01dB
Channel Separation	118.4dB	112.2dB	85.4dB
THD vs Level, 0dB	-102.5dB	-96.5dB	-96.7dB
-30dB	-87.0dB	-81.1dB	-67.8dB
-60dB	-57.4dB	-52.1dB	-36.2dB
-80dB	-25.7dB	-28.9dB	-16.8dB
Dithered, -90dB	-17.2dB	-21.4dB	-9.50dB
Dithered, -100dB		-18.9dB	
Dithered, -110dB		-7.50dB	
Resolution @ -60dB		-0.02dB	-0.03dB
-80dB		+0.16dB	+0.26dB
-90dB		+0.52dB	+1.46dB
-100dB		+1.40dB	+1.35dB
Peak Output Level, L/R	2.328V/2.326V		
Relative Output Level	+1.3dB		
Output Impedance	56.5ohm		
Radio Frequency Spuria	5.6mV @ 30MHz		
1Hz Noise Modulation	+7.8dB		
CCIR IMD, 0dB	-93.6dB		
Suppression of stop-band IMD	93.2dB		
De-emphasis Accuracy, 1kHz	-0.01dB		
5kHz	-0.10dB		
16kHz	-0.42dB		
S/N Ratio (A-wtd), w emp, 0LSB	112.4dB		
w/o emp, 0LSB	111.5dB		
w/o emp, 1LSB	110.6dB		
Digital input/output(s)	Coax & Opt (Tos and ST)		
Digital output level	1012mVp-p		
Digital input impedance @ 1MHz	75.0ohm		
@ 20MHz	72.0ohm		
Digital edge risetime	6.00nsecs		
Clock accuracy	-13.0ppm		
Frequency error at 20kHz	-0.26Hz		
Jitter + noise at -90dB	-25.40dB		
Track Access Time (99)	4.5secs		

EAD, in common with much of the competition, will insist on quoting the manufacturer's specification for DAC and digital filter performance rather than look at the DSP-1000 as a finished product. So figures of >110dB for stopband attenuation, 119dB for signal-to-noise, 0.1dB for response accuracy and <0.1mV for RF noise actually turn out closer to 93dB, 110-112dB, +0/-0.28dB and 5.6mV respectively. Incidentally, the 'blip' on its -60dB response was also detected on a Pioneer CD player (issue 112).

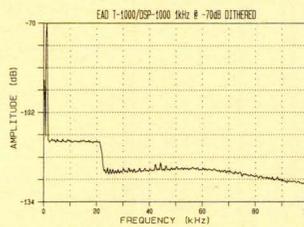
Otherwise, all is reasonably well, especially the digital interface which features an accurate 75ohm characteristic impedance, promoting a fast if rather high S/PDIF waveform (1012mV at 6nsec) which suffers the bare minimum of circulating interference.

Inside the DSP-1000, EAD has opted for a curious mixture of Crystal CS8412 interface chip, Burr-Brown DF1700 oversampling filter (eight times, not the four times quoted by EAD) and two 20-bit AD1862N DACs. The latter differ from Burr-Brown's PCM63P by offsetting every eight times oversample at the fourth Significant Bit, ensuring that all signals below -18dB are shifted away from the nominal zero-cross position. Any non-linearity that now occurs at this 'new' zero-cross point is reduced in significance by some eight times compared with an error at the true Most Significant Bit.

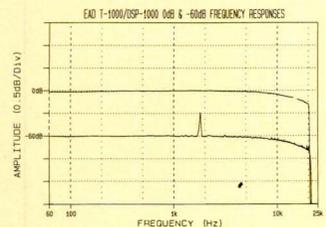
Despite these differences, the wide 112dB dynamic range and low ultrasonic output revealed by the -70dB plot are a good match for any PCM63P-equipped player.



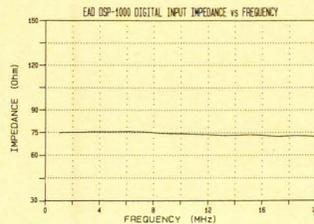
Excellent digital filter allied to a low distortion DAC and analogue filter.



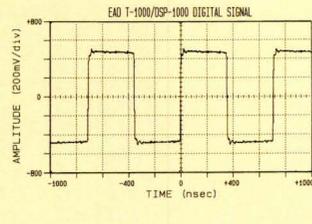
Excellent reaction to dithered signals from the T-1000/DSP-1000.



Blip on low-level response also seen with Pioneer's original CD players.



Textbook 75ohm input impedance trend promises wide compatibility.



Clean, fast edges over a wide bandwidth and little or no interference.

stripped the chestiness from his voice. "For a man who's typically more Irish than a pint of Guinness," one listener began, "this DAC puts his origins in serious doubt."

Nevertheless, the beauty of the EAD is its cleanliness, marvellous freshness and easy acoustic which is free of the digital hash which plagued other combinations in this test. That's not to say the EAD is easy-listening. Indeed, one panellist described it as "the Ben Johnson of the digital world".

The classical selection was portrayed as "the dance version of Mahler" — the ponderous weight of his *2nd Symphony* had a revitalised but tremulous speed as the EAD skipped and soared through the mass of strings and brass. None of the passion was lost, even though the weight, momentum and impact of the bass was undoubtedly diluted.

The jazz track found everyone swinging in tune, despite this song being played in what seemed like double time. Wiping their collective brow, our panel still craved

for more of this quick, pick-up-your-heels, goodtime track. Bags of addictive detail then, but delivered with unchecked enthusiasm.

### Conclusion

So vigorous is the presentation of EAD's newest duet that our panellists actually felt they had lost weight by the end of our

listening session. "The music seemed to fly past" was the conclusion. So do book-in for a check-up before auditioning the EAD, for if your heart can take the strain the T-1000/DSP-1000 comes exhaustingly Recommended.

*Audiofreaks, 15 Link Way, Ham, Surrey TW10 7QT. Tel: (081) 948 4153*



## Verdict

▲ Inexplicably 'fast' sound will set your pulse racing.

▼ Even a funeral march will run like a whippet on acid.

► £2,195.00 RRP





# Linn Karik/Numerik

In the June issue of *Hi-Fi Choice*, the Linn Karik CD player achieved a well-deserved Recommendation, a golden second string for a product first conceived as the CD transport for Linn's 20-bit Numerik converter. Although the role-call of facilities, including direct track access, index search and repeat play, is quite unaffected, the lack of a random access memory remains an obvious oversight.

Slick drawer action is another feature of the Karik, but the guts of the transport mechanism, including disc motor, three-beam laser and linear-tracking sled, are all derived from a Far Eastern parts catalogue. Nevertheless, this is a sophisticated and versatile machine, which is best operated in what Linn describes as its 'Master Mode', whereupon the Numerik DAC has a controlling influence over the Karik.

In this mode, an additional connection is made between the Karik and Numerik, not to return a clock signal to the transport (after the fashion of Arcam, Audio Synthesis and Deltec) but to deliver a DC control voltage to the Karik. This is used to govern the VCO (voltage controlled oscillator) in its Master Clock circuit, effectively using the Numerik DAC as a 'speed-control' for the Karik transport.

This forms part of a double attack on jitter, for whether the product is used in Slave or Master mode the Numerik's crystal oscillator and low-bandwidth PLL (phase locked loop) attempts to keep all data squeaky-clean above 40Hz or so. Below this frequency, Linn's DC Sync facility scrubs out digital nasties. The input circuitry and eight times oversampling filter are fully screened from the PCM63P DACs, top-

specification (K-grade) devices that undergo further selection at the Linn factory.

This all adds up to plenty of advanced engineering which has been designed to accommodate a host of future upgrades.

## Sound quality

To some degree or other, almost all CD players are plagued by a haziness — a digital 'hash' — which can be heard deep in the music. Some players, such as the Rotel RCD-965BX or Meridian 606, exhibit an almost velvety-black acoustic, while others, like this Karik/Numerik combination, can sound distinctly vibrant. This adds an electricity, however contrived, that brings an undeniable charge to its music, and this can be considered attractive or distracting, depending on the listener.

The dry balance of the Karik/Numerik is

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## TEST RESULTS

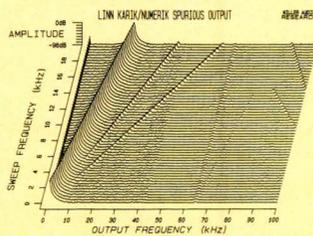
	20Hz	1kHz	20kHz
Channel Balance	0.00dB	0.00dB	0.02dB
Channel Separation	123.1dB	122.7dB	102.0dB
THD vs Level, 0dB	-86.4dB	-89.0dB	-78.7dB
-30dB	-81.2dB	-76.5dB	-81.4dB
-60dB	-61.3dB	-51.6dB	-58.5dB
-80dB	-28.4dB	-31.7dB	-40.7dB
-100dB	-18.1dB	-22.1dB	-30.6dB
Dithered, 90dB		-20.6dB	
Dithered, 100dB		-8.5dB	
Dithered, 110dB		-0.50dB	
Resolution @ -60dB		+0.01dB	+0.01dB
-80dB		-0.18dB	-0.04dB
-90dB		-0.54dB	-0.42dB
-100dB		-0.40dB	-0.50dB
Peak Output Level, L/R	2.118V/2.117V		
Relative Output Level	+0.50dB		
Output Impedance	57.3ohm		
Radio Frequency Spurious	3mV @ 67.7MHz		
1Hz Noise Modulation	+10.8dB		
CCIR IMD, 0dB	-95.4dB		
Suppression of stop-band IMD	>105dB		
De-emphasis Accuracy, 1kHz	+0.05dB		
5kHz	+0.28dB		
16kHz	-0.43dB		
S/N Ratio (A-wtd), w emp, 0LSB	112.9dB		
w/o emp, 0LSB	110.0dB		
Digital input/output(s)	110.1dB		
Digital output level	1056mVp-p		
Digital input impedance @ 1MHz	75.4ohm		
@ 20MHz	124.4ohm		
Digital edge risetime	9.00nsecs		
Clock accuracy	+2.7ppm		
Frequency error at 20kHz	+0.054Hz		
Jitter + noise at -90dB	-25.89dB		
Track Access Time (99)	4.5secs		

In practice, Linn's 1-bit Karik CD player has more in common with Meridian's 206 while the 20-bit Numerik betrays an allegiance with Creek's DAC60 converter, AVI's S2000MC (issue 119), Audio Synthesis' DSM-M (issue 113) and, to a degree, Proceed's PDP3 DAC. These latter players also feature Burr-Brown's 20-bit PCM63P DACs, a choice which is reflected in the wide dynamic range and much-reduced ultrasonic noise visible on the -70dB plot.

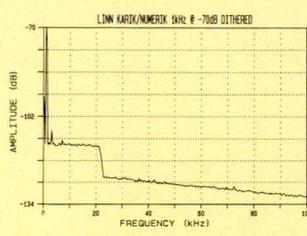
A matching DF1700 oversampling filter ensures there's little or no stop-band noise visible on the 3D plot, even though Linn's implementation has boosted distortion to some 0.005-0.012 per cent, a feature of its discrete Class A filter network rather than the high-performance AD846AN I-to-V op-amps.

Linn uses a constant group-delay RF filter on its digital input, causing the impedance to rise to a maximum of 145.5ohms at 15.1MHz before falling thereafter. This results in some 94 per cent reflection and 31 per cent overshoot on the low frequency (<15MHz) portion of the S/PDIF signal (see trace) but also slows-up the incoming rise time as a means of reducing circulating interference. Once again, wholehearted compatibility with competing transports is doubtful.

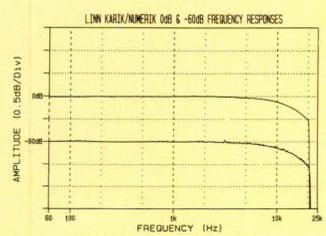
Linn's DC Sync Lock offers a small but repeatable reduction in broad-band (uncorrelated) jitter and noise, falling from -25.79dB (rel to -90dB) to -25.89dB. This is very close to the -26.06dB standard achieved by Wadia's WT3200 in issue 96.



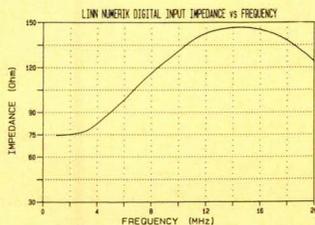
Some stop-band noise (right), THD is composed of 2nd/3rd harmonics.



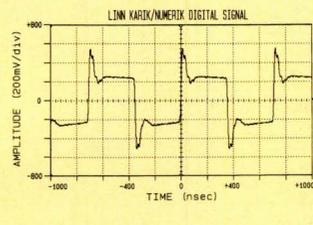
3rd and 7th harmonic distortions due to residual quantisation errors.



Good result showing no filter-rippling or low-level cross-coupling.



Impedance rises alarmingly before falling off below 75ohm above 28MHz.



Massive overshoot combined with a reduced edge-rise time.

complemented by a full and powerful bass, which is more extended than usual, but lacks nimbleness on strings and percussion. This was sufficient for the double bass from our jazz track to be chided by the panel for "dragging its feet". By contrast, the mid and treble octaves sound busier and more energetic.

Putting this into context, the various climaxes from Mahler's *2nd Symphony* reflected the rich, brassy timbre of horns and thrill of violins rather than the weight of tympani or lower strings. The bite of Spillane's guitar was highlighted in similar fashion, never bright or glassy but reproduced with a clinical articulation which affected the warmer fabric of his voice, the low whistle and fretless bass. Indeed, our listeners felt this track highlighted the Linn's principal weakness — guitar sounded rather dirty, infused with an extra hash or dirt.

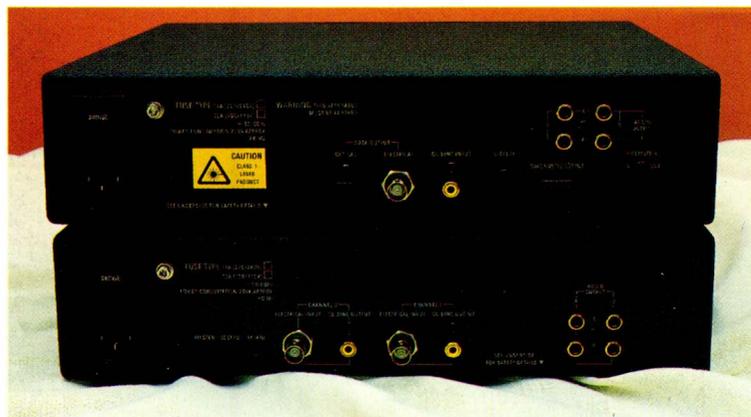
## Conclusion

Any correlation between this *Karik*/ *Numerik* combination and the standalone

*Karik* CD player (issue 119) is highly unlikely. For our part, we were not divided over the description of its sound, simply whether or not we could live with its foibles. While some listeners appreciated its sense of excitement, charge and vivacity, others were clearly bothered by its rough edges, detached treble and 'dirty ambience'. In the August issue of

*Hi-Fi Choice*, I hope to report on an imminent upgrade for the *Numerik* and discover whether its new PCM1702 DACs will overcome the current misgivings of our listening panel.

Linn Products Ltd, Floors Road, Waterfoot, Eaglesham, Glasgow G76 0EP.  
Tel: (041) 644 5111



## Verdict

▲ Dry and electric sound will give your system a buzz.

▼ Exciting but a bit grubby around the edges.

▶ £2,492.00 RRP





# Meridian 200/263 $\Delta\Sigma$

**M**eridian's flirtation with Crystal bit-stream technology continues in this latest version of its 200 Series DAC, the 263 $\Delta\Sigma$ . The DAC7 chips that graced its predecessor (issue 101) have been replaced by a 1-bit brew first shown in the new 206 CD player (issue 119). Meridian's 'black box' aesthetics remain, but now conceal a series of upgrades.

For example, Philips' original SAA7274 interface chip has been replaced by an equivalent ADIC (audio digital input circuit) from Crystal which will automatically latch onto any digital source. In addition, Meridian has engineered a second PLL (phase locked loop) which specifically homes-in on the 44.1kHz sample rate used by CD, squeezing jitter from the incoming data and lighting a new '44kHz' beacon on the 263's fascia.

The analogue electronics, including the discrete Class A output buffer, are culled from the 206 although the 263 does benefit from a beefier and better regulated power supply. Incidentally, a solitary coaxial digital input stares from the rear of the 263 even though the matching 200 CD transport is equipped with both Mitsubishi optical and coaxial outputs. It's also worth noting that the 263 does not offer a phase-invert facility, despite what you may have read elsewhere.

The 200 CD transport has been modified in line with the 206 CD player, featuring a two-stage microprocessor that will accept stacked commands from the IR handset or directly from the fascia itself. You'll still have to overcome Meridian's home-spun ergonomics and wrestle with the limitations of its four digit display, yet

these latest revisions do enhance the 200's general 'playability'. But do avoid fouling the CDM4 laser assembly which is exposed once the drawer slides into view.

## Sound quality

Previous 200 transport/DAC combinations have wowed our listeners with their brisk and refreshing sound, qualities that were not altogether lost in this latest 200/263. In addition to its mid/treble transparency, pointed detailing and fleet bass, however, this variation has also contracted a harder, grittier sound that taints the fiercest of jazz or rock CDs. Perhaps the 200/263 was simply reflecting the true balance of XTC's *My Bird Performs*, yet the rough-sounding strings, aggressive percussion and forward vocals taxed our patience after just a few minutes.

# Laboratory Report

## TEST RESULTS

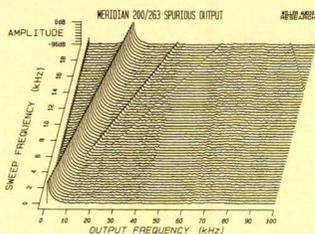
	20kHz	1kHz	20kHz
Channel Balance	0.03dB	0.02dB	0.01dB
Channel Separation	112.3dB	110.5dB	94.8dB
THD vs Level, 0dB	-104.9dB	-98.2dB	-82.9dB
-30dB	-89.9dB	-78.6dB	-65.5dB
-60dB	-53.2dB	-49.4dB	-35.1dB
-80dB	-22.2dB	-17.2dB	-16.1dB
Dithered, -90dB	-13.4dB	-9.7dB	-5.5dB
Dithered, -100dB		-1.5dB	
Dithered, -110dB		-0.02dB	
Resolution @ -60dB	-80dB	-0.32dB	-0.22dB
-90dB		-1.82dB	-1.55dB
-100dB		-1.00dB	-1.20dB
Peak Output Level, L/R	2.173V/2.179V		
Relative Output Level	+0.73dB		
Output Impedance	46.3ohm		
Radio Frequency Spurious	17.5mV @ 11.3-130MHz		
1Hz Noise Modulation		+1.6dB	
CCIR IMD, 0dB		-79.8dB	
Suppression of stop-band IMD		96.4dB	
De-emphasis Accuracy, 1kHz		-0.01dB	
5kHz		-0.02dB	
6kHz		+0.01dB	
S/N Ratio (A-wtd), w emp, 0LSB		100.2dB	
w/o emp, 0LSB		95.9dB	
w/o emp, 1LSB		95.7dB	
Digital input/output(s)		Coaxial & Optical (Tos)	
Digital output level		318.7mVp-p	
Digital input impedance @ 1MHz		46.1ohm	
@ 20MHz		56.3ohm	
Digital edge risetime		2.50nsecs	
Clock accuracy		+8.8ppm	
Frequency error at 20kHz		+0.176Hz	
Jitter + noise at -90dB		-19.81dB	
Track Access Time (99)		3.5 secs	

Our listening panel would never have likened this 200/263 combination with the Best Buy 206 CD player (issue 119), yet the technical performances remain virtually identical. The fifth order noise shapers of Crystal's CS4328 Bit Stream DAC are responsible for a characteristic spurge of ultrasonic noise, cut short at 75kHz by both internal and external analogue filters (see -70dB plot). Similarly, the 3D plot exposes a hint of second to third harmonic distortions (typically 0.00057-0.0072 per cent) with just the merest suggestion of stop-band noise.

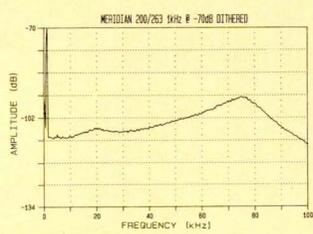
Even the 46ohm output impedance and 96dB A-weighted signal-to-noise ratio match those of the 206 CD player. But cast an eye over the -60dB frequency response and you'll see a ripple that escaped the 206 — a ripple notionally aggravated by its three FIR digital filters (eight times in total) but one that falls well outside of Crystal's 0.001dB specification.

The 263 also plays host to a CS8412 interface chip that receives and recovers both clock and audio data from the transport's digital output. Meridian's active digital input features a low but rising impedance trend (47-56ohm) that accelerates the digital edge rise time to some 2.5nsecs before prompting some 37 per cent reflection and overshoot. All of which make Meridian's own 75ohm interconnect cable look a little misplaced.

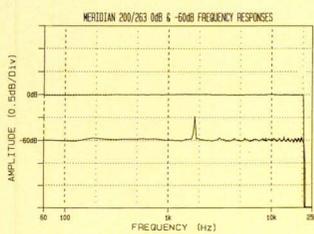
So, although the 263 is likely to trip-up competing CD transports, it's gratifying to see the 200 equipped with a beefed-up digital output. Sufficient at least for the 200 to retain our heartiest endorsement.



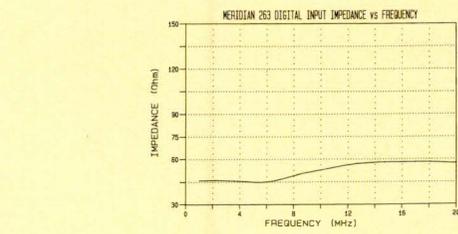
A simple second harmonic holds sway over peak level performance.



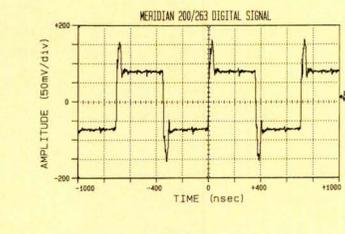
A typical Crystal DAC pattern showing analogue filter biting after 75kHz.



The blip is a genuine artefact, the ripples are caused by board layout.



Low but rising impedance trend will cause reflection and overshoot.



Meridian's ruse has accelerated the rise time of its digital edges.



In contrast to Meridian's 206 CD player, these same pieces of music sounded dirtier, less confident and simply less involving with this latest variation. To an extent this lean, dry and occasionally graphic sound was appreciated for its crisp and spritely bass, but it was also criticised for a lack of tonal colour.

This parched quality honed our jazz selection into sharp focus, filling the venue with space, but tonally speaking, the sound remained rather grey and dispassionate. "The leading edges are crisp and sharp," remarked one panellist, "revealing the lisp of the reed in an uncomfortable fashion." But was this faithful to the naked bite of a real-life jazz combo? Either way, the panel remained fatigued rather than exhilarated once this selection had faded into welcome silence.

## Conclusion

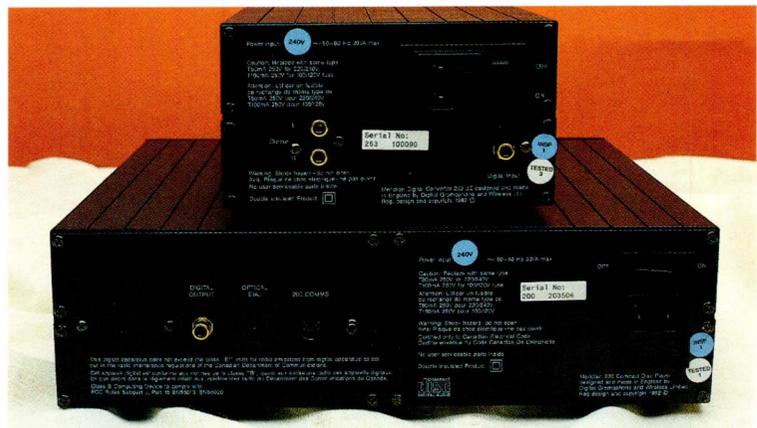
Having previously admired the "blushing radiance" of Meridian's earlier 200/203 combination (issue 101), our listeners felt this latter-day 200/263 was "sterile, soul-

less and one-dimensional" in comparison. If blame is apportioned, then the 263 DAC will be first up against the wall, especially as the tricky digital input could cause problems for other CD transports.

Either way, the performance of the pair is compromised — although the leading and trailing edges of notes are accurately painted, the note in between

is bleached of colour. In the final analysis, passion was missing from the music, which has been muddled by a digital haze that has fortunately escaped the matching 206 CD player.

Meridian Audio Ltd, 14 Clifton Road, Huntingdon, Cambs PE18 7EJ.  
Tel: (0480) 434 334



## Verdict

▲ Tries hard to please; light but brisk and gripping sound.

▼ Balance and smoothness lost to the 200/263.

▶ £1,390.00 RRP





# Meridian 602/606

**M**eridian's flagship D/A converter (the 606) was the first to be updated with Philips' DAC7 Bit Stream technology, but it has yet to receive the 1-bit 'alternative' from Crystal. Perhaps Meridian is simply hedging its bets, reverting to Crystal technology in the 206 (issue 119) and 263 but leaving the rather unwieldy DAC7 in its double-width 606. There's certainly no apparent change in the styling, four digital inputs or phase invert facilities that were included on the original 606 way back in issue 101.

The DAC relies on three separate crystal-based oscillators to capture any of the three possible incoming sample rates (38kHz DBS, 44.1kHz CD and 48kHz DAT), minimising digital jitter without demanding that the digital output adheres to

a strict Class I standard. Naturally, Meridian's accompanying 602 transport is the perfect partner and this model was re-engineered last autumn to accommodate a new suspension.

Once again Meridian has opted for Philips' older die-cast CDM4 mechanism rather than the low-profile CDM9. Furthermore, a new high-stability oscillator and re-clocking circuit improve the flip-flop performance of its digital output, which has been beefed-up with a line-driver amplifier and decoupled using a miniature wide-bandwidth toroidal transformer. The onboard microprocessor has also been updated in line with the 206 and 200, allowing it to handle damaged or partially defective discs while also accepting 'stacked' instructions from the bulky 209 system remote control.

## Sound quality

Way back in issues 96 and 101, our listening panel consistently favoured Meridian's cheaper 200 Series transport and DAC over the costlier 602 and 606, regardless of partnering equipment. This time, however, the tables were turned in favour of the 600 Series, the smoother but fuller and more luxurious sound commanding both the interest and admiration of the panel.

Gone was the hazy, dirty quality of the 200 combination, replaced by a very open and expansive acoustic with a pure woodwind sound and powerful vocal dynamics.

The smooth and undemanding balance was especially notable on Lyle Lovett's busy *Friend of the Devil* track, which was uniformly calm despite a loss of bass strength. Indeed, bass often sounds a little

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## TEST RESULTS

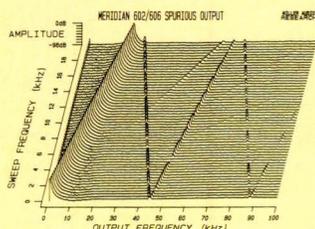
	20Hz	1kHz	20kHz
Channel Balance	0.01dB	0.02dB	0.01dB
Channel Separation	134.5dB	130.9dB	116.7dB
THD vs Level, 0dB	-110.6dB	-106.2dB	-72.9dB
-30dB	-93.0dB	-82.1dB	-50.5dB
-60dB	-59.0dB	-52.6dB	-20.8dB
-80dB	-28.6dB	-30.1dB	+0.1dB
Dithered, -90dB	-17.5dB	-21.4dB	+9.0dB
Dithered, -100dB		-18.1dB	
Dithered, -110dB		-7.5dB	
Resolution @ -60dB		0.00dB	0.00dB
-80dB		+0.04dB	-0.02dB
-90dB		+0.08dB	-0.12dB
-100dB		+0.30dB	+0.50dB
Peak Output Level, L/R	2.397V/2.395V		
Relative Output Level	+1.57dB		
Output Impedance	54.8ohm		
Radio Frequency Spurious	12mV @ 33.87MHz		
CCIR IMD, 0dB	-4.9dB		
Suppression of stop-band IMD	-99.5dB		
De-emphasis Accuracy, 1kHz	54.2dB		
5kHz	-0.05dB		
16kHz	-0.27dB		
S/N Ratio (A-wtd), w emp, 0LSB	107.8dB		
w/o emp, 0LSB	102.9dB		
w/o emp, 1LSB	102.9dB		
Digital input/output(s)	Coax & Opt (Tos)		
Digital output level	453mVp-p		
Digital input impedance @ 1MHz	46.9ohm		
@ 20MHz	56.2ohm		
Digital edge risetime	8.5nsecs		
Clock accuracy	-7.7ppm		
Frequency error at 20kHz	-0.154Hz		
Jitter + noise at -90dB	-25.20dB		
Track Access Time (99)	2.5secs		

It appears that Meridian has made several running modifications to the 606 DAC. The -70dB plot shows an increase in ultrasonic re-quantisation noise of some 2-3dB (around 80kHz) even though the in-band dynamic range is unaltered (see issue 101). Similarly, the V-shaped stop-band images and ripples on the frequency response all come courtesy of the SAA7321, used as a four times oversampling filter.

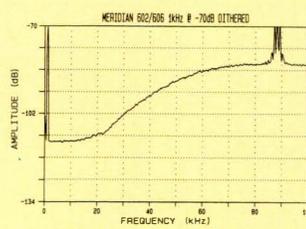
Distortion remains broadly unchanged at 0.0003-0.023 per cent across the audio band although the 108dB signal-to-noise ratio (A-weighted, with emphasis) has now been improved by some 3dB.

Excellent low-level linearity, low jitter plus noise and Class 1 clock accuracy put the 602/606 into the premier league of transports and DACs. That is until we take a closer look at the (electrical) digital interface. Meridian maintains a low but rising impedance trend of 47-56ohm, which is a quirk of the active digital input. This results in overshoot and reflection of some 25-37 per cent, a foible that also limits its compatibility with competing CD transports.

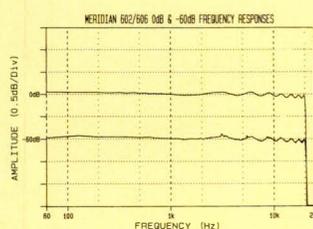
Digital edge rise time is rather sluggish at 8.5nsecs, (rather than the 2.5nsecs boasted by the 200/263), and this situation is exacerbated by a wealth of circulating interference clearly visible on the S/PDIF waveform. This interference coincides with the third harmonic of the crystal clock frequency (33.9MHz), and appears as unwanted RF noise that seeps at a lower level from the main analogue outputs.



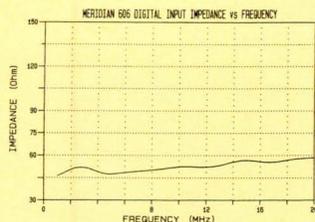
Rippled stop-band images are produced by the primary digital filter.



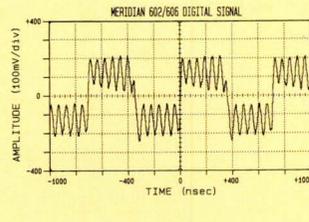
Shows the classic ultrasonic 'bump' of Philips' third order noise shapers.



Ripples caused by four times oversampling filter in Philips' SAA7321.



Active input is revealed by the low but rising impedance trend.



Circulating interference is obvious but has little influence.

diffuse, powdery or 'fluffy' but this track, along with Davy Spillane's *Walker of the Snow*, was free of any coarseness — the guitars, pipes and vocals sounded relaxed but still subtly detailed.

Clearly, this combination has what might be described as an 'expensive sound', which brings a realistic scale and drama to classical works but makes strings sound silky rather than thrilling. For some listeners the performance of this Meridian combination might be too composed but, for others, the freedom from contrived excitement is extremely valuable. Reflecting the former view, one panellist derided the 602/606 for sounding "as neat and tidy as a Dunn & Co shop window". "My foot's gone to sleep," he commented in response to what he considered to be an excessively civilised, prim and proper sound.

Mary-Chapin Carpenter should have sounded raunchy and seductive, he suggested, but here she sounded as if she had "exchanged her negligee for a set of winceyette pyjamas buttoned to the

neck". An extreme view, but one that summed up the panel's feelings toward the latest 602/606 duet.

## Conclusion

In a digital nutshell, this combination has a deliciously smooth, fluid and tidy sound. It may be a little too tidy, civilised or restrained at times but it is always free of

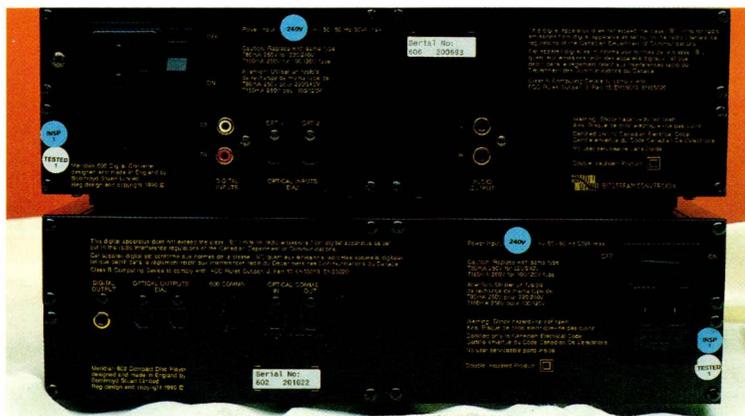
any gritty or hard colorations. It makes for easy listening, but also bubbles with delicate, intricate detail which keeps the spirit of the music alive. Recommended to all save the Motorhead fan club.

Meridian Audio Ltd, 14 Clifton Road, Huntingdon, Cambs PE18 7EJ.  
Tel: (0480) 434 334

## Verdict

- ▲ Refined and sober-sounding duet has extra polish.
- ▼ Still perhaps too cultured for some tastes.

► £3,100.00 RRP





# Proceed PDT3/PDP3

**W**atchers of very high-end hi-fi will remember the outrageous *No31* and *No30* 'Reference CD transport and DAC' from Mark Levinson, an exercise that helped create the third in this series of transports and DACs from Proceed. Both Mark Levinson and Proceed are registered trademarks of Madrigal Audio Laboratories, although this bond has been disguised by the individual styling of each product.

The new grey-painted *PDP3* DAC looks little different from the distinctive *PDP2* *Hi-Fi Choice* reviewed in issue 103, even though its four digital inputs now include both Toslink and ST-connected optical ports in addition to coaxial (75ohm) and XLR sockets. The latter uses a balanced 110ohm feed that conforms to the professional AES/EBU standard. This option is

also available on the matching *PDT3* transport, along with a full range of 'domestic' digital outputs.

In many respects, the *PDT3* is unusually and unnecessarily voluminous, for inside we find the cast-alloy version of Philips' compact CDM4 mechanism — a choice underscored by the standard Philips display and third-generation SAA7310 decoder. Nevertheless, Madrigal's implementation of Philips' basic chipset is unique, contributing to a very high level of performance.

By contrast, the *PDP3* DAC features an entirely new selection of digital, analogue and clock-related componentry, although the PCB layout is very similar to the old *PDP2*. Gone are the original 18-bit PCM58 DACs, replaced by two K-grade PCM63Ps from Burr-Brown — which seem

to be the most popular 20-bit DACs on the planet.

## Sound quality

Auditioned immediately after the Deltec combination, this duo from Proceed struck up an instant rapport with our panel. Encouraged by its gentler performance, they soon recognised this player for one that "harbours joy and enthusiasm for the music". The *PDT3/PDP3* has a moody sound that reflects the atmosphere of the music, drawing on the anticipation of Mahler's *2nd Symphony*, for example, without adding any fatiguing tension of its own.

A sense of ease filtered through to the music, which now ebbed and flowed with a sense of power but absolutely no sense of strain. "This player will never make you jump from your seat," one listener re-

# Laboratory Report

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.01dB	0.01dB	0.04dB
Channel Separation	116.6dB	121.2dB	116.2dB
THD vs Level, 0dB	-100.1dB	-96.1dB	-85.7dB
30dB	-82.5dB	-79.4dB	-75.9dB
60dB	-43.0dB	-38.9dB	-42.6dB
80dB	-18.2dB	-17.9dB	-27.8dB
Dithered, -90dB	-5.10dB	-7.8dB	-18.1dB
Dithered, -100dB		-7.0dB	
Dithered, -110dB		-5.5dB	
Resolution @ -60dB		-0.13dB	-0.06dB
-80dB		-1.10dB	-0.25dB
-90dB		-3.60dB*	-0.70dB
-100dB		-3.45dB*	-0.35dB
Peak Output Level, L/R		2.127V/2.123V	
Relative Output Level		+0.53dB	
Output Impedance		<1ohm	
Radio Frequency Spurious		108mV @ 2.82MHz*	
1Hz Noise Modulation		+14.8dB	
CCIR IMD, 0dB		-99.5dB	
Suppression of stop-band IMD		>105dB	
De-emphasis Accuracy, 1kHz		-0.01dB	
5kHz		-0.01dB	
16kHz		-0.11dB	
S/N Ratio (A-wtd), w emp, 0LSB		104.9dB*	
w/o emp, 0LSB		105.3dB	
w/o emp, 1LSB		104.3dB	
Digital input/output(s)	XLR (ball)/Coax (unball), Opt (Tos/ST)	459.4mVp-p	
Digital output level		72.2ohm	
Digital input impedance @ 1MHz		74.6ohm	
Digital edge risetime		4.40nsecs	
Clock accuracy		+0.80ppm	
Frequency error at 20kHz		+0.016Hz	
Jitter + noise at -90dB		-19.24dB	
Track Access Time (99)		5secs	

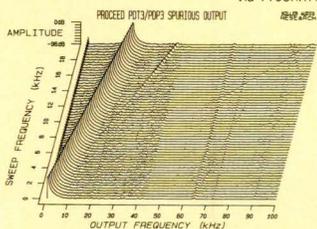
\* via 110ohm AES/EBU connection

First the good news. Proceed's various digital inputs are still transformer-coupled, but avoid the wildly fluctuating impedance trend of the PDP2 (issue 103). The inputs are also rather more discriminating, courtesy of Crystal's popular CS8412 ADIC. Furthermore, the top-flight eight times oversampling filter (an NPC SM5803) is responsible for a full 105dB rejection of stop-band noise.

