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See page 44

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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.

READER DIFFICULTIES

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

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Back issues of the magazine are also available, please refer to page 90 for full details

THE GET OUT CLAUSE

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

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Stentor of excellence

Last month's column found me rediscovering vinyl and deciding that an all digital system wasn't for me, thus branding myself a Luddite. Well this month things have got worse. I've had a subwoofer in the house. Not only that, but I've really enjoyed having it there. In fact, as I come to write this it's still pumping out the sub-bass, and long may it remain.

Before you start writing in with demands for my instant dismissal, perhaps a few qualifying words are in order. The subwoofer I've been using for the last month or so is the *Stentor* (£1,200), from a tiny little company called REL Acoustics. It's the same subwoofer that Paul Messenger wrote about in glowing terms when he got hold of a prototype the summer before last, but the one I have been using is the fully finished article, a gorgeous looking beast, resplendent in light oak.

I'm using it with a pair of Acoustic Energy *AE1s*, which brings the total price of the system to a not inconsiderable £2,000 or so, but the results have been very interesting. I've quite a small listening room, some 15 by 12 feet, and have always had a problem coming to terms with several cubic feet of vinyl wrapped speaker, perched on stands that look like something out of the industrial revolution, taking up most of one end of the room. By the time you add in the rest of the system, and a huge TV, there ain't a lot of space left to let the living room live up to the first part of its name.

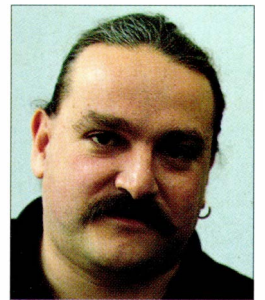
The glorious thing about the *Stentor/AE1* combination is that it actually sounds like a £2,000 speaker system, but is far less visually intrusive than a conventional box. I'm not going to say too much about the sound of the system, as you'll be able to read all about it in *Sessions* next month,

but a few words about subs in general are perhaps appropriate. There is no doubt that subwoofers as a breed have got a bad image, probably because some of the cheaper systems at the bottom end of the market have nicked the term as a marketing gimmick rather than as a serious attempt to overcome the problems of getting deep bass out of a moderate sized box.

Before I joined *Choice*, I edited our sister magazine *S&CS*, which looks at the sound systems the professionals use for concerts and the like. In that market 90 per cent or more of the systems are split into top and bottom boxes, with different cabinets handling treble and bass frequencies. When you go to Wembley or wherever to check out your favourite band, the chances are extremely high that you will be listening to a subwoofer based system.

In the pro market anyone looking to use a full range speaker is going to get looked at in much the same way as a hi-fi reviewer who decides to use a subwoofer at home. But, as the REL model proves, subwoofers can actually work extremely well.

I almost added the caveat, 'particularly where space is limited' to the preceding sentence, but then I thought what the hell, if I'm going to admit to a passion for adjusting VTAs and setting up turntable suspensions, then I may as well go the whole hog and admit that I'm now a confirmed subwoofer fan as well.



Andy Benham becomes converted to a rather special subwoofer system.

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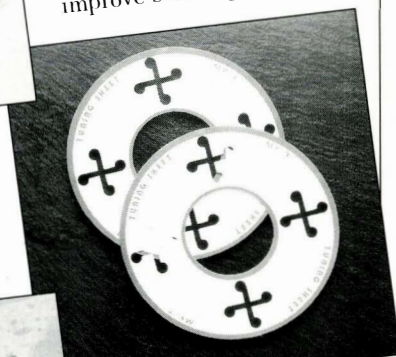
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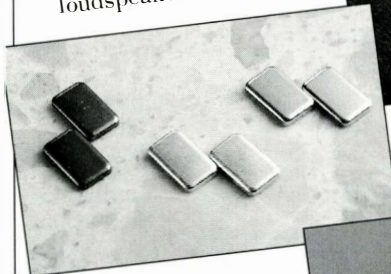


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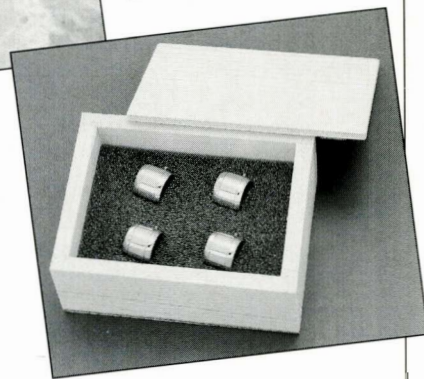
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HI-FI CHOICE

Tweaks for CDs and LPs — two of the products in Sessions.



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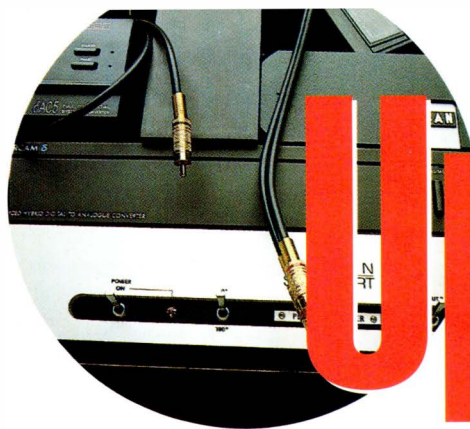
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Update

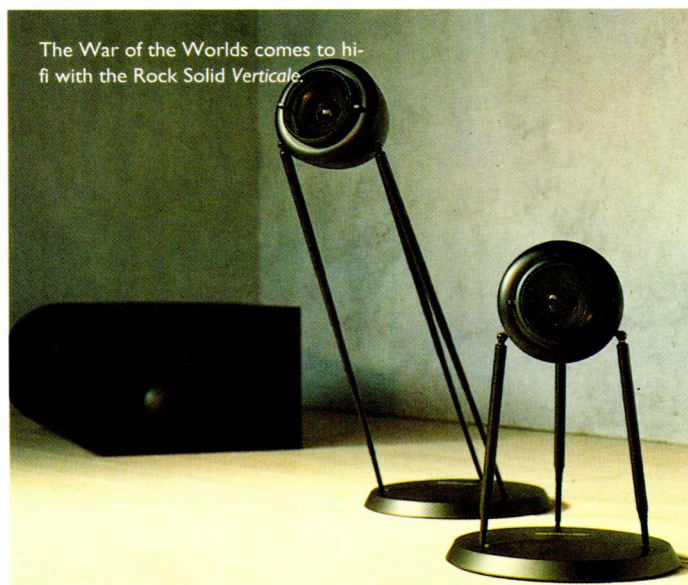
CHOICE NEWS FROM AROUND THE WORLD

Style conscious speakers

Rock Solid Sounds Inc, a division of B&W Loudspeakers has released a new satellite and subwoofer speaker system for the style conscious who believe the way a speaker looks is as important — if not more so — than the way it sounds. With a design that looks like its been made by the BBC for a John Wyndham adaptation, the £400 *Verticale* will prove to be a talking point wherever it's installed.

The *Verticale* is designed by Morton V Warren, who was also responsible for the *Solid Monitor*, and the acoustic engineering is by B&W. The magnetically shielded satellites can be wall or floor mounted and are atop retractable/extendible, twistable legs, like a sophisticated Anglepoise lamp.

The *Verticale* uses just a single 95mm driver in each satellite, which implies some sacrifice of high frequency extension. A 160mm driver powers the subwoofer which can be hidden, (although this too



The War of the Worlds comes to hi-fi with the Rock Solid *Verticale*.

has been designed to be on view) and can deliver bass to 38Hz. The speakers have self resetting overload protection and are claimed to be

ideally suited to the home entertainment side of things. The *Verticale* really needs to be seen to be appreciated. ☎ 0903 750 750

Technics trips onto the mini market

The 50W SC-CH650 is a new £600 mini system from Technics, featuring a double auto-reverse cassette deck with 'artificial intelligence' edit facility, MASH 1-bit D/A converters and loudspeakers with mica composite diaphragm drive units.

The system also has a remote control handset and 20-step random access CD programming. Up to 39 stations can be preset on the tuner and the cassette deck has Dolby B and C noise reductions — scarce in mini systems at this price.

One step up, the £700 SC-CH655 will offer all the above with the difference that the CD player on this version has a triple tray rotating carousel so

The Technics SC-CH650 hopes that size really isn't important.

that three discs can be loaded at any one time. This allows the usual shuffle through tracks and random play across all three, and has the advantage of being able to swap the third disc for a replacement while the machine is still playing. ☎ 0344 862 444



Cordless listening from Sennheiser

Well known headphone manufacturer Sennheiser has introduced a £169 cable-free infrared headphone system, called the IS 490.

This is made up from the S 180 stereo infrared transmitter which can be plugged into an amplifier's headphone socket and the lightweight, cable free HDI 490 headset.

The 160g headset unit has two infrared receiver lenses, separate volume controls for left and right channels and an on/off switch. The headset can be recharged from the transmitter unit, which has a second port allowing two cell packs to be used.

Additional HDI 490 headsets are available so in theory it might be possible to have a very loud party without annoying the neighbours at all, since the S 180 transmitter fills the room with infrared signals which are picked up by the receiver/headset. ☎ 0628 850 811



Music while you move with Sennheiser's infra-red 'phones.

TechniSat offer CD quality radio via satellites

German manufacturer TechniSat has announced the STD 5000 digital satellite radio receiver, which allows DSR radio broadcasts via cable and satellite to be received apparently 'in CD quality'.