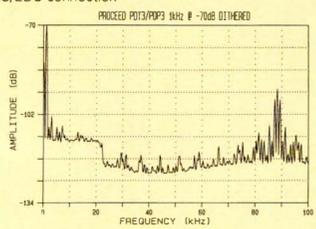
The new 20-bit DACs, in tandem with the AD845 I-to-V and filter stage op-amps, also ease peak-level distortion down to 0.00099-0.0052 per cent. However, serious cracks start to appear at mid-levels where most of the musical action takes place.

Connected via the AES/EBU (110ohm) interface, this PDT3/PDP3 combination was plagued by a huge sinusoidal RF component at 2.82MHz (twice the channel bit rate) together with unexpected -3.5dB deviations in low-level linearity. Yet, re-connected via the S/PDIF (75ohm) interface, this interference dropped considerably and restored the linearity errors to just +0/-1.3dB (1kHz).

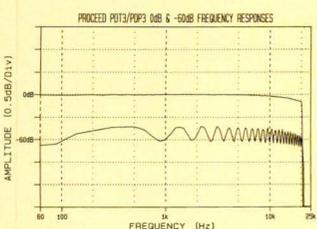
However, regardless of the choice of digital output or CD transport, the PDP3 DAC still suffers from excessive low-level distortion (1.12 instead of 0.26 per cent at -60dB), a poor reaction to dithered signals (see -70dB plot), substantial (0.3dB at 906Hz) ripples in its -60dB response and a poor 104-105dB signal-to-noise ratio (113dB is possible with PCM63s). In my experience, such anomalies are often caused by unforeseen cross-coupling between digital and analogue portions of the circuit, implying a poor circuit board layout.



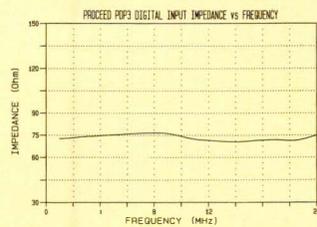
A hint of second harmonic distortion, otherwise fine at peak level.



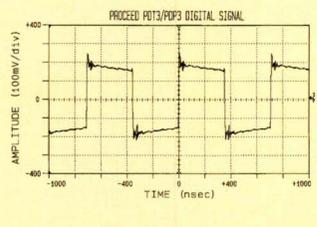
A poor result showing residual distortion and stop-band interference.



Significant rippling at low signal levels is caused by cross-coupling.



Transformer-coupled inputs offer a fairly even 75ohm impedance trend.



Some slight overshoot and ringing is visible, as is some HF filtering.



marked, "but neither does it rely on any digital graininess or 'hash' to electrify its natural and commanding performance."

The Proceed combination proved equally capable of digging deep into Lyle Lovett's bass, revealing an instrument that was purposeful rather than sloppy and confirming both the substance and momentum of a track that had sounded lightweight earlier in the day. XTC's *My Bird Performs* also benefitted, the rippling bass line sending sympathetic shudders through the vocal and synth lines. Its bass maintained this very solid rock track, retaining its urgency and spirit without ever sounding harsh or gritty.

So even though Proceed's entertaining duet lacks the biting transparency of some of its competitors, its warm, compelling and very comfortable sound will surely make for many hours of relaxed listening.

### Conclusion

According to our listening panel, there is "a potent and expansive quality" to the

PDT3/PDP3, "an unspoken power that ensures the music is effortless, easy and seamless". Nevertheless, this confidence was also described as "languid", the panel suggesting that a firmer grip on the digital reins might have turned-in a more incisive and revealing performance.

It is the technical performance, however, which lets this player down some-

what — unfortunate, as any CD player that costs £5,044 should really reflect the state of the art both in sonic and technical terms.

*Path Premier, Unit 2, Desborough Industrial Park, Desborough Park Road, High Wycombe, Bucks HP12 3BG.  
Tel: (0494) 441 736*



## Verdict

- ▲ Exudes a robust and confident performance.
- ▼ Needs a little more transparency and low-level detail.

▶ **£5,044.00** RRP





# Teac P-700/D-700

**T**he popular VRDS (vibration-free rigid disc-clamping) mechanism strikes again in a new and relatively affordable CD transport/DAC combination from Teac. This is the P-700/D-700, modelled on the older and very successful P-500/D-500 (issues 96 and 103) but benefitting from a series of sophisticated upgrades.

In terms of styling, not much has changed, the transport still features basic play, pause and track skip facilities, while the DAC is graced with the same rotary selector for its two coaxial and two optical inputs.

Extra widgets, including direct track access, programming, repeat and index skip, are available on the remote control handset but the lack of a 'stop' button on the P-700 is a real oversight. In fact, it's only

when we look beyond the elegant champagne-gold facias that we discover the real fruits of Teac's labours.

Principal among these is the latest VRDS mechanism, a proven device that forces the Compact Disc up against an inverted turntable which is driven from above by a powerful brushless motor. Not only does this prevent the spinning CD from vibrating or 'flapping' at high speeds, but it also irons-out small imperfections in the polycarbonate surface. The result is sharper, clearer data from the laser and, in theory, less jitter and distortion downstream.

Inside the D-700, Philips' old 16-bit DACs have been changed in favour of genuine 20-bit chips — the very same ICs chosen by EAD. In this instance, Teac uses a complementary pair of DACs per chan-

nel which, in tandem with the ZDII dither circuit, is supposed to reduce noise, distortion and improve low-level linearity. The full details are all outlined in the accompanying Lab Report.

## Sound quality

Compared with some of its competitors in this test, the sound of this particular combination is neither pin-sharp nor glaringly transparent. It does, however, offer a very 'together' performance that's coherent and even-handed. The sound is full of bass energy but with a lush midrange and a calm, refined treble. "Opulent and lucid," suggested the panel, "despite it sounding faintly syrupy."

Clarinet from the jazz selection was slightly sat-upon, for example, not exactly flattened but rounded rather than vibrant.

# Laboratory Report

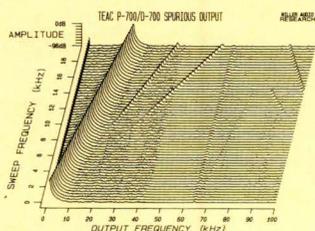
## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.09dB	0.08dB	0.06dB
Channel Separation	136.0dB	126.1dB	120.5dB
THD vs Level, 0dB	-103.0dB	-99.9dB	-80.8dB
-30dB	-76.5dB	-73.1dB	-77.1dB
-60dB	-59.6dB	-54.3dB	-62.5dB
-80dB	-28.3dB	-31.4dB	-40.1dB
Dithered, -90dB	-18.1dB	-21.5dB	-29.9dB
Dithered, -100dB		-20.1dB	
Dithered, -110dB		-9.50dB	
Resolution @ -60dB		+0.01dB	0.00dB
-80dB		-0.11dB	+0.02dB
-90dB		-0.42dB	-0.26dB
-100dB		-0.25dB	-0.28dB
Peak Output Level, L/R	2.071V/2.052V	+0.28dB	
Relative Output Level		1.04kohm	
Output Impedance			
Radio Frequency Spurious		6.5mV @ 84.4MHz	
1Hz Noise Modulation		+9.8dB	
CCIR IMD, 0dB		-99.5dB	
Suppression of stop-band IMD		>105dB	
De-emphasis Accuracy, 1kHz		0.00dB	
5kHz		-0.11dB	
16kHz		-0.21dB	
S/N Ratio (A-wtd), w emp, 0LSB		111.9dB	
w/o emp, 0LSB		110.3dB	
w/o emp, 1LSB		110.2dB	
Digital input/output(s)		Coaxial & Optical (Tos)	
Digital output level		559.4mVp-p	
Digital input impedance @ 1MHz		74.6ohm	
@ 20MHz		72.0ohm	
Digital edge risetime		5.25nsecs	
Clock accuracy		+22.5ppm	
Frequency error at 20kHz		+0.45Hz	
Jitter + noise at -90dB		-25.77dB	
Track Access Time (99)		3.5secs	

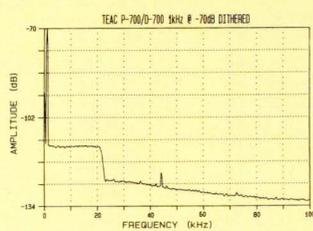
There is little to be gained from comparing this D-700 with the D-500 in issue 103, for the performance of the latter is dominated by the new SM5813 eight times oversampling filter and pairs of Analogue Devices' AD1862N DACs. The only real link between old and new, aside from the 'Teac flavoured' analogue stage, is the Yamaha YM3623B ADIC, used to access and regenerate clock and data lines from the incoming S/PDIF signal.

In fact, the D-700 has much more in common with EAD's DSP-1000, whose single-ended DACs actually succeed in besting Teac's 110-112dB signal-to-noise ratio. On the other hand, the efficacy of the Teac ZDII circuit (a form of ultrasonic dither) is reflected in its distortion performance. The limitations of the analogue stage cause THD to peak at 0.009 per cent (0dB at 20kHz) but at lower levels the dither kicks-in to hold THD at 0.014 and 0.075 per cent (-30dB and -60dB) respectively. By contrast, the DSP-1000 suffers some 0.041 and 1.55 per cent respectively: just compare the -70dB plots for a visual guide.

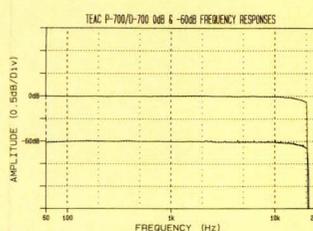
The complementary DAC stage also holds low-level linearity errors to just +0.02/-0.42dB over the entire audio band and over a full 100dB dynamic range. Only the high 1kohm output impedance gives cause for concern, so do watch those long and highly capacitive interconnect cables. Otherwise, the quick 5.3nsec rise time and clean waveshape of Teac's digital output seems ideally suited to the predictable and purely resistive 75ohm characteristic impedance of the D-700's digital input.



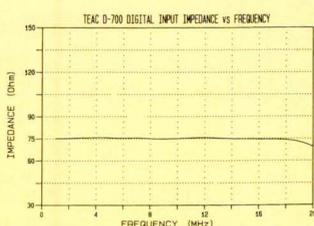
Some extraneous stop-band noise can be seen to creep through.



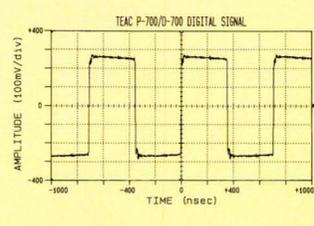
Dither successfully randomises all fixed quantisation errors.



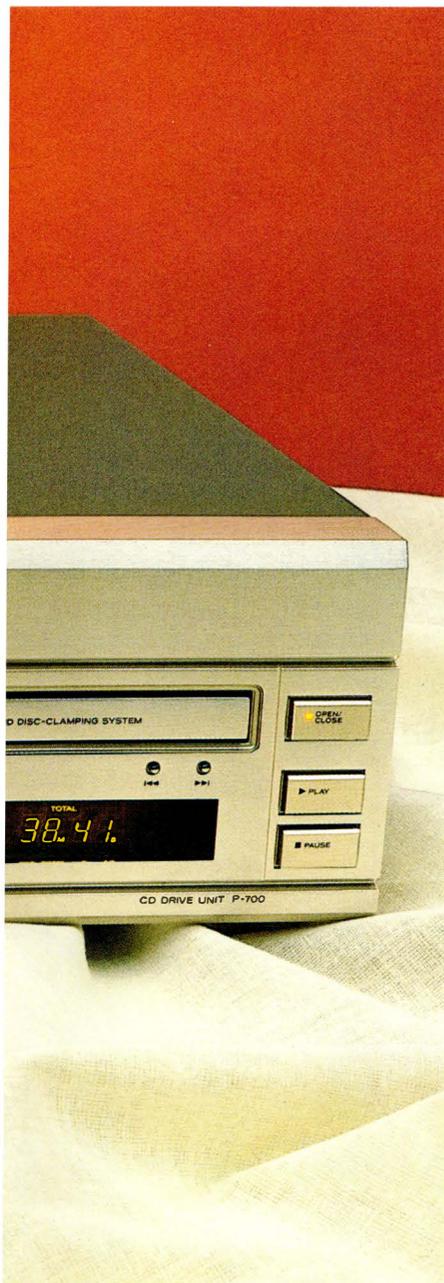
Another excellent result for the Teac combination.



A textbook 75ohm load from Teac's 'passive' digital output.



Good waveshape with clean edges, minimal filtering and no interference.



Similar results were achieved with the bass content of Mahler's *2nd Symphony*; the tympani and double bass breezed confidently through the soundstage, although the bowed strings and brass were a little short of edginess, rasp and bite. The size of the orchestra was revealed to marvellous effect, a big and powerful sound that swelled to fill the room without any sense of strain or hardness. The panel agreed the sound was "imposing but easy-listening".

The powerful bass drove Lyle Lovett's song from the speakers with equal confidence. A tinge of softness permeated the scene but there was no mistaking the passion in his husky voice. Indeed, this understated, broody power constantly hovered in the music, an invisible courage that suggests the P-700/D-700 will never be caught napping by any style of music.

### Conclusion

Teac's latest budget creation is not the most transparent, detailed or obvious in presentation yet it displays a confidence,

poise and class that pull together for a very balanced and memorable performance. That said, some listeners might think the 700s too polite for their own good, especially if they're auditioned in a system that's already very smooth and refined in character.

In all other respects, the sure-footedness, power and authority of this

combination remain unmatched at the price. A clear Best Buy, then, for a classy combination that ranks as a sure-fire upgrade on the single-box players featured in the June issue of *Hi-Fi Choice*.

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



## Verdict

▲ Warm and entertaining sound at an excellent price.

▼ Not as quick on its feet nor as detailed as some.

► £1,498.00 RRP



# V'AUDIO

36 Druid Hill, Stoke Bishop, Bristol BS9 1EJ  
0272 686005

Pride of place this month still has to be that superb piece of engineering from **SME**, the **Model 20A** turntable. It is at present looking lovely sitting on the **Townsend Seismic Sink (Model 1HD)**, sitting on a **Soundstyle Tripod System Model 4/125**. Underneath sits the magnificent **AVI S2000P** line stage pre-amp (and the **Mitchell ISO/Hera**). This is driving the **ATC 50A's** or the **Ruark Accolade** via either the **AVI S2000M** or **Chord 1200** power amps.

Cartridges being tried include my trusty old Denon 103D (Van den Huel Stylus) and Supex 900, plus later models from **Audio Technica**, **Ortofon**, **Lyra** and **Sumiko**.

One of the interesting effects is the improvement made by the ISO over the average pre-amp phono stage, when using the **SME 20A**. The sound is so clean with the **SME** that the head amp becomes even more critical. One's old LP's may sound different, but as it happens on rare occasions, one is immediately convinced the **SME** is right. Do come and have a listen; it's really good value if you have a good LP collection.

When I can drag myself away and need to play CD's, then on the lower shelf sits the **AVI CD Player**, as clean as the **SME**, especially for classical music enthusiasts.

*By the way, everyone who has tried the Seismic Sink has bought one, or two or . . .*



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# Conclusions, Best Buys and Recommendations

The contrast between these costly CD transport and DAC combinations and the integrated CD players reviewed last month couldn't have been greater. You might expect that paying significantly more money for a digital front-end would bring you closer to the absolute sound. Far from it. If we were dismayed at the lack of sonic diversity displayed by the recent crop of budget integrated players, then we were equally astounded by the differences between these digital overlords.

Audio Alchemy's digital products, including the *DDE* DAC, have already established the company as a front-runner on the upgrade scene. Unfortunately, its first CD transport, the £999 *DDS* turned out to be a rather token affair.

DPA Digital's £3,245 *T1/PDM2*, for example, would have stormed through to recommendation had it not been for a tiny but very significant oversight.

Linn's £2,492 *Karik/Numerik* is very refined in its technical implementation and sounded

very clean and sharp but rather dispassionate.

The strained performance of Meridian's £1,390 *200/263ΔΣ* was just plain bizarre, its graphic but tonally parched sound coming as a total surprise after the musical elegance of the *206ΔΣ*.

Proceed prides itself on being a measurement-oriented company, so the shortfall in the technical performance of the £2,449 *PDP3* DAC was particularly disappointing.

## Recommendations

The two formal Recommendations are both 20-bit combinations, using Analogue Devices chips. The £2,195 *EAD T-1000/DSP-1000* is an intriguing duet with an electric and occasionally rather frantic sound that's guaranteed to put a rocket up the most sloth-like of systems. Just strap yourself in and prepare for a roller coaster ride.

Unlike the cheaper Meridian combo, the engaging but unforced and silky-smooth char-

acter of Meridian's £3,100 *602/606* combination was perfectly in accord with results from previous issues.

The uncommonly solid perspective provided by Teac's

newest partnership makes for a beguiling alternative. The £1,498 *P700/D700* is an entirely compatible CD transport/DAC combination with an equally congenial sound.

## Best Buy and Recommended Listing

### BEST BUY

**TEAC P-700/D-700 (£1,500)** An affordable combo that includes TEAC's VRDS transport. Lacks the resolution of its high-end colleagues but sounds warm, bubbly and is perpetually entertaining.

### RECOMMENDED

**EAD T-1000/DSP-1000 (£2,195)** A two-box player based on Pioneer's Stable Platter CD transport. Its music always sounds fast, furious and fascinating.

**Meridian 602/606 (£3,100)** Meridian's top-of-the-range two-box player looks and sounds both distinctive and elegant, the perfect partner for a very cultured system!

## Best of the rest

One make combinations are not the only option for those seeking digital audio Nirvana, we've found that the following pairings work very effectively as well.

Audio Alchemy's cute little £420 *DDE* convertor put up a cracking performance with Wadia's £1,800 *WT3200* transport, for instance — as did DPA's high-end *PDM2*. More recently, we discovered a very sympathetic pairing between Sugden's £650 *SDA-1* DAC and Teac's original £1,499 *P-10* transport, a result likely to be duplicated with Teac's newer £899 *P-700*.

If the explosive detailing of the latter is simply too much of a handful, then either Mission's £300 *DAC5* or QED's £125 *Digit* offered a more 'musical' and civilised alternative

when partnered with Meridian's £895 *200* transport.

Another transport worth trying out is the £700 Arcam *Delta 170.3* which is capable of fine results in combination with either the £300 *Micromega Microdac* or the £995 *ROK-DA1* from Roksan.

At a much higher price, partnering Meridian's *200* with a £3,150 *Threshold DAC 1/e* brings yet another happy surprise from mixing different brands and technologies. Even in the apparently predictable realm of 1s and 0s, the most sympathetic pairings rarely turn out to be the most obvious.



**Arcam's D170.3 really boogies with a Roksan ROK-DA1 DAC.**

## Swing tags

Products that make the grade are awarded the Best Buy or Recommended accolade.

A product carrying the Best Buy swingtag is of excellent quality and good value for money in its price category.

Recommended products are runners up, but still definitely worth considering within their price bands.





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200/263/602/606, AudioLab 8000T**

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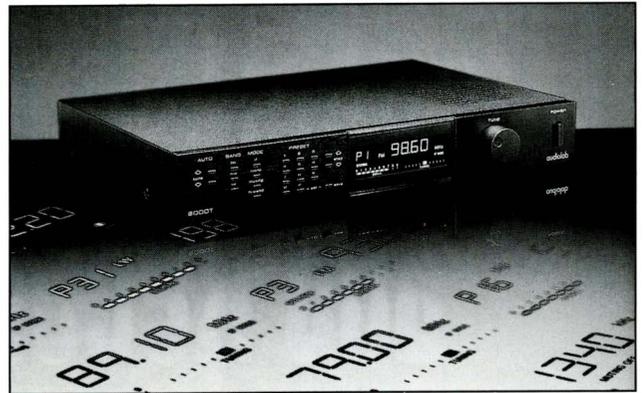
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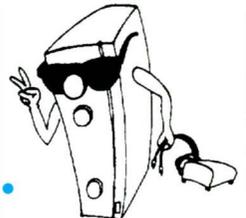
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# On test: stereo tuners

The UK radio airwaves have never been more crowded, nor offered a greater range of choice, so even though the medium no longer enjoys the same pre-eminence as fifty years ago, the current situation is positive proof that radio has a bright future.

There's no denying that the transmission of a recording will never match the direct reproduction of the same recording in the home, so to that extent the tuner is usually regarded as a secondary source. But there's also no better way of broadening your musical horizons and gaining access to an enormously wide variety of material than by investing in a good quality hi-fi tuner (and aerial).

Choosing a hi-fi tuner rationally should involve weighing up price against different aspects of performance and capabilities, related to individual preferences and site. But the most important factor in nearly every buyer's mind is whether to go for a tuner that matches an already selected amplifier.

This is certainly one reason why the vast majority of amplifier makers also produce tuners, and why in turn our particular test group includes several important examples from some of Britain's favourite amplifier brands.

There's no reason why you can't use any tuner with virtually any amplifier, but several factors encourage partnering stablemates together. Most people will prefer the components to match cosmetically, and nowadays there's an increasing chance that the two will be linked electronically to provide unified remote control over both. Furthermore, the tuner designer will

## The cast list

Arcam Delta 280	£349.90
Audiolab 8000T	£700.00
Denon TU-580RD	£219.95
Kenwood KT-3050L	£169.95
Linn Kremlin	£1,779.00
Meridian 604	£1,350.00
Quad 66	£519.00
Rotel RT-950BX	£199.95
Sherwood TX-3010C	£119.95

probably have used his company's amplifiers and other components when developing the tuner, so the two are also likely to blend well sonically.

If you already have an amplifier, you'll want to know whether its partnering tuner works well in an absolute sense, fits your requirements and represents reasonable value for money, even though



Pulling power: nine top tuners battle for supremacy of the airwaves

you may well be prepared to spend a handsome price premium to get the perfect cosmetic match. If you don't have an amplifier, you'd better go out and choose one

before you start worrying about tuners.

Superficially straightforward enough devices, from a user's point of view the evaluation of a tuner can be

### Waveband

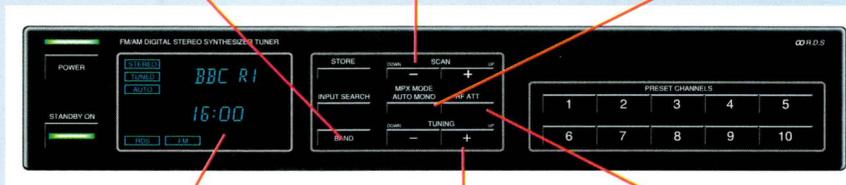
An increasing number of modern tuners are FM (Frequency Modulation) only devices. AM (Amplitude Modulation) is still included on some models, but FM is currently the only carrier of stereo signals.

### Search and Scan

Search and Scan hunt for stations automatically. Search tunes to the next frequency, while Scan flits from station to station, pausing for ten seconds on each, until you find one you like and lock onto it.

### MPX Filter

To remove background noise on weak stereo signals, the MPX filter introduces interchannel crosstalk, which increases with audio frequency. This was previously known as the Blend filter.



### Frequency

Station frequency and waveband are displayed using LCD and LED displays. Radio Data System (RDS) tuners are able to display station name, time, programme type and travel information as well.

### Tuning

Tuning is generally performed by up/down tuning buttons. These enable you to run through the waveband selected, but the tuner will not stop at any frequency until you take your finger from the button.

### RF Attenuation

If an RF (Radio Frequency) signal is too strong, it can swamp a tuner's input. An attenuator (a resistor) will cut the signal back to normal levels, though it is generally better to use a less powerful aerial.



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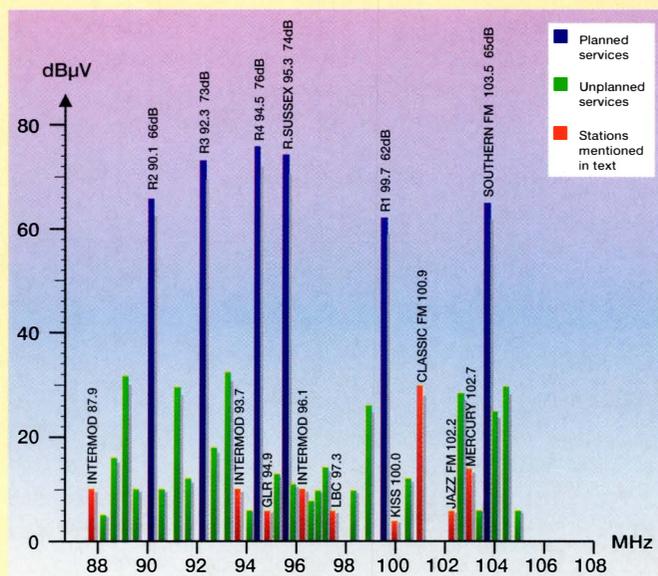
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## How the tests were done



The spectrum of signals and their relative strengths, measured at the aerial download, at our low level test site in Brighton using a three-element roof-mounted aerial array.

### AM tests

Sensitivity and image rejection are judged during aerial tests on known weak signals during the daytime, and on the image (585kHz) of a strong (82dBµV) local radio station (1485kHz).

The test signal for the AM measurements is produced by an exciter which uses a low-level balanced modulator followed by linear VMOS amplification to produce very low distortion, wide bandwidth amplitude modulation, to an accuracy down to 0.2 per cent and up to 15kHz. In practice, frequency response measurements don't relate to broadcast audio above 6.3kHz, more's the pity.

As AM broadcasts are heavily pre-emphasised for the most part, an assumed de-emphasis of 2 x 50µs has been used to make a rough correction for the sort of response that broadcasters might be aiming for, though there is no standard in Europe for this as there is in the United States.

To get the uncorrected figure, add the weighting and the given, corrected, result together. In most cases (with the honourable exception of the Audiolab) the response at 5kHz is some 18-20 dB below that at 315 Hz, while the idealised (or at least better) curve would allow 11 dB of de-emphasis at this point.

### FM tests

The test results are presented in the same order as the signal proceeds through the receiver.

The front end is tested for noise at a given signal level (10µV, +20dBµV), from which sensitivity and RF noise figures are calculated. Note that the noise is CCIR weighted for 50dB readings, which makes for results somewhat less favourable than unweighted figures. RF overload is the point where a signal 1 MHz away worsens the s/n ratio of a weak (10µV) signal by 1dB. Intermodulation is assessed during live aerial tests, with two signals present 800kHz apart and around 72dBµV in level. This can lead to intermodulation in some tuners, much less in others.

Selectivity is measured as the level of 100 per cent modulated interfering signal that breaks through to -30dB on the audio recovered from a 100µV (40dBµV) silent wanted signal either 200kHz or 400kHz away.

Crosstalk is measured using a signal with heavily compressed programme fully modulating one channel of the stereo signal, and silence on the other. It is quite revealing to listen to what is supposed to be the silent channel, as well as measuring it using a peak programme meter. This test produces high levels of L-R subcarrier signal.

Mono noise floors are tested using a crystal controlled oscillator as a source. A 19kHz oscillator and modulator, but no coder, was used to generate the stereo noise test signal.

boiled down to an equation which takes into account cost, RF (radio frequency) performance and sound quality.

However, in reality this is a considerable oversimplification. The internal architecture of a tuner is rather complicated, consisting of at least five distinct stages from the reception of the aerial signal down to its final conversion into a stereo audio signal.

The first task is to receive the incoming transmissions, which is where the aerial plays an important role (see box). The tuner has to make sense of the whole mish-mash of signals coming down the coaxial cable, a mish-mash which will vary dramatically from one place to another (see Air Check spectrum).

The 'front end' and IF strip have to extract the wanted signal from the ether. The selected (IF) signal must then be converted into audio and then decoded from a multiplex stereo signal into left and right channel outputs, which itself involves a fair amount of processing work, and in turn leads to sonic differences between the various models.

The tuner designer in fact faces a number of dilemmas when creating a product within a fixed budget. Should the tuner be as sensitive as possible, at the risk of overload on strong signals, or should it have a more robust front-end which is ultimately a little more 'deaf'? Should the IF bandwidth be wide for best stereo and lowest distortion on strong signals, or include a narrower option to dig out weak signals next to strong ones at some expense in sound quality? Should the signals be rigorously filtered to avoid interference, or is a gentler approach more sonically acceptable?

Which particular set of choices will suit you depends on the sort of listener you are, from strict audiophile through to radio freak and covering all shades in between.

## Listening tests

After the laboratory and air check tests, the tuners were auditioned in an audiophile context on an ad hoc basis over a two week period, using various high quality amplifiers and loudspeakers, and a combination of off-air and locally generated sources. Off-air, the tuners were fed from a large, multi-element *Galaxy* aerial in line-of-sight but 40 miles from the main Wrotham transmitter.

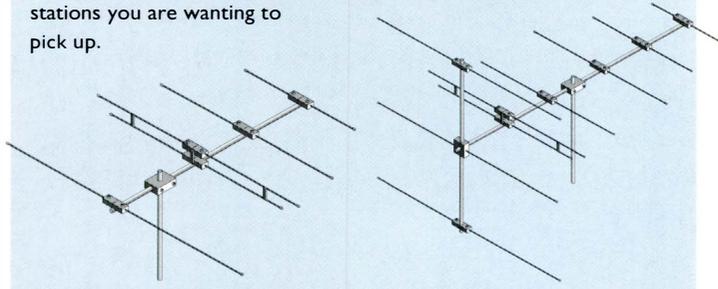
Blind tests were also carried out using both these techniques, with a panel of experienced listeners who were unaware of the identities of the tuners being auditioned.

## Why you need an aerial

A decent roof aerial is needed in order to pick up a top quality, clean signal that's as free as possible from dirty reflections. Make sure it is located as high up as possible, pointed in the right direction and with a clear 'view' of the transmitter broadcasting the stations you are wanting to pick up.



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# Denon TU-580RD



**A** Denon tuner, the budget £120 TU-260L (Best Buy issue 93) has been the market leader for months. However, such success won't be repeated with this £220 TU-580RD, simply because far fewer customers are shopping around for £200 plus radios. But this more upmarket unit looks an attractive proposition, adding features like RDS (radio data system) and independent remote control to the normal feature list.

RDS is primarily intended for in-car applications, but also includes digital information about the time, the station name and type of programming, and these are received, decoded and displayed as demanded on the 580RD's elaborate fluorescent panel. Hardly essential, these neat extra touches do help make the medium more accessible to technophobes.

Besides FM there's just medium wave AM here, but the rest is the usual full feature line-up, with step-by-step, scan or preset tuning (30 stations), adjustable selectivity, aerial attenuation, station naming and three stages of display dimming. A number of features are only accessed from the remote handset, which can be a

trifle confusing at first but at least keeps the tuner itself reasonably uncluttered.

### Air check

This new Denon model managed to show our air check reference tuner (an Akai AT-52L) several new tricks. The 580RD's narrow setting is exceedingly narrow — in some cases off-tuning by 50kHz can lose a weak station altogether. But this is just what's needed when trying to pull in *Jazz FM* or *Kiss* from a Brighton site, where the Denon could score Grade 4 (good) against the reference's simultaneous Grade 3 (fair).

RDS only manages to display a station identification label if the signal is (roughly) strong enough for stereo, which is fine for labelling local services, but not much value for identifying weak and obscure sources.

AM reception suffers badly from the woolly sock syndrome, but the FM section is good news for DX enthusiasts seeking high quality long distance reception.

### Sound quality

Exceptional RF performance often seems to accompany less promising sound quality from an audiophile perspective, and

this Denon followed the stereotype. It doesn't sound bad by any means, but it doesn't sound great either. The below average listening test results included particular criticism of a rather processed quality with some midband nasal coloration, and a slightly softened, slowed bass.

Dynamics at least are certainly better than the budget norm, but there's a degree of timesmear and the treble is occasionally slightly spitchy and untidy. It lacks the smoothness and sweetness of more upmarket offerings. The overall effect must therefore be regarded as ordinary and unexceptional, without the convincing coherence of more capable performers.

### Conclusion

The ultimate sound quality doesn't set any records, but the RF performance is out of the top drawer. The rest of the package is very competitive in terms of features, build and component quality, so a Recommendation is in order.

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

## Verdict

▲ Superb discrimination for weak and distant signals, oodles of features.

▼ Sounds a bit nasal and congested, no long wave on AM.

▶ £220.00RRP



## Laboratory Report

The main circuit board is only 28 x 12cm in size and looks very sparse because of the extensive use of surface-mount resistors and ICs mounted out of sight on the underside. A small but quite effective FM front-end has three LC circuits tuned to the incoming frequency prior to the mixer. Four ceramic filters, two narrow and two wide, and well buffered by discrete differential IF amplifiers, provide the maximum selectivity option. This arrangement delivers excellent measured figures, affording 20dB of protection only 200kHz away, which is reflected in the fine practical air check findings.

The IF amplifier and modulator is the indefatigable LA1235, used with a double-tuned quadrature discriminator coil pack. Careful production tuning delivers distortion figures close to the measurement limit at 0.05 per cent. Decoding is handled by a LA3401, with single-coil birdie and pilot filters fore and aft. Again the virtues of careful production alignment is seen in the fine separation of 40dB on programme peaks in wide IF mode.

AM has its own LA1245 IC, but unfortunately it is linked here to a ceramic filter with much too narrow a noise bandwidth for quality AM listening. The response is down nearly 20dB (unweighted at 5kHz compared with 31.5Hz), and there's no option to choose a wider response and gain some relief from the severe treble cut this implies.

This tuner pumps out a hefty +4.8dB (ref 775mV) on 100 per cent modulation, which will give plenty in hand for driving even a passive preamp system.

## TEST RESULTS

<b>FM SECTION (front end)</b>		<b>Distortion (100% modulation)</b>	0.05%
Sensitivity for 50dB (rms) S/N	4.5uV		-66dB
	+13dB/uV	<b>Frequency Response rel 50uS, 315Hz</b>	
S/N at 10uV Input (CCIR, peak)	-51dB	5.0kHz	-0.4dB
RF Noise figure	6dB	10.0kHz	-0.6dB
RF Overload	92dB/uV	12.5kHz	-0.9dB
Intermodulation	fair	16.0kHz	-1.4dB
<b>ADJACENT CHANNEL PROTECTION</b>		<b>AM SECTION (RF performance)</b>	
IHF Selectivity +/- 200 kHz wide	0dB	Sensitivity	good
narrow	+20dB	Image rejection	fair
IHF Selectivity +/- 400 kHz wide	+51dB	<b>AM SECTION (audio performance)</b>	
narrow	>+60dB	Distortion (90% modulation) 100Hz	8%
<b>STEREO CROSSTALK (programme, peak)</b>			-22dB
Level wide	-40dB	1kHz	1.3%
narrow	-34dB		-38dB
<b>DETECTOR AND DECODER</b>		<b>Frequency Response rel 2x50uS, 315Hz</b>	
Noise Floor (mono, peak)		2.5kHz (-4.09dB)	+0.3dB
unweighted	-75dB	5.0kHz (-4.09dB)	-8.6dB
'A' weighted	-80dB	6.3kHz (13.75dB)	-12.0dB
CCIR weighted	-73dB	8.0kHz (-17.20dB)	-22.8dB
Noise Floor (stereo, peak)		<b>Noise Floor (saturation, peak)</b>	
unweighted	-67dB	unweighted	-52dB
'A' weighted	-73dB	'A' weighted	-52dB
CCIR weighted	-67dB	CCIR weighted	-46dB

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# Kenwood KT-3050L



**H**i-fi cognoscenti regard Trio/Kenwood as a respected Japanese hi-fi specialist, but amateur radio enthusiasts know the brand as a world leader in multi-band communications receivers.

Kenwood tuners start at a fully competitive £120, but this £169 3050L sits at the middle of a five rung ladder, justified by a generous roster of features that includes something still quite rare called RDS (radio data system). Most of its applications are oriented towards the motorist, but the standard functions of displaying the name of the tuned station, and perhaps the pushbutton changing to alternative programmes of a similar type, do help make radio more friendly.

The tuner itself is a good looking device, its full-width blackness and bulk mollified by fashionably curved edges, a shade spoilt by the garish display. Covering medium and long wave AM as well as the FM band, it boasts plenty of features but basic operation is intuitive. What appears to be a chunky tuning knob turns out to be a disguised rocker switch — just another of life's little disappointments.

Performance related features include

a narrow/wide selectivity option, an AF attenuator and an 'active reception' button that attempts to take over most of these decision making processes. All the usual tuning options include 39 presets, with labelling available.

### Air check

Challenged to pick out *GLR* (94.9MHz) with *Radio Sussex* (95.0MHz), a few dB stronger and only 100kHz away, the Kenwood managed almost a grade better than the reference at times. On other challenging long-distance signals this tuner also acquitted itself very well.

However, medium and long wave were a disappointment, with a muffled, murky sound and no more than the usual protection against image response interference, which is not much. It also seems unwise to restrict long wave tuning to 9 kHz increments. There are stations, such as *Europe 1* on 183 kHz, which do not occupy the standard channel (180kHz), and the Kenwood's AM IF bandwidth is so narrow that the 3kHz tuning error introduced by offering only integral multiples of 9kHz is enough to preclude effective reception.

### Sound quality

The 3050L was not particularly well received in the listening tests, though the results were by no means poor in the context of its very modest price. The sound gives an inviting enough initial impression, with a slightly projected presence, but this tends to pall due to the lack of full coherence, and the whole effect is a little timesmeared and processed.

There's a degree of chestiness, but also some tightness in the bass which constricts the music's natural flow and expansiveness. And although the treble is clean and controlled, it's also a bit shiny, which doesn't make for a relaxing experience.

### Conclusion

There's no arguing with the specification and fine RF performance, which makes it an obvious choice for the radio enthusiast. However, the finer points of musical reproduction were not its forte, so things are less clear cut from a hi-fi perspective.

Trio Kenwood Ltd, Kenwood House, Dwight Road, Watford, Herts WD1 8EB.  
Tel: (0923) 816444

## Verdict

▲ Lots of tuner for your money, RDS and fine RF performance.

▼ Not the most communicative or involving sound around.

▶ **£169.95RRP**



## Laboratory Report

The front end uses three LC circuits tuned to the incoming frequency, and turns in quite respectable noise (4dB) and overload level (92dB $\mu$ V) figures. Overload is tested by applying a strong signal 1MHz away from a weak required one at 10 $\mu$ V, and assessing the level at which the strong signal degrades the noise floor of the weak one by 1dB. Figures above 90dB can be regarded as good. This is also better than usual at avoiding unwanted intermodulation products.

A full house of four ceramic filters, two narrow and two wide, make for very impressive selectivity figures. A 100 per cent modulated signal 200kHz away from a (silent) 100 $\mu$ V wanted one will not begin to break through until it is nearly 20dB stronger.