The receiver is available with two different sized satellite dishes depending upon the reception in your area. The system costs £350 with the 38cm dish and £400 with a 60cm dish. ☎ 0902 791 525

Denon airs a new RDS Tuner

The new Denon £200 TU 580RD fully remote control tuner has been developed in close consultation with the BBC to make the most of the Radio Data System service.

The fluorescent display identifies the major radio stations, and these names can be modified or (for broadcasts without RDS) written in via the

character generator. It also features a 'programme type' facility that identifies the type of programme a particular station generally offers, and can be used to search out specific types of programming across a particular wave band.

Accurate time readings are available from the 'clock time' function when tuned into BBC

broadcasts and many independent stations.

More standard features include an RF attenuator, an IF selector to cut down interference, random presets for 30 stations, scan and manual tuning. ☎ 0753 888 447



Nakamichi supports the less is more

Nakamichi describes the brand new £300 1A-3 as its first 'audiophile' amplifier. Only the most basic of controls are available on this integrated amp, namely a volume control, an input selector and a record output selector. The inputs available are for Compact Disc, tape, tuner and aux.

The record output selector isn't part of the main signal path and therefore it has no adverse effect on sound quality and the selectors themselves are arranged to have the shortest possible signal path.

The 1A-3 offers 40 watts per channel and has been specifically designed for Compact Discs, hence no phono input, which allows for simplification of the circuitry. In addition, all circuits use discrete components only.

☎ 0903 750 750

Two new launches from Micromega

Micromega Digital Audio Ltd launches its £699 Microdrive CD transport this month. Based on the Philips CDM9 mechanism, the whole device is constructed on a robust steel top plate and uses a fully floating suspension. Driven by Micromega servo and PSU systems, this top loading drive is smartly finished in black brushed aluminium and perspex.

A new D/A convertor, the £599 Variodac, is also available in a matching finish. The Variodac is equipped with two digital and one analogue input, and is designed to work at the centre of the MicroLine system, driving the power amp directly from its own outputs. ☎ 081 989 0692

Pro-ject moves into the low end of high-end

Austrian turntable manufacturer Pro-ject has brought out what it calls a budget high-end model, if you'll pardon the contradiction in terms.

The £350 Pro-ject 6 is a suspended chassis, silicon damped design that comes complete with the Pro-ject arm. The platter is a glass and metal combination with record clamp and the one piece tonearm has controllable height, VTA and azimuth adjustment. The main plinth can be levelled via the adjustable steel cones and has a built in spirit level for precision. An arm-less version is also available from Kronos Distribution at £275. ☎ 08687 48632



Don't you just love being in control?

Roomlink Solo is a new £100 remote control extension system from QED which allows all the facilities of a remote control hi-fi system to be extended to a second room in the house. It's a free standing (rather than in-wall) device which can link up any hi-fi system that is infra-red controlled and incorporates an infra-red sensing eye and speaker on/off switch. It receives instructions from the

appropriate hi-fi handset and relays them back to the main system via telephone-like wire, re-transmitting the commands through a tiny transmitter device that sticks onto the infra-red window of the hi-fi system.

Available from February the Roomlink Solo comes with connecting wire and power supply (speakers of your own choice will need to be added). ☎ 0276 451 166

In Brief

AuTeK Ltd, UK distributors for Dynaudio loudspeakers, are to be the sole distributors of the high-end cable connection system, OCOS, which will be available in various lengths at various prices from selected hi-fi dealers in the UK.

☎ 081 770 9553

The Rega Elex amplifier Choice reviewed in issue 116 is in fact £360 and not £298 as quoted in the review.

In the March issue of *Hi-Fi Choice* (issue 116), we inadvertently misnamed the Sony MiniDisc competition and then neglected to list it on the contents page.

Our apologies to Sony (UK) Ltd and to Mission Group for any confusion caused.

Scottish retail chain, Clydesdale Electrical Stores Ltd, is to sell Denon equipment throughout its 118 branches.

Formerly scathing of the audiophile cable market, Quad has designed two new loudspeaker cables that will be on sale from April.

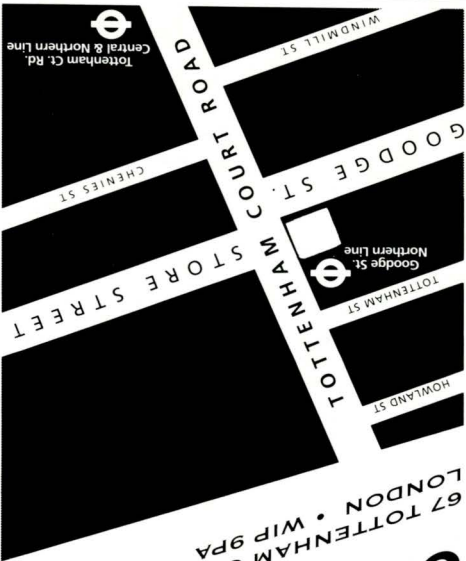
A round cable at £5.80 per metre has 4.0 sq mm conductors and is available in a range of colours, while a flat profile cable at £3.50 with 2.5 sq mm conductors will suit shorter runs and lower power applications.

☎ 0480 52561

For the ultimate in piano music collections, Instrumental Furniture's £1,895 table looks like a grand piano and provides storage space for CDs.

☎ 071 328 0058





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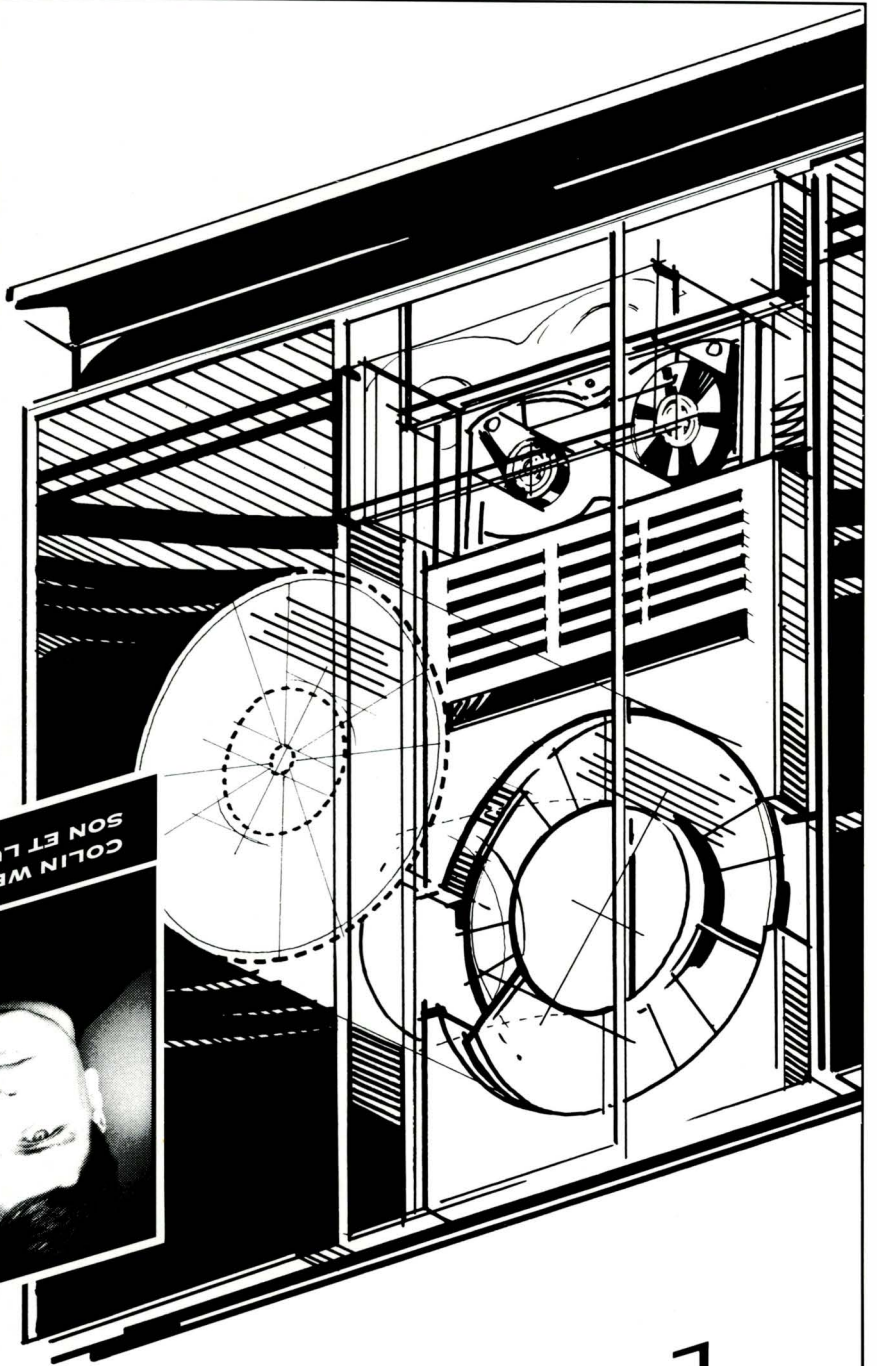
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TO SAMPLE AN
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HAVE GIVE US A CALL ON
THE NUMBER BELOW, OR
JUST POP IN."



SON ET LUMIERE

Two contrasting approaches to CD

It seems to be in vogue for high-end French hi-fi companies to make their first forays into the world of digital sound this month. One such is amplifier manufacturer YBA, launching the £3,000 CD2 which incorporates an outboard power supply, twin 18-bit converter, a linear induction motor and a belt driven laser diode.