The LA1266 IC doubles as FM IF amplifier/detector and AM receiver. FM demodulation uses a double-tuned quadrature coil according to standard practice, producing around 0.13 per cent (-58 dB) distortion on 100 per cent modulation. AM uses two narrow ceramic filters, with devastating effects on the treble response: the 5kHz response level is more than 18dB down relative to 315Hz, although the distortion figures are relatively good at -38dB midband, -29dB at LF.

Decoding is undertaken by the standard LA3410 circuit, followed by a single-coil multiplex filter. Ultimate noise figures are on a par with broadcast standards at -62dB CCIR (weighted, peak), or -75dB by the more generous 'A' weighted RMS assessment.

### TEST RESULTS

<b>FM SECTION (front end)</b>			
Sensitivity for 50dB (rms) S/N	5.6 $\mu$ V		
	15dB $\mu$ V		
S/N at 10 $\mu$ V Input (CCIR, peak)	43dB		
RF Noise figure	8dB		
RF Overload	87dB $\mu$ V		
Intermodulation	fair		
<b>ADJACENT CHANNEL PROTECTION</b>			
IHF Selectivity +/- 200 kHz	wide 0dB		
	narrow NAdB		
IHF Selectivity +/- 400 kHz	wlde +44dB		
	narrow NAdB		
<b>STEREO CROSSTALK (programme, peak)</b>			
Level	wide -27dB		
	narrow NAdB		
<b>DETECTOR AND DECODER</b>			
Noise Floor (mono, peak)			
	unweighted -67dB		
	'A' weighted -70dB		
	CCIR weighted -65dB		
Noise Floor (stereo, peak)			
	unweighted -61dB		
	'A' weighted -66dB		
	CCIR weighted -61dB		
<b>Distortion (100% modulation)</b>			0.13%
			-58dB
<b>Frequency Response rel 50<math>\mu</math>S, 315Hz</b>			
	5.0kHz	+0.1dB	
	10.0kHz	0dB	
	12.5kHz	-0.2dB	
	16.0kHz	-0.8dB	
<b>AM SECTION (RF performance)</b>			
Sensitivity			good
Image rejection			fair
<b>AM SECTION (audio performance)</b>			
Distortion (90% modulation) 100Hz			3.3%
			1.3%
	1kHz		-38dB
<b>Frequency Response rel 2x50<math>\mu</math>S, 315Hz</b>			
	2.5kHz (-4.09dB)		-1.0dB
	5.0kHz (-10.72dB)		-7.7dB
	6.3kHz (13.75dB)		-12.4dB
	8.0kHz (-17.20dB)		-21.8dB
<b>Noise Floor (saturation, peak)</b>			
	unweighted		-55dB
	'A' weighted		-55dB
	CCIR weighted		-50dB

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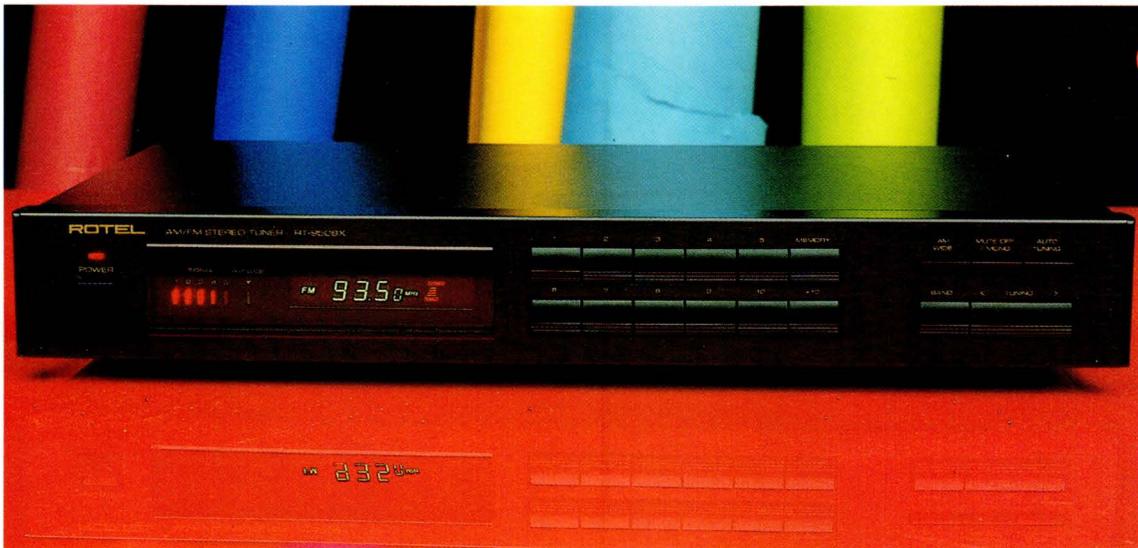


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# Rotel RT-950BX



**B**igin specialist budget amplifiers, Rotel naturally offers tuners to match, specifically the RT-930AX, Recommended in issue 108, and for an extra £50 this £200 RT-950BX. On the surface there's not a great deal to choose between them, but the 950BX has received rather more careful and costly component tweaking. No attempt has been made to integrate any of the system functions or provide remote control.

The feature count is adequate rather than generous, but you do get long and medium wave AM as well as stereo FM, and can access a total of 20 preset stations. Tuning relies on a pushbutton rocker, step by step or in automatic scan. A switch engages mono and disables muting, but there's no adjustment of FM selectivity.

AM does offer a 'wide' alternative, but since the standard setting is extremely narrow, the additional width only takes one up to a very narrow bandwidth.

A modest fluorescent display gives the usual readout of frequency and preset, plus a cluster of tell tales, centre tune and a five cherry signal strength reading.

Unusually, the high frequency sharp

notch filter normally used to suppress stereo pilot tone residuals has been substituted by a much gentler network.

### Air check

Neither sensitivity nor selectivity did much to help receive weak London stations at our Brighton site. LBC reception was two grades down on the reference, while stations with adjacent channel trouble like Kiss or Jazz FM couldn't be rooted out at all. Classic FM produced better results and full stereo, but even so the reference presented quieter background noise — always high at this level of signal input (around 40µV).

AM purports to have wide selectivity, but would easily qualify as narrow, being heavily rolled-off at the treble end. As such it sounds muffled and miserable, and although the tuner appeared to be more than usually sensitive, it was also prone to overload and gross distortion on strong local signals (above about 80 dBµV/m).

### Sound quality

It is impossible to say whether there's any direct link between this design's omission

of the usual pilot tone suppression and its impressive sound quality. Although not unanimous, the majority was positive.

Very much reflecting the Rotel 'house sound', the 950BX is open and lively, and drives the music along at such a pace that some listeners might be left a little breathless. The bass is dry and a little too restrained, which might be a positive benefit in a budget system where bass control is at a premium, but the net effect is a shade bright and shiny, and to some ears a trifle exposed and untidy. Speech did seem a trifle coloured, but the treble is a sweet as any, and the sound as a whole has fine timing and an engaging coherence.

### Conclusion

This tuner delivers a pacey and exciting experience from strong signals, and is something of a steal at £200. But the RF performance is ordinary and the build quality of our sample was suspect, so the verdict is a cautious Recommendation.

Gamepath, 25 Heathfield, Stacey Bushes, Milton Keynes MK12 6HR.  
Tel: (0908) 317707

## Verdict

▲ Punchy, and exciting with good communication skills.

▼ Not good for weak signals, slightly suspect build.

▶ £200.00RRP



## Laboratory Report

The front end is conventional, with three RF tuned circuits, dual-gate MOSFET RF amplifier, and bipolar mixer. Under test, it delivered an acceptable RF overload figure (93dBµV), but proved somewhat noisy (7dB) and was quite prone to intermodulation on strong signals. More than the usual amount of microphony was observed when tapping the cabinet, and it appeared that a dollop of wax intended to stabilise the oscillator coil had missed its mark in production, ending up ineffectually slumped in the corner of the oscillator can! There are only two medium bandwidth ceramic filters in the FM IF, so selectivity is a somewhat compromised 48dB for 400kHz separation. The conventional LA 1235 IC handles FM demodulation with a double-tuned coil, output being passed via a simple birdie filter to a NEC µPC 1223C decoder. AM or FM audio selection is undertaken by a relay rather than the more usual, and inferior, semiconductor switching process.

What really stood out at the measurement stage was the masking of the stereo noise floor by residual pilot tone. The 'flat' reading on our PPM was only -55dB, but this improved to -67dB by switching in CCIR weighting (which does away with most signals above 15 kHz). The explanation is that Rotel has failed to fit the usual 19/38 kHz LC filter after the decoder, relying instead on a much tamer (though sonically more acceptable) second-order RC roll-off. There's actually still room on the board for fitting a series LC circuit across the output, but no such components were present on the review sample.

## TEST RESULTS

FM SECTION (front end)		Distortion (100% modulation)	0.16%
Sensitivity for 50dB (rms) S/N	5µV		-56dB
	14dBµV	Frequency Response rel 50uS, 315Hz	
S/N at 10uV Input (CCIR, peak)	50dB	5.0kHz	+0.3dB
RF Noise figure	7dB	10.0kHz	+0.1dB
RF Overload	93dBµV	12.5kHz	-0.2dB
Intermodulation	poor	16.0kHz	-1.0dB
ADJACENT CHANNEL PROTECTION		*residual pilot tone	
IHF Selectivity +/- 200 kHz wide	-3dB	AM SECTION (RF performance)	
narrow	dB	Sensitivity	very good
IHF Selectivity +/- 400 kHz wide	+48dB	Image rejection	fair
narrow	dB	AM SECTION (audio performance)	
STEREO CROSSTALK (programme, peak)		Distortion (90% modulation) 100Hz	
Level	wide	1kHz	2.5%
narrow	-26dB		-32dB
	dB		-0.7%
DETECTOR AND DECODE			-0.3dB
Noise Floor (mono, peak)		Frequency Response rel 2x50uS, 315Hz	
unweighted	-75dB	2.5kHz (-4.09dB)	+0.2dB
'A' weighted	-78dB	5.0kHz (-10.72dB)	-7.0dB
CCIR weighted	-72dB	6.3kHz (13.75dB)	-15.2dB
Noise Floor (stereo, peak)		8.0kHz (-17.20dB)	-26.0dB
unweighted	-55dB*	Noise Floor (saturation, peak)	
'A' weighted	-64dB	unweighted	-62dB
CCIR weighted	-67dB	'A' weighted	-62dB
		CCIR weighted	-56dB

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# Sherwood TX-3010C



Not (yet) well known in Britain, Sherwood's UK distribution is controlled by the budget oriented retailer Richer Sounds, which at present limits availability to that particular chain and its Hi-Fi Direct mail order operation. This has ensured that Sherwood products are competitively priced. The £120 TX-3010C tested here is the most expensive of three Sherwood tuners, yet it's still £50 less than anything else in this group.

Not that you would have guessed it from either external or internal examination. Our engineering consultant was most impressed, even though the style council remained underwhelmed by the rather bulky and rattly metal box. Still, there's nothing wrong with the finish, and the feature list is pretty generous too.

You do get AM alongside the FM band, but this only covers the medium waveband. The full roster of features includes step-by-step, automatic scan or preset tuning, and although there's no RDS, you can go through a bit of a rigmarole to store a station ident with each of 30 presets.

The display is neat, informative and less garish than many, showing either fre-

quency or programmed name, plus preset number and tell tales for the various facilities that assist in handling weak or strong signal conditions. A local/distance switch optimises either for high sensitivity and low noise (distance), or greater immunity from strong signal overload (local).

### Air check

Three narrow IF filters are a match for four wider ones when it comes to 'skirt' selectivity, and the Sherwood gave an acceptable rendition of many troublesome FM signals on a par with the reference.

Telephone-like AM reception reveals, once again, that while the LA1245 AM receiver IC is basically sound, the standard choice of IF filter — a budget narrowband ceramic — does nothing at all for sound quality. On AM, a tuner like this is easily bettered by a vintage transistor radio.

### Sound quality

The various listening tests gave rather inconsistent results, which might well have been related to the complexity and strength of the signals coming down from the aerial. Initial sighted hands-on listening

was unpromising, at any rate from a sound quality perspective. A degree of tonal crudeness in the treble in particular left me wondering whether this is truly a genuine hi-fi rather than a mere audio component.

Yet although it could sound as cheap as its price-tag, with thumpy bass, shouty midband and spitty top, these are fundamentally cosmetic defects. The 3010C is also a communicative performer which manages to make radio sound interesting, if untidy and coloured.

In the blind tests, the panel was inconsistent in its judgements. Interestingly, it seemed rather better on our controlled pseudo-broadcasts than when exposed to the full rigours of the ether.

### Conclusion

It is tempting to point out that the Sherwood's inconsistencies could well be related to the measured susceptibility to RF intermodulation. That said, it's competitively priced, and certainly worth considering by anyone on a tight budget.

Hi-Fi Direct Ltd, 202 Long Lane, London SE1 4QB. Tel: 071-827 9827

## Verdict

▲ Very good price for a full feature tuner, lively and vigorous.

▼ Can be too lively and vigorous, and untidy with it.

▶ £120.00RRP

■ ■ ■ □ □

## Laboratory Report

A proprietary Mitsumi FM front end turns in a fair set of figures for RF performance, but with noticeable intermodulation on signal pairs above 70 dBµV or so. Dual-gate MOSFETs amplify and mix, and a 'local/distant' option on the AGC line provides relief from intermodulation when signals get too powerful. Only three ceramic IF filters provide selectivity, but unusually all three are narrow types, sufficient to turn out selectivity figures which match many four-filter combinations. There is no 'wide/narrow' bandwidth choice, so the TX-3010C is permanently a narrow bandwidth tuner, for better or worse.

The Hitachi HA12412 IC is employed as IF limiting amplifier and detector, with a double-tuned quadrature coil. The narrowness of the IF passband is reflected in the distortion figure of 0.4 per cent (-48dB), nearly an order of magnitude greater than tuners with a wider IF can achieve. Again, the permanent high selectivity means that stereo separation is less complete than usual, although the modest figure of -30dB from the HA12016 decoder, measured relative to peak programme in the other channel, is no cause for concern. However, listening to our test signal, consisting of silence in one channel and full modulation on the other, revealed a high level of distortion on the crosstalk signal.

AM reception is handled by an LA1245, as per standard issue, which like the FM is permanently wired in narrow mode. The treble response plummets like a stone especially above 3.5kHz, although midband distortion is a very low 0.5per cent.

## TEST RESULTS

FM SECTION (frontend)			
Sensitivity for 50dB (rms) S/N	5µV		
	14dBµV		
S/N at 10µV Input (CCIR, peak)	50dB		
RF Noise figure	7dB		
RF Overload	91dBµV		
Intermodulation	fair		
ADJACENT CHANNEL PROTECTION			
IHF Selectivity +/- 200 kHz	wide	NAdB	
	narrow	+17dB	
IHF Selectivity +/- 400 kHz	wide	NAdB	
	narrow	>+60dB	
STEREO CROSSTALK (programme, peak)			
Level	wide	NAdB	
	narrow	-30dB	
DETECTOR AND DECODER			
Noise Floor (mono, peak)			
	unweighted	-70dB	
	'A' weighted	-73dB	
	CCIR weighted	-65dB	
Noise Floor (stereo, peak)			
	unweighted	-64dB	
	'A' weighted	-68dB	
	CCIR weighted	-61dB	
Distortion (100% modulation)		0.4%	
		-48dB	
Frequency Response rel 50µS, 315Hz			
	5.0kHz	+0.2dB	
	10.0kHz	-0.3dB	
	12.5kHz	-0.9dB	
	16.0kHz	-4.2dB	
AM SECTION (RF performance)			
Sensitivity		good	
Image rejection		fair	
AM SECTION (audioperformance)			
Distortion (90% modulation)/100Hz		4%	
		-29dB	
	1kHz	0.5%	
		-46dB	
Frequency Response rel 2x50µS, 315Hz			
	2.5kHz (-4.09dB)	+0.8dB	
	5.0kHz (-10.72dB)	-13.9dB	
	6.3kHz (13.75dB)	-26.2dB	
	8.0kHz (-17.20dB)	-33.0dB	
Noise Floor (saturation, peak)			
	unweighted	-54dB	
	'A' weighted	-54dB	
	CCIR weighted	-50dB	

# Arcam Delta 280



**A**rcam's new £350 Delta 280 has a higher overall specification than the budget Alpha, and is a logical development of its Delta 80 predecessor. Both current Arcam tuners are now FM-only models, and the crucial benefit of this more upmarket model is the addition of full remote control for the first time. However, the relevant system remote handset costs a further £60.

The D280 has a number of other advantages over its cheaper stablemate, with better internal components from a sound quality point of view, more presets and a preset-scan feature, plus a narrow/wide selectivity option.

Presentation follows Arcam's full-width and very black house style. The slim fascia is well festooned with rather plasticky, clearly marked buttons. The display is bright, and most of it can be switched off.

The layout is very logical and the tuner itself is very easy to use. A shift key extends the 10 preset buttons to 20, while tuning in can be done step by step or automatically, the latter a trifle uncertain when to stop and when to keep going. Audiophile components notwithstanding, our engi-

neering consultant was surprised that the rather sparse component count should command such a premium price tag.

## Air check

This tuner was incapable of digging out weak signals effectively, even when no adjacent-channel stations were present. No weak London station was received above Grade 1 (bad), while the reference generally produced Grade 3 (fair). Intermodulation products were observed on signal pairs around 4mV.

There was less discrepancy in performance when the signal levels were increased to about 40µV by tuning to *Classic FM*, although the reference had somewhat lower noise.

## Sound quality

Disappointing weak signal and selectivity, plus synthesiser whine on the test bench, did not exactly get the Delta 280 off to a good start. The audiophile-oriented strong signal listening tests looked like it's only chance to escape ignominy. Which is precisely what it then proceeded to do.

You can hear that synthesiser, but only

during odd moments of broadcast silence and when the volume is high; normally it's inaudible. In other respects, the D280 has a sweet-natured sound that is informative while remaining unfaillingly easy on the ear — observations that were consistent, blind and sighted, under various conditions.

There's slight bass thickening and hangover, and slight treble smear and detachment, but the midband is particularly expressive, with an open quality that applies equally to the neutral balance and the unfettered dynamics. The sound keeps good coherence while remaining unforced and unstrained at all times. It's inherently sweet and very easy to live with.

## Conclusion

This is not a tuner for the long distance radio enthusiast. The audible synthesiser whine is a specific design flaw, and it's no great bargain from the component count. But it does sound very sweet with good signals, and it's easy to use as well.

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

## Verdict

▲ Sound is relaxed and informative, ergonomics well thought out.

▼ Disappointing reception of fragile transmissions.

▶ £350.00RRP



## Laboratory Report

The Arcam uses a rudimentary front end with two RF tuned circuits, the aerial socket being isolated from chassis by two 100pF capacitors. Two separate review samples produced midband synthesiser whine which was sufficiently far above the noise floor, at -57dB, to preclude normal sensitivity and noise measurements, though it was not generally apparent when listening to programmes. This whine was 6dB above the broadcast stereo noise expected on network radio, and implies a flaw in the design of the frequency synthesiser, if typical of production.

Selectivity figures fail to reach great heights, even in narrow mode. Many tuners go some 15-20dB better in 'alternate' channel measurements, taken 400 kHz away from a wanted signal at 100µV. Two 280kHz bandwidth ceramic filters for 'wide' selectivity are supplemented by a single 180kHz filter, which comes into circuit, together with a buffer amplifier, when a CMOS 4066 analogue switch is operated. Many tuners offer one more cascaded and buffered filter in narrow mode, and this is worth having.

The filtered 10.7MHz IF signal is processed by the usual LA1235 IC, with a proper double-tuned quadrature coil, followed by a second-order RC birdie filter feeding a standard LA3410 decoder. Distortion and separation figures are typical of this line-up. The output impedance is on the high side at 2.7k, but the frequency response is remarkably correct up to 12.5 kHz.

## TEST RESULTS

### FM SECTION (front end)

Sensitivity for 50 dB (rms)	S/N	µV
see text	see text	dB/µV
S/N at 10µV Input (CCIR, peak)		-42dB
RF Noise figure		see text
RF Overload		see text
Intermodulation		poor
ADJACENT CHANNEL PROTECTION		
IHF Selectivity +/- 200 kHz	wide	-6dB
	narrow	+4dB
IHF Selectivity +/- 400 kHz	wide	+37dB
	narrow	+46dB
STEREO CROSSTALK (programme, peak)		
Level	wide	-36dB
	narrow	-26dB

### DETECTOR AND DECODER

Noise Floor (mono, peak)		
	unweighted	-57dB
	'A' weighted	-57dB
	CCIR weighted	-50dB
Noise Floor (stereo, peak)		
	unweighted	-57dB
	'A' weighted	-57dB
	CCIR weighted	-50dB
Distortion (100% modulation)		0.2%
		-54dB
Frequency Response rel 50µS, 315Hz		
	5.0kHz	+0.1dB
	10.0kHz	0dB
	12.5kHz	0dB
	16.0kHz	-4.3dB

# Audiolab 8000T



Few tuners have been more eagerly awaited than this £700 Audiolab. Now that it has finally appeared, after some nine years gestation, I doubt any will complain that it wasn't worth the wait or the price. The 8000T is less system oriented than many. There is no attempt to provide remote control, and this minor inconvenience, along with elaborate, original features and full-width case, make it more a tuner in its own right, and less an amplifier appendage.

It's quite bulky but very substantially built with little spare space on the busy fascia, and more than enough buttons to intimidate gran. Besides all the necessities for high class FM reception, there's an ambitious AM section covering both medium and long wavebands.

The superb display uses a delightfully restrained and glare-free back-lit LCD device. It's large, providing lots of useful information, plus a frequency read out big enough to be read from your armchair without developing a squint. Best of all, for anyone who can recall the delightful fluidity of analogue flywheel tuning, is a proper round tuning knob which is a joy to use.

Philistines, of course, have all the usual options like presets (39) and push-button auto-scan, while long distance reception is aided by a narrow/wide selectivity option, high-blend and mono switches. Calibrated signal strength, tuning meters and record output level setting tone are further icing on an elaborate but friendly cake.

## Air check

The Audiolab proved at least a match for the reference on all the London stations at our Brighton test site. The 25kHz tuning increments proved useful in fine-tuning GLR (94.9MHz) away from interference from Radio Sussex (95.0MHz).

The signal meter and tuning indicator are informative, and the ability to hear through the 'soft muting' while trawling manually through any band was much appreciated. The splendid rotary tuning knob was well-paced on FM, but rather speedy on MW.

The bright and breezy AM section was sensitive enough and remarkably free of spurious, but reception was vulnerable to phasing. Aerial adjustment helps, but doesn't always cure the problem.

## Sound quality

The 8000T was consistently at the top of the listening panel voting, with praise for its relaxed clarity, openness and neutrality, well developed images and fine dynamic detailing. The only criticism levelled at the tuner was of slight sibilant and presence exaggeration.

Extended hands-on listening found the sound less crisp and grainier than more expensive references, with a loss of fine texture and delicacy. But the 8000T was always informative and enjoyable in its own relaxed way, with fine depth and dynamics alongside a neutral balance.

## Conclusion

Superb ergonomics, fine reception performance and a sound quality that gets pretty close to the state-of-the-art make it impossible to resist awarding a Best Buy rating to such a remarkably well thought out and balanced design.

Cambridge Systems Technology Ltd, 26 Roman Way Industrial Estate, Godmanchester, Huntingdon, Cambridgeshire PE18 8LN.  
Tel: (0480) 52521

## Verdict

- ▲ An ergonomic delight; fine all round performance.
- ▼ Could be a little sharper and more exciting, perhaps.

▶ £700.00 RRP



## Laboratory Report

A substantial in-house front end produces very good sensitivity (4dB noise figure) and RF overload performance (87 dBµV), although two close signals above about 70 dBµV did give some intermodulation. The essential functions of RF amplifier and mixer are handled by two dual-gate MOSFETs, with a pair of two pole bandpass filters for RF selectivity. The synthesiser neatly enables tuning in fine 25kHz steps, while the IF strip uses a combination of LC and ceramic selectivity to produce one narrow and one wide curve. In use, selectivity seems better than the bald figures suggest.

The 10.7MHz IF signal is doubled after amplification to 21.4MHz, carrying a peak deviation of 150kHz, and then converted by crystal oscillator to a final IF of 712.2kHz. This low frequency is capable of being demodulated by a very stable 'charge integrating' demodulator which does not rely on precise LC circuit tuning to achieve low distortion. Distortion is certainly well below 0.1 per cent, with every reason to suppose it will stay that way for a long time.

A standard LA1245 IC with SFR450G ceramic filter is the mainstay of the AM section. Unusually, perhaps uniquely, the manufacturers have arranged for a flat response from LF to around 5kHz in wideband mode. (Our test results are weighted according to two 50µS roll-offs and so appear to register top end boost.) In practice, all broadcasters pre-emphasise AM broadcasts to varying degrees, so a 'flat' balance can sound rather shrill.

## TEST RESULTS

FM SECTION (front end)			
Sensitivity for 50dB (rms) S/N	3.6µV		
	11dB/µV		
S/N at 10µV Input (CCIR, peak)	53dB		
RF Noise figure	4dB		
RF Overload	87dB/µV		
Intermodulation	fair		
ADJACENT CHANNEL PROTECTION			
IHF Selectivity +/- 200 kHz wide	0dB		
narrow	+6dB		
IHF Selectivity +/- 400 kHz wide	+35dB		
narrow	>+60dB		
STEREO CROSSTALK (programme, peak)			
Level wide	-30dB		
narrow	-26dB		
DETECTOR AND DECODER			
Noise Floor (mono, peak)			
unweighted	-69dB		
'A' weighted	-71dB		
CCIR weighted	-71dB		
Noise Floor (stereo, peak)			
unweighted	-65dB		
'A' weighted	-70dB		
CCIR weighted	-67dB		
Distortion (100% modulation)	0.075%		
	-62dB		
Frequency Response rel 50µS, 315Hz			
5.0kHz	-0.25dB		
10.0kHz	-0.4dB		
12.5kHz	-1.1dB		
16.0kHz	-3.5dB		
AM SECTION (RF performance)			
Sensitivity	very good		
Image rejection	very good		
AM SECTION (audio performance)			
Distortion (90% modulation) 100Hz	5%		
	-26dB		
	1%		
	1kHz		
	-40dB		
Frequency Response rel 2x50µS, 315Hz			
2.5kHz (-4.09dB)	+3.8dB		
5.0kHz (-10.72dB)	+8.2dB		
6.3kHz (13.75dB)	+6.4dB		
8.0kHz (-17.20dB)	-17dB		
Noise Floor (saturation, peak)			
unweighted	-64dB		
'A' weighted	-68dB		
CCIR weighted	-64dB		



# Quad 66



Quad may be one of the oldest British hi-fi manufacturers, but this hasn't stopped the company from recognising the increasing importance of system integration. The £519 66 extends the concept further than any, having no independent life of its own without the system remote, which Quad assumes purchasers will have acquired with the matching preamplifier.

The only control on this exceedingly neat unit is a large power on/off button. To use the tuner you must refer to the hefty table-top remote, for which Quad has adopted the 'large print' approach. The handful of big buttons and two even larger rotary knobs feel very pleasant to use, though the orange on bronze legends are not always easy to read.

You might well agree that the 66 is the prettiest tuner on the market. It's so goddam compact. The front looks interesting without being flash, and the display is a restrained back-lit LCD type, with clear read outs of tuned frequency, preset number, signal strength (eight cherries) and mono/stereo. It helps that there aren't any buttons to clutter everything up...

Impressive it may be, but it's not particularly intuitive to use. Your only options are to scan-tune up or down the FM-only band, the tuner stopping automatically when it receives a signal, and then store said signal into a 19 station preset memory. The other option is a step by step search through the memory bank.

### Air check

LBC (97.3MHz) is weak at our Brighton test site at the best of times, but has no adjacent channel problems to contend with. When the LBC signal was rated Grade 4 (good) on the reference, the 66 could only deliver Grade 2 (poor).

Where adjacent-channel interference compounds the difficulties, such as Kiss (on 100.0MHz, and having to contend with a much stronger local Radio 1 on 99.7MHz) or Jazz FM (102.2 MHz, with a problem on 102.4 MHz), the Quad failed to provide sufficient discrimination against the unwanted signal, and no reception at all was recorded at a time where the reference was able to muster Grade 2 at least. But Classic FM, at 40µV or so, came through well and in stereo, if with slightly

more noise than the reference.

### Sound quality

Fed with high quality signals in a (non-Quad) audiophile system context, the 66 sounds very pleasant, uncoloured and generally neutral, if a bit laid back, self-effacing and dynamically shy.

The listening test panellists were neither impressed nor particularly critical, reactions varying from "some lack of spark" to "flat and boring". The balance has a tendency towards brightness, perhaps as a consequence of the dry and constricted bass, but the sound remains tidy and well controlled, clean and easy on the ear, if perhaps a little too undemanding.

### Conclusion

The 66 tuner has little to offer the radiophile or audiophile that isn't available elsewhere for less. But it is a neat, attractively styled unit that should work satisfactorily in a Quad system context, provided local RF conditions aren't too demanding.

Quad, 30 St Peters Road, Huntingdon, Cambs PE18 7EJ. Tel: (0480) 434334

## Verdict

▲ Neat, compact and very pretty to look at.

▼ Only really of interest in a complete Quad system.

▶ £519.00RRP



## Laboratory Report

The 66 is unusual in using a TDA1062 IC to undertake the front end duties of converting RF to IF via three tuned circuits and an oscillator. This may save in construction terms, but it doesn't do much for the RF performance: the 8dB noise factor is somewhat worse than usual, and the 87dBµV RF overload point is not too high either. Another unusual feature is that selectivity is shared between LC and ceramic elements instead of being left the prime responsibility of the latter. Three LC circuits follow the front end, carefully damped and coupled, and feed a two-transistor buffer prior to the IF signal passing through two ceramic filters. This has a fixed response and falls into the 'wide' category, with respectable alternate channel selectivity of 44dB at 400kHz.

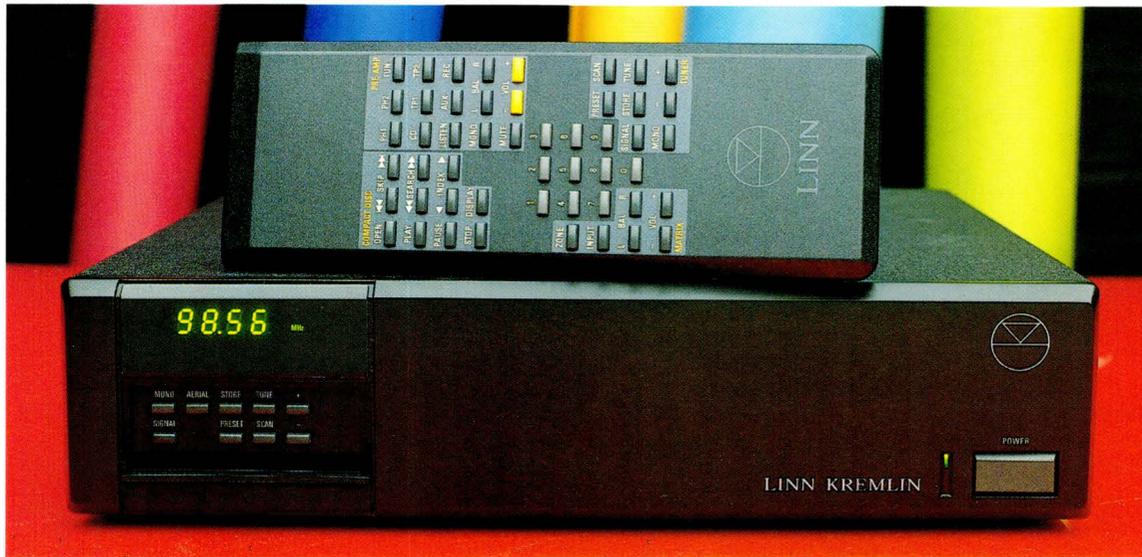
The LA1235 IC appears in a conventional quadrature detector circuit, which uses a transistor buffer on the demodulated output to feed a single-coil LC birdie filter. Distortion is typically 0.13 per cent at around 1mV input, but varies with signal level. Decoding is the job of an LM4500, which feeds a block pilot and multiplex filter with tuneable 19 and 38kHz notches. Separation and stereo noise, at -27dB peak programme and -61dB CCIR peak respectively, are less good than figures recorded elsewhere.

The output from the pilot filter is passed through an op-amp to buffer the load from the filter output, with FETs used to mute across a 1kohm output impedance. The output level is lower than most at a little under -7dB (ref. 775mV) for 100 per cent modulation.

### TEST RESULTS

<b>FM SECTION (front end)</b>		<b>DETECTOR AND DECODER</b>	
Sensitivity for 50dB (rms) S/N	5.6µV	Noise Floor (mono, peak)	
	15dBµV	unweighted	-67dB
S/N at 10µV Input (CCIR, peak)	49dB	'A' weighted	-70dB
RF Noise figure	8dB	CCIR weighted	-65dB
RF Overload	87dBµV	Noise Floor (stereo, peak)	
Intermodulation	fair	unweighted	-61dB
ADJACENT CHANNEL PROTECTION		'A' weighted	-66dB
IHF Selectivity +/- 200 kHz wide	0dB	CCIR weighted	-61dB
narrow	dB	Distortion (100% modulation)	0.13%
IHF Selectivity +/- 400 kHz wide	+44dB		-58dB
narrow	dB	Frequency Response rel 50µs, 315Hz	
STEREO CROSSTALK (programme, peak)		5.0kHz	+0.1dB
Level	-27dB	10.0kHz	0dB
	narrow	12.5kHz	-0.2dB
		16.0kHz	-0.8dB

# Linn Kremlin



Rather than partner its less expensive amplifiers, Linn's first tuner has gone completely the other way. A quick look at the prodigious componentry explains why the £1,779 *Kremlin* is the most expensive tuner made in the UK.

This FM-only unit has a compact well-finished mid-width box, and self-effacing presentation. A flap conceals nine tiny push-buttons which allow direct operation if your eyesight is good, but the rather complex supplied remote handset is the more practical option.

Despite the combination of pushbutton controls and digital display under micro-processor control, inherent simplicity makes this a quite friendly, logical and straightforward unit to use, although it's frustrating not to see the excellent (120 step, accurately calibrated) signal metre at the same time as the frequency display.

Tuning can be carried out in all the usual ways, with a preset memory covering eighty stations, plus direct keying in of the wanted frequency (from the handset). Unusually small 10kHz tuning steps feel good in an analogue sort of way, though its value is rather negated by the lack of any

narrow IF selectivity option.

## Air check

We tried to interest the *Kremlin* in tackling our worst signals with little joy. The IF bandwidth has been optimised for quality reception of stations which do more than just flirt above the noise, so *Kiss* 100.0MHz was totally flattened by the local Brighton *Radio 1* on 97.7MHz.

*Classic FM* (100.9 MHz) is weak at around 32 dB $\mu$ V, but it has no adjacent-channel problems, and came through clearly. *Mercury* (102.7MHz, about 13 dB $\mu$ V) was tidied up in the presence of local word processor interference by the HF roll-off applied to otherwise noisy signals. The immunity to ignition interference and the like was excellent.

## Sound quality

I first heard a *Kremlin* in the complete Linn system reviewed in *The Collection* (Autumn 1992). It was the best tuner I'd ever heard, and still sounds that way to me — but others involved in the listening did not by any means agree. Matters were further complicated by its refusal to be fooled by

our simulated stereo broadcast. It stayed resolutely in mono, for reasons which are clearly no fault of the tuner.

As soon as I powered up the *Kremlin* I was impressed by the superb coherence and lack of timesmear and chesty effects, which seemed to remove veils between the listener and the broadcast studio. However, my partner found the sound irritating and complained of coloration.

Unable to make repeatable stereo A/B comparisons, the dichotomy remains. In my opinion, much of the *Kremlin*'s apparent coloration emanates from the studio, but another listener correctly identified a 'Linn' character, so the truth may well be a combination of the two.

## Conclusion

Despite the limited selectivity, our RF consultant was much impressed, especially by the 'bullet-proof' front end. The sound is controversial, but I'm a believer and suggest you make up your own mind.

Linn Products Ltd, Floors Road, Waterfoot, Eaglesham, Glasgow G76 0EP.  
Tel: 041-644 5111

## Verdict

▲ Bullet-proof front end, controversial but consistent sound quality.

▼ Very expensive; limited simultaneous display information.

▶ £1,780RRP



## Laboratory Report

Two 'F' sockets permit signals to enter the *Kremlin* tuner, with the option of applying DC to either or both for a remote RF preamplifier. A matching network to preserve 75 ohm impedance feeds a double-tuned RF input circuit. Two BF981 RF amplifier transistors in parallel with independent output coils supply the mixer, which again consists of two devices (Plessey SL6440 ICs). This makes up an exceptionally robust front end, but the ultimate noise performance is not as good as some.

The frequency synthesiser is built around a TSA6057 IC, with the oscillator running low and a length of short-circuited co-ax acting as a resonator for better 'Q' and microphony. IF gain is initially generated by CA3046 differential amplifiers, with two TDA1576 ICs used as final limiting amplifiers to feed a PLL detector and provide a very wide indication of signal strength. Fixed selectivity comes courtesy of 13 LC circuits tuned to 10.7MHz — no cheap ceramic filters here.

An eightpole LC low-pass birdie filter follows the detector, and is in turn followed by a comprehensive discrete RC group-delay equaliser. Decoding is handled by the TDA1578A, with full LC and RC filtering of the left and right signals, which are presented to the outside world via a discrete transconductance audio amplifier capable of silent muting. Stereo signals below about 200 $\mu$ V (46 dB $\mu$ V) start to blend, and treble roll-off is introduced on low-level mono reception, but strong signal stereo separation is excellent.

## TEST RESULTS

### FM SECTION (front end)

Sensitivity for 50dB (rms) S/N	5.6 $\mu$ V* 15dB $\mu$ V
S/N at 10 $\mu$ V Input (CCIR, peak)	49dB
RF Noise figure	8dB
RF Overload	>97dB $\mu$ V excellent
Intermodulation	
ADJACENT CHANNEL PROTECTION	
IHF Selectivity +/- 200 kHz	wide -3dB narrow NA dB
IHF Selectivity +/- 400 kHz	wide +41dB narrow NA dB
STEREO CROSSTALK (programme, peak)	NA dB
Level	wide -43dB

### DETECTOR AND DECODER

Noise Floor (mono, peak)	
unweighted	-70dB
'A' weighted	-75dB
CCIR weighted	-70dB
Noise Floor (stereo, peak)	
unweighted	-62dB
'A' weighted	-69dB
CCIR weighted	-67dB
Distortion (100% modulation)	0.1% -60dB
Frequency Response rel 50 $\mu$ S, 315Hz	
5.0kHz	0.0dB
10.0kHz	+0.2dB
12.5kHz	+0.25dB
16.0kHz	-1.4dB

\*treble roll-off temporarily disabled

# Meridian 604



**M**eridian calls this brand new £1,350 604 tuner a 'digital wireless', which gives one clue to a design primarily intended to be part of a complete 600 (or 200) series system.