The triple lens laser is mounted on two low friction metal rails which are in turn mounted on a metal support. To maintain good stability in the face of rapid variations in rotational speed, the CD2 holds discs in position by a small, lightweight, magnetic clamp. An unusual, but claimed extremely effective, manual slide system is used to load the machine. Analogue and digital outputs have high class 24 carat gold plated output sockets.

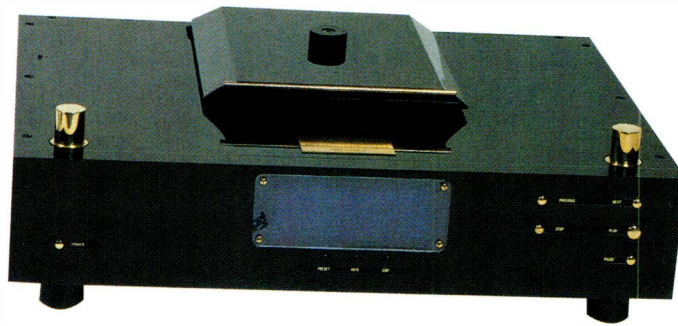
Another Gallic company Audiomeca has made a different approach with its new £1,875 CD transport. Called *The Mephisto*, it

concentrates on mechanics rather than electronics in order to provide the best conditions possible for accurate tracking with very little jitter.

Designed by Pierre Lurne *The Mephisto* is the first digital offering from Audiomeca. The cover section of *The Mephisto* incorporates a high precision real platter with its own spindle and bearing.

In a more usual design the motor supports all the vibrations and noise from mechanical movements. Here, mechanical and acoustic isolation are ensured as the cover, platter and laser assembly are suspended and decoupled from the main cabinet. Both CD players are available from Kronos Distribution.

☎ 08687 48632



Pierre Lurne's *The Mephisto* CD transport — not as ugly as Depardieu?

Updated Triangle loudspeakers

French loudspeaker manufacturer Triangle has brought out the new £1,299 Icare and £1,799 Calisto models with totally redesigned drive units.

These units feature a hyperbolic paper cone and tissue suspension giving a long travel which with the use of longer coils allows better power handling and low frequency response.

The magnets follow a new configuration to allow more linear reproduction of the higher frequencies, and the aluminium baskets have been shaped to allow for a better airflow at the back of the cone.

The cabinets themselves are from stiffened medite conglomerate. Two different damping materials have been used to try and attain a wide and uniform damping spectrum without self coloration.

Heavy aluminium dark grey lacquered stands with a Plexiglas top and 3 floor spikes are supplied with the speakers which also come with a bi-wiring plug set.

The designs should suit low powered amplifiers, the Calisto having a claimed sensitivity of 94dB and the Icare 93dB. ☎ 08687 48632



The green monster



A £350 plinth system for the classic Garrard 401 turntable is available from Slate Audio. The manufacturer claims the solid marble plinth eliminates motor noise, rumble and feedback and as long as the deck to be fitted is in good working order 'a totally silent background to the music is guaranteed'. The 'green monster' — as it is endearingly nicknamed — is designed for nine inch arms and comes supplied with detachable arm mounts for easy fitting. There is also a plinth for the Garrard 301. ☎ 0525 384 174

Made in the USA, affordable in the UK?

Theta Digital has a new line of 'affordable' audio products to add to its high-end digital devices. Available from Absolute Sounds the £700 Cobalt 307 D/A converter is the first product in this range. The 307 uses a Crystal Semiconductor input receiver, a digital filter with 45-bit accumulator and digital de-emphasis. The DAC itself is a selected version of the Burr-Brown PCM67. On the analogue side the 307 has high-current output buffers, Vishay resistors and polystyrene capacitors. There are two separate transformers to power the digital and analogue sections. ☎ 081 947 5047

The Celestion Trinity, three in one

Celestion's new £250 Trinity is a small box loudspeaker system made up from two satellites and a subwoofer. The small, simulated black ash veneer finished speakers are considered suitable for hi-fi and home entertainment applications.

Each satellite contains a 25mm titanium dome tweeter with a new 105mm bass/mid unit. The cabinets are ported and can be placed either on shelves or on stands.

The subwoofer is a single bass enclosure that uses a 200mm dual voice coil woofer at its heart that receives signals from both channels simultaneously. ☎ 0473 723 131



Two's company, but three's not a crowd with Celestion's Trinity.

Kenwood mix and match

Convenience being the name of the game, overall system remote control is becoming crucial for today's hi-fi buyers. To some, it seems incredibly archaic to have to lift more than a finger to change the track.

Kenwood has recognised this growing expectation for fingertip control and has developed its range of separates to be used with new remote control amplifiers and receivers.

The £350 90W KA-5050R and £550 115W KA-7050R amplifiers will be available from April along with the £330 KR-V6050 and £400 KR-V7050 receivers both of which feature RDS and Dolby Pro-Logic. They will allow the convenience of mini and midi systems without sacrificing the quality of separates. ☎ 0923 816 444



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

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

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

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

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

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

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

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

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



PD-S801

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MAY ISSUE ON SALE
9TH APRIL 1993

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Choice Sessions

by Jason Kennedy, Alan Sircom, Tim Frost & Ian Ward



MOVING-COIL TRANSFORMER

The Head

Tim de Paravicini of Esoteric Audio Research is widely recognised in the hi-fi industry as being the UK expert on transformers, due to his experience with Luxman in Japan and his latest crop of domestic and studio valve amplifiers. As such, he is well qualified to make *The Head*, a £488 high class step-up transformer for bringing low level moving-coil cartridge signal voltages up to moving magnet amplifier input sensitivity levels.

It has input taps for 40, 15 and four ohm cartridge impedances. Although this appears not to cover every moving coil cartridge known to man, it should confidently cope with the vast majority. Even outrageously low output devices, like the Audio Note IO, can be covered by custom versions that EAR also make.

The Head is also booby-trapped, to keep prying eyes

from unearthing its transformer secrets. The eight Allen bolts that hold the transformer together have to be unscrewed in a prescribed manner, otherwise the unit self-destructs and needs to be sent back to EAR, who will supply a suitable rapping of knuckles. In fairness, however, unless someone smears epoxy resin into the phono sockets or the chunky earth tag gets broken, there is little in *The Head* that can go wrong.

In the years since its launch, only one operational difficulty has emerged. The four pairs of phono sockets, at the rear of *The Head* are recessed, which makes them far less likely to suffer damage over the passage of time, but it also makes using exotic phono plugs, like WBTs, tough going.

As with many genuinely high-end components, the transformer is dependent on the quality of the cartridge and the phono stage it is partnered with. Put it in between a £100 moving-coil cartridge and a £150 amplifier and it can sound awful. Multiply these costs tenfold and *The Head* will display qualities that few onboard amplifier moving-coil stages can better.

It has a sense of absolute correctness, allied to an almost complete absence of character, that makes you unaware of *The Head* until you swap it with a less worthy moving-coil step-up, whereupon the other device sounds steely and artificial, generally with a big, bloated bass.

The Head's bass perform-

ance is similar to all EAR products. It often sounds light and too dry, but remember how real instruments sound, and the deep, clean EAR bass seems more natural than many well-respected alternatives.

The neutrality of *The Head* is unquestionable, as it imposes only the slightest fingerprint of its own on the sound of the cartridge. Ultimately, the latest developments include a handful of devices that can approach the performance of *The Head*, and in the author's experience only the Tesseract TAHA confidently outperforms it, sounding even more natural, dynamic and expressive when using a well-matched cartridge like a Lyra. Given that the TAHA costs nearly £1,200 more in its basic guise, *The Head* is clearly in a league of its own for value.

PRE/POWER AMPLIFIER

John Shearne Phase 2

Regular followers of *Hi-Fi Choice* will remember a marbled blue 80Watt pre/power amplifier called the John Shearne *Phase 1*, which had its chromed knobs aimed squarely at the high-end. There is obviously a long term strategy for domination of the hi-fi industry, since the latest £495 *Phase 2* integrated amplifier invades territory currently held by Audiolab and Arcam.

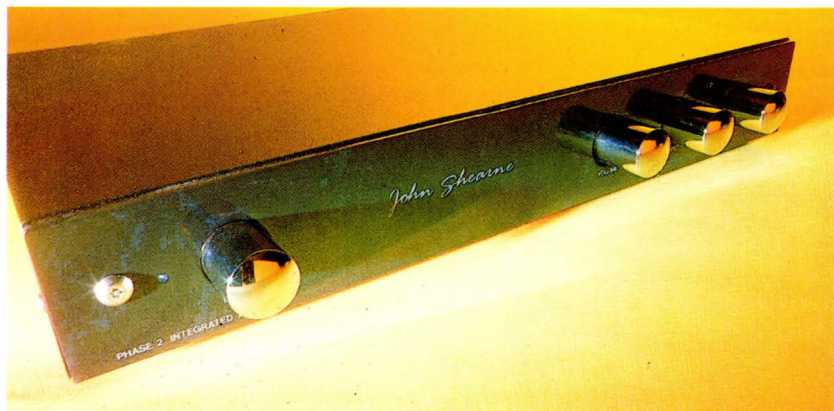
Phase 2 looks almost identical to the preamp section of the

more expensive *Phase 1* from the front, save for the lack of a balance control on the integrated's fascia. A phono stage is also conspicuous by its absence, because a vinyl disc input is considered to be less important in today's sub-£500 amplifiers.