The company has pioneered both multi-room systems and digital-feed active loudspeakers, in which role the 604's internal analogue-to-digital convertor and digital audio output are particularly relevant. However, in the context of a non-Meridian system, the non-digital 204 tuner, at half the price, might be the more logical option.

Presentation is quirky but typically classy, with plate glass forming much of the fascia. The compact midi-width unit is actually two separate slimline cases, siamesed by front and rear panels. Remote control is available, either via an extra, pricey Meridian system remote, or any other which follows Philips' protocol.

Ergonomics are unconventional. Partly to handle the multi-room dimension, this flexible tuner can be configured in various ways according to system and preference, or the patience to wrestle with the logic. Seven edgewise strips perform a variety

of functions, default providing scan tuning, preset storing and cycling. The flexible display is small, bright and rather digital-matrix. The signal meter is a little crude.

## Air check

Unusually but quite effectively, the 604 automatically soft-mutes weak signals so these sound quieter than strong ones. This may have misled our front-end tests, which may be worse for noise and better for overload than the figures suggest. *Classic FM*, at 40µV, was clear and quiet but largely monophonic at this input level.

The 604 was just capable of digging out *Kiss* despite the very strong local *Radio 1* signal 0.3MHz down, but the reference tuner was a full grade better. The Meridian was also in difficulty with noise and adjacent channel interference on the other London stations, but its intermodulation performance was among the best.

## Sound quality

The formal listening test findings were slightly disappointing, but I spent several days under more relaxed circumstances,

developing a healthy respect for its capabilities, without exactly falling in love.

This is a very sweet sounding tuner, which delivers an unfailingly civilised sound with a lovely transparent midband that relishes the delicate portrayal of fine detail. An element of timesmear and chestiness at low frequencies is well disguised by a very dry and controlled bottom end, which in turn tends to focus attention on the slightly forward presence and the sweet, tidy treble. Image depth and dynamics are both slightly constrained, and there could be greater liveliness and urgency. But unflappability is part of its temperament, while dynamic range is very good indeed.

## Conclusion

Though the big price premium over the 204 will make most sense in a Meridian digital speaker system context, the 604 still deserves a Recommendation as a well-balanced, high performance, audiophile tuner.

Meridian Audio Ltd, 13 Clifton Road, Huntingdon, Cambridgeshire PE18 7EJ. Tel: (0480) 434334

## Verdict

▲ Makes sense in a Meridian system; good all round performance.

▼ Pricey and ergonomically too quirky for radio buffs.

▶ £1,350RRP



## Laboratory Report

The circuitry consists of three main PCBs in separately screened compartments: the radio receiver proper; the analogue output and A/D conversion process; and the computer panel with micro controller and an optically isolated interface to prevent interference from the digital circuitry. Aerial signals feed a discrete RF amplifier using a dual-gate MOSFET, while the mixer/oscillator and first IF amplifier functions are handled by a Philips TDA1574 IC. There are three stages of RF tuning before the mixer. Note some discrepancy between lab-measured and aerial-observed RF performance (see Air check).

The main IF selectivity is provided by two medium bandwidth, matched pair ceramic filters. Selectivity is very good, exceeding our limit at 400kHz separation, but more in line with 'wide' practice on the 200kHz spacing test. In addition to providing the usual demodulating function, the Philips TEA6100 IC interfaces directly with a microprocessor to supply IF frequency, signal strength, and centre-tuning information for display.

The output from the demodulator is passed through a level shifting stage and birdie filter to a National LM4500 Walsh-function decoder. Separation measured an excellent -40dB, although marginal signals begin to suffer (or benefit) from the progressive stereo blending undertaken to preserve the signal-to-noise ratio. De-emphasis at 15µs is applied prior to A/D conversion to match standard CD and broadcast characteristics, while the remaining analogue de-emphasis takes place in a discrete audio buffer stage.

## TEST RESULTS

<b>FM SECTION (front end)</b>			
Sensitivity for 50dB (CCIR) S/N	4µV*		
S/N at 10µV Input (CCIR, peak)	12dB/µV		
RF Noise figure	52dB		
RF Overload	5dB		
Intermodulation	82dB/µV		
ADJACENT CHANNEL PROTECTION	very good		
IHF Selectivity +/- 200 kHz	wide +3dB		
	narrow NA dB		
IHF Selectivity +/- 400 kHz	wide >+60dB		
	narrow NA dB		
STEREO CROSSTALK (programme, peak)			
Level	wide -40dB		
	narrow NA dB		
<b>DETECTOR AND DECODER</b>			
Noise Floor (mono, peak)			
unweighted			-67dB
'A' weighted			-68dB
CCIR weighted			-60dB
Noise Floor (stereo, peak)			
unweighted			-62dB
'A' weighted			-64dB
CCIR weighted			-57dB
Distortion (100% modulation)			0.4%
			-48dB
<b>Frequency Response rel 50µs, 315Hz</b>			
		5.0kHz	-0.1dB
		10.0kHz	-0.2dB
		12.5kHz	-0.3dB
		16.0kHz	-1.2dB

\* See text



# Conclusions, Best Buys and Recommendations

The most difficult part of this group test was the separation of those which qualified for formal Recommendation from those which did not. Although the Audiolab almost selected itself, the remainder made strong claims for inclusion on one ground or another. Ultimately, personal preference had to play a part.

The radio enthusiast interested in pulling in weak signals will have a very different list of preferences from the audiophile who wants the very best results from the nearest transmitter.

For sheer pulling power it's hard to beat the relatively inexpensive, Far Eastern sourced tuners like the Denon, Kenwood and Sherwood. Sound quality is more closely related to price with the more expensive tuners showing their superiority under good reception conditions. This leaves personal preference and the system matching factor as other considerations.

There did seem to be some correlation between a tuner's susceptibility to RF intermodulation and its sound quality consistency which suggests that those using roof aerials in strong signal areas, who are interested in local transmissions, might improve the sound of some tuners by introducing a degree of aerial attenuation.

In-line attenuators are not an ideal solution, but are cheap enough to be worth a try. Thanks to Alan Brown and Tim Foulsham at Wireless Workshop, Andy Gemmel-Smith of Alice Soundtech, and Edward Lisle for the use of facilities and equipment.

## Best Buy and Recommended Listing

### BELOW £250

#### BEST BUYS

Denon TU-260L (£120) Basic features, and a surprisingly open and vivacious sound. Don't overlook it.

#### RECOMMENDED

Denon TU-580RD (£220) Features include remote and RDS; excellent RF performance; decent sound.

Marantz ST-40L (£120) Slow to tune but meaty and dynamic sound on FM. AM has a little extra bite.

Pioneer F-676 (£200) Detailed and clean sounding. Perhaps a little bright but not unpleasant.

Rotel RT-930AX (£160) Competent performer; low audible interference; slightly muddled sound.

Rotel RT-950BX (£200) Fast and coherent sound; RF performance only adequate; sample build suspect.

Technics ST-G70L (£250) Polite, refined yet interesting sound; plenty of widgets to play with.

### £250 - £750

#### BEST BUYS

Audiolab 8000T (£700) Combines fine sound and RF performance (inc AM); superb ergonomics.

#### RECOMMENDED

Harman Kardon TU9400 (£270) Striking appearance and sound; on stereo FM, it's H/K's best yet.

Yamaha TX-950 (£260) Very clean and civilised; plenty of detail and clarity; lots of useful features.

### OVER £750

#### RECOMMENDED

Linn Kremlin (£1779) Controversially good sound, but at a price; check it out for yourself.

Meridian 604 (£1,350) Sweet, civilised and transparent; digital section adds a lot to price.

#### Test stations included:

- *GLR* 94.9 MHz
- *Radio Sussex* 95.0 MHz
- *LBC* 97.3 MHz
- *Kiss* 100.0 MHz
- *Radio 1* 99.7 MHz
- *Jazz FM* 102.2 MHz
- *Southern FM* 102.4 MHz

All these stations typically hover around a few microvolts under flat conditions, just enough for entertainment-quality mono reception on equipment capable of good noise performance and of handling the adjacent-channel interference.

## Swing tags

Products that make the grade are awarded the Best Buy or Recommended accolade.

A product carrying the Best Buy swing tag is of excellent quality and good value for money in its price category.

Recommended products are runners up, but still definitely worth considering within their price bands.



## Order of merit after air check

Assessment of reception of weak London FM signals at Brighton test site.

**Reference tuner:** Akai AT-52L, #150, (Best Buy issue 65)

**Better than reference**

#1 - Denon TU-580RD

#2 - Kenwood KT 3050L

**Similar to reference**

#3 - Audiolab 8000T

#4 - Sherwood TX 3010C

**Poorer than reference**

#5 - Meridian 604

#6 - Linn Kremlin

#7 - Quad 66

#8 - Rotel RT-950BX

#9 - Arcam Delta 280



# SEVENOAKS SUPERFI

This advertisement is valid until at least 31st July 1993.

## Display, Demonstrations and After Sales

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

## SUGGESTED SYSTEMS

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

SPEAKERS	AMPS	Turntable or CD player	System Price						
JPW Sonata (V) Celestion I Goodmans M100  Celestion 3 JPW Sonata (W) Tannoy 603 Mission 760I Widale Diamond 5  Tannoy 605 MoniAudio One  Celestion 5 B&W DM600 Kef K120 Heybrook Solo Mission 761I MoniAudio R7  Tannoy 607 B&W DM610 Celestion 7  Rogers LS2A-2 JPW AP3 Kef 140  Mission 762 Castle Durham II Heybrook HB1/3  Rogers LS4A-2 Tannoy 609	NAD 3020I	NAD 5120	267.95	311.95	319.95	351.95	367.95	383.95	407.95
	Marantz PM32	NAD 5120	275.95	319.95	327.95	359.95	375.95	391.95	415.95
	Rotel RA 920AX	NAD 5120	283.95	327.95	335.95	367.95	383.95	399.95	423.95
	Nad 302 Kenwood KA3020	NAD 5120	296.95	328.95	348.95	367.95	396.95	412.95	436.95
	Harman HK6150 Rotel RA930AX Technics SUVX500K	NAD 5120	312.95	328.95	348.95	364.95	396.95	412.95	436.95
	Technics SUVX600K	NAD 5120	340.95	356.95	384.95	392.95	424.95	455.95	480.95
	Nad 304 Sony TAF540E	NAD 5120	355.95	371.95	407.95	439.95	455.95	471.95	495.95
	Marantz PM40SE Harman HK6250	NAD 5120	363.95	379.95	407.95	447.95	463.95	479.95	503.95
	CD Players	NAD 5120	300.00	300.00	300.00	300.00	300.00	300.00	300.00
	Turntables	NAD 5120	300.00	300.00	300.00	300.00	300.00	300.00	300.00

### Options

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

- CD Players**
- Aiwa XC300 Add £49
  - Denon DCD595 Add £79
  - Denon DCD695 Add £99
  - Denon DCD890 Add £169
  - Denon DCD1290 Add £229
  - Marantz CD42II Add £99
  - Marantz CD52II Add £129
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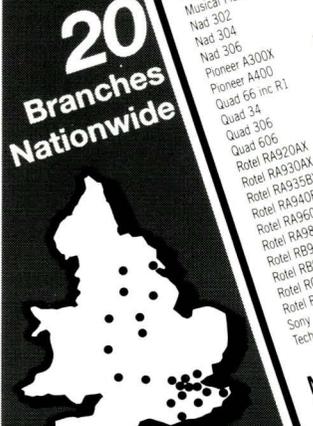
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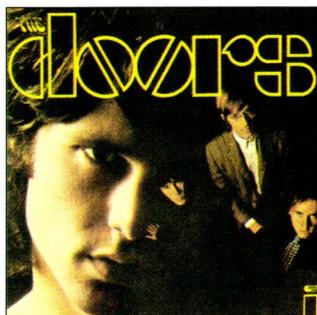
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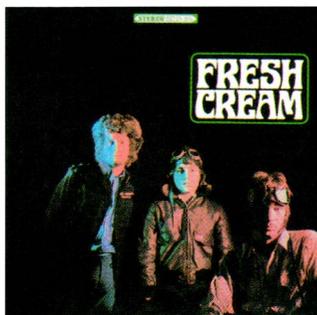
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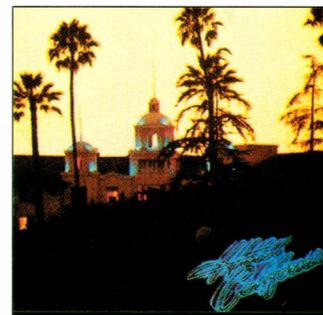
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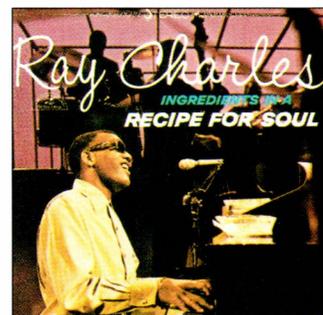
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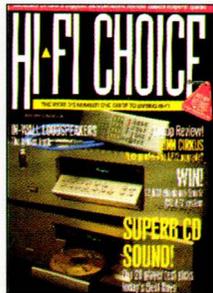
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## HEREFORDSHIRE

ENGLISH AUDIO, 95 Whitecross Road, Hereford HR4 0DG. (0432) 355081 Cyrus Centre, Pink Triangle, Audion, Systemdek, Heybrook, Michi, KEF Reference, Micromega, Nakamichi, Chord, Arcam, Musical Fidelity, Rogers, NAD, Rotel, Denon, Tannoy, Marantz, Mission, Stax, Dual, TDL, Albary, JPW, Celestion, Ixos, SME, Ruark, Moth, Audio Technica 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, Chord, Denon, Marantz, Meridian, SME, TDL., Teac, TUES Sat 9.30-6.00.

AUDIO FLE, 27 Hockerill St, Bishops Cleeve, 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, ProAc. 0% credit.

RADLETT AUDIO, 141 Watling Street, Radlett, Hertfordshire, WD7 7NQ. (0923) 856497. Mark Levinson, Proceed, PRO AC, AVI & ATC, Martin Logan, Tube Technology, Teac, Roksan, Audiolab, Rotel. Home trial facilities, Free Install, Service Dept. Visa, Access 9-5.30 Mon-Fri 10-5.30 Sat STUDIO 99, 82 High Street, Harpenden. (0582) 764246. 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.

## NORTH HUMBERSIDE

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

## KENT

ASHFORD, SOUND CRAFT HI-FI, "BADA" LOGO)

40 High Street. Seeking music lovers, male or female any age, to share common interest in, musical Pro-aktiv Hi-Fi Systems, Multi Room or Home Cinema. Attractive unusual equipment in unusual setting, your place or ours, we guarantee lasting pleasure. Open Mon-Sat, Appointment Service or just pop in. Tel: 0233 624441.

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, Aura, B&W, Heybrook, JPW, Pro-Ac, Pioneer, Rotel, Ruark, Tannoy, Technics. Dem and home trial fac. Mon-Sat 9-5.30 closed Thurs. Free install. Credit to £1,000. Access, Visa, Credit charge. Service Dept.

KIMBERLEY HI-FI, 193 Broadway, Bexleyheath, Kent. (081) 304 3272. Pioneer, Technics, Kenwood, Denon, NAD, Aiwa, Tannoy, Mission, Wharfedale, B&W. Separate dem room, no appt nec. Free installation. Service Dept. Instant credit facilities. 9.30-5.30. No early closing.

PANATEC SOUND & VISION CENTRE, 83b High Str, Gillingham. (0634) 573141. B&W, Bose, Cambridge, Dual, Kenwood, Marantz, Pioneer, Philips, Sony, Tannoy, Technics, Wharfedale. Dem room facilities. 0% credit, Service Dept. Free Installation. Pioneer Reference Point Dealer.

PANATEC SOUND & VISION, 17 Week Str, Maidstone. (0622) 661488. See above for details. VOLUME ONE, 41 Upper Wickham Lane, Welling, DA16 3AD. 081 304 4622. Arcam, Dual, Epos, Exposure, Mordaunt Short, Monitor Audio, JPW, Marantz, Micromega, Nakamichi, Pink Triangle, Rotel, Royd, Ruark, Sony, Systemdek. Large demo room, no appt nec. Evening dems in shop by appt. Home trial & demo, free delivery & installation.

Access & Visa, 10.00-6.00 Mon-Sat. V J HI-FI, 29 Guildhall St, Folkestone. (0303) 56860. Mon-Sat 9-6. NAD, Yamaha, Marantz, Sony, Tannoy, Denon, Kenwood, Rogers, Musical Fidelity, Quad, Dem and home trial facilities, free install, credit to £1000. Amex, Diners, Visa, Access. Service dept.

VJHI-FI, 119 High Street Margate. (0843) 226977. For full details see our above entry.

## LANCASHIRE

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

NORMAN AUDIO, also at 216 Church Str, Blackpool, (0253) 295661, Fax (0253) 295722.

JO KOCZUR LTD., 185 Yorkshire Street, Rochdale, Lancashire. (0706) 42107 Harman Kardon, Quad, Revox, Aura, Teac, JBL, Tannoy (including definition) B&W, Canon, Bose and many others. Dolby Pro Logic, A.V. System. Established over 25 years, qualified & experienced staff. Appts nec only after 5.30pm. Home trial, free install, service dept. Open Sat 9-5. Mon, Wed, Thurs, Fri 9-5.30pm. Closed Tues.

## LEICESTERSHIRE

MAYS HI-FI, 27/33 Churchgate, Leicester. LE1 3AL. (0533) 625625. Sony, Technics, Denon, Kenwood, Pioneer (Reference Point) Philips, B&W, Tannoy, Mission/Cyrus, Dual, Listening room, free install, service dept. Full range of credit facilities. Open Mon-Sat 9-5.30 Thurs 9-1.30

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

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

SOUND ADVICE, The Factory, Duke St, Loughborough LE11 1ED. (0509) 218254. Shahinian, Rega, Naim, Linn, Royd, Yamaha,

Rotel, Arcam, Nakamichi, JPW. 3 demonstration areas, no appts necessary, free installation, service department. Lombard credit charge, Access, Visa. Mon-Fri 9.30-6.00, Sat 9.30-5.30.

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

## LINCOLNSHIRE

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

STAMFORD HI-FI CENTRE, 9 Red Lion Square, Stamford, Lincs PE9 2AJ. (0780) 62128. Pioneer, Technics, Cyrus-Mission, Rotel, NAD, Yamaha, Kenwood, Marantz, Quad, plus all major speaker manufacturers. Expert advice, comparator demonstrations, on two floors, part exchange Hi-Fi purchased for cash. No appointments necessary, home trial facilities, free installation, service department. Mastercard, Visa & credit charge, finance available. Mon-Sat 9-5.30pm, closed Thursdays.

SUPERFI, 271A High Str, Lincoln LN2 1JG. (0522) 520265. See main entry under Nottinghamshire for full details.

## LONDON

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

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

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

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

CORNFLAKE SHOP, 37 Windmill St ( just off Tottenham Court Rd), London W1. (071) 631 0472 (domestic). (071) 323 4554 (multiroom). Fax. (071) 323 4554 Fax. (071) 436 7165. 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 (071) 379 7635, Fax (071) 836 1345. London's premier digital audio centre. Phono CD, DCC, CD, & 16X9 TV'S. Audiolab, B&O, Marantz, Mission, Cyrus, Philips, Pioneer, Rotel, Rogers, Quad, Sony, Technics, single speaker dem rooms, appointments suggested, installation service available. 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. Closed Monday.

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

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

K.J. WEST ONE, 26 New Cavendish St, London, W1M 7LH. (071) 486 8262/63. Fax (071) 487 3452. Most established brands stocked. Two Hi-Fi and one Home Cinema dem studios. Appts nec. Home trial. Free installation. Service dept. Major credit cards. Interest free credit usually available - ask for details. Mon-Sat 10-6pm. (Late night Thurs till 7pm)

MUSICAL IMAGES LTD. See under Middlesex & full page advert in the Product Directory. SOUND ORGANISATION LONDON, 4 Pickfords

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

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

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

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 Dem Rooms, Installations, 2 Year Guarantee, 7 day exchange. Major credit cards, Tues - Sat 10 - 6, See Middx entry for brands stocked.

VOLUME ONE, 41 Upper Wickham Lane, Welling. (081) 304 4622. For full details see entry under Kent.

ZEBRA, 18-24 Brighton Road, South Croydon CR2 6AA. 081 688 2093. Audio lab, Arcam, KEF Reference, Marantz, Mission, Micromega, Pioneer, Rotel, Sony, Tannoy, and large range of AV equipment. S2 Air Conditioned Demo Rooms. In a more casual environment. Service department. Mon-Sat 9.30-6.00. Access, Visa & instant credit up to £1000 subject to status.

## GREATER MANCHESTER

CENTRAL RADIO, 30-32 Shudehill, Manchester M4 1EY. Tel 061 834 6700. JBL, Mission, B&W, Wharfedale, Aiwa, Teac, Boston, Sony, Thorens, Pioneer. Service Dept. Free installation. Access, Visa, Switch. Interest Free and standard. Credit available. Mon-Sat 9-5.30.

THE AUDIO COUNSEL, 12 Shaw Road, Oldham, Manchester OL1 3LQ. (061) 633 2602. Linn, Yamaha, Rega, Rotel, Arcam, Micromega, EPOS, Creek, Nakamichi, Denon. 2 dem rooms. Free install. Visa, Access, Licensed credit brokers up to £1000 instant credit. 10.00-5.30 Tues, Weds, Sat; 10.00-7 Thurs & Fri. Closed Mon.

MURRAY HI-FI, 19 Middle Hillgate, Stockport. (061) 429 7666. Linn, Naim, Rega, Arcam, Yamaha, Royd, Epos, Creek, Nakamichi, Rotel. Full demo facilities, free installation & delivery, service dept. Full 2yr guarantee on all products. Access, Visa, Lombard Tricity, licensed credit broker. 10-6 Tue-Sat.

SWIFT OF WILMSLOW, 4-8 St Annes Parade, Wilmslow. (0625) 526213. Aura, B&W, Denon, Kenwood, Marantz, NAD, Pioneer, Rotel, Tannoy, Revolver, JPW. Open 9:30am-6:00pm 2 dem rooms. No pressure!

## 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. Mon-Fri 10-6pm. Sat 9.30 - 5.30 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms. AV Dept.

HARROW AUDIO, 27 Springfield Rd, Harrow. (081) 863 0938. Mon-Sat 9.30-5.30. A&R, Audiolab, Cyrus, Denon, Epos, Monitor Audio, Musical Fidelity, Nakamichi, Quad, Rotel, Tannoy, Thorens, Yamaha. etc.

MUSICAL IMAGES LTD. 173 Station Rd, Edgware (081) 952 5535, fax (081) 951 5864 and 45 High St, Hounslow. Tel (081) 569 5802, fax (081) 569 6353. Most brands available - see full page advert in Product Directory. Interest free credit available, ask for details. Demo Room, Repairs & Service, Mail Order facilities.

RIVERSIDE HI-FI LTD, 422 Richmond Road, East Twickenham, Middlesex TW1 2EB. Tel. (081) 892

7613. Fax (081) 892 7749. A.R., Arcam, Audio Innovations, Castle, Dual, Denon, KEF, Luxman, Michell, Musical Fidelity, Micromega, Marantz, Nakamichi, Rotel, Spendor, Systemdek, Tannoy, Yamaha. One demo room, in-car demo for car hi-fi systems. Apts 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 apts nec, free install, 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. **TRADING**  
P & A AUDIO (BIRKDALE) LTD 31 Liverpool Road, Birkdale, Southport (0704) 68373. Arcam, Cambridge, Creek, Denon, Michell, Mission/Cyrus, Mordaunt-Short, NAD, Pink Triangle, QED, Revolver, Rogers, Rotel, Royd, Tannoy. 3 Single speaker demo rooms and Nicam surround sound dem room. Free delivery, installation (Merseyside) Service dept. Mon-Sat 9-5.30 Half day Tues, Access, Visa, Lombard.

PETERS HI-FI 11 Werburgh Sq, Grange Precinct, Berkenhead. (051) 647 5626. 9-5.30 closed Thurs. See Cheshire entry for full details.

PETERS HI-FI, 8 High Street, Bromburgh, Wirral. (051) 334 1874/2825. Open 9-5.30 6 days a week. See Cheshire entry for details.

## WEST MIDLANDS

AMADAEUS SOUND & VISION, 10 Boldmere Road, Sutton Coldfield, West Midlands Tel (021) 354 2311. Arcam, Audio Innovations, B&O, Carver, Castle, QED, Wharfedale, Yamaha, Cambridge Audio, Hafler. Single Speaker demo, apts 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. **TRADING**

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. **TRADING**

MUSICAL APPROACH, 37 High Street, Aldridge, Walsall, W. Mids. (0922) 57926. Linn products, Arcam, Creek, NVA, Revolver, Onix, Epos, Marantz, Rotel, Quad & more. Dem facts. Home trial. Service dept. Credit facts 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. Apts 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, Yamaha, Toshiba, Hitachi, Bose, Wharfedale, Sony. Demo facilities available, appointments preferred. Access, Visa, 10 month interest free credit. Amex, Lombard Tricity Creditcharge. Mon-Sat 9-6.00.

## NORFOLK

AUDIO IMAGES, 7 All Saints Rd, South Lowestoft, Suffolk NR33 0DL. Tel: 0502 582853. For full details see our main entry under Suffolk.

BASICALLY SOUND, The Old School, School Rd, Bracon Ash, Norwich NR14 8HE. (0508) 70829. Arcam, Linn, Naim, Denon, Spendor, Exposure, Audio Technica, Creek, Rega, Epos, etc. 2 comprehensive dem rooms. Home trial. Free

installation. Visa, Access, HP facilities. Tues-Sat 9.30-1, 2-5.30.

MARTINS HI-FI, 5 High Street, Kings Lynn. (0553) 761683. Est. 1968. Making good vibrations for 20 years **TRADING**

MARTINS HI-FI, 85/91 Ber Street, Norwich. (0603) 627010. Est. 1968. Making good vibrations for 20 years **TRADING**

## NORTHAMPTONSHIRE

AUDIO CRAFT 23-25 Derrigate, Northampton, NN1 1TY. Tel: 0604 36291 Bang & Oulfsen, Kenwood, Technics, Marantz, Celestion, Mordaunt-Short. No apts 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, Rega, Epos, Royd, Mission, Cyrus, Arcam, Audiolab, Neat, Creek, Quad, Denon etc. 2 Dem Rooms **TRADING**

## NOTTINGHAMSHIRE

CHANTRY AUDIO, Chantry Walk, 18-18a Eldon Street, Tuxford, Nr Newark, Notts NG22 0LH. (0777) 870372. Pink Triangle, DPA, Rotel/Michi, Micromega, NVA, Alchemist, Michell, Monitor Audio, Lumley, SME and much more! 3 dem rooms. Home trial, free installation, service dept. Access, Visa & credit facilities and mail order. Mon-Sat 9:30-6pm Sun & evenings home dem by apt.

DEFINITIVE AUDIO, (0602) 813562. For a carefully considered approach to building a true hi-fidelity audio system with components derived from the following manufacturers; Audio Innovations, Snell, Wadia, Micromega, Deltec, Voyd, Systemdek, SME, Revox, Ortofon, Pioneer. Demos by apt. 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. **TRADING**

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) 839305. Aura, B&W, 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 9-9.5. Records & CDs stocked.

AUDIO T, 19 Old High St, Headington, Oxford OX3 9HS. (0865) 65961, Fax (0865) 60415. Great hi-fi from Arcam, Audiolab, Cyrus, Denon, KEF, Meridian, Mission, Rotel, Sony, Yamaha and many more. Open Mon Fri 10-6pm, Sat 9.30-5.30. 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms. A/V Dept. **TRADING**

OXFORD AUDIO CONSULTANTS LTD, Cantay Hse, Park End Street, Oxford OX1 1JE. (0865) 790879 fax (0865) 791665. NAD, Rotel, Musical Fidelity, Pioneer, Marantz, Rogers, TDL, Thorens, Audio Research, Proceed. 2 Demo rooms. Service Dept, Home trial and free installation. Instant credit,

Access, Amex, Visa. 10-6 Mon-Sat.

WESTWOOD AND MASON, 46 George St, Oxford. Tel: 0865 247783 Arcam, Rotel, Rega, Epos, Tanoy, Royd, JPW, Mission, Nakamichi, Denon, Aiwa, Naim, Quad, Aura, Teac. Open 9:30-5:00pm. Dem room. Closed Thur. **TRADING**

## SHROPSHIRE

AVON HI-FI, 12 Barker Street, Shrewsbury, Shropshire SY1 1JQ. (0743) 55166. NAD, Quad, B&W, Arcam, Kenwood, Aiwa, Bose, Nakamichi, Revolver, Onkyo. Dem room. Home trial. Free install. Service dept. Access, Visa. £1000 instant credit. Mon, Tues, Wed, Fri, Sat 9-5.30.

CREATIVE AUDIO, 9 Dogpole, Shrewsbury. (0743) 241924. Arcam, Audiolab, Celestion, Cyrus, Denon, Epos, Kef, Meridian, Mission, Naim, Quad, Rega, Roksan, Rotel, Ruark, Tripod. Dem room. Home trial and free installation. Credit to £1000. Access, Visa. Tues-Sat 9.30-5.30. Service dept.

MID-SHROPSHIRE AUDIO, 4 Holland Court, Dawley, Telford TF4 2EX. (0952) 630172. Audio Innovations, Marantz (inc Music Link), Denon, Tannoy, Ortofon, Pink Triangle, Ion Systems, Systemdek, Ruark, Monitor Audio etc. 2 dem rooms. Home trial, service dept. Instant credit up to £1000 Access, Vsa, Amex.

## SOMERSET

MIKE MANNING AUDIO, 110 Middle Street, Yeovil, Somerset BA20 1NE. (0935) 79361, Fax (0935) 32923, Mobile(0850) 325965. Naim, Roksan, Pink Triangle, A+R (Arcam), ION, NAD, Pioneer, Rotel, Denon, etc. Dedicated listening lounge, for relaxed and unpressured demonstrations. Apts 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 Branson Rd, Burton-on-Trent, Staffordshire DE14 3DQ. (0283) 33655. Albarr, Audio Innovations, Arcam, Castle, Denon, Pink Triangle, Marantz, Rotel, Rogers, Systemdek, SME, Tannoy, TDL. Dem fac, apts nec on Sat, Free Install. Service dept Access, Visa. 9.00-5.30pm. Closed Mon & Wed afts. Closed for lunch 12.00-12.30.

## SUFFOLK

AUDIO IMAGES, 7 All Saints Rd, Pakefield, South Lowestoft, Suffolk NR33 6JL. Tel/Fax: 0502 582853. Quad, Triangle, Arcam, Castle, Rotel, Moth, JPW, Finlux, Audio Innovations, plus the amazing Rothwell range. Separate demo room, no apts nec 10-6.30 Tue-Thur, 7pm Fri, 6pm Sat. BURY AUDIO, 47 Churchgate St, Bury St Edmunds, Suffolk, IP 33 1RG. Tel 0284 724337. Arcam, Furukawa, Heybrook, Infinity, Marantz, Meridian, Michell, Pink Triangle, Proac, Rotel, Target, Roksan, Shannian, Quad. Etc. Single Speaker Room. No appointments necessary. Home trial fac. Free Installation. Service Department. Access, Visa, Switch. Open 6 days a week. Mon/Tues/Sat 9.30-5.30 Thurs/Fri 9.30-7.00. Closed Wed  
EASTERNAUDIO, 41 Bramford Rd, Ipswich. (0473) 217217. Quad Audio Lab, Denon, Dual, Marantz, Mission, NAD, Nakamichi, Technics, Arcam. Mon-Sat 9.30-6. **TRADING**

## SURREY

AUDIO SOUTH, 24 (The Woolmead) East Str, Farnham, Surrey GU9 7TT. (0252) 714555. Audio Note, Deltec, JPW, Marantz, Rotel, Teac, etc. AV specialist. Dem room and evening appointments available. Home trial facilities. Free installation. Access, Visa. 10.30-6 Mon-Sat.

COSMIC, 244/256 Station Road, Addlestone, Surrey, KT15 2PS. (0932) 854522/851753/843769. Fax (0932) 841615. Most brands stocked, including Aiwa/Arcam, Denon, Mission, Cyrus, NAD, Nakamichi, Pioneer, Quad, Rotel, Yamaha, etc. Open 7 days 9-6pm. Partexchange, large free car park, service dept, instant credit available, Access, Visa, Switch.

DATASOUND, 23 South St, Dorking, Surrey RH4 2JZ. (0306) 882897. Arcam, Celestion, Denon, Dual, Marantz, Mission, Musical Fidelity, NAD, Rotel, Tannoy. Dedicated listening room. Free install. Service dept. Up to £1000 instant credit subject to status. 9.30-5.30 6 days.

INFIDELITY, 9 High Str, Hampton Wick, Kingston Upon Thames, Surrey. Tel: (081) 943 3530. Arcam, Creek, Epos, Heybrook, Micromega, Naim Audio, Roksan, Rega Research, Shannian, TEAC. Single speaker listening room. Apts pref, free installation, service dept. Major credit cards. Closed Mon, Tue-Fri 10.30-7, Sat 10-6.

PJ HI-FI - the Hi-Fi Shop, 3 Bridge St, Guildford, Surrey GU1 4RY. (0483) 504801. 9-6 Mon-Sat. Linn, Meridian, Creek, Arcam, Quad, Revox, Musical Fidelity, Rotel, NAD, Nakamichi, Marantz. **TRADING**

RIVERSIDE HI-FI, 422 Richmond Road, East Twickenham, TW1 2EB. Tel: (081) 892 7613. Fax: (081) 892 7749. See main entry under Middlesex. ROGERS HI-FI, 13 Bridge Street, Guildford, Surrey. (0483) 61049. Aiwa, Creek, Denon, Dual, JPW, Marantz, Philips, Pioneer, Systemdek, Tannoy. Demonstration facilities available, no appointment necessary. Free installation. Service department. Access/Visa. Instant credit up to £,000 subject to status. Monday-Saturday 9.30-6pm, later by appointment.

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, apts preferred, home trial facilities, free install, service dept. Access, Visa. Open 9-5.30 Mon-Sat.

SPALDINGS HI-FI, 352-4 Lower Addiscombe Rd, Croydon, Surrey. (081) 654 1231/2040. 3 dem rooms and home dem. Free install, credit. Mon-Sat 9-6. Tues-8. Closed Wed. Service dept. **TRADING**

SURBITON PARK RADIO, 48 Surbiton Rd, Kingston-Upon-Thames, Surrey. (081) 546 5549. Quad, Castle, Dual, Denon, Kenwood, Rotel, Pioneer, QED, B&W, Tannoy. Demo facilities. Access, Visa. 9.30-5.00 Tues-Sat. Service dept.

SURREY HI-FI, 45 High Street, Godstone, Surrey RH9 8LS. (0883) 744755. Parking, easy access - just 2 mins off junction 6, M25. Tube Technologies, Rel Acoustics, Audio Lab, Quad, TDL, Nakamichi, KEF, Thorens, Rotel, Marantz, Denon, Michell, Tannoy, Top Line, Rel Acoustics, Single speaker demo room. Demonstration by appointment, free installation, service dept. Access, Visa, Mastercard. 0% Credit. Open 9-6, closed Wed.

TRU-FI SOUND & 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 Rd, Brighton, East Sussex, Tel 0273 609431. 2 Dem Rooms, closed Mon. Late night Wed. Free parking. Bus route. Credit Facilities. **TRADING**

JEFFRIES HI-FI. (Pourtsmouth), 29 London Road, Portsmouth, PO2 0BH Tel: 0705 663604. 2 Dem Rooms, Closed Mondays. Late night Wednesday. Free parking. Bus route. Credit facilities. **TRADING**

JEFFRIES HI-FI, 4 Albert Parade, Green Street, Eastbourne, East Sussex. Tel: 0323 31336. 2 Dem Rooms. Closed Mon. Late night Wed. Free Parking. Bus Route. Credit Facilities. **TRADING**

THE POWERPLANT, 66 Upper North Street, Brighton BN1 3FL. (0273) 775978. Roksan, Musical Fidelity, Marantz, Rotel, Yamaha, Tannoy, Audiolab, B&W, Micromega, Epos, JPW, etc. Comfortable single speaker facilities. No apts. nec. Home trial facilities, free install. Late night dems by request. Service dept. Credit facilities available on request. Tue-Sat 10-6pm.

## SUSSEX (WEST)

AUDIO DESIGNS, 26 High Street, East Grinstead, W. Sussex RH19 3AS. 0342 314569. Arcam, Audiolab, Cyrus, Epos, Linn, Marantz, NAD, Naim, Rotel, etc. Very comfortable listening room. No appts nec., Home trial facilities, free installation, service dept. Access/Visa. 9.30-6.00 Mon-Sat, late-Tue.

BOWERS & WILKINS LTD, 1 Becket Buildings, Little Hampton Rd, Worthing. (0903) 2 64141. B&W, Nakamichi, Castle, Denon, Dual, JVC, Mordaunt Short, Philips, Quad, Sony, Technics. 3 dem rooms. Mon-Sat 9-5.30, Wed 9-1pm. Home trial facilities, free install. Credit to £1000, Access, Visa. Service dept.\*

CHICHESTER HI-FI, 7 St. Pancras, Chichester, W. Sussex PO19 1SJ. Tel: (0243) 776402. Linn, Naim, Rega, Creek, Nakomichi, A&R, Denon, Roksan etc. Tues-Sat, 10-1, 2-5.15 (closed Mon).