The 50Watt *Phase 2* deliberately runs at less than full steam to aid longevity. Having such reserves of power means that it cruises through surprisingly difficult loudspeaker loads at neighbour-annoying levels without turning a hair. Ultimately, partnering *Phase 2* with an amp-killing speaker like a big Apogee would not be a wise move, and the character of the sound does harden at extremely high volumes, but in the real world it never sounds under great pressure.

Strangely, the loudspeaker terminals are phase inverted. While it is accepted that some preamplifiers invert absolute phase (the Linn *Kairn*, for example), on an integrated amplifier it is surely easier to swap the loudspeaker terminals around than to leave it to the end user. Also, I find gaining access to the phono sockets difficult, as they sit just below the loudspeaker terminals. When using chunky loudspeaker cables, like the big Furukawa or AudioQuest stranded designs, getting at the

The *Phase 2* amplifier shows John Shearne making a bid for hi-fi domination.



VERDICT

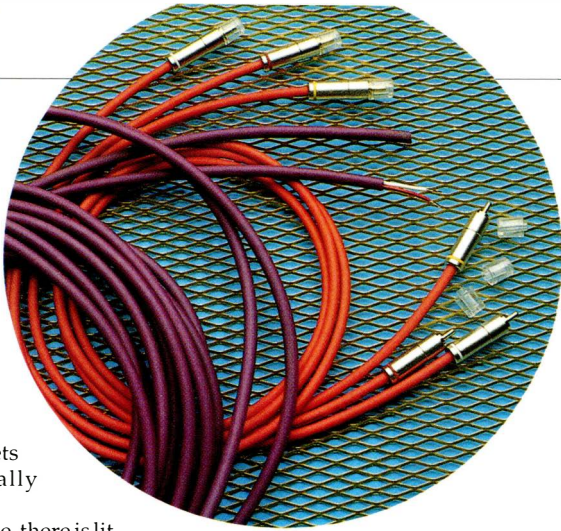
EAR The Head

★★★★★ £488.00

PROS: Solidly built. Whisper quiet, with a clean, tight bass.

CONS: Not quite as good as the £1,650 Tesseract TAHA.

▶ **ESOTERIC AUDIO RESEARCH, Unit 11, Stukely Meadows Ind Est, Huntingdon, Cambs. Tel: 0480 453791**



phono sockets is practically impossible.

That aside, there is little to criticise. The sound is on the rosy coloured side of neutral, with a warmth and naturalness that is highly alluring. It is best to make the *Phase 2* the cheapest part of the equipment chain as it shows up a lesser source, and it deserves a good pair of loudspeakers. I used both the Meridian 206 and Teac VRDS-10 CD players to head the system and pairs of ProAc *Response One 'S'* and Ruark *Templars* to make the noises. With each successive change of equipment, the *Phase 2* seemed more than happy to adapt. It treads the middle path, proving perhaps the perfect palliative to those who find the up-beat *Nait 2* strident or aggressive, and the neutral Audiolab 8000A too bland.

Which brings us to the thorny question of neutrality. Although it comes close, I don't believe the *Phase 2* is as tonally accurate as some in its class, yet its euphonic character is so beguiling that this seldom matters. Enthusiasts of the measured tones of the Baroque might prefer something a little more Audiolab-like, but the *Phase 2* is far more likely to find favour with people who have some Otis Redding in their CD collection.

It is adept at capturing the spirit and vibrancy of a performance, in a manner more commonly associated with expensive valve amplifiers.

VERDICT

John Shearne Phase 2

■■■■■ □ £495.00

PROS: Musical, vibrant sound, very un-hi-fi like performance.

CONS: Try getting to the phono plugs. Phase inversion.

▶ **JOHN SHEARNE,**
PO Box 22, Stevenage,
Hertfordshire SG2 8HF.
Tel: (0438) 740953

Only the timing can be found slightly lacking on complex rhythmic material, when set against the likes of the pacy *Nait 2*.

In some areas, such as the tight, deep bass and the Dexter Gordonesque coherence, the *Phase 2* sets the standard at the price. Its imagery and solidity are as good as produced by the finest of its rivals. All in all, the John Shearne *Phase 2* has a confident, distinctive character that will win over many listeners, and is unlikely to become an also-ran in 1993's £500 amplifier sweepstakes.

INTERCONNECT & LOUDSPEAKER CABLE

Furukawa cables

Furukawa interconnects and speaker cables have a formidable reputation as the one to beat in almost every manner. All the designs share a solid build quality that shows considerable research, and have a family sound that is often described as natural, detailed and well controlled. Unfortunately, the cables are priced a bit too high to be justifiable in every hi-fi.

Its latest range of cables go some way to redress this imbalance, as they are priced lower than the previous range. At £4.50 per metre, the new *FS-2T07* is £3 per metre cheaper than the existing bottom of the Furukawa speaker cable range, the Best Buy winning *FS-2T14*.

The new cable follows along the same lines as the more expensive Evencap and rope stranded designs, with something approaching 30 high purity PCOCC copper strands per side, separate red and white polypropylene insulators and a flexible, Victoria plum coloured, PVC jacket. With a cross sectional area of only 0.7mm², *FS-*

2T07 uses less copper than any of the existing Furukawa loudspeaker cables, but the difference between this and the existing *FS-2T14* shows the amount of research that has taken place between the two generations of cable.

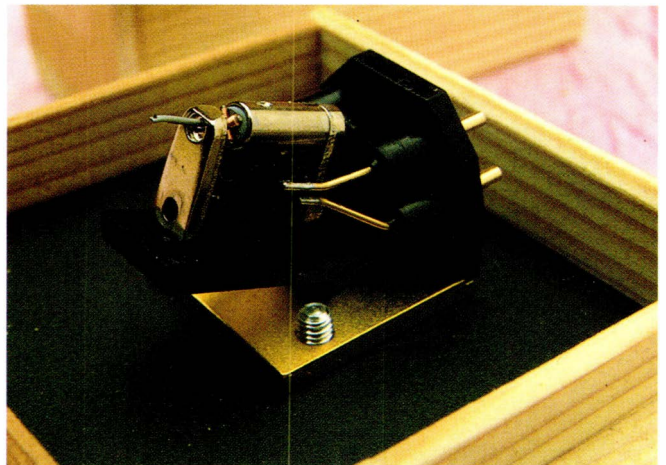
Sonically, the first impressions of the new cable reinforce this research. The *FS-2T07* matches the performance of *FS-2T14* punch for punch. I find '07 moderately less detailed and shut in than the former cable, but it does possess a rich, deep bass that clearly determines bass guitar runs. And as the previous *FS-2T14* achieved Best Buy status, I am confident that the *FS-2T07* will prove to be as popular.

Likewise, the new Vector interconnects repeat the concepts developed in the original cable range, except that they have changed the outer flexible PVC casing from dark blue to bright red. Once again, the £35 75ohm *FV-3010* digital interconnect and

ductor, surrounded by a high density polyethylene dielectric, that is further insulated by a foamed polyethylene and uses a 0.12mm diameter PCOCC braid, unlike the digital interconnect, that uses seven strands of 0.18mm PCOCC, a single polyethylene dielectric and a 0.1mm PCOCC braid.

This cable possesses the 'family sound' of the more expensive Furukawa cables; a sound that is slightly grainy, but nevertheless one that has plenty of air and a full, if somewhat indistinct bass. The more expensive cables, recommended in *Choice*, have the same clean, natural and exciting sound as the Vectors with more air and detail.

In fact, the entry-level Furukawa cables are so good, they almost undermine the existing range. The more expensive cables are still superior, but in low to mid price systems the Vector interconnects, especially the new *FS-2T07* should prove more popular.



the £70 unbalanced *FD-3010* CD to preamp cable look very similar but aren't, aside from sharing the same hermetically sealed gold plated phono plugs and an outer diameter of 5.3mm.

The analogue cables are made from 19 strands of 0.19mm PCOCC copper as a central con-

A true giant killer, the *Blue Point Special*, is an alternative to pricey high-end cartridges.

CARTRIDGE

Sumiko Blue Point Special

In the US, one name stands out above all others as the champion for the budget high-end analogue cause; the Sumiko *Blue Point* cartridge. At just under £100, the *Blue Point* high output moving-coil is gaining the same reputation over here, with people even making allowances for its midi system P-type mounting bracket.

Although more expensive, the £199 *Blue Point Special* (also known as *The Naked Truth*)

VERDICT

Furukawa cable

■■■■■ □ (£35, £70 and £4.50/m)

PROS: Well made, cheaper than standard Furukawa.

CONS: Furukawa sound will not suit everybody.

▶ **QUANTUM AUDIO LTD,**
22-26 Nelson street,
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needs no such allowances. It is designed for use with 'proper' tonearms, and as such lacks the plastic, bolt-on bracket fitted to its lesser sibling. It also lacks a body, which puts it in a class normally associated with the rarefied atmosphere of the serious high-end, as does the dainty little sandalwood box (just like a Koetsu).

Paradoxically, stripping away the body leaves the *BPS* looking substantially larger than the standard *BP* cartridge. The mounting plate and rear panel is bigger than average, which may cause fitting difficulties, especially with arms that adjust cartridge alignment at the headshell. I had no problems with my own *SME Model V*, although it was a tight squeeze, leaving little space between the rear of the cartridge and the front of the arm tube.

The *BPS* is a high-output moving coil cartridge which Sumiko considers has the best of both worlds, allowing delicacy and grace without having to resort to a step-up. Output of the *BPS* is a trifle low compared to most moving magnet cartridges, so a good, quiet and well-engineered moving magnet stage is essential.