BADA

## TYNE & WEAR

BILL HUTCHINSON LTD, 87A Clayton Street, Newcastle-Upon Tyne. Tel: (091) 230 3600. A.R. Aiwa, Denon, Dual, JVC, Mission, Mordaunt Short, Omar, Technics, Yamaha, etc. Demo facilities. Free Install, Service Department, Instant Credit, Access, Visa, Mon-Sat, Late Tue till 8pm

RED RADIO SHOP AND HI-FI CENTRE, 11 Olive Street, (Off Park Lane), Sunderland. Tyne & Wear SR1 3PE (091) 567 2087. Castle, Denon, JVC, Kenwood, Mordaunt-Short, Michell, Pioneer, Teac, Tannoy, Monitor Audio etc. AV Dem room, large with comparator facility. No appts nec, Free install. Service dept. Interest free credit and no deposit 9am-5.30pm daily.

## WARWICKSHIRE

CASTLE HI-FI, 59 Smith Street, Warwick. CV 34 4HC. Tel (0926) 499963. A.R. B&W, LPW, Jensen in car, Marantz, usical Fidelity, NAD, Pioneer, Rogers, TDL, Yamaha, Dolby Pro Logic. Dem Room. No apt necc, Home trial facilities, Free Installation, Service Department. Interest free credit, Access, Visa, Chartered Trust. Open 10-6 6days a week.

FRANK HARVEY HI-FI, 163 Spon Street, Coventry, Warwickshire, CV1 3BD. Tel 0203 525200. Arcam, Mission, Cyrus, Musical Fidelity, Marantz, Rotel, NAD, Tannoy, Yamaha, KEF. Open 9.30-5.30 closed Thursday.

BADA

NAAM HI-FI VISION, 78 Lower Precinct, Coventry CV1 1DX. (0203) 632086. NAD, Yamaha, Marantz, Pioneer, Kenwood, AR, Akai, Aiwa, Panasonic, Toshiba, Wharfedale, KEF. Demo facilities. Access, Visa, Amex, Lombard Tricity credit charge. 9.00-6.00 Mon-Sat. Closed Thurs.

STRATFORD HI-FI, 25 Henley Street, Stratford Upon Avon, CV39W. Tel (0789) 414533. Please call for further details.

## WILTSHIRE

THE AUDIO EXCHANGE, 52 Morse Str, Swindon, Wiltshire, SN1 5QP. Tel: (0793) 539008. Acoustic Energy, Audio Innovations, Beard, Cerwin Vega, Impulse, Magnum, Micromega, Michell, REL, Sequence. AV and single speaker demo room. Home trial facilities, free installation, service dept. 9-7six days a week.

AUDIO T, 60 Fleet St, Swindon, Wiltshire. SN1 1RA. (0793) 538222, Fax (0793) 487260. Great hi-fi from Arcam, Audiolab, Cyrus, Denon, Linn, Meridian, Mission, Rotel, Sony, Yamaha, and many more. Mon-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

PR SOUNDS, 58 Castle Street, Trowbridge, BA14 8AU. Tel 0225 777799. Also at Melksham & Devizes. Pioneer, Technics, Kenwood, Denon, Marantz, B&W, Tannoy, JPV, Dual. Where music is a pleasure, personal service, no appointments necessary. Installations & much much more. Access/Visa £1000 instant credit. Open 9-6, 6 days.

## WORCESTERSHIRE

NAAM HI FI VISION, 27 The Cross, Worcester, WR1 3PZ. Tel 0905 726375. Denon, Marantz, NAD, Musical Fidelity, Acoustic Research, Harman Kardon, Sony, Technics, Akai. Appts necc for demonstrations. Installation 7 days a week up till 9 pm. Interest Free credit over £400. Open 9-5.30 Mon-Sat.

WEST MIDLANDS AUDIO, 158 Ombersley Road, Worcester WR3 7HA. (0905) 58046. Nakamichi, Naim, Rega, Absolute Sounds, Meridian, Arcam, Ion Systems, Roksan. 3 dem rooms for budget & high end audio. Appointments necessary. Free installation. Service Dept. Access, Visa, Amex, Diners, Lombard/Hitachi. Mon-Fri 9.30-8.30 by appt Sat 9-5.30.

SPAINS HI-FI, 282a New Road, Bromsgrove, Worcestershire. Tel: (0527) 72460. B&W, Denon, Kenwood, Marantz, Mission, Nad, Pioneer, Rotel, Sony, Tannoy and more. Integral demo room/showroom for instant comparisons on hi-fi and AV equipment. Free installation, service dept & credit facilities, Access & Visa.

## YORKSHIRE (NORTH)

THE AUDIO CLINIC, 22 Lord Mayors Walk, York, Yorkshire, Y3 7HA. Tel: 0904 646309. Mission, Revox, Yamaha, JVC, Audio Innovations, Celestion, NAD, Musical Fidelity, Allison, Thorens. No appts necc, Home trial facilities, Free Installation. Service Department Access/Visa, Credit. Open 10-5.30 Mon-Sat.

SCARBOROUGH HI-FI CENTRE, 14 Northway, Scarborough, N. Yorks YO11 1JL. (0723) 374547. Aura, Albarry, B&W Matrix, Cyrus, Denon, Pioneer, Marantz, Cabasse, Tannoy, Laser vision and wide screen TV. Dem room, appointment preferred. Home trial facilities. Free installation. Service dept. Access/Visa/Credit charge/£1,000 instant credit/Amex/Diners. 10-6 Mon to Sat.

SOUND ORGANISATION YORK, 2b Gillygate, York YO3 7EQ. Tel: (0904) 627108. Linn, Meridian, Micromega, Naim, Rega, Arcam, Mission, Denon, Epos, Rotel. 3 single speaker dem rooms. Appts preferred. Home trial. Free installation. Service dept. Credit fac on request. Access, Visa. 10am-5.30pm Tues-Sat. Sony Dealer Award nominated '86, '87, '88.

BADA

VICKERS HI-FI, 24 Gillygate, York. (0904) 629659. Audiolab, Harman-Kardon, Marantz, Musical Fidelity, Pink Triangle, Quad, Systemdek, Tannoy, Technics, & lots more. 3 demonstration studios (2 by appointment) superb showrooms, 2 year guarantee on all hi-fi products. Appts as above, home trial facilities, free installation, service department. Qualified and experienced staff, over 25 years experience. 12 months interest free credit. 10.30-5.30 Mon-Sat.

## YORKSHIRE (SOUTH)

BARNSELY HI-FI CENTRE, 40-42 Sheffield Road, Barnsley, S. Yorks. S70 1HP. (0226) 205549 Fax (0742) 467207. Arcam, Quad, Audiolab, Mission Cyrus, Technics, Denon, Tannoy, Nakamichi, Dual, Rotel. Purpose built demo room, no appts necessary, free install, service dept, Access, Visa, varying finance packages. Open 9.30-5.30, 5 days (closed Thurs).

HI-FI STUDIO, Sunnyfields, Doncaster. (0302) 781387. Sugden, ProAc, Impulse, Teac, Ruark, Michell, AMC valve, Art Audio valves, Heybrook, Monitor Audio, Albarry. Listening room demos. Home trial. Free installation. 2 yr guarantee on all equipment. Service available. Access, Visa. 10-8pm 6 days. Phone for further info & FREE fact pack.

## YORKSHIRE (WEST)

AUDIO PROJECTS, 45 Headingley Lane, Leeds. (0532) 304565. A&R, Audiolab, Creek, Heybrook, Linn, Musical Fidelity, Naim, Quad, Rega, etc. Free installation, home trial, 2 year warranty, appts preferred. Tues-Fri 9.30-6, Sat 2.30-5.30.

AUDIOVISION (BRIGHOUSE) LTD, 5 Bethel Street, Brighouse, (1 mile from junction 25, M62) W. Yorks. HD6 1JR. Tel 0484 713996 Largest range of Technics Hi-Fi in Yorkshire. Aiwa separates,

Castle, Cerwin Vega, Mordaunt Short speakers. Panasonic Nicam TV's, VCR's and camcorders. Yamaha, Philips widescreen TV's, CD-Interactive Players. Dolby Pro-Logic AV Surround Systems. Reproduction Furniture. Telarc, CD- Audio, CDI and DCC. Demo's. Free expert install. Panaservice in-store service dept. Access, Visa, credit charge. Mon-Sat 9-5.30.

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. MonSat 9-5.30 (Tue 10-5.30).

DOUG BRADY HI-FI, The Forge Cottage, 19 Crossgate, Otley, Leeds, 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.

BUDDERSFIELD HI-FI CENTRE, 4 Cross Church St, Huddersfield. (0484) 544668. B&W, Kenwood, Denon, Dual, Arcam, Musical Fidelity, Quad, Audio Lab, Philips, Mission, etc. Dem facilities - appointment reqd. Mon-Sat 9-5.30, Thurs 9-8. Closed Wed. Free installation, credit facilities. Access, Visa.

IMAGE HI-FI, 17 The Springs, Wakefield, WF1 1QE. (0924) 200272. Arcam, Linn, Meridian, Mission, Quad, Rotel, Etc. 2 Listening Rooms. Free Parking, Dell & Instal Mon-Sat 9.30 5.30pm

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

### 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

ZEUS AUDIO, 6 Hope Street, Belfast, (0232) 332522 Audio Innovations, Pink Triangle, Roksan, Marantz, Celestion, Linn, Meridian, Mission Cyrus, Ortofon, etc. Mon-Sat 10.00-5.30. Late night Thursday.

BADA

### 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

## 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

### AYRSHIRE

LASER AUDIO 9 West George Street, Kilmarnock, Ayrshire, KA11DH. Tel 0563 40292. Audiolab, Aiwa, Celestion, Cyrus, Denon, Dual, Mission, Philips, Pioneer, Rotel, Ruark, Systemdek and Tannoy. Dem Room, AV on Dem. Appts Preferred, home trial facilities, Free installation, service facilities. Access, Visa and written credit. Open Tues-Fri 10-5.30 Sat 9.30-5.30.

## 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.

STEREO STEREO, 278 St. Vincent St, Glasgow G2 5RL. (041) 248 4079. Linn, Naim, Rega, Arcam, Creek, Epos, Castle, Shahinian, Denon and Sehring etc. Closed Tuesdays Mon-Sat 10-6.

## GRAMPIAN

HI-FI EXCELLENCE 293 Union Grove, Aberdeen, AB1 6TD. Tel 0224 322520. Aiwa, Audio Innovations, Denon, Impulse, Infinity, Musical Fidelity, Rotel, Roksan, TDL. 2 large single speaker dem rooms. Appts necessary after 6.00pm. Home trial facilities, Free Installation, Service Department. Various offers. 3 Yr guarantee. Open 10-6.00pm 6 days.

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.

BADA

## TAYSIDE

J.D. BROWN, 28-36 Castle St, Dundee DD1 9NZ. (0382) 26591. Rotel, Denon, Pioneer, Technics, Aiwa, Mission, Castle, Mordaunt-Short, Monitor Audio, Bose, Infinity. All equipment ready for demonstration. No apt nec, free installation, service dept. Open 9.30-6pm six days a week, (close 5pm Sat).

## 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 install. Access, Visa. Open 9.30-1.00, 2.00-5.30 Mon-Sat.

ACTION GATE AUDIO, 4 Ruabon Rd, Wrexham, North Wales, Tel: 0978 364 500, Arcam, B&W, Marantz, Mission, NAD, Quad, Rega, Rotel, Tannoy, Yamaha, etc. Dem Facilities, A.V. on dem, Mail Order. No appts nec, home trial fac, Free install, Service Dept. Access, Visa. 9.30-5.30 closed Weds PM

### SOUTH GLAMORGAN

AUDIO EXCELLENCE, 134 Crwys Road, Cardiff. (0222) 228565. Great Hi Fi carefully selected and dem'd by friendly, enthusiastic staff. Closed Mon.

BADA

### WEST GLAMORGAN

AUDIO EXCELLENCE, 9 High St, Swansea. (0792) 474608. Great Hi-Fi carefully selected and demonstrated by friendly, enthusiastic staff. Closed Mon.

BADA

## GWYNEDD

I&H GRIFFITHS & SONS, 313 High St, Bangor LL57 1YA. (0248) 370655. Yamaha, Tannoy, Teac, Sony, B&W, SVC, Wharfedale. Demos available, no appts nec, home trial facilities, free installation, service dept. Access, Visa, Lombard credit charge. Mon-Sat 9-5.30, Wed 9-1. Audio Visual Specialists.

PETERS HI-FI Victoria Buildings, Mostyn Avenue, Craig-y-don, Llandudno. (0492) 876788. 1 Single speaker dem room. Open 9-5.30. Closed Wed. See Cheshire branch for details.

# The Directory



This is the legendary Hi-Fi Choice Directory, the only audio buying guide that is entirely based on comprehensive technical and subjective reviews. Each and every entry carries the weight of our exhaustive test procedures with regularly updated prices and specifications.

The *Hi-Fi Choice Directory* was conceived as a reference guide to all the audio products reviewed by *Choice* that are currently available. The products are split into 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 ratings are based on the product's price at the time of review.

## ▲ Recommendations and Best Buys

Perhaps the most influential symbols in the *Directory* are the little red triangles ▲ found in the value column at the beginning of each entry where appropriate.

Products that make the grade are awarded the Best Buy or Recommended accolade.

▲ A product carrying the Best Buy swingtag is of excellent quality and good value for money in its price category.

▲▲ Recommended products are runners up, but still definitely worth considering within their price bands.

Please note however, that an expensive Recommended product will nearly always sound better than an inexpensive 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 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.

Which of course is where a competent dealer is crucial. A good dealer, such as you might find in our *Dealer Directory*, will be skilled in art of putting components together so that their sonic sum is greater than the individual components in the system.

## Sound quality

This column contains the ratings for the standard achieved in our listening tests. The sound quality ratings range from Poor to Excellent. Their meaning and order as follows;

P	Poor
A-	Average-
A	Average
A+	Average+
G-	Good-
G	Good
G+	Good+
VG	Very Good
E	Excellent

## Finding that component

Before you shop, follow our top eight tips for better buying:

1. Check out the components' recommended retail prices in the *Directory*.
2. Find out as much as you can about the products you want by reading *Hi-Fi Choice's* reviews and lab tests.
3. Visit local dealers that stock some of the brands you want to hear and try to find one that seems sympathetic to your needs.
4. Don't discount a dealer's suggestions just because the products don't have rave reviews.
5. Take your own software (records, CDs, tapes) along for a demonstration of the equipment that the dealer recommends.
6. Listen at the sort of volume you would normally use at home — systems often sound more impressive when played loud.
7. If you are unsure about something or want to hear an alternative, just ask.
8. Audition a system for a reasonable amount of time, say three quarters of an hour or so before making a decision.

With P being the worst and E the best rating within a section.

One important point to remember is that these 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 have first generation masters of course.

## Comments

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 we have attempted to put across the essence of the review. 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.

Please note that these comments are those of our own re-

viewers and not, as is the case with some magazines, those of the manufacturer.

## Features

Product features are shown with a combination of figures and blob charts, with headings at the top of each column indicating the appropriate category, a blob indicating the existence of a particular feature on the product.

There are different headings for each section of course and the more complicated categories are explained in the individual introductions. Where figures are used the unit of measurement is shown in the heading.

## Back issues

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 through our back issues department.

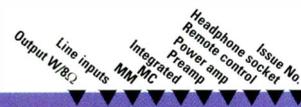
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## Amplifiers

The Directory entry for the AMC CVT3030 integrated amplifier, a 35 watt model with MM phono and five line inputs and average sound.

Product	EPrice	Comments	Line inputs	MM MC	Integrated	Power amp	Headphone socket	Remote control	Issue No.
AMC CVT3030	460	A well meaning and affordable attempt to mix transistors with valves, albeit one that only really shines with simple musical styles.	35	5	•	•	•	•	116



# 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, even separate power supplies, 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.

We 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).

Apart from output the facilities listing shows how many line (that is inputs besides those for phono cartridges) inputs a product has and includes tape inputs. The MM and MC blobs indicate which types of cartridge can be accommodated. Integrated, preamp and power amp indicate the type of amplifier reviewed, and in some instances that a pre/power combination has been tested. In such instances the price given is for both components. The remote control and headphone socket blobs indicate the existence of these facilities.

## Amplifiers

Product	£Price	Comments	Output W/8Ω	Line inputs	MM	MC	Integrated Preamp	Power amp	Headphone socket	Remote control	Issue No.
AMC CVT3030	460	<b>A</b> A well meaning and affordable attempt to mix transistors with valves, albeit one that only really shines with simple musical styles.	35	5	•	•					116
Aiwa XA-006	150	<b>A</b> Competent enough performer with plenty of facilities. A gutsy sound though one that's rougher via CD than MM.	67	5	•	•					92
▲ Akai AM-47	230	<b>G+</b> Plenty of widgets and an unexpectedly sharp, open and detailed sound. Looks ghastly but sounds strain free.	104	4	•	•					104
Akai AM-95	630	<b>A-</b> A revamped version of the older AM-93 with newer onboard bitstream DACs. Its sound is just too eager, however	110	6	•	•					109
Albarray AP4/S508	850	<b>A-</b> A disappointing sound from a pre/power amp that's hamstrung by a variety of technical oversights. Albarray has done better.	46	4	•			•	•		116
▲ Albarray PP1	400	<b>G+</b> Available with or without various MM/MC options, the 'basic' PP1 has an attractively warm, earthy sound.	48	4			•				104
Alchemist Kraken	444	<b>A</b> Class-A objet d'art that's far too sensitive to RF interference. Can sound cold and fierce as a result.	54	5	•	•					116
Arcam Alpha 3	200	<b>A</b> Generally lacklustre and bland sound offered on this occasion met with (unexpected) disapproval.	53	3			•				104
▲ Arcam Delta 110/120	1300	<b>G</b> Performance is limited by power amp - in isolation the PDM-preamp offers a remarkably open and detailed sound	112	4	•	•		•	•		92
▲ Arcam Delta 290	450	<b>VG</b> Combines the dryness and restraint of Arcam's older models with a refreshing sense of detail, dynamics and musical colour.	99	5	•	•	•			•	116
▲ Arcam Delta 60	300	<b>G+</b> Very refined and highly detailed sound via MM and CD without any of the hardness ted via the MC stage	59	4	•	•	•				68
▲ Art Audio Quintet	988	<b>VG</b> Switchable triode/ultralinear output stage. In triode mode these are 15 of the sweetest watts around. Surprisingly gutsy	15/25						•		109
Audio Innovations Series 200	850	<b>G</b> Turns in a fuller and more substantial performance via MM rather than CD. Otherwise its sound can seem slightly bleached.	10	5	•			•	•		109
▲ Audio Innovations Series 300II	500	<b>G+</b> Under-powered and over-distorted yet capable of realising an open and captivatingly expressive sound. Sensitive speakers are a must	9	4	•		•				97
▲ Audio Innovations Series 700	999	<b>G+</b> Valve amp that can turn the roughest of digital sounds into music, both understated and graceful. Sensitive speakers are a must	24	5			•				116
▲ Audio Note Ongaku	43125	<b>E</b> A single ended, zero negative feedback, triode, line level integrated amp and a half. Probably the best amplifier in the world!	27	6			•				Col
▲ Audiogram MB1	500	<b>G+</b> It'll successfully tackle the most difficult of speakers and still provide a very warm, rich and euphonic sound.	46		•	•			•	•	116
▲ Audiolab 8000A	430	<b>VG</b> Recent mods have cured the slightly glassy treble, replacing it with a smoother and more solid style of music making	81	7	•	•	•				97
Audiolab 8000C/8000P	970	<b>G</b> Very distinctive, almost stark neutrality that will not appeal to all listeners. Good value engineering, nevertheless	157	7	•	•	•	•			97
▲ Aura VA-100 Evolution	300	<b>G+</b> Might overheat when driving insensitive, low-impedance speakers but was applauded for its sense of scale and drama via CD	81	5	•		•				109
▲ Aura VA-50	220	<b>VG</b> Superficially similar to the cheaper VA-40 but with much more of the old MA-80's magic! Great sound from a slimline package	65	5	•		•				97
▲ Beard Audio CA35/P35mkII	1790	<b>VG</b> Good build quality and finish and a characteristic valve sound make a first class amplifier capable of great musical enjoyment	35	4	•	•		•	•		63
Beard CA506	1295	<b>G+</b> A versatile valve preamp, the bass sounded lively if a touch softened, while the treble was detailed but lacked a little sparkle	4		•	•		•			50
Beard M70	1995	<b>G+</b> A substantial British monoblok power amplifier, but not a great deal more impressive than the P35	70						•		50
▲ Concordant Excelsior	1040	<b>E</b> Styling might not inspire confidence, but sonically this preamp is tremendously vivid and detailed. Real high-end performance	3		•			•			77
▲ Conrad-Johnson PV-10	1250	<b>E</b> Fabulous preamplifier. Beautiful imaging, superb detail, plenty of gain on the phono stage; classy build quality too.	4		•			•			78
▲ Conrad-Johnson Premier 7	11000	<b>E</b> The 'Seven is designed without compromise, and is clearly one of the finest (valve) preamplifiers money can buy.	4		•	•		•			Col
▲ Creek CAS 4040 S3	220	<b>G</b> 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.	41	3	•	•					92
Creek CAS 4140 S2	250	<b>A+</b> Running production changes inspired us to re-review this amp which now sounds thicker and 'blurred' compared to the original	41	3	•	•	•				109
Creek CAS 6060	500	<b>G</b> Looks like the old '5050 but employs the sort of big, meaty-sounding electronics used in the earlier '4040. Dynamic and impressive.	81	5	•	•	•				104
▲ Cyclone Catalyst	1995	<b>VG</b> Exceptionally load tolerant and very refined in delivery. Extra options available in future	74								80
▲ Denon PMA-350	190	<b>G</b> Bold claims were made at its launch but the sweet and inoffensive sound, though very pleasant, is not mould-breaking	88	5	•		•				92
▲ Denon PMA-450	250	<b>G+</b> Denon's latest integrated amp swept the board with its big, brassy if somewhat extravagant sound.	99	5	•		•				116
▲ Dual CV600RC	160	<b>G</b> A very lively, open and vibrant sound. Slightly sanitised via CD perhaps, but still damn good for a features-first integrated amp!	63	5	•		•			•	104
E.A.R. 549	5400	<b>VG</b> Valves imitating trannies give exceptional power delivery but not the delicacy and transparency one expects	200						•		60
▲ E.A.R. 802/509mkII	4200	<b>VG</b> Extremely well made and combining the sonic strengths of both transistors and valves this EAR combo warrants attention	100	6	•			•	•		63
EMF Audio Sequel	349	<b>G+</b> A fresh start for Mike Creek has resulted in the Sequel, a minimalist amp with a very refined but mildly restrained sound	47	4	•		•				109
▲ Exposure XI/XII/VIII Super	1650	<b>VG</b> New preamp and improved power amp led to a smooth and refined sound, MM/MC less transparent than CD	61	5	•	•		•	•		80
▲ Grant G60AMS	1300	<b>G+</b> Neat and compact valve monoblok gave good sound on the 8ohm tap, better still on 4ohms. The midrange was particularly natural	60						•		57
▲ Harman Kardon HK6150	190	<b>G+</b> Based on the older HK6100 but with a more solid, punchy and expressive performance that attracted considerable praise	44	5	•		•				109
▲ Harman Kardon HK6250	250	<b>G+</b> Heavily based on the cheaper HK6150, this version offers slightly more power with a similarly gutsy and expressive sound	51	5	•		•				116
Harman Kardon HK6850	800	<b>G</b> This monster is derived from the HK6800 with a similarly deep and powerful sound but a rather steep price tag	101	6	•	•	•				109
Heybrook C3/P3	1379	<b>A</b> Heybrook has improved the manufacture of its power amp though flaws in the preamp's disc input remain	146	4	•	•		•	•		104
▲ Heybrook Signature	2014	<b>G+</b> A stunningly powerful and vivid-sounding combination which is equally impressive via vinyl or CD	148	4	•	•		•	•		109
JVC AX-A342	170	<b>A</b> A value-conscious budget amp offering plenty of power but a slightly untidy and inconsistent sound	77	5	•		•				109
▲ JVC AX-Z1010	650	<b>G+</b> One of the best behemoths: a big amp with a big, boppy and un-muddled sound and a couple of ancient 16-bit DACs for good measure!	124	6	•	•	•				109
▲ Jadis JP30/JA30	10750	<b>E</b> French tubes. Beautiful build, nostalgic styling and delightful sounding midrange transcend limitations at frequency extremes	30	4	•			•	•		60

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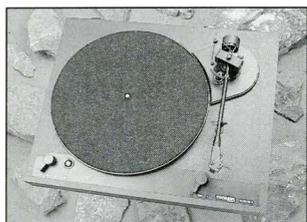
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## Amplifiers continued

Product	Price	Comments	Output W/R/C	Line inputs	MM	MC	Integrated	Headphone socket	Remote control	Power amp	Preamp	Issue No
Kelvin AZI	700	<b>A</b> This latest Absolute Zero still sounds animated but also rather more synthetic and crude. It's also rather more expensive.	100	6								116
▲ Kenwood KA-3020	160	<b>G+</b> An unassuming little amplifier that turns in a remarkably balanced and entertaining sound. Lively, detailed and engaging	66	5	•	•	•					97
Kenwood KA-4020	200	<b>A+</b> On paper this a beefier version of the '3020 yet our listeners thought it sounded weaker, lacking richness and detail	103	5	•	•	•					97
Kenwood KA-4040R	250	<b>A+</b> A 'digitised' version of the KA-4020 with full remote control. Unusual looks but can seem insubstantial via CD.	82	5	•	•	•					104
▲ Kenwood KA-5020	250	<b>G+</b> This powerhouse on the cheap can keep pace with the most challenging of dynamics. Sound is vibrant but some fine detail is lost	115	6	•	•	•					92
Kenwood KA-5040R	300	<b>A</b> A flexible amp that uses the old KA-5020 as a building-block. Unfortunately it lacks dynamics, sounding stifled and uninteresting	100	5	•	•	•					109
▲ Lecson Quattra	370	<b>G</b> Underpowered but with the flexibility of four independent power amps. Very deep, captivating sound with 3D soundstaging.	40	5	•	•	•					92
Lecson Stereo	230	<b>G+</b> Can reflect the full weight of a classical performance. Genuinely deep, detailed and enthralling sound	76	6	•	•	•					104
Linn Intek	448	<b>A+</b> Linn's no-nonsense Intek still lacks the authority and confidence to support its forward balance.	55	5	•	•	•					104
▲ Magnum A-Class	599	<b>G+</b> Lashings of rich and compelling music, trading a hint of lushness for stark accuracy. An unexpected find. Phono stage option	55	7			•					116
▲ Marantz PM-40SE	250	<b>G+</b> The improved version of the basic PM-40 model has itself been updated to provide a bigger and more exciting sound	61	4	•	•	•					97
Marantz PM-62	270	<b>A</b> Attempt to introduce remote control that has failed if the rather flat and uninteresting sound of this amp is any guide.	101	6	•	•	•					116
Marantz PM-72	350	<b>A</b> This is a very neutral, pleasantly detailed and even-handed performer but one that lacks a sense of emotion or expression	155	5	•	•	•					109
▲ Meridian 201/205	1285	<b>G+</b> A fine preamp with option of full system remote, plus competent monoblok power amplifiers with generally good performance	100	6	•	•	•	•	•	•		62
▲ Moth Series 30	587	<b>G+</b> A modular system capable of cracking results. The passive preamp and power amp combination warrant a Best Buy in their own right.	35	4	•	•	•	•	•			109
▲ Musical Fidelity Preamp/Typhoon	500	<b>G+</b> A combination that plays everything close to its chest but bridge the power amp and you'll witness an explosion of detail.	62	6				•	•			116
Musical Fidelity Tempest	200	<b>P+</b> Basic but lusty amp has a disturbingly bright and forward sound, accentuating strings and percussive detail above all else.	62	6			•					116
▲▲ NAD 302	160	<b>G+</b> A spritely and uplifting performance. Sounds loud but never intrusive or fatiguing.	39	5	•	•	•					116
▲ NVA AP20	260	<b>G+</b> Utilitarian amplifier sounds gentle and restrained but is euphonic and utterly engaging. Optional phono stage	35	4			•					109
Onix OA-21S/SOAP	730	<b>G-</b> Via MM disc this amp comes alive with a fresh and vibrant sound though its CD input sounds utterly dead by comparison.	60	4	•	•	•					97
Onix OA22L	300	<b>A+</b> Nothing genuinely unpleasant about this amplifier, simply that its hurried and lacklustre sound fails to spark the imagination.	39	5			•					116
▲ Philips FA-930	200	<b>A+</b> Radical styling hides a digital switching facility plus full remote control over what is Philips' best effort to date	99	5	•	•	•					109
Philips FA890	230	<b>G-</b> Based on the FA880 model but tarted-up with a remote control facility. Inoffensive, civilised but unexciting sound is retained	120	6	•	•	•					97
Pioneer A-300X	200	<b>A+</b> This revamped version of the A-300 was also more confident sounding via CD than MM, yet our panel were still left unmoved.	55	5	•	•	•					116
▲▲ Pioneer A-400	280	<b>VG</b> Pioneer's design concept snaps into focus with an amp that seems to bubble with musical detail. A budget bench-mark	71	5	•	•	•					92
Pioneer A-676	300	<b>A-</b> A lusty amplifier at a modest price yet one that failed to inspire our listeners with its bland, indifferent sound	98	7	•	•	•					109
Pioneer A-777	450	<b>A-</b> A larger version (!) of the A-676 that offers more power but an equally sluggish and uninspiring sound	121	7	•	•	•					109
▲ QED A270CD/PA	370	<b>G+</b> Recent updates have bolstered the output of the A270 without adding to its colorations. The PA phono option is a touch expensive	61	5			•					97
▲ QED C300/P300	630	<b>G</b> A cost-effective combo, limited in its resolution but less beguiling as a result. Disc stage is sweeter but samey	58	3	•	•	•	•				85
Quad 34	388	<b>A</b> Well-built durable preamp, filtering and above average tone controls but was found lacking in sound quality (viz: detail/dynamics)	4	•	•		•					44
Rational Audio	175	<b>A+</b> Wacky Czechoslovakian amp offers a very open and fluid sound via CD but its MM performance depends on cartridge load impedance.	129	3	•	•	•					92
Ray Lumley Model 75	1995	<b>G+</b> Valve monobloks represent good value. What they lack in musical subtlety they make up for in sheer muscle.	75						•			78
Rega Elex	298	<b>A</b> Minimalist amplifier that sounds too forward, hard and unforgiving for its own good. Shows plenty of promise, however.	51	4	•	•	•					116
▲ Rose RV-23	425	<b>G+</b> Beautifully built British 'hybrid'. You can spend more to get a more transparent sound but it's hard to criticise at the price	3	•			•					77
▲▲ Rotel RA-930AX	180	<b>G+</b> This budget wonder captivated our listeners with its clean, vibrant and thoroughly involving sound	53	3	•	•	•					104
▲ Rotel RA-940BX	250	<b>G</b> Rotel's cheapest 'BX' amp prompted a mixed reaction, some finding it muddled while others thought it 'exceedingly musical'	53	5	•	•	•					109
▲ Rotel RA-960BX	275	<b>G+</b> If you like music to harbour a latent rather than blatant sense of power this amp's confident restraint could be just the ticket.	88	5	•	•	•					116
▲ Rotel RC-960BX/RB-960BX	350	<b>G-</b> Excellent standards of construction, flexibility and plenty of power under the bonnet, an ideal choice for the first-time buyer.	80	5	•	•	•	•	•			104
Rotel RC-980BX/RB-980BX	700	<b>A</b> Plenty of watts per pound, sound is expansive but lacks a sense of poise, of control and fine detail - a disappointment	143	5	•	•	•	•	•			109
Sansui AU-X11	100	<b>A</b> An amp that's both solid and flexible for the price, but its sound is rather bland compared to competition in the £110 sector	52	5	•	•	•					92
▲ Sansui AU-X91 1DG	800	<b>G+</b> At its best when used with the on-board MASH/PWM DAC where it sounds technically neutral but still emotionally charged	112	7	•	•	•	•				85
▲ Sony TA-F440E	200	<b>G</b> A new budget amp based on tried-and-tested circuits. A fresh and up-beat sound with plenty of detail, can sound smeared via CD	109	5	•	•	•					104
Sony TA-F540E	250	<b>G-</b> An MC input but little else over the TA-F440E. Sounds more consistent from input to input but is still rather superficial	108	5	•	•	•					104
Sugden A21a	469	<b>G</b> The modern-day relative of Sugden's original Class A amp and one that offers a smooth, easy-going sound.	25						•			92
TEAC A-X5000	230	<b>A-</b> This amplifier is compromised by a grey and muddled sound that taxed the concentration of our listeners. Better via MM disc	107	6	•	•	•					97
▲ Technics SU-VX600	220	<b>G</b> The first 'tweaked' amp from Technics, its solid and sharply focused sound a taste of things to come.	90	5	•	•	•					104
Technics SU-VX720	250	<b>A+</b> Big and spacious sound either appears rough and blustery or impressively grand depending on the music at hand.	84	5	•	•	•					116
Technics SU-VZ220	100	<b>A-</b> Cheap, cheerful and pretty flexible to boot the SU-VZ220 quickly sounds thin, splashy and relentless when the going gets tough	50	4	•	•	•					109
Threshold FET 10e/SA-4	11852	<b>G+</b> Almost valve-like limpidity and excellent soundstaging are star qualities of the Threshold amps	100	7	•	•	•	•	•			Col
Woodside ISA230	900	<b>A</b> Smooth and inoffensive valve amplifier if one that lacks the sparkle and euphony required for a truly entertaining sound.	27	5	•	•	•					116
Woodside SC26/STA35	2743	<b>G+</b> Synergistic pairing with a cool, controlled sound, good focus and transparency. More about poise than grunt	35	5					•	•		100
▲ YBA 1 power amp	3999	<b>E</b> Well finished power amp offers front rank stereo staging and transparency, and is capable of driving the most difficult loads	85							•		62
▲ YBA 1 preamp	3650	<b>E</b> A front line French audiophile product. Great stereo and a fine Krell style finish	5	•	•	•						62
▲ YBA 2	3624	<b>G+</b> Superbly finished with very good space and transparency, slightly softened bass. Needs transformer for MC cartridges	70	5	•	•	•					56
YBA 3	2350	<b>G</b> This duo produced see-through, ethereal stereo images that were more convincing towards the centre of the soundstage	56	4					•	•		72
Yamaha AX-550	260	<b>G</b> Neutral yet lacks the ability to involve on an emotional level	131	5	•	•	•					97
Yamaha AX-750	400	<b>A</b> Impressive handling, but two samples split the opinion of our listeners, one sounded squashed the other fast and articulate	149	5	•	•	•					104

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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. Buffs may wrinkle their noses, but are happy to use cassette decks to make up tapes for the car or personal.

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 auto-

matically.) Lab performance and sound quality often go hand in hand, and are frequently somewhat dependent upon factory alignment. The mechanical integrity of the mechanism is another crucial factor, that is reflected in the price.

The columns on the right indicate when the facilities shown in the headings are available on a deck. Dolby B and C offer varying degrees of noise reduction and the HX Pro system gives significant treble improvements with ferric (Type I) tapes. Dolby S increases the level of noise reduction with less signal degradation than B or C.

Three-head recorders allow you to listen to a recording as it's being made, a useful quality control function. Bias adjustment allows you to fine tune the deck to suit different types of tape when recording. Auto calibration is an automatic system for setting bias and Dolby levels. Twin deck offers the option to dub tapes or to play two cassettes simultaneously. Autoreverse is a useful convenience feature, but usually with some mechanical compromise. In the case of twin decks a blob is inserted in this column even if only one transport autoreverses.