The cheaper *BP* cartridge can sound remarkable in a variety of turntables and arms, but the *BPS* is selective about its partners. I tried both cartridges in a *Rega Planar 3*, a more prosaic platform than my own battery-powered *Pink Triangle Anniversary*, and found that the *Rega* was intrinsically better with the cheaper *BP*. On my own turntable, the quality of the *BPS* was immediately evident, easily outclassing its little brother.

It sounded as if the coloration was removed from the *BP* at the same time as the body. The standard *Blue Point* is quite transparent for the price, but the *BPS* strips away the thickening in the *Blue Point's* character and replaces it with a cleaner and more coherent performance.

The top-end is particularly noteworthy, with not a trace of the shrillness or splashiness attributed to middle-market cartridges. This correct sounding cartridge carries off its dis-

appearing act right down to the lower registers, and it is only here it starts to show its limitations. The bass sounds recessed with the occasional smear, albeit free from bloatedness, and simply lacks the 'rightness' of the rest of the *BPS* profile.

Prior to this I had been running in a Koetsu *Red K*, and having to remove such a top-rank cartridge, to replace it with a far cheaper model filled me with dread. However, after installing the *BPS* I wasn't as downcast as I had expected.

In some respects the two measured up fairly well but had different perspectives. The *BPS* is a notably neutral performer compared with the Koetsu's romance and musicality. Ultimately, the *BPS* lacks the beauty and richness of the *Red K* and sounded almost harsh by comparison, but it still left the contest with its giant-killer crown intact, if a little askew.

I cannot praise the Sumiko *Blue Point Special* highly enough. It's not an alternative for an expensive high-end cartridge but those with a good turntable who don't want to scale the extravagant heights of real high-end cartridges should take note, as it allows music at a price normally associated with mere hi-fi.

VERDICT

Sumiko Blue Point Special

■■■■■□ £200.00

PROS: Neutral, open and musical qualities.

CONS: Fragile. Bass tends toward imprecision.

▶ **PATH PREMIERE,**
Desborough Ind Park,
Desborough Pk Rd, High
Wycombe, Bucks, HP12
3BG. Tel: (0494) 441 736



TUNING DEVICES

Harmonix

The Japanese Combak Corporation, inventors of the Harmonix range of tuning devices, claim to have addressed one of the last areas of hi-fi tweaking: equipment resonance. As with many of the more off-the-wall tweaking devices, the underlying physics is rather vague, but at least it appears to be based on empiricism, rather than black magic.

It is claimed that Harmonix' inventor Kazao Kiuchi has spent the last thirty years attempting to find an objective reason for the sonic differences between acoustic instruments. From this research, he suggests that when a hi-fi component is tuned to resonate in a consistent manner, the sound quality of the system as a whole is improved.

In a review of Harmonix in the American magazine *Stereophile*, Martin Colloms has suggested that the effect is closer to dissipation of feedback than resonance control, as claimed. He draws the analogy of the action of small balancing weights on a flywheel, and has discovered measurable differences with the *RFS-65* feet, which seem to tally with the audible changes.

We looked at four products

Tuning devices, do they really make a sound difference?

in the range; the *RF-56* tuning bases, at £125 for eight, designed to stick on to the audio component itself, the £277 *RFS-65* feet, the £69 *RF-413* cable rings and the removable *RF-11* CD sheets, at £17.95 for eight.

I used Harmonix on a variety of different systems, from about £800 to over £12,000. In particular, I looked for systems belonging to people and dealers unconnected with Harmonix, such as Uxbridge Audio in Chiswick, who I knew would greet the tuning system with the cool welcome of healthy cynicism. I also sought the advice and comments of high ranking Harmonix black belts, like John Smith of KJ West One.

Refinement is the *raison d'être* of the Harmonix system. The CD tuning sheets add subtlety and sophistication, appearing to improve the definition of instruments in the soundstage while removing some of the hardness and glare that often undermines the CD format. It is particularly good at making the best out of a bad disc, as the lack of harshness together with the improvements in soundstaging help a lot.

Paul Messenger found that the CD sheets did not work all that well with a Naim *NACDS*

CD player, which is not too surprising as this is one of the few players around that takes the vibration of the spinning disc into account. In addition, a few discs actually sound worse after the addition of the CD sheets, regardless of player, but as the sheets are easily removable, this is not a problem.

On the hardware side, the RF-65 tuning bases produced dramatic and consistent results when fitted to the bass drivers of a decent pair of loudspeakers, especially on speakers with acoustically live cabinets. Whichever loudspeaker was selected, the Harmonix bases seemed to remove unwanted resonance and muddling in the midband, without changing its fundamental characteristics. It's not possible to tune your Wharfedale *Diamonds* to sound like Quad *Electrostatics*, but Harmonix will try to get the best out of the *Diamonds* in the first place.

Subtle refinements

The effects seem to be more profound as the cost of the equipment rises, but there are still subtle refinements to be had at any price level. Cheaper loudspeakers can almost be transformed by Harmonix, although there is often a trade-off; the effects of small scale tuning improves the loudspeaker in some ways, but also shows up the limitations in the loudspeaker itself.

The wood and metal tuning feet (RFS-65) also provide dramatic changes to the sound of a component like a CD player. Once again, the effect is profound, improving clarity, focus and imagery, although I feel that a good CD player is needed to really show their worth. Placing the feet under an Arcam *Alpha plus* CD player brought about the most dramatic and positive change in a lower priced system, but in this context it is more logical to spend the money on a

better CD player. However, once the overall cost of the system reaches really silly levels, the improvements generally become even more dramatic and worthwhile.

The RF-413 cable rings have the most subtle effect of all the Harmonix devices — so subtle that it all but escaped my ears on a number of systems. Whereas the other tuning devices work on improving the coherence of the system from top to bottom, the rings appear to work on the high frequencies alone, clearing away mush that we often take for granted, and making the high frequencies sound more natural and less hi-fi. Once again this works best with high-end components.

The changes brought about by the Harmonix system are largely consistent and repeatable. There were some who were cool about using Harmonix, saying that it is difficult to justify the price for a set of small tuning devices. Some also stayed clinging to their untuned system, preferring its hi-fi-like aspects over the smoother sounding Harmonix system.

In last month's *Personal Messages*, Paul Messenger mentioned that after using the Harmonix bits for a month he did not miss their removal over-

Wringing more from the grooves, the Ringmat 200.



TUNING DEVICES

Ringmat 200

The Ringmat is a turntable mat that was developed jointly by amplifier specialist DNM Design, and QR Design (Quality Records) a wing of Brentwood Music run by John Rogers. Both John and Dennis Morecroft of DNM are keen vinyl enthusiasts (DNM is currently developing a turntable of its own called *Rota*). Feeling that existing record interfaces weren't doing a great job of aiding the extraction of information from the grooves, they were inspired to design the Ringmat.

This is a circular disc made of card to which three cork rings are attached and arranged so that two rings sit on the platter and support the single ring that interfaces with the record. It is designed to be used instead of existing mats or on top of otherwise matless platters. The theory behind the Ringmat is that 'scientific' placement of the rings minimises the amount of stylus induced record vibration that remains in the vinyl. Basically it is supposed to act as a drain or valve for this unwanted energy, and being a very lightweight affair it has little chance of storing energy and releasing it back into the record.

much. I would tend to agree with him, although I find their overall decongestant properties to be quite difficult to live without in some systems. Broadly speaking the effects are more decorative than fundamental — but the same could be said of your pet cat.

It could be that, in a few years time, Harmonix will be considered as important as the aftermarket cable industry. Ultimately, the proof of the worth of Harmonix will be in its addictive nature. Within six months, your Harmonix habit could easily take hold; you can't sleep or eat and you have turned to crime, just to pay for the next set of tuning dots. There's no way that I'm going to become an addict, I just do Harmonix a bit; I could give up anytime...

VERDICT

Harmonix Tuning Devices

■■■■■■ £various

PROS: Repeatable (even measurable?) performance.

CONS: Superficial improvements in certain systems.

▶ **ABSOLUTE SOUNDS LTD,**
58 Durham Road,
London SW20 ODE.
Tel: (081) 947 5047

The Ringmat comes in three different thicknesses (2, 2.5 and 3.3mm) so that it can be used to replace different thickness mats where arm height adjustment is not possible. The least expensive is the £25 Ringmat 200 which I tested on my otherwise matless Voyd turntable, the wonderfully easy to adjust SME IV arm absorbing the extra 2mm in record height without difficulty.

The results were wholly positive if quite subtle, the most obvious effect being an increase in high frequency resolution which improves definition and gives harmonics a better chance of being heard. Dynamic contrasts also seem improved, the difference between crescendos and lulls in music gaining in emphasis and the levels of different instruments attaining greater variety.

With some records the treble

resolution factor could sound like tonal exaggeration, but having tried a variety of acoustic recordings I suspect that this was less the fault of the mat than the LP being played.

I took the Ringmat down to Paul Messenger's on the day that we went to town on the *Air Partner* horn loudspeakers featured in *Statements*. Using his Armageddon LP12/Naim Aro/Audio Note IO deck and the frighteningly revealing *Air Partners*, the mat had a more distinct brightening effect, resulting in a leaner and less appealing balance. Whether this was a more accurate representation of the records being played or the result of subtle variations in VTA (which the IO is generally pretty immune to), or more likely, a reflection of the difference in resolving powers between the APs and conventional loudspeakers is open to debate. Suffice to say that in that system, with those records, a conventional felt mat was preferred.