## Cassette decks

Product	Price	Comments	Dolby B	Dolby C	Dolby HX Pro	Dolby S	3 Head	Bias adjust	Auto calibration	Twin deck	Autoreverse	Issue No.
▲▲ Aiwa AD-F410	100	<b>A</b> Comparable to AD-F500 but cheaper: Good all round performance, well adjusted, useful basic and not so basic features	•	•	•							99
▲ Aiwa AD-F500	160	<b>G</b> Noise levels are a little higher than usual, but sound quality is otherwise very good - open, explicit and very neutral tonally.	•	•	•							93
▲▲ Aiwa AD-F810	200	<b>G</b> First class budget 3-head machine with a dual capstan transport that really works at reducing the 'fudge' factor	•	•	•							99
▲▲ Aiwa AD-WX929	200	<b>A</b> Superbly equipped twin deck that works and works well - remote control	•	•	•	•					•	117
▲ Aiwa XK-S9000	700	<b>G+</b> Fabulous build, clunky transport and sharp, refined sound quality with Dolby S or B and metal tapes	•	•	•	•	•	•	•			105
Akai DX-57	220	<b>G</b> Eschews fancy gadgets for a good transport and decent electronics. Sound quality is firm and tidy but avoid Dolby C.	•	•	•	•	•	•				105
Akai GX-65	300	<b>A</b> Fine ungimmicky middle ranking deck with simple, purposeful controls, works best with metal tapes. Performance fair to good	•	•	•	•	•	•				87
▲ Akai GX-95II	440	<b>G+</b> Sharp, clear and articulate sounding deck, with superb performance extending to frequency extremes	•	•	•	•	•	•			•	99
Akai GX-R35	220	<b>A</b> Middling sound quality at best with Dolby B; deteriorates with Dolby C	•	•	•	•	•	•				99
▲ Akai GX-W45	320	<b>A</b> Costly but musical high-spec dual deck, doesn't like modern high energy Type IIs and IVs. Good stability and clarity	•	•	•						•	111
▲ Arcam Delta 100	850	<b>E</b> Superb transport and a ripe, spacious sound. The Dolby S installation more successful than most. Some replay incompatibility	•	•	•	•	•	•				111
▲ Denon DRM-510	150	<b>A+</b> An amnesic Dolby switch and lack of timer standby detract from an otherwise strikingly successful deck with a good performance	•	•	•							99
Denon DRM-710	250	<b>A</b> Although this is a fair performing model, the design has lost some of the competitive edge of its predecessor, the DRM-700.	•	•	•							105
▲ Denon DRS-610	180	<b>G</b> Unique loading mechanism provides stability, and the deck has a crisp, clean quality. Occasionally anaemic bass.	•	•	•							111
Denon DRS-810	300	<b>A</b> Basically good deck with non-stressful material let down by an inability to deal with high energy tapes properly.	•	•	•	•						105
▲ Denon DRW-650	200	<b>A</b> This simply equipped model is a little fiddly to operate at times, but sound quality is generally workmanlike - good value	•	•	•						•	93
Dual CC800RS	170	<b>A-</b> Low(ish) cost auto-reverse deck. Delivers a punchy but ultimately rather crude impersonation of source material, thin, lightweight bass.	•	•	•							105
Harman Kardon DC5500	500	<b>A</b> Workmanlike sound quality offset by high price and inexplicable shortcomings like 'forgetful' Dolby switching and no timer support.	•	•	•						•	117
Harman Kardon TD4600	600	<b>A</b> Original Dolby S deck has improved over the years and now sounds very acceptable. A strong, solid sounding deck - but expensive.	•	•	•	•						117
JVC TD-R452	180	<b>A-</b> Tidy, stable but ultimately rather soul-less experience. Auto-reverse is useful though.	•	•	•							117
▲ JVC TD-V1010	400	<b>E</b> Very high grade enthusiasts deck with almost CD-like resolution and stability, especially with Type IV tapes	•	•	•	•	•	•				111
JVC TD-X352	150	<b>A-</b> Disappointingly amorphous sound despite decent measured results.	•	•	•	•						117
▲ Kenwood KX-3050	160	<b>A</b> Acceptable sound quality marred only by a loss of midband analysis and slightly edgy treble.	•	•	•							117
Kenwood KX-5030	200	<b>A</b> Confusing mishmash of listening impressions caused by poor set-up afflicting metal tapes and Dolby C in particular. Promising otherwise	•	•	•							99
Kenwood KX-5530	190	<b>A-</b> Neat looking, well equipped deck, adequately engineered but somewhat lacking musically. Worth considering if auto-reverse is a must	•	•	•						•	105
▲ Kenwood KX-7030	260	<b>G</b> Fine, articulate middle price cassette deck whose only (mild) failing with some programme material is a just perceptibly synthetic glaze	•	•	•	•	•	•				99
▲ Marantz CP230	330	<b>A</b> This is a competitively priced portable recorder though not suited to replay of musicassettes	•									52
▲ Marantz CP430	400	<b>A</b> Uniquely flexible and compact package for outside work which at a pinch can double as a domestic cassette deck	•					•	•	•		87
Memorex SCT-5	150	<b>P</b> Poor example of a twin cassette deck where everything has been sacrificed on the altar of flexibility	•	•								87
▲ Nakamichi DR-1	780	<b>VG</b> Typically idiosyncratic Nakamichi with manual everything, Good azimuth adjustment and dynamic, authoritative sound.	•	•								117
▲ Nakamichi RX-202E	600	<b>G+</b> Fine, clear and articulate sounding player. Excellent with prerecorded material, but idiosyncratic and sometimes obstructive control	•	•	•						•	63
▲ Pioneer CT-339	150	<b>A</b> Auto BLE tape alignment is the most interesting feature. Sound quality is a little flaky.	•	•	•							105
Pioneer CT-676	250	<b>P</b> Dull, compressed and hard sounding deck, which is hamstrung by high measured transport flutter.	•	•	•							99
Pioneer CT-900S	500	<b>A</b> High spec and well built derivative of CT-93, but disappointingly lacklustre sound	•	•	•	•						99
▲ Pioneer CT-91a	550	<b>G+</b> Superb, near state of the art deck with excellent dual capstan transport and capable electronics. At the price, this one is a mould breaker	•	•	•	•						75
▲ Pioneer CT-93	800	<b>E</b> State of the art deck, built like something out of NASA's shuttle, with superb all round performance	•	•	•	•	•	•				99
▲▲ Pioneer CT-S410	200	<b>A+</b> Powerful selection of features, excellent ergonomics and the fine, explicit sound with metals, though some instability was noted.	•	•	•							111
▲▲ Pioneer CT-S510	240	<b>A-</b> Slightly highlighted balance, but open and detailed, and backed by a basic but excellent set of features	•	•	•							117
▲ Pioneer CT-S610	270	<b>G+</b> Exactly engineered and highly articulate up-market cassette deck. Imagery and dynamics are finely resolved	•	•	•							111
Pioneer CT-S910	500	<b>G+</b> Refined and able performer, strong detail and excellent imagery, but slightly laid back.	•	•	•							117
Pioneer CT-W601R	200	<b>A-</b> Mediocre performance attributable to flimsy build and less than stable transport. Frequency responses not wholly accurate.	•	•	•							111
▲ Pioneer CT-W650R	200	<b>A</b> There were some intermittent problems with the tape alignment system on the test sample, but the deck was otherwise good,	•	•	•						•	105
▲ Revox B215	1322	<b>G+</b> Fine, consistent and solid sound, excellent under the skin engineering and many useful features — but you're also paying for it	•	•	•	•	•	•				87
▲ Revox B215-S	1697	<b>G+</b> This is a superbly engineered deck with a classically fine performance that almost transcends the stereotypes.	•	•	•	•	•	•				75
Revox Professional Series C115	1083	<b>G</b> Not for the numbers freaks, it's unobtrusively musical, with a slightly wayward top end and a very clean, extended bass	•	•	•	•	•	•				111
Sansui D-X111E	120	<b>P</b> 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?	•	•	•							105
Sansui D-X117WR	220	<b>P</b> Bass is thin and coloured, and the sound lacks dynamics, pitch accuracy and overall stability - the sound is neither stable nor solid.	•	•	•							111
▲▲ Sansui D-X211HXR	170	<b>G+</b> Clean, stable and open sounding recording quality distinguishes this player, - and auto-reverse too. Excellent value.	•	•	•							93

# Cassette decks continued

Product	£Price	Comments	Dolby B	Dolby C	Dolby HX Pro	Dolby S	3 Head	Bias adjust	Auto calibration	Twin deck	Autoreverse	Issue No.
Sansui D-X311WR	250	<b>A-</b> Not wholly successful auto-reverse deck which suffers because it has tried to be all things to all people. Lack of clarity is main limitation	•	•	•	•	•	•	•	•	•	99
Sherwood DD-3010C	150	<b>P</b> Good range of features, let down by poor transport and iffy electronics.	•	•	•	•	•	•	•	•	•	117
▲▲ Sony (WMD6C) Pro Walkman	280	<b>G+</b> One of the finest sounding cassette decks on the market today. A mandatory Best Buy, which also fits in your pocket	•	•	•	•	•	•	•	•	•	60
▲▲ Sony TC-K520	180	<b>G</b> Fine, assured and detailed performer with a very well designed and straightforward user interface	•	•	•	•	•	•	•	•	•	87
Sony TC-K870ES	350	<b>A+</b> Good but not outstanding deck which proved slightly disappointing on audition. This model is no standard setter	•	•	•	•	•	•	•	•	•	99
TEAC R-9000	500	<b>G</b> Much better than average auto-reverse deck, well worth considering. Nicely engineered too.	•	•	•	•	•	•	•	•	•	105
TEAC V-7000	480	<b>G</b> Intrinsically sharp, clear and solid sound spoiled by exaggerated detail with prerecorded material and losses imposed by Dolby circuits	•	•	•	•	•	•	•	•	•	99
▲ TEAC V-8000S	700	<b>G</b> Superb stability and real subtlety, this must be the best TEAC yet. The only disappointment was the Dolby C	•	•	•	•	•	•	•	•	•	105
▲▲ Technics RS-BX626 II	180	<b>G</b> First rate deck at a bargain price. Losses when recording are low and mostly benign, an all-round achiever	•	•	•	•	•	•	•	•	•	111
Technics RS-BX828 II	300	<b>G</b> Fine deck, with explicit detail and stability, but in the final analysis it doesn't go much further musically than the cheaper RS-BX626	•	•	•	•	•	•	•	•	•	111
▲▲ Yamaha KX-260	160	<b>A</b> Lively, entertaining deck that trades gadgets for a convincing performance at an attractive price point	•	•	•	•	•	•	•	•	•	111
Yamaha KX-360	200	<b>A</b> Performance has both dryness and precision. Good - but doesn't 'breathe,' and occasionally sounds unstable	•	•	•	•	•	•	•	•	•	111
▲ Yamaha KX-650	260	<b>G</b> Fine audio manners, especially in the midband and treble, mark this high class deck out from the crowd	•	•	•	•	•	•	•	•	•	99
Yamaha KX-W362	250	<b>A-</b> Almost a good deck, it is let down by audible levels of wow & flutter, apparent even with prerecorded material, audio circuits are good	•	•	•	•	•	•	•	•	•	111



## CD Players

Now over a decade old, this all digital music source is well established despite high disc prices and the opposition of some hi-fi enthusiasts. Compact Disc's strengths over conventional vinyl are complete freedom from surface noise, ease of use, and more robust software.

However, many vinyl enthusiasts still find CDs sound less involving than top quality vinyl. But, with the dominance of CD in the high street, even vinyl die-hards need a CD player today.

The columns on the right indicate when the facilities shown in the headings are available on a CD player: DAC type indicates the type of converter chip used in each player, 16, 18 and 20-bit are multi-bit types, all the others are bitstream variants. In much the same way that an amp's output is not indicative of its sound quality, the chip used in a DAC isn't the only determining factor in a CD player's sound, but it is an important one. Remote control is not yet universal, and we have included a tick box, more to show which

machines don't have one than which do. The existence of electrical and/or optical digital outputs is important for future upgrading with an outboard DAC, as a rule electrical outputs are the most desirable. Phase inversion in the digital domain is rare on one box players but can make quite a big difference if you've got golden ears. Headphone sockets are useful but beware of those without volume controls. Track entry key-pads are those with calculator style buttons which makes track access much quicker.

## CD Players

Product	£Price	Comments	DAC type	Electrical digital output	Optical digital output	Remote control	Headphone socket	Track entry keypad	Phase invert	Issue No.
▲ Aiwa XC-300	150	<b>A+</b> Cheap, cheerful and gratifyingly free of digital 'nasties', well-equipped but safe rather than thrilling on the sonic front.	Toshiba BS	•	•	•	•	•	•	107
Aiwa XC-750	180	<b>A</b> A refined version of the XC-700, sadly it has lost the magic of the original	SAA7350	•	•	•	•	•	•	119
▲ Arcam Alpha Plus	420	<b>G+</b> As its name suggests, this is the 1992-version of a classic 16-bit player with an all-round smoother sound!	16-bit	•	•	•	•	•	•	112
Arcam Delta 70.3	650	<b>G+</b> A distinctly rugged, beefy sound. Plenty of power behind individual instruments but lacks a feeling of involvement	7350 PDM	•	•	•	•	•	•	95
Audio Alchemy DDS/DTI/XDP/P52	2047	<b>A+</b> A multi-box combination with a Bit Stream DAC that is fundamentally more inspiring than its partnering transport.	DAC7	•	•	•	•	•	•	120
Aura CD-50	400	<b>G-</b> Based on an older Philips board with new CDM9 transport, this is a slim player with an innocuous sound	SAA7321	•	•	•	•	•	•	119
AVI S2000MC	999	<b>G+</b> A stylish, midi-width player with an exceptionally refined and comfortable sound. Lacks passion	20-bit	•	•	•	•	•	•	119
Cary Audio Design CAD-955	899	<b>A+</b> Rotel with add-on valve processor to filter-out any RF. Nice idea but sounds very dry and taut, lacking warmth and body.	16-bit	•	•	•	•	•	•	107
Creek CD60	500	<b>G</b> A big and confident sound from a player that's 'into' green. So it looks ghastly even if the internal design is very thoughtful.	16-bit	•	•	•	•	•	•	107
Denon DCD-1290	330	<b>G-</b> Looks the business but sound is a real five-minute wonder. Its compelling fizz lasts about as long as a firework.	18-bit	•	•	•	•	•	•	107
Denon DCD-2560	600	<b>G</b> Beautifully built but decidedly sluggish, particularly through the bass. Vocals are more forward but can sound a little glassy	20-bit	•	•	•	•	•	•	95
Denon DCD-890	270	<b>G-</b> Similar to the DCD-1290 in its execution, sounds lively and powerful but lacks subtlety.	18-bit	•	•	•	•	•	•	112
DPA Digital T-I/PDM2mkII	3245	<b>G</b> An ingenious combination that includes a clock-feed from the DAC to CD transport. Capable of astonishing results	DAC7	•	•	•	•	•	•	120
Dual CD1080RC	200	<b>A-</b> Strange-sounding player with a top-heavy treble that does little to redress its lack of vibrancy and emotion	MASH/PWM	•	•	•	•	•	•	107
▲ EAD T-1000/DSP-1000	2195	<b>VG</b> A two-box player based on Pioneer's Stable Platter CD transport. Its music always sounds fast, furious and fascinating.	20-bit	•	•	•	•	•	•	120
Goodmans GCD-658	170	<b>A-</b> A 6+1 magazine-loading autochanger with an exaggerated and often aggressive sound	Hybrid	•	•	•	•	•	•	117
Harman Kardon HD7450	260	<b>A+</b> Dominated by a budget decoder/oversampling IC. Good bass nevertheless but pop tracks can sound fizzy and tiring.	18-bit	•	•	•	•	•	•	107
▲ Harman Kardon HD7500II	300	<b>G+</b> Tonal integration is very good, packed with detail that's expressed with enthusiasm.	MASH	•	•	•	•	•	•	95
Harman Kardon HD7600II	400	<b>A+</b> HD7500II with a motorised volume control and extra-heavy casework. Lacks the transparency and sparkle of the cheaper machine	MASH/PWM	•	•	•	•	•	•	100
Harman Kardon TL8500	500	<b>A</b> This 5-disc carousel player sounds civilised enough but lacks the detail and finesse of its peers	MASH/PWM	•	•	•	•	•	•	117
JVC XL-M406	270	<b>A</b> A 6+1 disc magazine-based autochanger with a rather lean, bright and disappointingly synthetic sound	PEM	•	•	•	•	•	•	117
JVC XL-V152	130	<b>A</b> Based on earlier budget designs but minus a remote control. The voluminous but vague sound is equally familiar.	PEM BS	•	•	•	•	•	•	112
JVC XL-Z1050	500	<b>A</b> Technically advanced and luxuriously equipped, this player remains rather bland and unsatisfying on audition	PEM bitstrm	•	•	•	•	•	•	119
▲ JVC XL-Z452	180	<b>G+</b> Another lightweight player but graced with a surprisingly bold and detailed sound. Impressive stuff for the money.	PEM BS	•	•	•	•	•	•	112
▲ Kenwood DP-3040	180	<b>G+</b> The sophisticated sound of this budget player could teach Kenwood's costlier offerings a thing or two!	NPC BS	•	•	•	•	•	•	112
Kenwood DP-5040	200	<b>A</b> Better built and technically superior to the older DP-5030 but its untidy, detached treble quality proved a real disappointment	PLM	•	•	•	•	•	•	107
Kenwood DP-7050	320	<b>A</b> Kenwood's first sowing of Philips' Bit Stream technology has fallen on stony ground judging by its dry and awkward sound	SAA7350	•	•	•	•	•	•	119
Kenwood L-1000D	830	<b>G</b> A beautifully constructed and very stylish player that really only gives off its best when used in balanced	16-bit	•	•	•	•	•	•	100
▲ Kenwood DP-M6640	250	<b>G</b> This 6+1 CD multichanger is hardly the slickest available but it still sounds impressively open and detailed	PWM	•	•	•	•	•	•	117
▲ Linn Karik	1497	<b>VG</b> Based on Linn's original CD transport, this player sounds dry but very positive, detailed and engrossing	Crystal BS	•	•	•	•	•	•	119

## CD Players continued

Product	Price	Comments	DAC type	Optical digital Remote control	Electrical digital Remote control	Headphone output	Track entry keypad	Phase invert	Headphone socket	Issue No.
Linn Karik/Numerik	2500	<b>G+</b> Partnering Linn's Numerik DAC with its Karik CD player (as transport) provides a dry, dynamic but also slightly dirty sound.	20-bit	•	•					• 120
▲ Marantz CD-52II	230	<b>G</b> Launched to usurp the position of its own CD-52SE, the '52II is less colourful but equally appealing	SAA7350	•	•					• 119
▲ Marantz CD-52IISE	300	<b>G</b> A new mains transformer plus the full complement of internal mods has recaptured the frothy if startling sound of the original '52	SAA7350	•	•					• 119
Marantz CD-72	400	<b>G+</b> A heavily-constructed player. This implementation sounds astonishingly solid and immediate but also rather too 'clean'.	bitstream	•	•					• 107
Marantz CD-72SE	500	<b>G+</b> A recommendation just eluded the grasp of this superbly built player thanks to its very polished but restrained sound.	bitstream	•	•					• 112
▲▲ Meridian 206ΔΣ	995	<b>E</b> A new variation on the 206 theme with the most liquid and captivating sound to date	Crystal BS	•	•	•				• 119
▲ Meridian 208	1550	<b>E</b> State of the art CD sound combined with a decent preamp and full remote control	bitstream	•	•	•	•	•		• 83
Meridian 200/263	1390	<b>G</b> Now updated with Crystal Bit Stream technology, this popular duet has unfortunately lost much of the charm and poise of the original.	Bit Stream	•	•					• 120
▲ Meridian 602/606	3100	<b>VG</b> Meridian's top-of-the-range two-box player looks and sounds both distinctive and elegant, the perfect partner for a cultured system!	DAC7	•	•	•	•			• 120
Micro Seiki CD-M100	5541	<b>G</b> Extravagantly styled, finished and built. The good lab performance led to an only 'good' sonic display	16-bit	•	•					• 72
Micromega Logic	500	<b>G</b> A version of Philips CD624 with new op-amps and CD tray. Still, it sounds rather meatier, better integrated and more purposeful	SAA7321	•	•					100
Mission DAD5	300	<b>A+</b> Similar to Philips' 600-series: lively, plenty of space and full of 'bounce' but a little too eager to impress in the short term	bitstream	•	•					• 107
▲ Musical Fidelity CDT	500	<b>G+</b> Oddball player with a cheap top-loading transport and appalling digital gubbins yet saved by the euphony of its valves!	hybrid							112
▲ NAD 502	200	<b>G</b> This updated version of the 5425 has traded the spontaneity of its forebear for a more precise but mechanical style of music	MASH/PWM	•	•					• 119
▲ Philips CD920	150	<b>A+</b> A new budget player with an appalling technical record but a surprisingly clean if understated sound	SAA7341	•	•					• 119
Philips CD930	180	<b>G-</b> Featuring digital circuitry similar to Marantz's players but a sound that's a little too ripe and soft.	bitstream	•	•					• 112
▲ Philips CD950	350	<b>G+</b> Philips' top 900-series player is the first to employ its advanced DAC7 chipset. Sounds very crisp, clear and confident.	DAC7	•	•					• 112
▲ Pioneer PD-201	150	<b>G</b> A budget player with a genuinely fizzy and exciting sound. Hardly neutral but audacious and entertaining nevertheless.	PDM BS	•	•					• 112
Pioneer PD-75	800	<b>G+</b> A confident yet beautifully poised and relaxing sound from an equally luxurious package. Oodles of refinement	PDM BS	•	•		•			• 107
▲ Pioneer PD-M701	300	<b>G+</b> A 6-disc multichanger from the originators of the breed. A little untidy perhaps, but still sounds fresh, dynamic and exciting	PDM	•	•					• 117
Pioneer PD-M901	400	<b>A</b> Another 6-disc multichanger based on the PD-M701 but with the addition of various 'Sound Field' options. Listening is hard work	PDM	•	•					• 117
Pioneer PD-S501	190	<b>A+</b> The cheapest player to be equipped with a Stable Platter mechanism, but compromises elsewhere have suffocated its flair	bitstream	•	•					• 112
Pioneer PD-S801	300	<b>G</b> Pioneer's Legato Link digital filtering provides an unpredictable sound. Capable of poor or superb results, depending on system	bitstream	•	•					• 112
▲ Pioneer PD-S901	400	<b>G+</b> The very refined but confident, crisp and powerful sound of the '901 snatches Pioneer's LLC concept from the jaws of defeat	PFM bitstrm	•	•	•				• 119
Proceed PDT3/PDP3	4598	<b>G+</b> The third in a series of unusual transport/DAC combinations and a pairing that retains a powerful, confident and rugged sound	20-bit	•	•	•				• 120
Revox B226S	840	<b>A</b> Top quality build and finish for the Revox system enthusiast. For high value sound look elsewhere	16-bit	•	•					• 76
Rotel RCD-955AX	280	<b>A</b> Repackaged version of the evergreen RCD-855. Our sample disappointed, lacking the clean, cohesive quality of the original	16-bit	•	•					• 107
▲▲ Rotel RCD-965BX	300	<b>E</b> An exceptionally refined bitstreamer: transparent, exquisitely detailed and powerfully emotive. A landmark player	SAA7323	•	•					• 100
Rotel RCD-965BX LE	380	<b>G-</b> This 'tweaked' version of the fabulous '965BX certainly sounds different, but different is rarely better	SAA7323	•	•					• 119
▲ Sansui CD-X217	230	<b>G-</b> Sansui has returned to its roots judging by the balmy and very comfortable sound that pours from this player	MASH/PWM	•	•					• 119
Sansui CD-X317	300	<b>A</b> Not in the same class as older CD-X311mkII. Same technology but the sound is neither as responsive or engaging	MASH	•	•					• 107
Sansui CD-X617	300	<b>A</b> This 'double-DAC' version of the CD-X317 is more impressive, sounding light and tizzy with pop but dull with classical CD's	MASH	•	•					• 112
▲ Sansui CD-X711	600	<b>G+</b> Luxury features, finish and sound from this classy Sansui; excuses required here	bitstream	•	•		•			• 83
▲▲ Sherwood CD-3020R	120	<b>G</b> Although this budget wonder has little respect for musical convention, what emerges is still remarkably entertaining	NPC bitstrm	•	•					• 119
▲▲ Sherwood CDC-5010R	200	<b>G+</b> This highly affordable 5-disc carousel player sounds unexpectedly deep, spacious and involving - a rare find	PDM	•	•					• 117
▲▲ Sony CDP-397	140	<b>G</b> The first CD player to be almost entirely composed of miniature surface-mount components. Unsophisticated but enthusiastic sound	PLM	•	•					• 112
▲▲ Sony CDP-597	180	<b>G</b> This lightweight version of the acclaimed CDP-797 is equally flexible but provides a slightly warmer and smoother sound	PLM bitstrm	•	•					• 119
▲ Sony CDP-797	200	<b>G-</b> Succeeds with its taut imaging, clean and impressive soundstaging. Can seem a little too lean or dry, however.	PLM	•	•		•			• 107
Sony CDP-X229ES	300	<b>G-</b> Built to the same standards as the CDP-X339ES but with a colder and less forgiving sound. Lacks a sense of integration	PLM	•	•		•			• 112
Sugden SDT-1	850	<b>A</b> Bearing in mind Sugden's SDA-1 converter lies at the heart of this player, its unpredictable performance is disappointing	16-bit	•	•					119
TEAC CD-P3500	170	<b>A</b> A well-meaning attempt to pare-down the CD-P4500 results in a similar looking player with a thoroughly uninspiring sound	bitstream	•	•					• 112
▲ TEAC CD-P4500	250	<b>G</b> TEAC's first genuine 1-bit player its sound described as having a certain 'organic warmth', very composed and easy-going.	SAA7350	•	•					• 107

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# CD Players continued

Product	Price	Comments	DAC type	Electrical digital output	Optical digital output	Remote control	Track entry keypad	Headphone socket	Phase invert	Issue No.
TEAC VRDS-10	769	<b>A+</b> A basic analogue stage compromises the potential of TEAC's superb engineering and digital electronics. Lacks bass energy	DAC7	•	•	•	•	•	•	119
▲▲ TEAC P-700/D-700	1500	<b>VG</b> They may lack the resolution of high-end colleagues but still sound warm, bubbly and perpetually entertaining.	20-bit	•	•	•	•	•	•	120
▲ Technics SL-PG320A	140	<b>G+</b> A cheaper and remote-less version of the '420A with an equally dry but vivid, spacious and astringent sound. A good 'un	MASH	•	•	•	•	•	•	112
▲ Technics SL-PG420A	160	<b>G+</b> Offers an open, transparent and uncommonly fresh sound but a little of the 'magic' is missing.	MASH	•	•	•	•	•	•	107
▲▲ Technics SL-PG520A	200	<b>G+</b> A cracking player. Superb clarity and dynamics, thrilling but musically involving too	MASH	•	•	•	•	•	•	107
▲▲ Technics SL-PS620A	230	<b>G+</b> A costlier, tarted-up version of the SL-PG520A that loses very little in the way of clarity, sparkle or in compelling dynamics	MASH	•	•	•	•	•	•	112
▲ Technics SL-PS840	420	<b>A</b> A very refined but highly detailed and engrossing performance from just about the fastest, slickest player on the planet	MASH/PWM	•	•	•	•	•	•	119
Technics SL-PS900	350	<b>G-</b> Just about the quietest transport in existence and a sound that is equally unobtrusive, polite and refined	MASH	•	•	•	•	•	•	100
Woodside WS2	1095	<b>G+</b> Responded well to our jazz and classical selection but sounding bright and grainy with the pop CD's	16-bit	•	•	•	•	•	•	95
Yamaha CDX-560	180	<b>G</b> An advance on the CDX-450 the light, up-front if entirely welcoming sound of this newcomer could shock the timid listener	18-bit	•	•	•	•	•	•	112
▲ Yamaha CDC-625	300	<b>G</b> A reassuringly solid 5-disc carousel player that sounds smooth, cultured and 'delicately proportioned'. Good value	Hybrid	•	•	•	•	•	•	117
▲ Yamaha CDX-660	249	<b>G</b> This cheaper iteration of the CDX-860 provides a similar mix of features with a slightly slower but heavier sound	PDM DAC	•	•	•	•	•	•	119
▲ Yamaha CDX-860	280	<b>G+</b> Probably Yamaha's best player to date: powerful and confident yet delicate and nimble when the occasion demands	PDM	•	•	•	•	•	•	112



## CD Transports and DACs

A CD player can be split into two basic components, the mechanism which reads the information from the disc, called the transport, and an electronic device which turns the digital bitstream coming off the disc into an analogue audio signal, this is called a digital to analogue convertor or DAC. Although at the lower end of the market both of these are contained in a single box, the best CD players are usually two box affairs.

Although many of these units will be purchased as matching pairs, a DAC can also be used to upgrade an existing CD player. For instance an early machine with a satisfactory transport but a dated convertor can be rejuvenated by adding an outboard DAC.

The columns on the right indicate when the facilities shown in the headings are available on a transport or DAC. Remote control is not yet universal, and we have included a tick box, more to show which machines don't have them than which do. The existence of electrical and/or optical digital in and outputs is pretty fundamental to transports and DACs, as a rule electrical outputs are the most desirable. Class 1 transports are those with an output whose crystal clock accuracy is better than ± 50ppm (parts per million), certain DACs won't lock onto (and thus can't be used with) transports with a lower clock accuracy. DAC type shows the specific convertor chip employed, multi-bit indicates the use of a 16-bit, four times oversampling chip. In much the same way that an amp's output is not indicative of its sound quality, the chip used in a DAC isn't the only determining factor in a CD player's sound, but it is an important one. Phase inversion in the digital domain can make quite a big difference if you've got a high resolution system and golden ears to go with it, and is worth having.

The choice of interconnect used to link drives and DACs is also important. Despite the fact that you are conveying a digital bitstream differences can be heard between interconnects and conventional interconnects, a dedicated 75ohm digital cable will give the best results.

The choice of interconnect used to link drives and DACs is also important. Despite the fact that you are conveying a digital bitstream differences can be heard between interconnects and conventional interconnects, a dedicated 75ohm digital cable will give the best results.

## CD Transports

Product	Price	Comments	Electrical digital output	Optical digital output	Remote control	Class 1	Issue No.
Kenwood DP-X9010	500	<b>A+</b> Compromised by jitter, RF noise and poor clock selection it encourages a dynamic but bright and edgy sound with most DACs	•	•	•	•	96
▲ Meridian 200	895	<b>G+</b> Broadly compatible and offering a light, fresh and very bubbly sound that is both natural, engaging and unfatiguing	•	•	•	•	96
Meridian 602	1750	<b>G</b> This dedicated CD transport teams-up most successfully with the 606 DAC. Otherwise it lacks the life and pizzaz of the 200	•	•	•	•	96
▲ TEAC P-10	1499	<b>G+</b> A chunkier and altogether more successful transport than the P-500 with an especially beefy and compelling sound. TEAC's best	•	•	•	•	96
TEAC P-2	3300	<b>G</b> Beautifully styled and constructed but sound is bleached and generally less inspiring than that of the P-10	•	•	•	•	96
▲ TEAC P-500	649	<b>G+</b> Provides a smooth and very sympathetic sound yet is also rather vague, lacking the crispness and resolution of its peers	•	•	•	•	96
Technics SL-PA10	470	<b>G</b> Has the unusual limitation of only optical output. Reassuringly solid and more immune to vibration than most	•	•	•	•	88
Wadia WT2000	5614	<b>G+</b> Active digital output and alloy casework. Dynamic and crisp sound best realised with Wadia DACs, otherwise less impressive.	•	•	•	•	96
▲ Wadia WT3200	1800	<b>VG</b> Based on Marantz CD-95DR with new casework and active output. Very clean, clear and authoritative with Wadia and Philips based DACs	•	•	•	•	96

## DACs

Product	Price	Comments	DAC type	Electrical digital input	Optical digital input	Phase invert	Issue No.
▲ Arcam Black Box 3	300	<b>G+</b> Top of a series of three decoders it can offer a high sonic standard with top class transports	Bitstream	•	•	•	88
Arcam Black Box 5	450	<b>G</b> Equipped with Sync Lock for D170.3. It gives off its best with a standard 75ohm transport like the TEAC P-10.	hybrid	•	•	•	113
▲▲ Audio Alchemy DDE v1.0	420	<b>VG</b> A very sweet and seductive sounding unit that gives good results with a wide range of CD players/transports	Bitstream	•	•	•	101
Audio Synthesis DSM-M	1234	<b>G+</b> A weighty but neutral and highly calculated performer, best suited to transports like the P-10, despite Sync Lock facility.	20-bit	•	•	•	113
Audiolab 8000DAC	700	<b>G</b> Needs Class 1 transport. At its best with Wadia WT3200 where it sounds vivid and alive. Otherwise can sound a little antiseptic	Bitstream	•	•	•	103
Beard DAP-1	975	<b>A-</b> Clad in a wooden case this marriage of digital technology and valves has hit the rocks, a disappointingly flat sound	16-bit	•	•	•	113
▲ DPA Digital Bigger Bit	700	<b>G</b> With either P-10 or Meridian 200 transports it delivers a very taut and dynamic sound, bathed in an open acoustic	DAC7	•	•	•	103
DPA Digital Little Bit (Optical)	400	<b>VG</b> Works especially well with Meridian's 200 transport but does require the services of Deltec's 'Power' mains filter	SAAT7350	•	•	•	101
DPA Digital PDM1 Series 3	1280	<b>G+</b> Bears technical comparison with both PDM2 and Bigger Bit but - in terms of sound quality - is great advance on the latter	DAC7	•	•	•	103
▲ DPA Digital PDM2	2350	<b>E</b> State of the art technical performance with pristine sound to match	DAC7	•	•	•	101
▲ ds/d Decode-1	495	<b>G</b> Elegantly designed bitstreamer with plenty of inputs, can sound too bright, immediate or artificial for its own good.	Bitstream	•	•	•	113
▲ Forte Audio Model 50	950	<b>VG</b> A typically big and full-blooded sound, infiltrated by a slightly euphonic quality but never hard or gritty.	DAC7	•	•	•	103
▲ Meridian 203 DAC7	560	<b>VG</b> A broadly compatible DAC that's free of fatiguing nasties yet remains bubbly and exciting	DAC7	•	•	•	101
Meridian 606 DAC7	1350	<b>G</b> By refining the 203's sound further Meridian have also tempered its vibrancy and 'life'. Fickle with other transports	DAC7	•	•	•	101

# DACs continued

Product	£Price	Comments	DAC type	Electrical dig input	Optical dig input	Phase invert	Issue No.
Micromega Duo BSII	550	<b>G</b> Has a tendency to sound light, airy and 'fast' but it can also become a little hard or - fatiguing with some digital outputs	SAA7321	•	•	•	101
Micromega Microdac	300	<b>A+</b> Described as a modest but entertaining performer, achieving its sweetest balance with Arcam's D170.3 transport.	SAA7321	•	•		113
▲ Mission DAC5	299	<b>G+</b> Another modest DAC but one capable of a lean but clean and detailed sound that's typical of the DAC7 breed.	DAC7	•		•	113
▲ NVA DAC-ON	730	<b>G+</b> DAC-ON actually turns out to be a QED Digit linked to substantial external supplies. A ruse that undoubtedly improves its sound	SAA7323	•			113
PS Audio Superlink	1498	<b>G-</b> Does the business with Meridian's 200 but can sound bloated, smeared and even vaguely electronic other transports	18-bit	•	•	•	103
▲▲ QED Digit	139	<b>G+</b> Bearing in mind its expressive but very forgiving performance the Digit is almost embarrassingly cheap	SAA7323	•			113
Roksan ROK-DA1/ROK-DS4	995	<b>G+</b> A creditable affair, both expansive and expressive in character but rather also lean in balance.	Crystal	•			113
Stax DAC-Talent	1400	<b>G+</b> Natural, refined and never over-zealous, its also capable of sounding very spicy and dynamic. Can be a maturing influence	20-bit	•	•	•	101
▲ Sugden SDA-1	749	<b>G+</b> A pleasant surprise from the fuddy-duddies of audio, judging by its 'masses of high resolution detail and tremendous dynamics'	TDA1541t	•			113
Sugden Stermfoort PDA-10	1200	<b>G+</b> Unfortunately this 'upgraded' SDA-1 is less impressive than the original, losing out on dynamics, airiness and subtle detailing	16-bit	•	•	•	113
Sugden Stermfoort PDA-10	1750	<b>G+</b> Unfortunately this 'upgraded' SDA-1 is less impressive than the original, losing out on dynamics, airiness and subtle detailing	16-bit	•			113
▲ TEAC D-500	400	<b>G+</b> Combination of NPC O/S filter and two Philips' DACs. Its broadly compatible. A dynamic and 'interesting' sound	16-bit	•	•		103
Threshold DAC 1/e	3150	<b>G+</b> Can sound beautifully detailed with a marvellous sense of scale and sharp, solid images. Compatibility is unpredictable	MASH	•	•	•	103
Wadia DigiMaster X-32	2000	<b>G</b> It can sound bold, dynamic and crisp but lacks the warmth to bind its music together	18-bit	•	•		101
Wadia DigiMaster X-64.4	5000	<b>G+</b> The X-64.4 positively buzzed with vibrant, sharply-etched detail. An exciting sound	18-bit	•	•	•	101
Woodside DAC1	909	<b>G</b> Fine but slightly dated and costly package in performance terms - but flexible, musical and t well built	16-bit	•	•		87
▲ Woodside DAC2	510	<b>G+</b> Offering a sharp and dynamic sound, all the more captivating for its lack of graininess and 'tizz'. A reliable upgrade	16-bit	•			101



## DAT

**D**AT, 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, this is shown in the LP

mode column.

The optical and electrical in/outputs in the column headings are for digital signals, analogue in/outputs are universal. The AES/EBU and S/PDIF socketry is for connection to professional components and typically DAT machines with this facility have been made for the pro and semi-pro markets.

## DAT

Product	£Price	Comments	LP mode	Electrical in/outputs	Optical in/outputs	AES/EBU in/outputs	S/PDIF in/outputs	Issue No.
JVC XD-21010TN	1050	<b>A+</b> Ambitious but ultimately disappointing deck with an opaque musical delivery and more features than you can shake a stick at	•	•	•	•		111
▲ JVC XD-Z505	620	<b>G</b> Competent middle market DAT with uncomplicated (but still flawed) user interface, but good basic sound quality	•	•		•		105
Kenwood DX-7	500	<b>A</b> Sound quality is pretty fair, but a little rougher than the best of the breed. Controls are good, the display however is poor	•		•			94
Kenwood DX-7030	700	<b>A-</b> Bland sounding deck that lacks low level clarity and imaging. Build quality is good however and ease of use ranks highly			•	•		99
Luxman KD-117	1499	<b>G</b> Slightly soggy, earth-bound sound quality, this model trails the other DAT decks tested so far						63
Panasonic SV-3700	1111	<b>A</b> Slick, powerfully equipped, this pro DAT has a clear, quick and colourful sound somewhat lacking in weight and substance			•		•	111
▲ Sony DTC-55ES	550	<b>G</b> Broadly comparable to a middle ranking CD player sonically, the Sony is particularly well equipped and well priced.						93
Sony DTC-77ES	1000	<b>A</b> Superb engineering, many nice features (including off tape monitoring) but perceptibly slowed, thickened sound	•	•	•	•		105
▲ Sony DTC-M100	799	<b>G+</b> Clean clear sounding second generation model with most of the features and sound of the DTC-1000ES						63
▲▲ Sony TCD-D3	500	<b>G+</b> At the time of writing, this model represents the state of the art, and beats all comers.	•			•		94
Tascam DA-30	1199	<b>A+</b> Interesting pro DAT deck with solid, tangible sound quality which is nevertheless lacking in analysis			•		•	111



## Headphones

**T**here are a variety of different approaches to headphone design. Amongst the more expensive models, electrostatic drivers are used in open-backed phones. The majority of these come with some form of transformer which usually takes the signal from the speaker terminals on the amplifier, but some can run from a pair of tape out sockets.

The more down to earth (see affordable) models feature dynamic, or moving coil, drivers in circular open or closed backed designs. The advantage of open backs seems to be a correspondingly open sound, but one can also of course hear external noises. Closed-back designs are useful in situations where it is necessary to block out background noise, but they aren't gen-

erally as good sonically.

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 feature a flat pad which presses on the outer ear (pinna); and intra-aurals rest inside the ear itself, and are popular with personal stereos.

## Headphones

Product	£Price	Comments	Type	Open back	Closed back	Dynamic	Electrostatic	Issue No.
▲ AKG K1000	500	<b>E</b> One of the best dynamics on the market, hooks directly to speaker outputs and makes much of the competition sound lame	Extra-aural	•	•	•	•	99
AKG K135	33	<b>A</b> The K135s don't live up to the usual AKG standards, though they do have the ability to reproduce rhythm well	Supra-aural	•		•		63
▲ AKG K240 Monitor	60	<b>G</b> Something of a classic, these AKGs are very user friendly in all respects; sonically on the warm side of neutral	Circumaural	•		•		63

# Headphones continued

Product	EPrice	Comments	Type	Open back	Closed back	Dynamic	Electrostatic	Issue No.
▲ AKG K280 Parabolic	90	<b>G+</b> A very revealing and unusual twin driver design that uses the same principle as a satellite dish to beam sound into the ear	Circumaural	•			•	63
▲ AKG K340	140	<b>E</b> Heavyweight cans in most respects, the K340 with its electrostatic tweeter is a very revealing headphone	Circumaural			•	•	75
AKG K44	40	<b>A</b> Good quality personal oriented phone, could have a better sense of space but is musically quite communicative	Supra-aural			•	•	99
▲ AKG K500	119	<b>G+</b> Open and clear, they reproduced music with impressive definition, balance is on the light side but transparency is high	Circumaural			•	•	111
Aiwa HP-X30	31	<b>G-</b> A flashy personal stereo phone which alternatively could be used at home. A slight LF tonal preference colours the response	Supra-aural			•	•	75
▲ Audio-Technica ATH-308	26	<b>A-</b> Small cans with a fairly forward balance which helps perceived clarity but can become wearing over time, good for personals	Supra-aural			•	•	111
▲ Audio-Technica ATH-609	31	<b>A-</b> Warm feeling and sounding with impressive physical substance for the price, could be more relaxed and open	Circumaural			•	•	99
Audio-Technica ATH-611	51	<b>G</b> Same basic design as 609 but bigger thinner diaphragm makes this a more relaxed and informative headphone	Circumaural			•	•	99
Audio-Technica ATH-9000	246	<b>G</b> Electrets which connect to the amps speaker outputs, it sounds a little too smooth but would suit aggressive amps	Circumaural			•	•	111
▲ Audio-Technica ATH-910	70	<b>G</b> The closed-back 910s are an improvement on the 909s with a nice rhythmic quality rarely found with headphones	Circumaural			•	•	55
▲ Audio-Technica ATH-911	80	<b>VG</b> Nicely finished dynamic headphones with all the trimmings, plus a very clean and subtle sound	Circumaural			•	•	63
Beyer DT411	49	<b>G</b> A reasonable but not very thrilling headphone that doesn't really offer enough at the price	Supra-aural			•	•	111
▲ Beyer DT911	179	<b>VG</b> Probably too revealing for many headphone amps these are very subtle and fine if expensive cans	Circumaural			•	•	111
▲ Beyer DT990	102	<b>VG</b> A significant pair of dynamic headphones; they have a smooth and yet revealing neutral sound that is hard to criticise	Circumaural			•	•	55
▲ Beyer IRS690	203	<b>VG</b> High quality infra-red headphones with soft comfy earpads and mellow but informative sound quality which is hard to dislike	Circumaural			•	•	75
JVC HA-D690	40	<b>A</b> Competent but rather undistinctive cans, a bit middle of the road and well suited to aggressive sources	Supra-aural			•	•	111
▲ Jecklin Float Electrostatic	399	<b>E</b> These electrostatics have an openness of sound rarely found in the breed, with good dynamic range to boot	Circumaural			•	•	55
▲▲ Jecklin Float Model One	79	<b>G+</b> Whilst very unusual in appearance, the Floats give remarkable sound quality and openness at a reasonable price	Circumaural			•	•	55
▲ Jecklin Float Model Two	99	<b>G+</b> Helmet shaped and pretty unflattering but open sounding and comfortable in the long term. te lack of adjustment	Circumaural			•	•	63
▲ Sony MDR-CD750	73	<b>G+</b> Reasonably comfortable and eminently listenable these Sonys have characteristically good bass power and relaxed hf	Circumaural			•	•	111
▲▲ Sennheiser HD 480II	50	<b>G</b> t the most accurate cans on the market but amongst the most enjoyable	Supra-aural			•	•	111
Sennheiser HD 540II	100	<b>G+</b> A good but not great headphone that due to its high impedance and efficiency should work well with most sources	Circumaural			•	•	111
▲▲ Sennheiser HD40	20	<b>G-</b> Very light and comfortable headphones with an even sonic balance that will suit most sources. 6.3mm jack	Supra-aural			•	•	75
Sennheiser HD450II	40	<b>G-</b> Makes quite acceptable noises with a variety of outputs, could sound more spacious but is pleasantly relaxed	Supra-aural			•	•	99
▲ Sennheiser HD480 Classic II	60	<b>G</b> 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			•	•	99
▲ Sennheiser HD520	65	<b>G+</b> A very comfortable and musically capable headphone. If you've got this sort of bread to blow on cans, give 'em a blast	Circumaural			•	•	75
▲ Sennheiser HD530	75	<b>G+</b> 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	Circumaural			•	•	75
Sennheiser HD560 Ovation II	120	<b>G+</b> A comfortable and nicely styled headphone that could be more natural sounding at HF, but is detailed and open with good power	Circumaural			•	•	99
▲ Sony MDR-CD1000	150	<b>G+</b> A fine sounding and comfortable headphone that's likely to work well with most sources	Circumaural			•	•	111
▲ Sony MDR-CD3000	300	<b>G+</b> Better than most of the headphone outputs around so hard to make the most of, potentially up there with the electrostatics	Circumaural			•	•	99
▲▲ Sony MDR-CD350	32	<b>G</b> Very impressive, possibly the most open sounding cheap closed back can around, lightweight in balance but transparent	Circumaural			•	•	99
▲▲ Sony MDR-CD550	50	<b>G+</b> A very competent headphone, creates a remarkable sense of space for a closed back design and sounds natural to boot	Circumaural			•	•	99
▲ Sony MDR-R10	2500	<b>E</b> State of the art design built to the highest standards. Sound quality reflects this care, being big, clear, sweet and refined	Circumaural			•	•	72
▲ Stax Gamma pro/SRD-X pro	583	<b>E</b> The Gamma pros are like a stethoscope for your hi-fi, revealing subtleties that many loudspeakers fail to resolve	Circumaural			•	•	63
▲ Stax Lambda Signature/SRM-T1	1370	<b>E</b> The Signature when combined with the SRM-T1 valve driver must be the most transparent headphone available	Circumaural			•	•	72
▲ Stax SR Gamma	219	<b>G+</b> The next model down the Stax range from the Lambda, the Gamma is an excellent headphone with little to criticise but the price	Circumaural			•	•	55
▲ Stax SR Lambda Pro/SRD-7SB	559	<b>G+</b> An industry reference, frighteningly revealing, bringing across more information than loudspeakers costing twice as much	Circumaural			•	•	55
▲ Stax SR Lambda Pro/SRM-1	1020	<b>E</b> Extracts layers of information that other headphones only hint at. The SRM-1 has more edge than the SRM-T1	Circumaural			•	•	75
Stax SR34	140	<b>G+</b> The electret driven SR34s are lively and rhythmic with good tight bass and a sweet midrange	Supra-aural			•	•	55
▲ Stax SR84	210	<b>G+</b> The stepping stone between dynamics and full electrostatics, these electret phones are revealing, open and highly enjoyable	Supra-aural			•	•	63
Technics RP-F3	100	<b>A</b> Robocop styling coupled with a turbo bass switch and an uncomfortable fit, rhythmically OK butno t up to the price	Supra-aural			•	•	111
Yamaha YHD-1	46	<b>G</b> Stylish semi-folding design with a slightly forward balance that very nearly scraped a recommendation	Supra-aural			•	•	111



## 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 small-

ish 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), shown as 'bass from', for the given box size. After that such subtleties as coloration (or lack of it) and dispersion come into the equation.

Careful placement of the loudspeakers within the room is as important as the initial choice of model. See siting columns for guidance. For good stereo they need to be more or less the same distance from nearby walls. Models not ticked as 'floorstanding' will require rigid stands.

## Loudspeakers

Product	EPrice	Comments	Size: HxWxD (cm)	Bass from (Hz)	Site close to wall Sensitivity (dB)	Site in free space Floorstanding	Issue No.
ATC SCM20	1461	<b>G+</b> Massively built, invariably informative but the rather forward presentation can be uncomfortable	44x24x31	28	82	•	86
▲ Acoustic Energy Aegis 1	452	<b>G</b> Rich and slightly heavy balance doesn't mask fine mid/treble coherence and transparency. Entry level for all-metal drivers	39x21x26	28	84	•	118
Acoustic Energy AE1	764	<b>G</b> Amongst the best miniatures around, shows exceptional mid focus and coherence, but is pricey and could be more agile.	29.5x18x25	48	84	•	102

# Loudspeakers continued

Product	£Price	Comments	Size: HxWxD (cm)	Site close to wall	Site in free space	Floorstanding	Issue No.
Acoustic Research P13	219	<b>A</b> Lively good value box has extra bass driver to give plenty of thump, but lacks refinement and extension	51.5x21x23	50	88	•	110
Acoustic Research AR M.5	129	<b>A-</b> Pretty enough but a bit too tiny for its own good, it's better suited to auxiliary surround sound duties	22x16x23	50	88	•	114
▲▲ Acoustic Research AR M1	199	<b>G</b> Cutely shaped miniature delivers splendidly unboxy bass and midrange, but is a little marred by a rather bright treble	27x20x26	30	85	•	110
Acoustic Research AR M2	269	<b>A</b> Not necessarily as agile or well balanced as the cute little M1, M2 is larger, louder and still attractively unboxy	41x24x36	28	89	•	118
▲▲ Allison AL100	100	<b>A</b> Loud and lively budget wall-mount is bigger and beefier than most of the competition, if lacking some subtlety and refinement	33.5x24x21.5	30	87	•	94
Allison AL105	170	<b>A-</b> Pretty enough in appearance, sonically the AL105 doesn't really make the grade at the £150 asking price	37x24x21	45	87	•	78
▲ Allison AL110	220	<b>G-</b> Compact bookshelf model is a little dry and mid forward, but bass is extended and solid	40x24.5x22.5	28	86	•	102
Allison AL120	420	<b>A</b> Pretty well balanced if slightly mid forward, but sound quality is a little disappointing for the price	63x28x27	30	88	•	98
Allison MS 200	220	<b>A-</b> Small and solid as a brick, this micro-miniature has limited bass and bright balance, but sounds agile and communicative	25.5x14.5x15	50	85	•	106
▲ Apogee Caliper Signature	3998	<b>G+</b> Power hungry full range ribbon panels have remarkable transparency and delicacy, loudness and 'grunt' are a bit lacking	122x70x6.5	30	81	•	81
▲ Arcam Delta Two	340	<b>G+</b> Pretty luxury compact sounds a shade forward and coloured but has dynamic and lively bass for its size	37.5x22.5x27.5	40	87	•	94
▲ Audio Note AN-E	1300	<b>G+</b> Lovely coherence, great midband dynamics and transparency, extended bass and high sensitivity — pity it's so darn ugly!	80x36x28	20	91	•	106
▲ Audio Note AN-J	799	<b>G+</b> Light damping and local unevenness adds some coloration, but doesn't spoil the very lively, dynamic and coherent sound	58.5x33x24.5	25	90	•	110
▲ Audioplan Kontrapunkt	899	<b>G+</b> Sounds as sweet as it looks, dressed expensively in real wood with matching stands. not for bass or loudness freaks	31x24x13	48	83	•	86
▲ B&W 2001	120	<b>A</b> Cunningly concealing its (very real) limitations, this is just about the smoothest and best balanced miniature around	29x18x21	48	87	•	118
B&W 610	220	<b>A</b> Bass extension and impressive loudness credentials, but rather indifferent integration and coherence	49x23.5x30	25	89	•	102
▲▲ B&W 620	370	<b>G</b> Has well balanced, laid back and slightly lazy sound that is pleasantly easy on the ears; could do with its own spikes	74x23.5x30	25	89	•	94
▲ B&W DM600	170	<b>A+</b> An impressively smooth overall balance, but sound is a touch bland with it	35x20.5x25	30	85	•	98
▲ B&W Matrix 801	3495	<b>G+</b> Lacks the transparency of the best panels, and the drama of the best dynamics, but is something of an acoustic tour de force	77/99x56x43	<20	86	•	81
B&W Matrix 805	845	<b>G</b> Stylish, with remarkable imaging properties, good balance and low coloration, though less successful at musical communication	42x26x22.5	30	87	•	98
▲ Bose 305	390	<b>G-</b> A bit of an oddball, fine dynamic liveliness and a good room match more than make up for the strange stereo imaging and treble	28x45x23	40	88	•	78
Bose 401	456	<b>A</b> Cheaply built but distinctively styled semi-omni floorstander suffers from heavy midbass but still sounds lively and open	78.5x30x28.5	28	89	•	110
Bose 901 MK6	1496	<b>A</b> The pre-equalised multi-driver 901 is cleverly engineered to deliver exceptional loudness	33x54x32	28	89	•	86
Bose Interaudio 3000XL	170	<b>A-</b> Lots of perceived value and well enough balanced, but low cost engineering results in a crude and unsubtle sound	46.5x29x23	45	89	•	71
Boston HD5	130	<b>A</b> Tiny and prettily shaped miniature has an attractive lack of boxiness, but is a little short of drama and dynamic drive	25x16x18.5	30	86	•	110
Brinkmann Endymion	395	<b>A+</b> Omnidirectional design with rococo styled urn-shaped ceramic enclosure. Distinctly bass light, but impressively coherent	48x29 (diam)	50	85	•	106
▲ Cabasse Bisquine	600	<b>G+</b> Classy French large bookshelf speaker has great coherence and dynamic grip, but a rather mid-forward overall character	48x26x30.5	30	91	•	110
▲ Canon S-30	150	<b>A+</b> Clever and unusual moulded design has attractive lively coherence, along with 'wide imaging stereo' effect	27x22.5x23.5	50	88	•	114
▲ Canon S-50	350	<b>A+</b> Only a small cone miniature at heart, the fascinating styling and extended sweet spot feature make it utterly original.	30x24(diam)	48	84	•	102
▲▲ Castle Chester	650	<b>G+</b> A brilliant throwback, using horn-type approach to provide startling midrange dynamics and coherence.	94x23x27	45	87	•	98
Castle Durham	250	<b>A</b> Like the slightly larger York, the very pretty presentation is not reflected in a similarly sweet sound	40x22x24	48	88	•	118
▲ Castle Pembroke	400	<b>A+</b> Comfortably recommended, a sweet smooth sound with good overall balance of engineering-based performance	55x37.5x30.5	46	88	•	31
▲ Castle Trent	169	<b>A</b> This miniature wall-mount sounds lively and engaging, if a bit rough at the top.	33.5x18x20	50	88	•	102
▲ Castle Winchester	1499	<b>G+</b> Unconventional and beautifully crafted, large for its bass extension but engagingly agile and attractively open and airy	114x24x47	25	87	•	90
Castle York	340	<b>A+</b> Pretty little real wood compact has an engaging transparency, good balance and fine timing, could do with more authority	43x22x26	30	86	•	110
▲▲ Celestion 1	109	<b>A</b> Pretty basic performance but at a very basic price — it all sounds a bit scrappy and untidy, but its heart's in the right place	27.5x16x21	50	87	•	114
▲ Celestion 15	389	<b>G</b> Big box and bang for your bucks, short on subtlety and control, but long on both enthusiasm and perceived vinyl wood grain	103x20.5x25.5	28	90	•	114
▲ Celestion 3	129	<b>A</b> Good balance and stereo imagery, with a character which leans more towards offensiveness than excitement	31x18.5x21	55	86	•	78
Celestion 5	169	<b>A</b> Cunningly conceived and balanced, the 5 may be a little slow for some tastes, but is well suited to CD-oriented budget systems	35x20.5x26	30	89	•	90
▲ Celestion 6000	1510	<b>G+</b> A genuine full range audiophile quality speaker system — with Star Wars styling to suit a high tech environment	Two box system	30	82	•	C92
▲ Celestion 7	219	<b>A+</b> Good looking large bookshelf size wall-mount has lively up front presentation. Can sound a bit coarse, stand is critical	45x24.5x32	30	87	•	98
Celestion 9	269	<b>A</b> Nicely presented and fair material value, with impressively flat bass-to-mid balance	49.5x20.5x24	30	89	•	102
Celestion SL12Si	629	<b>A</b> Elements of fine sound quality, but this 'grown up' SL6 variation has a lumpy response alongside its improved power handling	53x20x27	50	85	•	66
Celestion SL600Si	820	<b>G</b> Has certain remarkable qualities that some will find irresistible, but needs careful system and room matching	27x20x23	52	82	•	68
Celestion SL6Si	429	<b>A+</b> This stereotype luxury compact can sound a bit dull and congested, but really opens up on Slate Audio stands; favours CD	37.5x20x25	30	86	•	94
Celestion 300	1100	<b>G</b> Splendid bass extension and fine panel-like openness and transparency, but dynamics and timing are suspect, balance very laid back.	100x21x31	<20	86	•	118
Creek CLS 10	119	<b>A</b> Almost identical to the Goodmans Maxim 3, this neat miniature is very competently engineered, but not desperately exciting	26x17x21	50	85	•	114

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TARGET, TEAC, ETC.

## Loudspeakers continued

Product	£Price	Comments	Size: HxWxD (cm)	Site close to wall Bass from (Hz)	Site in free space Sensitivity (dB)	Floorstanding	Issue No.
Dali 102	230	<b>A</b> Attractive bookshelf model has fine midband focus and bass extension, but treble's a bit restrained and bass a bit detached	37x21x25	30 86		•	114
Dawn Chorus FS	698	<b>G</b> Compact floorstander with superb coherence but rather forward midband. Would suit smaller rooms best	91x26x21	30 86		• •	114
▲ Diamond Acoustics Reference III	895	<b>G+</b> Lovely free stander suffers from indifferent bass alignment, but is fast, coherent, solid and very informative indeed.	87x27.5x28	30 90		•	106
▲▲ Epos ES11	350	<b>G+</b> Integral baffle/driver to give a remarkable combination of low coloration, transparency and speed; bass is a bit shy	37.5x20x25	45 86		•	94
▲ Epos ES14	515	<b>G+</b> Substantial stand mount delivers delightful midrange focus and delicacy with good bass control. System sensitive	49x22.5x29	25 85		•	98
▲ Faraday FS1	225	<b>A+</b> Concrete box on a budget, works surprisingly well despite cheap drivers, wood veneers here Direct sale only	47x27x28	45 86		•	114
Faraday FS5	589	<b>G</b> Pricey and ugly, but with its own sonic charm, thanks to substantial influence of the concrete enclosure has upon the sound	46x27x26	28 90		•	102
Faraday Siren	330	<b>A-</b> Interesting if ugly high mass concrete cabinet is let down by imbalance of ageing driver combination	46x27x27	48 87		•	94
Genexa SE100	150	<b>A</b> Tandy-stocked miniature is attractively lively, coherent and communicative, could do with more grunt and lower coloration	28x15.5x19	50 84	•		110
▲ Goodmans Maxim 3	110	<b>A</b> Smooth and accomplished wall-mount miniature makes a worthy replacement for the bestselling Maxim 2	26x17x21	50 85	•		106
Harbeth HL Compact	584	<b>A</b> Clean, neutral sound lacks resolution and gives rather unobtrusive though well differentiated stereo.	52x27.2x28.1	65 87		•	59
Harbeth LS3/5A	379	<b>A</b> Still a classic miniature, though not to every taste, and none the better for the recent update under our listening conditions	30.5x19x16	60 81		•	66
▲ Harbeth HL-P3	400	<b>G</b> Very limited loudness but impressive full-range scale from uncoloured and very well balanced but time-smearing sub-miniature	31x19x17	23 82		•	118
Heco Presto Superior 750	650	<b>A</b> Tall slim and attractive floorstander delivers a fine, even in-room balance but lacks transparency, coherence and dynamic drive	95x24x27	22 87		•	106
Heco Reflex 10	160	<b>A</b> Nicely balanced small bookshelf is a competent rather than exceptional package for the price, thanks to indifferent build.	32x21x23	30 90		•	102
▲▲ Heybrook HB1 S3	250	<b>G</b> Latest version of long established favourite delivers good liveliness and fine coherence for the price	47x29x24	30 88	•		98
▲ Heybrook Prima	120	<b>A+</b> Neat and discreet miniature delivers fine coherence, pace and timing, though balance is a trifle forward and bass a bit light	29x19.5x18	50 86	•		110
▲ Heybrook Sextet	1079	<b>G+</b> Engagingly coherent and a highly analytical, partly due to distinct and t always comfortable upper-mid forwardness	96x27x20	25 85	•	•	102
▲ Heybrook Solo	170	<b>A+</b> Discreetly styled, sounds a little untidy in both bass and treble but handles complex rhythmic material much better than most	36x23x22	28 87	•		90
▲ Heybrook Trio	349	<b>G</b> Same drivers as HBS1 in prettier real wood enclosure give a sweeter and more forgiving if less committed sound	47x24x25	45 89		•	118
Infinity Modulus	795	<b>A+</b> Carefully conceived and beautifully built. Undeniably attractive in the mid and treble, it failed to handle the bass as well	30x18x26	45 84	•		86
▲ Infinity Reference 10	180	<b>A</b> An engaging and lively sound from a prettily finished and substantial small bookshelf size model	36x23x23	50 87	•		98
Infinity Reference 20	230	<b>A</b> Well presented and balanced with good bass control, but somehow lacks convincing cohesion and agility.	46x27x24	27 88		•	102
▲ Infinity Reference 30	330	<b>G</b> Drivers from Ref 20 in box from Ref 50 creates a well balanced and extended floorstander at a very competitive price	85x26.5x25	25 87		•	106
Infinity Reference 50	550	<b>A-</b> Despite hi-tech drivers, good bass extension and sensitivity, this three-way suffers from a forward, coloured sound	86x26.5x25	25 89		•	98
JBL Control 1 Plus	250	<b>A</b> Sub-miniature with forward midrange and real bass; highish price partly justified by near-indestructible Pro build	23x15.5x14	50 89	•		90
JBL ti1000	1500	<b>G</b> Ultra-engineered, beautifully crafted bookshelf model. Performance compromised by over enthusiastic midbass output from port	44x30x28	45 89		•	118
▲ JPW AP2	180	<b>A</b> Offers real wood veneer at a bargain price; performance is cleaner but broadly comparable to P1 Vinyl overall	43.5x25.5x26	45 86		•	106
▲ JPW AP3	225	<b>A+</b> Pretty good stereo and well balanced overall it had its own character which is well suited to vinyl replay	52x25x29.5	57 90	•		46
▲ JPW Minim	79	<b>A-</b> Very civilised but dynamically limited, the Minim is well suited to the smaller room and where limited loudness is acceptable	27.5x18x19.5	28 85	•		82
▲ JPW P1	155	<b>A+</b> Honest and basically articulate if not very sophisticated, resolution is good but can sound a little wearing in bright systems	44x25.9x26.1	60 89		•	59
▲▲ JPW P1 Vinyl	135	<b>A</b> A lot of highly competent loudspeaker for the price, with a safe sound that's unlikely to disappoint.	43.5x25.5x26	32 87		•	102
▲▲ JPW Sonata	115	<b>A+</b> Well balanced and integrated, offers fine sound if limited bass and dynamic range, plus real tree wood at a nearly silly price	32x23x20	55 86	•		71
JPW Sonata Plus	135	<b>A-</b> This luxury variation on the redoubtable Sonata theme features a metal dome tweeter, and isn't the better for it	32x23x21	30 87		•	90
▲ JRT AD1	500	<b>G+</b> A fair share of cosmetic deficiencies do little to spoil the impressive coherence and timing	59.5x28x36	28 86	•		86
▲ JRT AD1 Micro	389	<b>G</b> Delightful life and coherence, gives surprising impression of scale; some aggressive tendencies but very open to system tuning	28x17x21	50 87	•		94
Jamo Concert II	330	<b>A-</b> A respectable 'bookshelf' performer that needs free space siting but includes attractive cabinetwork and a neat grille	41x24x25	48 85		•	66
Jamo Concert V	500	<b>A</b> Compact, solid, nicely finished delivers unusually extended bass at the expense of lowish sensitivity; midband is laid back.	86x24x28	20 85		•	102
Jamo Concert VII	800	<b>A</b> Beautifully built, uses unusual double reflex bass system, unsuccessfully as far as low frequency resolution is concerned	96x28x31.5	25 87		•	94
▲ Jamo Cornet 50	150	<b>A+</b> Good value bookshelf size speaker has a rough and ready sound but good heart, engaging liveliness and fair timing	42x23x22.5	28 87		•	110
Jamo Silhouette	400	<b>A+</b> Tall, slim and rather elegant in its way, doesn't sound bad for a styling exercise, just a bit rich and polite	122x24.7x17	45 88		•	114
▲ Jordan JH400	504	<b>A+</b> Piano finish hexagon has single full range driver and controversial sound, with uneven balance but delightful mid coherence	33x24x30.5	50 83		•	106
KEF 101/2	549	<b>G-</b> Small high class wall-mount has a beautifully even, slightly dull balance, fine freedom from boxiness, but not much bass drive	33x26.5x26	50 86	•		114
▲ KEF 104/2	1495	<b>G+</b> A reference point for dynamics, preferred without KUBE, suited to many rooms. Good stereo, high sound level	90x28x41.5	50 92		•	60
KEF K120	169	<b>A</b> Physically pretty and sonically competent but undistinguished bookshelf size model has good sensitivity but limited extension	34x20.5x26	45 87		•	106
▲ KEF Q80	549	<b>A+</b> Uni-Q floorstander has good stereo and fine midband coherence, but bass lacks extension, drive and resolution	85x24.5x26.5	45 87		•	106
KEF Q90	700	<b>A</b> Generous floorstander has even balance and decent extension but fails to communicate excitement and involvement effectively	90x25x32	25 88		•	118



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## Loudspeakers continued

Product	Price	Comments	Size: HxWxD (cm)	Site Sensitivity (dB)	Site close to wall	Floorstanding	Issue No
Kammerzell Ref Mini Monitor	425	<b>G</b> A beguilingly sweet sound with good pace and drive, but scale is restricted and presence a little dulled considering the price	27x17x24	50	85	•	94
▲ Kenwood LS-770E	260	<b>G</b> Impressively communicative bookshelf model has fine vigour, scale and dynamics, if not the smoothest sound around	48x27x25	25	89	•	106
▲ Kenwood LS-500G	500	<b>G</b> Japanese designed and built luxury compact delivers an invigorating and exciting sound; an interesting contrast to some lazier models	45x23x26	48	89	•	118
▲ Linn Index II/KuStone	374	<b>G</b> Stand and speaker looks and sounds very good, good bass extension and control, fine dynamic range. Clean, clear if a shade slow	44x21x23.5	28	86	•	90
▲ Linn Kaber	1198	<b>G+</b> Dry, bright balance emphasises superb dynamic range and transient precision, but can sound unforgiving	89x19x29	25	85	•	118
Linn Kan II	530	<b>A+</b> Niche product for those prepared to tolerate its strong character for the sake of fine bass performance and near invisibility	30.5x18.5x16.5	35	82	•	78
▲ Linn Keilidh	579	<b>G+</b> Stunning timing and coherence and awesome bass drive, especially with ceramic plinth; sounds a bit shut in	83x20x27.5	22	87	•	114
▲ Mordaunt-Short 5.40	299	<b>G</b> Elegant near-floorstander has an even balance that makes it very easy on the ears, yet also inviting and informative	64x21.5x26.5	28	85	•	110
▲ Magneplanar MG1.4	1090	<b>G+</b> Offers a very crisp and articulate sound, particularly revealing of upper mid vocal details	155x8x57	40	88	•	72
Magneplanar SMGa	688	<b>A</b> Tonally 'rich', in the right room it proved a satisfactory musical experience	122x48x4.5	56	85	•	46
Marantz DS110	200	<b>A+</b> Pretty near-miniature trades bass extension for sensitivity, delivering fine midband dynamics but little grunt	33x19.5x20.5	55	88	•	114
▲ Martin Logan CLS II	4200	<b>G+</b> High resolution design, fussy about system set-up, demanding of ancillaries and software alike. It rewards the efforts though	60x28x7.5	45	86	•	72
Meridian Argent 1	995	<b>G+</b> Beautifully built, finished and shaped, has fine bass extension and virtual absence of 'boxiness'; needs a big amplifier	33x27x27	28	83	•	98
Meridian Argent 2	875	<b>G</b> Beautiful high-tech 'large compact' delivers extended, smooth and neutral sound with fair speed. Slate Audio stands essential	48.5x21x29.5	23	85	•	94
Meridian M30	950	<b>A</b> Pricey active speaker, easy on the ears and worth considering especially where space is at a premium	38.5x18x32	40	NA	•	46
▲ Mission 753	700	<b>G+</b> Gorgeous presentation and potential for open transparency. Floorstander with lots of drivers that gives lots of loudness	90x22x30.5	45	88	•	114
▲ Mission 760i	130	<b>A+</b> Attractive little wall-mount miniature has livelier dynamics and bass drive than most of its type, but sounds as little shut in	29.5x18x20	48	87	•	110
Mission 761i	180	<b>A</b> 760 theme adds an extra driver for easier amp loading and power handling. Slightly inferior to simpler, cheaper 760i	38x19x24	48	88	•	102
Mission 764i	480	<b>A</b> Generous and handsome floorstander looks fine material value for money, but good scale sound has lazy tendencies	89x25x32	22	86	•	118
Mission 765i	680	<b>A+</b> Big heavyweight floorstander has good sensitivity and bandwidth, but somehow lacks agility, authority and dynamic grip	102x25x33	22	91	•	110
▲ Mission Cyrus 780	200	<b>A+</b> Pretty miniature based on Mission 760 but with beefed up box and crossover network to enhance sound quality still further	29x18x26	50	88	•	90
▲ Mission Cyrus 781	250	<b>G</b> Properly run in, the pretty little 781 delivers a fast, dynamic and informative sound which more than justifies its price.	43x22.5x28	28	88	•	86
Monitor Audio MA1800	1350	<b>A+</b> Even when ballasted with lead shot the 1800 inclines towards upper bass richness and lacks genuine extension	106x22x32	30	88	•	81
Monitor Audio MA700 Gold	400	<b>A</b> Luxury compact does a good job of voice reproduction, but sounds a bit lazy and off the tempo with faster, busier material	35x21.5x25	50	85	•	110
Monitor Audio MA800	600	<b>G</b> Beautifully finished compact has a delightfully even and uncolored midband transparency, sensitivity and bandwidth are limited	51.5x20x27.5	45	85	•	114
▲ Monitor Audio Monitor 11	330	<b>G</b> Tall, slim and attractive compact has an extra driver to help out in the bass, giving extra urge at some price in delicacy	52x20x24	48	87	•	94
Monitor Audio Monitor 14	400	<b>A</b> Suffers from excess upper bass, giving a thick, chesty coloration beneath a quite lively and well focused mid and treble	78x20x24	30	86	•	98
Monitor Audio Monitor 7	180	<b>A</b> Lively and punchy, looks pretty enough and is good value but is let down by an unruly and indifferently integrated tweeter	34x16.5x17	70	84	•	74
Monitor Audio Monitor 9	210	<b>A</b> Despite a much better treble balance than the 7, the 9 is less engaging and lively at low frequencies than its smaller sibling	37x20x21	30	85	•	78
▲ Monitor Audio Monitor One	150	<b>A+</b> Pricey but cute micro-miniature just about gets away with it sonically, though performance envelope is inevitably limited	24x15x16	55	85	•	106
Monitor Audio Studio 10	1200	<b>A+</b> All-metal driver diaphragms provide engagingly transparent midrange and treble, spoiled by over-strong mid-bass.	40x20x25	45	87	•	90
▲ Monitor Audio Studio 15	1600	<b>G</b> A little slow and lazy but better balanced than the smaller Studio models, the midband coherence and focus is superb	51x20x26	45	87	•	102
Monitor Audio Studio 5	650	<b>A+</b> All metal diaphragm luxury miniature has splendid presence coherence but sound can be aggressive and lacks welly.	32x18x20	28	83	•	98
Monitor Audio Studio 6	800	<b>A+</b> Pretty but pricey metal diaphragm compact has clear and transparent midband but is ultimately lacking in vim, vigour and drive.	35x22x25	45	86	•	118
Mordaunt-Short 5.10	130	<b>A</b> Plenty of well engineered speaker for the money, and smoother than most of the competition, but lacks timing and enthusiasm	30.5x18.5x21.5	50	85	•	110
Mordaunt-Short 5.20	150	<b>A</b> Lots of speaker for your money, but not as smooth or well balanced as other M-S 5-series models	36x21.5x21.5	45	87	•	114
Mordaunt-Short 5.30	220	<b>A-</b> Good hi-tech material value for money, but a disappointingly dull and rather bland sound. Safe but uninspiring.	42.5x25x28	28	86	•	106
Mordaunt-Short Classic 20	395	<b>A+</b> Luxuriously finished, beguiling mid transparency, bass is altogether less convincing	37x22x27	45	86	•	102
Morel Bassmaster 602	1200	<b>G+</b> Superbly built compact stand-mount, did well in listening tests but suffers (enjoys?) upper midband peak	24.5x40x22.5	25	84	•	114
Musical Fidelity MC-3	400	<b>A+</b> Solid and authoritative large bookshelf model gives fine stereo and decent dynamic drive but balance is rather shut in	47x26x28	25	88	•	118
▲ NVA Cube 1	720	<b>G+</b> Attractive, semi-omni is very sturdily built, and gives an idiosyncratic but unusually open, spacious and informative sound	33x32x32	52	85	•	71
▲ NVA Cube 2	480	<b>G</b> A rude but exciting miniature, with unusually accomplished bass capabilities for its size	28.5x27x28.5	48	85	•	82
NVA Cubix	1400	<b>G</b> Too idiosyncratic for recommendation, the Cubix possesses remarkable bass extension for its size, but is tricky to optimise	60x32.5x32.5	28	84	•	78
Naim NA IBL	823	<b>G</b> This tiny floorstanding wall mount delivers outstanding dynamics, speed and detail, marred by pronounced upper mid forwardness	80x18x15-20	30	84	•	94
▲ Naim SBL	1584	<b>G+</b> Impressive scale, full bandwidth, coherent, attractively discrete, coloured midband, very well balanced and agile	88x26.5x17-27	25	86	•	102
▲ Neat Petite	525	<b>G</b> Far from perfect, but one of the most entertaining and enjoyable speakers around, colorations notwithstanding.	30.5x20x18	33	86	•	102
Nobis DM7	560	<b>G</b> Pretty US bookshelf model has more than enough speed, timing and coherence to make up for a measure of coloration	38x21.5x28.5	25	85	•	110
Origin Live OL1	499	<b>G</b> Luxury miniature has very good overall balance, sacrificing sensitivity to achieve remarkable bass extension for the box size	30.5x19x21	25	82	•	106
Philips FB820	470	<b>A</b> Big-but-less-than-beautiful three-way is well enough balanced but lacks communication skills in the time domain	86x27x35	28	87	•	98
▲ Philips FB825	700	<b>G</b> Generous sounding and impressively uncongested, loudness and bass extension don't quite match plasticky looks	110x29x41	25	88	•	90
▲ Pro Mon Co LB1	998	<b>G+</b> Delightful smoothness and transparency, though bass extension and sensitivity are both limited	53.5x18x26	33	86	•	110
Professional Monitor Co AB1	1600	<b>G</b> Bulky stand-mount transmission line has lovely panel-like transparency, slightly shut in balance, and needs a big room	79x27x43	22	89	•	114
QLN Model One	700	<b>A</b> Model One exaggerates the Signature's rich and heavy midbass and lacks its velvet smoothness	35x25x27	28	85	•	82
QLN Signature	1100	<b>G</b> Luxury compact has a rather laid back and 'heavy' sound, but coloration is low and stereo imaging very good	37x18x36	30	83	•	78
▲ Quad ESL-63	2384	<b>G+</b> This classic electrostatic may not be punchy in the bass, but has strengths that some can't live without	92x66x27	34	84	•	60
▲ Rega ELA	405	<b>G</b> Very compact floorstander with integral stand has serious coherence and dynamics, but a measure of brightness and untidiness	84.5x20x30	30	86	•	110
▲▲ Rega Kyte	198	<b>G</b> Has splendid timing and coherence, sounds very explicit and informative, if a bit bright and short of grunt	31x19x20	50	87	•	114
Richard Allan CD5	176	<b>A-</b> Neatly presented small reflex design can sound engagingly communicative, but is flawed sonically and technically	38x19x23	80	88	•	68
▲▲ Rogers LS2a/2	220	<b>G</b> Balance is a bit warm and rich but 2a/2 has delightful mid-to-treble coherence and transparency, and more welly than Mk1	35.5x23x22	30	84	•	106
Rogers LS4a/2	300	<b>A+</b> Civilised but a trifle lazy, this large bookshelf model hasn't quite the timing or agility to be particularly engrossing	43x25.5x25.5	25	86	•	110
Rogers LS6a/2	350	<b>G</b> Largish stand-mount is well built, measures well, good material value, but sounds a bit heavy and lacklustre	51x28x29.5	22	87	•	114
Rogers LS8a	450	<b>A+</b> A mixed bag, with plenty of scale and welly but lacking the subtlety, clarity and agility delivered by some rivals	89x25.5x25	48	91	•	102
▲ Rogers Studio 3	450	<b>G</b> Pricey LS3/5A-derived wall-mount sub-miniature is excitingly coherent if a bit lightweight, no real loudness capabilities	31x19x17	30	83	•	118
▲ Rogers Studio 1a	599	<b>G-</b> Classic BBC monitor sound sensitively updated – transparent and natural with fine stereo, but a touch 'heavy' in balance	63.5x30.5x30.5	36	87	•	66
▲ Roksan Darius	1895	<b>G+</b> Provides an exceptionally impressive combination of transparency and delicacy with fine information retrieval and speed	47x27x40	20	82	•	86