In the context of my own, still very revealing system, I found I preferred the Ringmat and will carry on using it. Given that my Audio Note AN-Es are more representative of most loudspeakers, I think that it's safe to recommend the Ringmat to vinyl enthusiasts (or the 'illuminated ones' as they should be known) everywhere.

VERDICT

Ringmat 200

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ **£25.00**

PROS: Improves resolution of high frequencies, dynamics.

CONS: In very high res systems it can sound a bit lean.

▶ **RINGMAT DEVELOPMENTS,**
PO Box 200, Brentwood,
Essex CM15 8QG.
Tel: (0277) 200210

LOUDSPEAKERS

Avondale Audio RMS

One day last year I spent an enlightening few hours in the listening room of a long term client of Avondale Audio. The system was turntable-based, and the two three-way speakers were actively driven by six

power amps and a modified Naim preamplifier. This little lot, together with outboard crossover networks and a turntable which could be described as the industry's best kept secret, had one thing in common: all were designed by Avondale's Les Wolstenholme. Indeed, a Nottingham Analogue arm and Kiseki cartridge were the only non-Avondale items in the system.

The mixture of clarity, transparency, dynamics and sheer excitement was utterly devastating. I had previously heard the speakers in the Mana room at Penta 1990, and again at the 1991 Chesterfield Hi-Fi Show. On each occasion my curiosity was further aroused, and Les kindly agreed to supply a pair for further investigation.

The £1,440 RMS *Metal Monitors* use two bass/mid units and a tweeter per enclosure with a port built into the lower front of the (price included) stand. The *Metal* in the product title is no mere macho posture, since both textured black cabinet and stand are made from it. The speaker is fastened to the stand via a thick threaded bolt which runs from stand base up to cabinet top face, secured by sturdy nuts at each end. Rigid? You're not kidding. Heavy? Ditto. A triangular metal base houses three spikes, while the stand columns have three pairs of Michell binding posts to facilitate tri-wiring or tri-amping.

For future flexibility, the crossovers are supplied in separate plastic boxes, so passive to active conversion will be relatively fuss free.

Pink Triangle *Anniversary/SME IV/AT OC9* and Marantz *CD80/Digilog* source components were used for the evaluation, along with pre and power amps either tweaked or designed from scratch by Avondale Audio. Sensitivity seems subjectively quite high, so low powered valve amps are a feasible alternative to beefy transistor designs. The requirement for both sources and amps, however, is quality, not quantity. These speakers are so stunningly transparent that they will embarrass anything of less than excellent pedigree.

My experience with them has been one of re-discovery; I have heard much of my record collection as never before. The combination of raw Sixties production and spacey effects on The Byrds *Fifth Dimension* was a heady mixture, with cosmic keyboards swirling between the speakers. The group's legendary harmonising was revealed in discrete layers, and studio multi-tracking could easily be discerned from the natural three or four part harmonies.

I was staggered by the way the *Metal Monitors* captured the ambience of the various recording venues on early sacred music CD recordings, together with the general mood of each work. On Abbess Hildegard Of Bingen's *Feather On The Breath Of God* (Hyperion), it was as if the year eleven hundred and something had been transported into my listening room.

The one caveat is that these speakers' sheer lucidity makes them rather fussy about the partnering source and amplification. In short, they will not suffer fools, but at no time during a lengthy spell did their revealing nature develop into fatigue. Designer Les Wolstenholme feels that the hi-fi art can only be advanced with components of a neutral and transparent nature, and the *Metal Monitors* are a testament to these beliefs. Those who wish to hear both the unbridled truth

and full potential of their recordings and system should seek them out.

VERDICT

Avondale RMS Metal Monitor

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ **£1,440**

PROS: Impressive, lucid and highly revealing.

CONS: Can be too revealing of some recordings.

▶ **AVONDALE AUDIO,**
The Hollies,
Avondale Road,
Chesterfield S40 4TF.
Tel: (0246) 200096

Digital Audio Broadcasting - the future of radio?

After digital disc and digital tape, the next music source expected to go digital will be radio, and Digital Audio Broadcasting (DAB for short) is likely to happen sooner than previously anticipated. Although originally not due until the turn of the century, the BBC is now planning to start full test transmissions in the London area later this year. If successful, these DAB transmissions will continue until the service is officially opened in 1995 or 1996.

DAB has been a dream of radio engineers ever since the

Metal Monitors have great lucidity but won't suffer fools gladly.



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BARTLETTS SUGGESTED SYSTEMS

The Bartletts Suggested systems listed below are supplied with either the Dual CS 503-2 or Revolver Rebel turntable, an alternative Turntable or CD player are available at extra cost, see below for details. All systems are supplied with 8 metres of 79 strand loudspeaker cable, QED 4mm banana plugs are available at a cost of 1.00 each. Carriage & Insurance are free for all deliveries on the U.K. mainland. Prices correct at time of printing but are subject to change without notice. E&OE.

SPEAKERS	W/Dale Delta 30.2 JPU' Sonata Vinyl Celestion DL 4 II Celestion One	Mission 760 i Tannoy 603 JPU' Sonata Wood W/Dale Diamond 4 Roud A7 II Celestion 3	Celestion 5 BeU' DM 600 Tannoy 605	Mission 761 i	Tannoy 607 BeU' DM 610 Celestion 7 Marantz DS 110	Mission 762 i Rogers LS2a2 Cerwin Vega AT20	Tannoy 609	Rogers LS 4a2 BeU' DM 620 Cerwin Vega AT40 Marantz DS 220
AMPLIFIERS								
Marantz PM 32	329.95	345.95	373.95	389.95	409.95	429.95	449.95	489.95
Marantz PM 30 SE	339.95	355.95	383.95	399.95	419.95	439.95	459.95	499.95
Marantz PM 40 SE	403.95	419.95	447.95	463.95	483.95	503.95	523.95	563.95
Nad 302	339.95	355.95	383.95	399.95	419.95	439.95	459.95	499.95
Nad 304	371.95	387.95	415.95	431.95	451.95	471.95	483.95	523.95
Rotel RA 920 AX	332.95	348.95	376.95	392.95	412.95	432.95	452.95	492.95
Rotel RA 930 AX	343.95	368.95	396.95	412.95	432.95	452.95	467.95	507.95
Sony TAF 540 E	395.95	411.95	439.95	455.95	475.95	495.95	515.95	555.95
Yamaha AX 550	403.95	419.95	447.95	463.95	483.95	503.95	523.95	563.95

CD PLAYER INSTEAD OF CS 503-2 / REBEL

Aiwa XC 300	Deduct 5.00
Aiwa XC 700	Add 30.00
Denon DCD 590	Add 28.00
Denon DCD 690	Add 50.00
Denon DCD 890	Add 116.00
Marantz CD 42 II	Add 44.00
Marantz CD 52 II	Add 74.00
Marantz CD 52 SE II	Add 150.00
NAD 502	Add 50.00
Philips CD 634	Add 10.00
Philips CD 930	Add 15.00
Philips CD 940	Add 50.00
Philips CD 950	Add 200.00

Rotel RCD 955 AX	Add 110.00
Technics SLPG 420	Add 10.00
Technics SLPG 520	Add 50.00
Technics SLPS 620	Add 80.00
Technics SLPS 700	Add 120.00
Technics SLPS 900	Add 200.00
Sony CDP 497	Add 10.00
Sony CDP 797	Add 50.00
Yamaha CDX 460	Add 20.00
Yamaha CDX 560	Add 50.00
Yamaha CDX 660	Add 100.00
Yamaha CDX 860	Add 150.00

IMPROVED TURNTABLES

Dual CS 430	Deduct 14.00
Dual CS 505-4	Add 56.00
Thorens TD 280 II'	Add 64.00
Systemdek IIX 900 Moth AT 110e	Add 146.00
Systemdek IJ920 Moth AT 110e	Add 100.00



BARTLETTS HI-FI GUARANTEE
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development of Compact Disc, although it was initially believed that this would use up far too much of the limited and strictly rationed airwave spectrum. A single PCM-encoded digital broadcast would, for example, take up as much as a dozen normal FM stations. But research by a group of companies under an EC Eureka broadcasting project umbrella has developed a system that fits a digital service into a similar amount of spectrum as traditional FM transmissions, while producing 'near-CD quality' digital sound that should also prove less prone to interference.

To do this DAB combines two relatively recent developments. Audio data reduction reduces the amount of information that needs to be transmitted, while a new transmission format is used which is both very efficient and resistant to the multi-path reflections that cause the fading and distortion with in-car FM.

The Musicam codec (encoder/decoder) DAB data reduction format is also now the internationally agreed standard

for broadcast data reduction, approved after both comprehensive technical and listening tests. It works like the systems used for DCC and MiniDisc and is reckoned to be at least as good, if not better, than either. A Musicam-based DAB system should be capable of transmitting high quality audio while using only a fifth of the data needed for CD-style PCM encoded digital signals.

The DAB transmission system works on a quite different principle from AM or FM radio. Instead of one station per frequency, DAB merges the data of five or six onto a 'block' of frequencies 1.7MHz wide.

Intolerance to 'multi-path' signals is the main reason that FM stations cannot be transmitted on the same frequency right across the country. In a border area between two transmitters the signals would be received at fractionally different times depending on how far you are from each transmitter, and the resulting multi-path confusion would destroy the reception. This is why adjacent transmitters have

to operate wastefully on different frequencies—and therefore why you have to keep re-tuning when you travel up and down the motorways.