# Loudspeakers continued

Product	Price	Comments	Size: HxWxD (cm)	Site in free space	Site close to wall	Site in free space	Floorstanding	Issue No.
	£			Sensitivity (dB)	Bass from (Hz)			
▲ Roksan Darius	1895	<b>G+</b> Provides an exceptionally impressive combination of transparency and delicacy with fine information retrieval and speed	47x27x40	20	82		•	86
Royd Topaz	173	<b>A+</b> Cheerful, articulate and essentially communicative miniature can also sound a trifle scrappy and shut in; well worth trying	30.5x20.5x19	50	87		•	114
Royd Abbot	666	<b>A+</b> Engaging and dramatic dynamics and fine transient coherence are hampered by a rather coloured mid-forward balance	83x20x34	43	88	•	•	118
Ruark Swordsman Plus	299	<b>A</b> Real wood variation on the Swordsman theme looks and measures rather better than it sounds	38x20x28	27	84		•	98
▲ Ruark Talisman 2	700	<b>G</b> Less ideologically committed than some compact floorstanding rivals, its key strength lies in fine all round compromise	86x25x31	30	86		•	118
SD Acoustics Ribbon	2295	<b>G+</b> Amplifier sensitive, Ribbon is a lively and loud hybrid marred by some colorations; some like it, others don't	152x30x(15-30)	30	91		•	81
▲ SD Acoustics SD1	1650	<b>G+</b> A large scale, airy and unusually detailed system with excellent dynamics. A warmer balance than original model	123.5x38.2x32	50	90		•	60
▲ SD Acoustics SD3	399	<b>G</b> Port firmly blocked, the new SD3 has the agility and charm of a quality miniature, with good bass extension but low sensitivity	38x19.5x29	25	83		•	106
SD Acoustics SD4	699	<b>G</b> Tall slim floorstander has fine balance, good bass extension and lovely open midband transparency	100.5x20x30.5	25	85		•	114
Sequence 30	200	<b>A</b> Radical slimline hang-it-on-the-wall design has performance comparable to a typical miniature, with reasonable overall balance	87x25x7	50	85	•	•	114
Shahinian Arc	1062	<b>G</b> Unusual and occasionally wonderful small floorstanding omni; too bright but exceptionally coherent and revealing	69x35x25	24	85		•	110
Snell Jill	770	<b>G</b> Dated styling belied by fine sensitivity and bass extension, and a lively if slightly untidy and not quite coherent sound	58x33x25	30	89		•	118
▲ Sony APM-101ES	120	<b>A</b> Big hearted sound from small bookshelf model, sounds a little untidy at frequency extremes, so suits CD better than vinyl	39.5x22.5x23.5	52	86		•	71
Sony APM-121ES	170	<b>A-</b> Good perceived value, but balance has an artificial 'loudness', too rich in the bass and too strong in the treble	43x25x28	25	86		•	86
Sony APM-181ES	350	<b>A</b> Big, beefy, fat and bass heavy, has table strengths but lacks transparency and sounds better at lower levels	57.5x29x36	40	87		•	71
▲ Spendor S20	535	<b>G</b> Maintains Spendor's tradition for peerless mid-to-treble coherence and perspectives. Bass is rather unconvincing.	38x22x26	25	83		•	102
Spica Angelus	1295	<b>A</b> A little bass shy and soft in the bass and lower mid, otherwise tidy, extremely lively and fluid, if uneven overall	116.8x53.3x26	50	86		•	60
Spica TC50	599	<b>G</b> This triangular-profile 'grown up' miniature is a shade boxy and laid back but has good rhythmic and musical integrity	40.5x33x29	55	88		•	71
Spica TC50SE	799	<b>G</b> A heavily UK-modified TC50, the SE sounds less boxy and more spacious, but lacks some of the urgency of the standard model	40.5x33x29	55	88		•	71
▲ TDL Monitor	1999	<b>G+</b> Fine solidity and good accuracy, with great bass extension. Needs a big room and can sound a bit lazy and a shade tinkly	118.5x30x47	28	85		•	66
TDL Studio 0.5	450	<b>G</b> Tiny floorstanding transmission line has good agility but doesn't provide the coherence or even balance of Studio 1	55x20x30	40	85		•	94
▲ TDL Studio 1	650	<b>G</b> Genuinely extended bass from a compact enclosure, very detailed but a shade clinical and detached in presentation	76x23x33	25	84		•	78
▲ TDL Studio 1M	900	<b>G+</b> Transmission line helps bring the best from metal cone driver: lovely transparency and fine bass extension	81x23x33	<20	84		•	118
▲ Tannoy 603	125	<b>A+</b> Pretty hexagonal cabinet delivers fine imaging with little boxiness, but little in the way of welly and power either.	33.5x22x16	45	85		•	102
▲ Tannoy 605	160	<b>A+</b> Largish bookshelf size hexagon is potentially fine performer, though unusual stand sensitivity makes optimisation difficult	40x27.5x18	25	85		•	106
Tannoy 605LE	189	<b>G</b> Mass-loaded audiophile variation of 605 sounds lively, with decent weight and timing	40x27.5x18	30	87		•	114
▲▲ Tannoy 607	200	<b>A+</b> Modest and pretty hexagonal box helps give fine bass and mid performance, but treble is rather shut in	50x32x23	25	88		•	118
▲▲ Tannoy 609	270	<b>G</b> Hexagonal cabinet and dual concentric driver is sweeter than its predecessors, making this one very superior speaker	50x32x22	25	90		•	102
Tannoy 611	399	<b>A</b> This compact floorstander would seem to have plenty going for it, but somehow failed to get musically	72x32x24	25	92		•	110
▲ Tannoy Westminster	6000	<b>G+</b> These awesome horn loaded speakers are remarkably controlled and impressive, if only suited to a few pockets and rooms	Huge	38	96	•	•	Col
Technics SB-EX2	180	<b>A</b> Nicely presented, well built and decent size enclosure sounds solid but somewhat dull	48x23.5x27	20	86		•	98
▲ Technics SB-RX50	650	<b>A+</b> A smooth and well balanced loudspeaker, its minor weakness being a mildly excessive low bass	48x30x26	40	86		•	46
▲ Thiel SCS	1069	<b>G+</b> Luxury piano-gloss compact sets class-leading standards for coherence and communication, can sound a shade dark and shut in	40x22x23	45	87		•	114
Thiel CS1.2	1219	<b>G</b> Elegant compact floorstander has fine balance and dynamic range, but transient timing and dynamics are less convincing	94x27x27	30	86		•	118
Vandersteen Model One	1395	<b>G+</b> This compact American floorstander's elegant staggered baffle arrangement contributes to a refreshing freedom from boxiness	100x30.7x25.6	23	87		•	86
Visonik David 6001	173	<b>P</b> Sharp styling but the complex grillework worsens a sound which starts off with too much top and not enough bottom	20x12x13	130	87	•		74
▲ Wharfedale 425	200	<b>A+</b> Large bookshelf size 505 heir shows fine control and a conservative balance ideally suited to quality systems on a budget	40x27x26	45	87		•	118
▲ Wharfedale 515	260	<b>G</b> An update on the 505 theme, this is still more evenhanded, with better bass extension and smoother treble.	40x25.5x30	28	85		•	106
Wharfedale 517	400	<b>A</b> Half as big again as the 515, should offer an improvement, but somehow has a less effective overall subjective balance	53x26.5x34	25	86		•	110
▲▲ Wharfedale Delta 30.2	100	<b>A</b> Has a bigger main driver than many, and so packs a bit more welly and loudness. Coloration is rather obvious, but timing is good	38x22x17	48	88	•		98
Wharfedale Diamond V	130	<b>A</b> This miniature is smoother than most, but rather stodgy with it, inspiring little enthusiasm among our listeners	27x18x20	50	86	•		114
▲ Yamaha NS 1000M	1100	<b>G+</b> Living up to its monitor label, and tonally well suited to digital material, it's superbly crafted and capable of high levels	67.5x37.5x32.5	40	90	•		46
▲ Zyp A1	199	<b>A+</b> Cute metal cased micro-miniature is quite coloured but great fun, with surprising dynamics and fine wall-loaded room balance	22.5x14.5x13	30	85	•		110

## 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, combining the skills of RF (reception) and audio (signal processing) engineering. The importance of the former will depend on local reception conditions, but money invested in a high quality outside aerial system is well spent.

Tuners come in two basic types. Analogue models tune gradually (and usually manually) across the bands, and can have analogue or digi-

tal displays; they are often preferred for sound quality, and are certainly best for AM bands. Digital tuners offer convenient automatic tune facilities and pre-set memories.

The 'Presets' column heading shows how many different frequencies a tuner can memorise for instant access. FM, LW and MW show which wavebands it can access. 'Signal strength meters' are useful for aerial alignment. 'Automatic tuning' means that a tuner can seek out signals for you.

## Tuners

Product	Price	Comments	Presets	FM	LW	MW	Signal strength meter	Automatic tuning	Manual tuning	Issue No.
Aiwa XT-003	110	<b>A-</b> Economically designed and built in the UK, but trade-offs have a marked influence on FM and AM sound quality.	30	•	•	•	•	•	•	93
▲ Akai AT-93L	280	<b>G+</b> By AM standards presentable (good) while FM delivers the goods	20	•	•	•	•	•	•	65

# Tuners continued

Product	£Price	Comments	Presets	FM	LW	MW	Signal strength meter	Manual tuning	Automatic tuning	Issue No.
▲ Arcam Alpha 2	185	<b>A+</b> Arcam's cheapest tuner makes up for its lack of features with a sensitive front-end and mellow sound.		•			•	•	•	93
Arcam Delta 280	350	<b>G+</b> Fine sound quality marred by mild synthesiser whine; RF performance only average, remote £60 extra	20	•			•	•	•	120
▲ Audiolab 8000T	700	<b>VG</b> Unusually combines fine sound quality and RF performance (inc AM); superb ergonomics are a joy to use	39	•	•		•	•	•	120
Aura TU-50	260	<b>G</b> Tonally neutral, but with rather poor imaging and a certain woodenness to the sound.	16	•					•	109
Creek T40S3	250	<b>A</b> Analogue tuner. Sample was hampered by an obvious bass 'hump', production units are said to be cured		•					•	93
▲▲ Denon TU-260L	120	<b>G+</b> Bare minimum of features. Careful designwork promises a surprisingly open and vivacious sound, so don't overlook it!	20	•				•	•	93
▲ Denon TU-580RD	220	<b>G</b> Fine feature package including remote and RDS, plus excellent RF performance and decent sound quality	30	•			•	•	•	120
Harman Kardon TU9200	200	<b>A</b> The listening panel appreciated its liveliness, but found it a little muddled.	32	•			•	•	•	109
▲ Harman Kardon TU9400	270	<b>G+</b> Striking in appearance and with a sound to match, it comfortably exceeded our expectations. On stereo FM it's HK's best yet.	24	•			•	•	•	93
Harman Kardon TU9600	380	<b>G</b> Good bass and detail, and good - perhaps slightly enhanced dynamics	24	•			•	•	•	109
Kenwood KT-3050L	170	<b>A</b> Excellent RF performance and plenty of features including RDS, but did sound rather ordinary under our conditions	39	•	•		•	•	•	120
▲ Linn Kremlin	1779	<b>E</b> Controversially good sound at a very high price. The reviewer's saving up but you should check it out for yourself	80	•				•	•	120
▲ Magnum Dynalab FT101	795	<b>G+</b> Although expensive for its fairly minimum set of facilities, its excellent sound makes up for what it lacks elsewhere		•				•	•	72
▲ Marantz ST-40L	120	<b>G</b> Slow to tune but provides a meaty and dynamic sound on FM. AM too has a little extra bite to its performance	30	•	•		•	•	•	93
Meridian 204	660	<b>G</b> Pleasant sounding with a fine finish but does not make the grade at this price	18	•				•	•	55
Meridian 604	1350	<b>VG</b> Unique digital convertor makes most sense in Meridian system context; smooth sweet sound with fine front end	30	•				•	•	120
▲ Naim NAT 01	1425	<b>E</b> There may be better sounding tuners in the world, but we have yet to hear one		•					•	50
Nakamichi ST-7E	765	<b>G+</b> Exceptionally good for weak-signal areas, and good all round	16	•	•			•	•	55
▲ Pioneer F-676	200	<b>VG</b> A tuner that's detailed and clean-sounding. Perhaps a little bright, but not unpleasant.	36	•			•	•	•	108
▲ Quad FM4	424	<b>G+</b> Fine sound, excellent ease of use, good build and finish and a more than satisfactory technical performance	7	•				•	•	50
Quad 66	519	<b>G+</b> Very pretty and compact but technically unadventurous. Smooth sound but only makes sense in Quad system context	19	•				•	•	120
▲ Rotel RT-930AX	160	<b>G-</b> A competent rather than exciting performer, with low audible interference though slightly compressed and muddled sound.	20	•	•				•	108
▲ Rotel RT-950BX	200	<b>G+</b> Fine fast and coherent sound quality for price, but RF performance only adequate and sample build was suspect	20	•	•		•	•	•	120
Sherwood TX-3010C	120	<b>A</b> Lots of features and fine RF discrimination for price. Sound is communicative but inconsistently tacky	30	•			•	•	•	120
Sony ST-S570ES	230	<b>A</b> A host of features, but the sound is muddled, compressed and lacking in frequency extremes.	30	•	•			•	•	109
▲ Technics ST-G70L	200	<b>G+</b> Another very polite and refined-sounding tuner but one that does retain just enough sparkle to keep your interest. Plenty of widgets	39	•			•	•	•	93
▲ Yamaha TX-950	260	<b>G+</b> Very clean and civilised, tonal balance, detail and clarity are all very good, lots of useful features	40	•			•	•	•	108



## Turntables – cartridges

Cartridges fall into two groups: high output models, capable of working directly into most amplifiers and categorised as having a normal (N) output, and more expensive low and very low output models (L, VL). 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. With CD now the dominant medium many amplifiers are no longer equipped with the necessary phono input for a cartridge and a separate phono stage is necessary. Valve designs need either an extra head amp or transformer to cope with the low output of moving coil cartridges. Cartridge/amplifier interfacing can be very

subtle, but even basic high output MM designs benefit in overall balance from optimised amplifier capacitance loading. The mechanical characteristic of cantilever compliance ('springiness') needs to be considered in the light of the effective mass of the tonearm, and to achieve a good match compare the effective mass requirements figures with the actual effective mass of specific tonearms

## Turntables – cartridges

Product	£Price	Comments	Arm effective mass (g)	Output	MM	MC	Issue No.
▲▲ Arcam C77	30	<b>A+</b> A sensible moving magnet package with good bounce at a competitive price	6-16	N	•		48
▲▲ Arcam C77Mg	40	<b>A</b> Punchy sound quality with plenty of extra energy to liven things up. The solid body seems well worth the extra £10	4-8	N	•		67
▲ Arcam E77Mg	60	<b>A</b> Our sample had a disappointing stylus, but gave a coherent, rich and laid back sound, with good 'scale'	3-8	N	•		48
▲ Arcam P77Mg	73	<b>A+</b> Preferred to its cheaper partner by virtue of a better tip. Channel balance could have been better	4-9	N	•		48
▲ Audio Note IO IIV	1395	<b>E</b> One of the best, giving 'an extraordinarily relaxing midrange clarity', needs a transformer	8-18	VL		•	100
▲ Audio-Technica ART1	850	<b>VG</b> This is a delicate and very fluid-sounding MC that tracks well, offers very low distortion and exceptionally good separation	9-18	L		•	72
▲ Audio-Technica AT-420E	36	<b>A</b> Better suited to pop recordings, this MM bears some of the sonic hallmarks of the Linn K5	7-14	N	•		67
▲▲ Audio-Technica AT-95E	20	<b>A</b> Clear, dynamic if richly balanced, the magnetic '95E is a definite Best Buy	8-14	N	•		48
▲ Audio-Technica OC-10	320	<b>G+</b> Good treble and good detail too, but some congestion and coloration reduces its informativeness.	4-12	L		•	103
▲ Audio-Technica OC-5	130	<b>G</b> For the price, it's unusually effortless and detailed, but it tends to become rather relentless and tiring after a while.	5-14	L		•	103
Audioquest AQ 404i-L	500	<b>G+</b> Slight harshness detracted from the performance of this otherwise clear-sounding and detailed cartridge	8-16	L		•	84
Audioquest AQ 7000	1300	<b>G+</b> Stunning stereo imaging and good detail at low levels are spoiled by less-than-perfect tracking and high sensitivity to arms.	6-20	L		•	91
Audioquest MC5	250	<b>A</b> Offers high-output benefits but the drooping frequency response and severe VTA error preclude recommendation	10-20	N		•	54
Denon DL103	99	<b>A+</b> Good performance in bass and general 'life' is seriously let down by its spherical stylus which kills subtle details.	9-22	L		•	103
▲▲ Denon DL110	69	<b>G</b> Firmly recommended as a fine all-rounder, this high-output MC model is likely to perform well in nearly all circumstances	6-16	N		•	48
Denon DL160	90	<b>G</b> Although listeners just preferred the 110, its brother here proved a twin in lab tests and is still "thoroughly competent"	6-16	N		•	43
Denon DL304	200	<b>VG</b> Uncolored, detailed, neutral, superb tracking; top notch altogether, and a top notch bargain too.	4-12	L		•	103
▲ Dynavector 17D2	298	<b>VG</b> Clear, detailed, neutral and generally very informative - excellent.	6-18	L		•	91
▲ Dynavector DV-50X	110	<b>A</b> A high-output MC model with impressive lab performance, but whose tip and sound quality both disappointed	6-14	N		•	48
▲ Dynavector DV10X IIV	138	<b>A+</b> Fine sounding and realistically priced, damping is recommended to ensure successful tracking ability	8-18	N		•	48

# Turntables – cartridges continued

Product	£Price	Comments	Arm effective mass (g)	Output	MM	MC	Issue No.
▲ Dynavector XX-1L	698	<b>VG</b> Very clear, very detailed, no troubles with tracking; response lift around 20kHz seems to do no harm	7-13	L		•	84
Empire Benz Micro MC-Gold	150	<b>G</b> Nothing is obviously wrong, but nothing is stunningly right either. Safe, but perhaps a little too safe	7-17	L		•	103
▲ Empire Benz Micro MC-Silver	150	<b>G</b> Ultimately not the peer of the MC Gold is more appropriate to the sort of equipment it's likely to be partnered with	8-18	N		•	103
▲ Empire Benz-Micro MC-3	800	<b>G+</b> Offers a warmer and very transparent account of the music. Its tracking prowess is slightly limited	5-12	L		•	72
Glanz GMC-10LX	80	<b>A+</b> Bearing some of the hallmarks of the '10EH, the '10LX is still less competitive in the sonic stakes	7-15	L		•	67
▲ Glanz GMC-20E	129	<b>G+</b> Very good tracking, smooth sound and good detail. Very slight surface noise enhancement	5-10	L		•	91
▲ Goldring 1012	50	<b>G</b> Slightly harsh sound but plenty of life and quite good detail. Some very high frequency coloration apparent	6-12	N	•		85
▲ Goldring 1022	70	<b>G</b> As with 1012, a touch harsh; detail and transient purity improved, though, and it goes well with electric guitar!	5-11	N	•		85
Goldring 1042	90	<b>G</b> Not terribly subtle, and not such good value alongside 1012 and 1022. Quite lively, though	7-12	N	•		91
▲ Goldring Elan	20	<b>A</b> A lightweight and frisky-sounding MM that appears to be based upon the same body as the Nagaoka mm4	7-15	N	•		67
Goldring Elite	200	<b>G</b> The basics are right, and it will cheerfully tackle any source material, but its sound possesses a certain dirtiness	8-18	L		•	103
▲ Goldring Epic II	30	<b>A+</b> An excellent budget choice though the limitations of the stylus are rather obvious at higher frequencies	5-12	N	•		67
Goldring Eroica H	100	<b>G-</b> More confused and coloured than low-output LX, high output less of an issue these days	8-15	N		•	84
▲ Goldring Eroica LX	100	<b>G</b> Not the most subtle cartridge in the world; can sound edgy at times, but lively and informative	8-14	L		•	84
Goldring Excel	549	<b>G</b> Errs on the warm and heavy side of neutral. Strong bass lines are its forte, but resolution of subtle treble details is weak	6-13	L		•	72
Goldring Excel GS	600	<b>G+</b> True high end quality in its lack of colorations, but tracking seems indifferent and high levels tend to sound rough and edgy.	9-20	L		•	103
▲ Grado ZTE +1	27	<b>A</b> Bass and treble are a trifle coloured but the midband proved highly enjoyable. Ideal for budget systems	6-13	N	•		54
Kiseki Blackheart	1995	<b>G</b> Demonstrated refined poise and a delicate but at once potent security, however, the price did seem a little on the high side	6-16	L		•	60
Kiseki Blue Goldspot	499	<b>G+</b> Good bass and imaging, but hints of spit and coloration let the side down slightly	8-15	L		•	84
Kiseki Lapis Lazuli	5000	<b>G+</b> Combining very sensible design concepts at a silly price, combines the detail of the MC3000 and the fluidity of the Clearaudios	4-12	L		•	60
Kiseki Purpleheart Sapphire	899	<b>G+</b> Rare, beautiful to look at and sweet to listen to, our review of this high-flyer conjured up images of Japanese art	5-14	L		•	48
▲ Linn K5	49	<b>A+</b> Not as crisply focused as the costlier Linn magnetics, the K5 offers a smoother presentation	7-16	N	•		67
▲▲ Linn K9	98	<b>G</b> Linn threw this model into the leading pack by beefing up the Basik's bodywork and adding a super stylus	6-15	N	•		Col
London Maroon	199	<b>A+</b> Now manufactured under the London brand name this Decca cartridge is as iconoclastic as ever	9-20	N	•		67
London Super Gold	339	<b>A-</b> Immediate and detailed, but very coloured, very nonlinear and questionable effect on records. Devotees swear by it	9-15	N	•		84
▲ Milltek Aurora	299	<b>G+</b> An overall feeling of relaxed ease characterised this clear and atmospheric Kiseki-built cartridge	8-16	N		•	Col
▲ Milltek Olympia	349	<b>G+</b> Warm and detailed sound packs the punch of the best MCs with high output as a bonus	12-20	N		•	54
▲ Nagaoka MM4	9	<b>A-</b> Clear punchy sound that delivers the rudiments of a good performance	6-16	N	•		54
▲ Nagaoka MP10	19	<b>A</b> High frequencies sounded "shut-in" with this spherical-stylus model, but mid and mass were energetic, bouncy and punchy	5-13	N	•		48
▲ Ortofon 510	30	<b>G+</b> For the price, a good blend of virtues weight, clarity and neutrality.	3-11	N	•		85
▲ Ortofon 520	50	<b>A+</b> Very sensitive to load capacitance this new Ortofon maintains the company tradition for a lively, effervescent SQ	7-16	N	•		67
▲ Ortofon 530	80	<b>G+</b> Very clean and assured sound; transients not quite perfectly pure but plenty of detail.	4-11	N	•		85
Ortofon 540	100	<b>A</b> Graced with FGII stylus but possessed of too high a compliance for broad arm matching. It could also sound a little unforgiving	3-8	N	•		67
▲▲ Ortofon MC10 Super	80	<b>G</b> "What a delightfully sweet-sounding cartridge this is . . ." we said	5-15	L		•	48
▲▲ Ortofon MC15 Super	100	<b>G+</b> A good all-rounder, with outstanding performance in detail retrieval, even if it can be very slightly bright and close-up	10-24	L		•	103
▲ Ortofon MC3 Turbo	110	<b>G</b> Not terribly subtle, but it obviously doesn't aim at that. The 3 Turbo is bright, cheerful and bouncy - take it as it comes!	10-24	N		•	103
▲ Ortofon MC3000 MkII	900	<b>E</b> Low levels of body resonance are a real ear-opener. Nothing to criticise elsewhere; one of the very best	9-16	VL		•	84
Ortofon MC5000	1500	<b>G</b> Review sample could not be fully run-in, limited tracking ability, bright and forward sound, though imaging is excellent	12-20	VL		•	91
▲ Ortofon Quartz	140	<b>G</b> Lively, quite detailed, and a touch bright, the Quartz has many qualities of the much dearer Quasar	3-12	L		•	91
▲ Ortofon Quasar	350	<b>G+</b> Many of the qualities of the MC3000, although a touch bright. Good detail and delicacy	8-15	L		•	84
Ortofon Quattro	210	<b>G+</b> Undoubtedly a competent performer. Generally neutral, but can be edgy and bright in loud passages.	6-18	L		•	103
Rega Bias	34	<b>A+</b> Difficult to mount in some arms due to its shallow build, the bias offers a gentle, refined SQ	4-10	N	•		67
▲ Rega Elys	74	<b>G</b> Clearly superior to the Bias, despite their common heritage, the Elys is both more detailed, accurate and musically convincing	8-15	N	•		67
▲▲ Revolver	20	<b>A</b> This modified AT-95E enjoys a very lively mid and treble even if the bass is somewhat 'slower' in comparison. A firm budget buy	8-16	N	•		67
▲ Roksan Corus Black	130	<b>G</b> Recognisably related to Corus Blue, but distinctly more civilised and smoother.	7-12	N	•		91
Roksan Corus Blue	75	<b>G</b> Roksan-specified modified Goldring 1012; slight harshness detracts from otherwise good sound.	7-12	N	•		91
Shure M110HE	67	<b>A</b> Sound quality was thought eminently presentable, but not exciting; smooth clear high frequencies, but a loss of bass definition	5-10	N	•		38
Shure M92E	20	<b>A</b> Though lacking depth, the overall sound quality was competent, but treble was not its forte	10-15	N	•		43
▲ Shure ME97HE	55	<b>A+</b> 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	8-20	N	•		48
Shure V15 VMR	220	<b>A+</b> Initial listening gave promising results, but extended familiarity gave the feeling of a lack of energy and a "shut-in" sound	5-12	N	•		38
▲ van den Hul MC One	849	<b>G+</b> This extended all the positive qualities of the '10 but added greater authority and scale worth it for the extra money	6-12	L		•	60
van den Hul MC One Super	949	<b>G+</b> Slight softening on transients was the only real flaw, but it didn't quite seem to have that special touch one expects	8-15	L		•	84
▲ van den Hul MC Two	1099	<b>G+</b> Connected directly to any standard MM input it rewards with a highly detailed yet fluid and musically convincing portrayal	6-13	N		•	72
▲ van den Hul MC10	699	<b>G+</b> A neutral balanced performer giving transparent midrange, fine depth and focus with firm extended bass. Gosh!	5-10	L		•	60
▲ van den Hul MM1	250	<b>G+</b> If woody midrange coloration could be tamed, the excellent imaging and admirable security would make it excellent	7-15	L		•	103

**SUBSCRIBE TO THE WORLD'S NO.1 GUIDE TO BUYING HI-FI,  
CHECK OUT THE SAVINGS TO BE MADE ON PAGE 52**

# Turntables



Specialist turntables are what high fidelity sound is all about, CD may offer silent backrounds and flat frequency responses but they can't match the dynamics and superlative timing that serious turntable users take for granted. The only serious limitation in this day and age is the dearth of software and it's debatable whether those of you without significant record collections should consider spending large sums on a turntable. It's also worth remembering that getting the most out of a record player is something of a labour of love, requiring very careful set-up, proper support and the best vinyl disc amplifier stage that you can find. Basically it's all about enthusiasm for getting the most out of the medium and allows a degree of tweakability that

CD users can only dream about. Alternatively you could say that it's a major pain in the butt with a complete lack of convenience features. 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 are often made by the same company), and a good dealer can be invaluable.

Listed separately as integrated players and as motor units, 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 fac-

tor soundwise in any system.

The columns show from left to right, 'arm effective mass' which relates to cartridge compliance and is explained in the 'Cartridges' introduction. 'Suspended subchassis' - decks which have some form of internal isolation, generally in the form of springs but occasionally more solid materials such as rubber. 'Manual' and 'Automatic' refer to the operational tendencies of the deck/arm combination - automatic high end turntables are as rare as hens teeth. 'Cartridge' - if one is supplied. 'Belt drive' as opposed to direct drive is the preferred method in most quality decks. An 'Electronic PSU' offers switchable speed change and a 'smoother' power supply, which means better sound quality.

## Turntables – integrated

Product	£Price	Comments	Arm effective mass (g)	Suspended subchassis	Manual	Automatic	Cartridge	Belt drive	Electronic PSU	Issue No.
▲ Alphason Sonata/HR100S MCS	1785	<b>G+</b> Good sound in all areas - bass, clarity and neutrality all in the top class and bettered by very few decks at price	13	•	•			•	•	79
▲ Dual CS-503-2	160	<b>A</b> Not wholly inspiring; generally coarse and wooly sound is at least not offensive, but easily bettered by the CS505-4	10				•	•	•	91
▲ Dual CS-505-4	200	<b>A</b> Consistent sounding and well isolated turntable. It is slightly lacking in balls, compensates with a consistently unmuddled presentation	10				•	•	•	103
Dual CS-750	330	<b>A-</b> Attractive but lazy performance from a deck with many good ideas and which is a pleasure to use. 78rpm facility					•	•	•	103
▲ Dual CS430	120	<b>A-</b> Ragged, sometimes unpleasant cartridge mixes with a modest pleasing player in a very sharply priced package	5				•	•	•	67
▲ Kuzma Stabi/Stogi Reference	2000	<b>G+</b> Beautifully made solid oak plinth, the Stabi also sounds very clear, detailed and extended. Stogi Reference is very capable.	12	•	•			•	•	91
Linn Axis/Akito	535	<b>A+</b> A neat, attractive and well-made package which delivers a rather harsh sound with a 'one-note' effect in the bass	10	•	•			•	•	79
▲ Linn Basik	299	<b>A+</b> Strong midband analysis and imagery, clean if sharp treble is matched to a good if occasionally wooden bass	10		•			•	•	103
▲ Linn LP12 Basik/Akito	855	<b>G</b> Trails the full LP12 significantly, but pace, rhythm, timing etc. still in top class, and bass tauter than of old	10	•	•			•	•	103
▲ Linn LP12-Lingo/Ekos	2642	<b>G+</b> The classic reference is improved by the Lingo but charming character remains. Ekos is well made and suited to many decks	9	•	•			•	•	91
▲ Rational Audio Aura 01	180	<b>G</b> Poor lab results but midrange and treble are very pure and clean; idiosyncratic sound and styling should be tried!	10		•			•	•	91
▲▲ Rega Planar 2	185	<b>G</b> A remarkable product at the price, surprisingly articulate and confident	11.5	•	•			•	•	48
▲▲ Rega Planar 3	250	<b>G</b> A long time leader in its category, the '3 (with excellent RB300 arm) sounded nicely 'musical' in a balanced and coherent manner	11.5	•	•			•	•	48
▲ Revolver Rebel	185	<b>G</b> Quite lively and detailed but not the strongest on subtlety, with slightly lumpy bass. Motor breakthrough audible	12	•	•			•	•	91
Revox B291	1003	<b>A-</b> Subjective bandwidth is narrow and the music lacks grace and energy. Ease of use however is unrivalled					•			55
▲ Roksan Radius/Tabriz zi	740	<b>G</b> Design is subtle, refined and easy on the eye. Musically it offers exceptional performance with a minimum of fuss	9		•			•	•	103
Roksan Xerxes 33/Tabriz zi	990	<b>G</b> At its optimum with a relatively inexpensive arm/cartridge unless upgrade to full Xerxes is contemplated. XPSII PSU	9		•			•	•	103
▲ Roksan Xerxes/Artemiz/Artaxerxes 2114		<b>E</b> Superb, highly integrated and synergistic in nature, suitable for use with any good MC. Will not suit all tastes, however	8					•	•	103
▲ Systemdek 1.920	235	<b>A-</b> The motor unit is derivative of the Rega Planar 2 with a Moth arm. Up tempo even bright at times but never lacks enthusiasm	12		•			•	•	115
▲▲ Technics SL-DD33	150	<b>A</b> As with the QD33 though better value. P-mount cartridge	7.5				•	•		48
▲ Technics SL-QD33	180	<b>A</b> Quartz controlled version of the DD is short on sound quality but not features. But it did have fair focus and some depth	7.5				•	•	•	48
▲ Technics SLBD-22	130	<b>A-</b> Not bad for the price and a great improvement on the L20, it performs reasonably when not stretched	6g				•	•		48
▲ Thorens TD-3001/TP90SF	760	<b>G</b> Excellent middle ranking esoterica, with strong all round abilities rather than excellence in particular areas			•	•		•	•	103
▲ Thorens TD166 VI/UK/RB250	280	<b>A-</b> Refined and articulate sound with well focused imagery, suitable for use with good MM and budget MC cartridges	11.5	•	•			•	•	103
Thorens TD2001	650	<b>G-</b> Similar to TD320 but much dearer - why? Sound is comfortable but not very detailed	15	•	•			•	•	91
▲ Voyd Reference	5950	<b>E</b> Voyd's flagship, equipped with three substantial motors, a Lexan platter and brute PS. A strong contender for world's best			•	•		•	•	C91
▲ Well Tempered WTAT	1690	<b>G+</b> Intriguing/challenging design. Musically it is not ideal, but has a limp quality and a lack of artificiality that sets standards	7.5		•			•	•	67

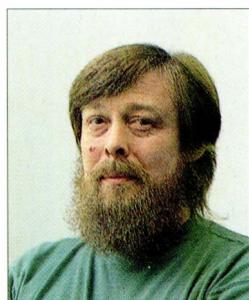
## Motor units

Product	£Price	Comments	Arm effective mass (g)	Suspended subchassis	Solid plinth	Belt drive	Electronic PSU	Issue No.	
▲ Michell Gyrodec	697	<b>G</b> Sweet and natural sounding player, well suited to Rega RB300. Aesthetics, and the acres of clear acrylic are very distinctive		•			•	•	55
▲ Michell Syncro	325	<b>G</b> A happy blend of qualities endows the stylish Syncro with a blend of subtlety and force - the mailed fist in the velvet glove		•			•		67
Origin Live Oasis A	495	<b>G-</b> Rather coarse sound lacking resolving power - but lively sound may appeal. Industrial appearance		•			•		79
▲ Pink Triangle Anniversary	1495	<b>E</b> Possibly the most detailed, clear and neutral deck around. Likeness to master tape is uncanny		•			•	•	91
▲ Pink Triangle Export	890	<b>E</b> The PT TOO with built in PS. Retains features of great transparency and neutrality. Review sample had highish motor noise		•			•	•	91
▲ Pink Triangle Little Pink Thing	500	<b>G+</b> Semi suspended, leads the field for clarity and neutrality at the price. It also looks good. Excellent value					•	•	79
Revolver	200	<b>A</b> Nicely balanced, but unimpressive timing and lightweight bass made this deck rather average for the price				•			48
▲▲ Systemdek IIX/900	230	<b>G</b> A high performance budget turntable which is particularly strong at fine detail resolution and imagery		•			•		103
▲ Systemdek IIXE/900AP	388	<b>G+</b> The acrylic platter'd IIXE is one of the most capable budget decks on the market, good resolution, dynamics and timing		•			•	•	103
▲ Voyd 0.5	3368	<b>E</b> Halfway between standard and Reference Voyds with the latter's platter and bearing. Superb finish, colourful and dynamic sound		•			•	•	72
▲ Voyd Valdi	955	<b>VG</b> Acrylic plattered twin motor deck is remarkably capable, revealing and neutral, for dynamics it's hard to beat at the price		•			•	•	79
▲ Zarathustra S4/PSU	3000	<b>E</b> A hand made high mass design that's built to the highest standards, it sounds superb and makes most of the competition look shabby		•			•	•	72

# Weird but wonderful hi-fi

**W**hen I came back to edit *Hi-Fi Choice* for the third time this March, I anticipated a six month stint. That the very experienced Simon Davies has been found and installed after just four has come as something of a relief, since combining part time editing with much of my normal freelance reviewing proved rather tougher than I expected. Editing today's *Hi-Fi Choice* is certainly a full time job, and I'm looking forward to working for the new leader, once I've recovered from the trauma of the past four months.

Three unusual products have come my way recently. Each deserves examination and discussion; each is interestingly different from the norm; each is from a well established and very reputable manufacturer. But I doubt whether much more than a handful of shops across the country will stock any of them.



**Paul Messenger discusses three new components that have come his way, but may not come yours.**

The world of specialist hi-fi is a conservative place. A manufacturer comes up with a new product which doesn't fit in with the market stereotypes. He takes it to the shows; badgers the magazines and reviewers; hawks it around the trade — and then goes bust waiting for the orders which fail to come in.

Innovations do get through, and change does gradually come about over the long term. But

the stereotypes are so deeply ingrained that many interesting niche products don't even make it into the shops.

Perhaps the press can be accused of hyping the new for its own sake. The obscure and peculiar makes almost as good copy as the sensational, and writers develop an unfortunate habit of confusing the three. But if the press has a tendency to over-sell, the trade is equally inclined to sell-short, and reluctant to stray far from well worn paths. There are reasons, like cash flow and stock control; surviving these tough times demands caution. But it's a great shame to limit diversity and customer choice.

The three products I mentioned include a most entertaining £1,500 loudspeaker called *Skiff* from leading French brand Cabasse, which is new to Britain and has only a few dealers. From Rega came the delightful *Elicit* integrated amp. Now Rega does have plenty of UK outlets, but British customers don't buy (or British shops don't sell) £700 plus integrated amplifiers; at least the *Elicit* is doing well in Taiwan!

But the most intriguing and unusual of the three is certainly something called the *DSS930*. It's a loudspeaker, Captain, but not as we know it. Actively driven, it accepts only a digital input, costs £1,300 a pair and is made by Philips, some of which explains why it hasn't exactly proved a commercial fireball.

"Now is the hour of a great forward leap," according to Mao Tse Philips, which unfortunate lapse tends to distract attention from a product which is original and probably unique. We've seen packaged active speakers with built-in power amps for years, notably from Meridian and B&O. There are several worthwhile advantages to be had, but also the inconvenience of having to apply mains power as well as signal connections.

The Philips doesn't get round the mains problem, but its treatment of the signal side is very clever indeed, especially for anyone interested in multi-room applications. The stereo signal from (digital) source to just one of the speakers is carried down a single and very thin, flexible and easily hidden wire, and then a similar single link is continued on to the other speaker of the pair. But it is also possible to continue the hook-up to include two more pairs of speakers in other rooms, while the same daisy-chained cable carries control commands back the other way to instruct a *DSC950* digital pre-amp (an extra £400, but the best way to get a flexible system). You can't vary the source from room to room of a single chain, but you can change the volume and switch the source.

It certainly looks like one way to achieve multi-room without installation tears, but currently lacks one vital ingredient. Although people will be prepared to pay £1,300 for their main pair of speakers, I doubt they'll want to add the same amount for less important rooms. A simple passive, powered 7litre bookshelf model would make the concept more viable. A smaller speaker is planned, but not until 1994.

Without the space or desire to get all bogged down in the technicalities involved, as a speaker the *DSS930* is actually rather good, with lovely clear vocal diction, admirable precision, modest coloration and fine imaging — though I have to add I found it dynamically rather lazy and uneventful. The ribbon-type tweeter is very sweet, but requires that ears have to be at roughly the same distance from the ground. The active bass compensation gives very impressive bass extension from such a compact box, but I couldn't quite decide whether I preferred it disabled. The extension was good for its own sake, but with it the bass had a dead quality; without, it was somehow more coherent and focused.

In its current guise the *DSS930* concept has certain limitations, so perhaps combining audio and control signals together does introduce compromises. But to some extent it's more of a design exercise than a product, showing off various clever technical tricks which Philips would presumably be happy to license to other users. I wonder whether anyone will take it up?

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