The Coded Orthogonal Frequency Division Multiplex (COFDM) transmission format used by DAB is less easily confused by reflections bouncing off buildings or signals coming from other transmitters. Consequently, national stations can be transmitted on the same frequency throughout the country. So although each six-station DAB block uses almost as much space as ten FM stations, the ability to use the same frequency for each station throughout the country makes DAB a more efficient user of radio spectrum.

The UK plans to have two national DAB frequency blocks, giving a total of twelve national stations. Local stations will get one block in rural areas and two in the cities, putting the number of local DAB stations up to a maximum of twelve.

The UK will use frequency bands around 60MHz and 220MHz, as these are our only

suitable and available slots. However, co-ordinating the DAB frequencies across the world will be problematic, as each country is responsible for its own frequency allocation and has different ideas on what should go where in the radio spectrum. Some countries, including France, may have to use frequencies as high as 1.5GHz, so the first DAB radios currently being developed by Philips, Thomson, Telefunken and Blaupunkt will have to cope with this wide frequency range, tuning in between 60-220MHz and using a transposer to drop the 1.5GHz signals down into this range.

The first DAB units will be in-car systems with a dashboard front end and most of the electronics in a box in the boot. Prices are likely to start high, similar to DCC/MiniDisc in-car players, but with services expected to be up and running in most European countries by 1996 at the latest, manufacturers are hoping demand will soon lead to a fairly rapid drop in price by the end of the century.

New Digital Recording Technology HDCD

As mentioned in last month's Las Vegas show report, one of the main talking points was a CD called *Testament*. Inevitably, at a hi-fi show, the interest was primarily the technology used in its creation rather than the music, for *Testament* is the first disc to feature HDCD or High Definition Compatible Digital.

This is an encoding/decoding system jointly developed by Reference Recordings and San Francisco based Pacific Microsonics which allows a larger amount of relevant musical information to be recorded onto a digital format than existing 16-bit technology. It is also, as the name suggests, compatible with existing CD players. Which sounds rather like Sony's SBM (Super Bit Mapping) system, except that in this instance even better results should be achieved with HDCD decod-

ers when they become available.

The catalyst for this development was Reference Recordings' Keith Johnson, who was dissatisfied with the quality of his digital master tapes. The technical wizardry came from Michael Pflaumer, the man who invented the TOPS computer networking system. At present there is scant technical information available on HDCD, but from what I can glean it involves using 20-bit recordings along with a form of data compression to eliminate unwanted information, which sounds rather like ATRAC or PASC but in the context of the larger information storage capacity of CDs.

Pacific Microsonics is in the process of developing hardware for both the professional encoding and mass market decoding processes. It intends to reduce decoders to a single IC chip which can be fitted to both CD players and DACs, and should

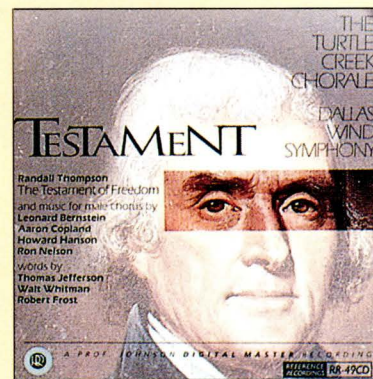
be ready by January next year.

At present Reference has released a six track HDCD sampler, *Testament (RR-49CD)*; which is a collection of American choral works, and *Dick Hyman Plays Duke Ellington (RR-50DCD)*, a piano work billed as the world's second direct to CD recording. I have listened to both discs and have to say that even in undecoded form they represent a significant step forward for digital audio. The music on both discs has greater architectural solidity and image depth than one generally encounters on CD, yet retains the familiar Reference character.

To be frank the music on both discs is not really to my taste, which is bound to limit my enthusiasm somewhat, but both are good enough to make me look forward with relish to the first HDCD decoders. It's a pity that there aren't any non HDCD Reference Recordings of the same

sessions; the comparison would be revealing and perhaps as inspiring as the demo that Pacific Microsonics has given to the American press. Even that staunch defender of analogue faith, *The Absolute Sound*, admits that the effects of encoding and decoding an analogue signal with HDCD are remarkably benign.

Both *RR-49* and *RR-50* appear in our mail order pages. If you fancy getting in on the start of something big, I'd suggest you check one out.



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Home recording from copyright sources is currently illegal in the United Kingdom.



PHILIPS

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Comet, Bristol 0272 591445
John Lewis, Bristol 0272 279100
F.H. Moss, Bath 0225 465085
Radford Hi-Fi, Bristol 0272 428247
Paul Roberts Hi-Fi, Bristol B51 0272 250760
Paul Roberts Hi-Fi, Bristol B57 0272 429370
Paul Roberts Hi-Fi, Weston-super-Mare 0934 414423

Bedfordshire
Tavstock Hi-Fi, Bedford 0234 356323

Berkshire
B&B Hi-Fi, Reading 0734 583730
V.A. Climo & Sons, Maidenhead 0628 21765
Heelas, Reading 0734 575955
C.F. Lake, Slough 0753 538288
Reading Hi-Fi Centre, Reading 0734 585463

Buckinghamshire
Currys, Milton Keynes 0908 690084
C.F. Lake, Aylesbury 0296 25119
C.F. Lake, High Wycombe 0494 42666
John Lewis, Milton Keynes 0908 679171
The Power People, Aylesbury 0296 394977

Cambridgeshire
John Lewis, Peterborough 0733 44644
Andrew McCulloch, Cambridge 0223 351825
Robert Sayle, Cambridge 0223 61292

Cheshire
Currys, Stockport 061 476 6649
Martin Dawes, Altrincham 061 941 2131
Martin Dawes, Crewe 0270 256820
Martin Dawes, Stockport 061 480 1120
Martin Dawes, Warrington 0925 36215
John Littler, Warrington 0925 812963
Miller Brothers, Cheshire 0532 441616
New Dawn Hi-Fi, Chester 0243 324179
Tomorrow Studios, Chester 0244 320414
Yeoman & Russell, Altrincham 061 941 3131

Cleveland
Action Acoustics, Redcar 0642 480723
Miller Brothers, Stockton 0642 875234

Cornwall
ETS, Penzance 0736 64274
ETS, St. Austell 0276 75400
ETS, Truro 0209 79809

Cumbria
Sidney Bakewell, Penrith 0768 62319
Brooks Music Centre, Whitehaven 0946 692116
Kenneth Gardner, Kendal 0329 21953
The Hi-Fi Centre, Barrow-in-Furness 0229 38757
Misons Sound & Vision, Carlisle 0228 22620
Peter Tyson Hi-Fi, Carlisle 0228 46756

Derbyshire
Chesterfield Co-op, Chesterfield 0246 220200
Logic Electrical, Derby 0773 743411
Logic Electrical, Heanor 0773 759680
Manton Electronics, Derby 0332 48369
Miller Brothers, Derby 0332 678167
David Robinson, Buxton 0298 27933
F.L. Smith Electrical, Chesterfield 0246 823167
Roy Smith, Chesterfield 0246 34953

Devon
Chelston Hi-Fi, Torquay 0803 606863
Dingles, Plymouth 0752 266611
Ford & Sons, Sidmouth 0395 512501
James Television, Barnstaple 0271 43731
Plymouth & Devon Co-op, Plymouth 0272 662800
Radford Hi-Fi, Exeter 0392 218845
Radford Hi-Fi, Plymouth 0752 226011
Radford Hi-Fi, Torquay 0803 326723
Upton Electronics, Paignton 0803 551329

East Sussex
Adams & Jarrett, St. Leonards-on-Sea 0424 437165
Sevenoaks Hi-Fi, Brighton 0273 733338
Smythe & Barne, Eastbourne 0323 29192

Essex
Alders, Basildon 0268 527858
Audio T, Ilford 081 518 0915
Chew & Osborn, Epping 0992 574242
Chew & Osborn, Saffron Walden 0799 523728
Vernon Collard, Rayleigh 0268 776702
Currys, Chelmsford 0245 496330
Currys, Romford 0708 863026
House of Fraser, Lakeside 0708 891006
Hyper Fi, Barking 081 591 6961
Levett & Ward TV, Colchester 0206 210844
Miller Brothers, Grays 0708 867231
Sevenoaks Hi-Fi, Witham 0376 501733
Tempo Electrical, Harlow 0279 454375
Woolmans, Basildon 0238 285922
Woolmans, Ilford 081 478 4455
20/20 Audio Visual, Grays 0708 891898

Gloucestershire
Audio T, Cheltenham 0242 583960
Cavendish Video, Cheltenham 0242 521300
Cleartone Hi-Fi, Gloucester 0452 419777
Hutchinsons, Cheltenham 0242 573012
Sevenoaks Hi-Fi, Cheltenham 0242 241171

Greater Manchester
Cleartone Hi-Fi, M3 061 835 1156
Currys, M40 061 274 3255
D & T Electronics, M20 061 445 2694
Kendals, Manchester 061 832 3414

Hampshire
Audio T, Basingstoke 0256 24311
Bryants Hi-Fi, Aldershot 0252 20728
Currys, Southampton 0489 581872

Hemmings Hi-Fi, Farnborough 0252 547095
Sinclair Youngs, Basingstoke 0256 28623
Suttons, Salisbury 0222 727117
Tyrrell & Green, Southampton 0703 227711

Hereford & Worcestershire
Hereford Hi-Fi 0432 268922
Miller Brothers, Droitwich 0905 770699
Hi-Fi Preston Television, Malvern 0684 575594
Naam Hi-Fi, Vision, Worcester 0905 726375

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Currys, Stevenage 0438 740240
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John Lewis, Welwyn Garden City 0707 323456
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Invicta, Dartford 0322 223444
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Sevenoaks Hi-Fi, Canterbury 0277 462787
Sevenoaks Hi-Fi, Chatham 0634 846859
Sevenoaks Hi-Fi, Sevenoaks 0732 495555
Sevenoaks Hi-Fi, Tunbridge Wells 0892 531543

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Martin Dawes, Bolton 0204 35462
Martin Dawes, Preston 0772 53266
Martin Dawes, Wigan 0942 492351
Kenneth Gardner, Blackpool 0253 852412
Kenneth Gardner, Lancaster LA1 0524 54328
Kenneth Gardner, Lancaster LA1 0524 64328
Harry Garlick TV Centres, Barmsey 0282 37118
Goodnights, Preston 0772 57528
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Sevenoaks Hi-Fi, SE18 081 855 8016
Studio 99, NW6 081 624 8855
Tempo Electrical Discount, W8 071 937 5166
Tempo Electrical Discount, E4 081 529 9176
Tempo Electrical Discount, N12 081 445 6392

The Studio, N8 081 340 7775
Wallace Heaton, W1 071 629 7511

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Beaver Radio, Liverpool 051 709 9898
Better Hi-Fi, Liverpool 051 227 5007
Colourvision Plus, Liverpool 051 524 3333
Comet, Liverpool 051 228 8032
Currys, Liverpool 051 228 3287
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Martin Dawes, St. Helens 0744 34416
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George Henry Lee, Liverpool 051 709 7070
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Tomorrow Studios, Southport 0704 531500

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Currys, Hayes 081 573 9353
Currys, Ruislip 081 422 1115
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Bonds, Norwich 0603 660021
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Hughes TV, Swaffham 0760 24939
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R.C. Snelling, Norwich 0603 712202
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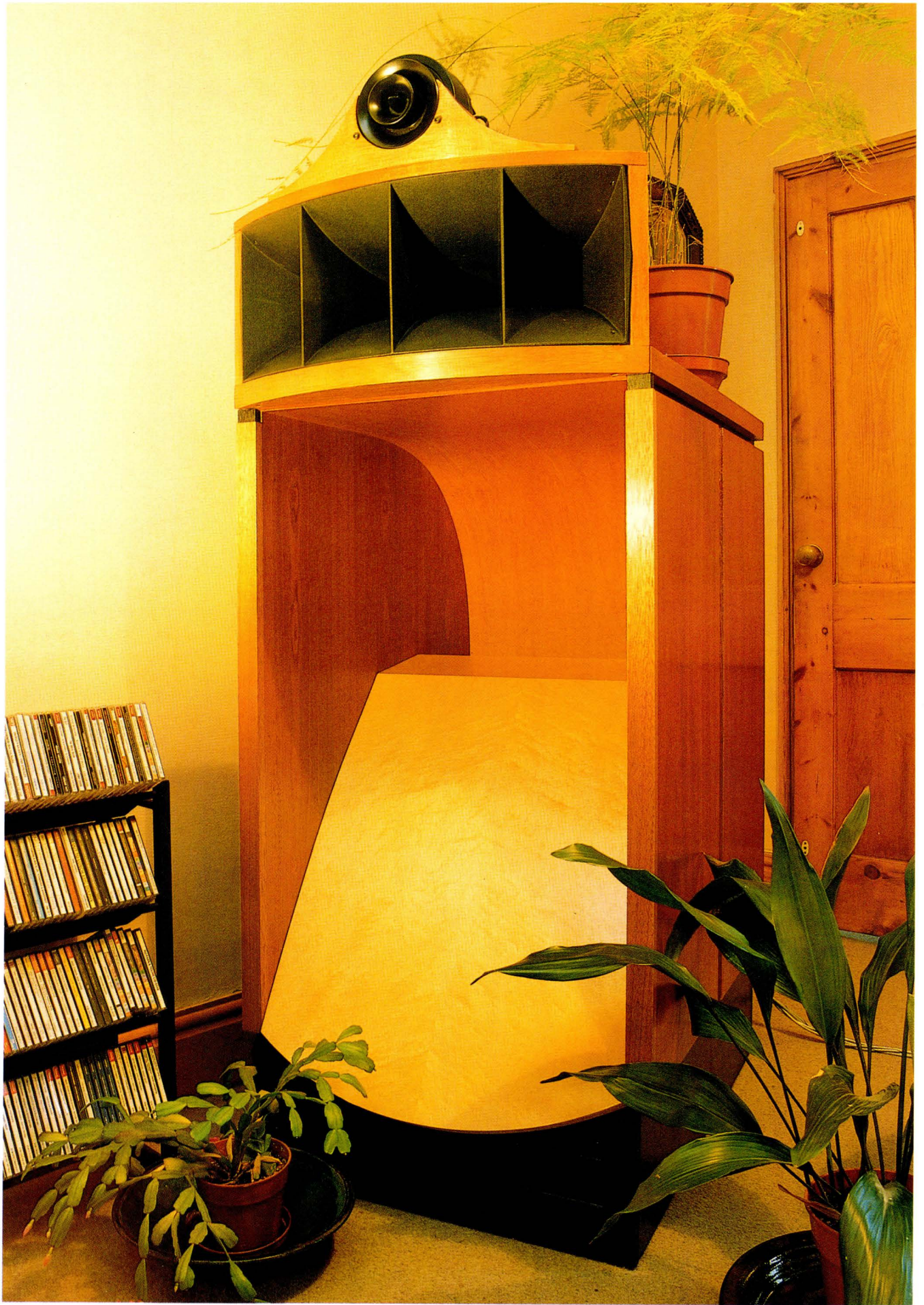
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Statements

I'm a sucker for big loudspeakers, so when the rumour mill decided a giant pair of UK-built audiophile horn speakers had stolen the show at Penta last year, I put my name down on the waiting list. However, having missed the Penta dem completely, I was ill-prepared for the monstrosities which turned up.

We're talking 'serious intrusion into personal space' here. Even though the enclosed volume isn't all that different from the Tannoy *Westminster Royal* horns I've been using regularly this past twelvemonth, the *Partner's* assertiveness makes the *WR's* cocktail cabinet shape seem a masterpiece of discretion. Looking more like a lighthouse or railway engine, complete with built in toddler slide, contrasting veneers give a welcome art deco echo, though most visitors' reactions ranged from hilarity to horror. I suppose aesthetic judgements should be left to the reader and the photograph; I suppose its mother loves it too . . .

In the Air tonight

I wouldn't say we ever got used to the way they took over and dominated the lounge, but the end of a three week stay turned out to be much more an occasion for mourning than celebration. The *Partner's* definitive and uncannily convincing authority through the most important octaves of the audio band is sorely missed, and probably irreplaceable. In vital respects it's unrivalled in my experience, though as is always the case, especially with very large loudspeakers, there are downsides to the package too.

Aside from a pricetag close on twelve grand, two of the most obvious features

Who said small is beautiful? The huge Vitavox drive units in the Living Voice *Air Partners* claim that bigger is better.

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hi-fi component is the

magnificent Living Voice Air

Partner horn loudspeaker,

reviewed by Paul Messenger.



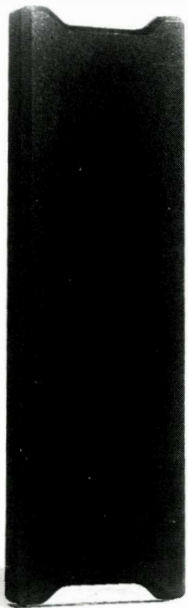
are prodigious depth and an unusually high tweeter. (A third dawns on you if you make the mistake of trying to move one.) My normal review procedure is to take in-room frequency balance measurements with the speakers in two places, one set with their backs close to the wall, another with the front panel a metre out from the wall. This is the first speaker I've encountered that meets both conditions at the same time. Since the tweeter is high enough off the floor to eyeball a six-footer in stocking feet, candidates for *Air Partners* are going to need a very decent size room — a properly integrated

soundfield is only really achieved when seated at least three and preferably four metres from the wall against which the speaker is placed.

Aside from such practicalities, which are mainly a function of the large and essentially simple (Z-shaped, non-bifurcated) bass horn, at least LV has tried to do something with the styling. The bass cabinet is veneered over high density plywood with sides some 35mm thick, and even the separate midrange horn that sits on the top is a real struggle for one person to carry, as the cast metal horn is surrounded and damped by a sand-filled wooden jacket. Huge magnets for each of the three drivers all help to provide exceptionally high sensitivity, aided of course by high efficiency horn loading.

The Living Voice operation may be entirely new, functioning from Nottingham specialist dealer Definitive Audio, but high quality horn loudspeaker technology has deep, if sometimes all too easily overlooked British roots. For the *Air Partner*, LV has tapped into the knowhow and experience of the long established and highly respected Vitavox operation, especially for the bass and midrange horns, while another strictly professional (US) supplier, Gauss, is responsible for the tweeter. The big 15 inch bass driver is hidden down inside the Z-shaped horn, its back left effectively open on our samples though a closed back option is available (and probably better avoided, in the light of our experiments). The high power handling crossover is remarkably simple for a three-way design, and fed from twin terminal pairs for bi-wire/-amping (the bass being kept separate).

The initial set-up session was a bit fraught, the *AP* delivering fascination and frustration in almost equal measure. It



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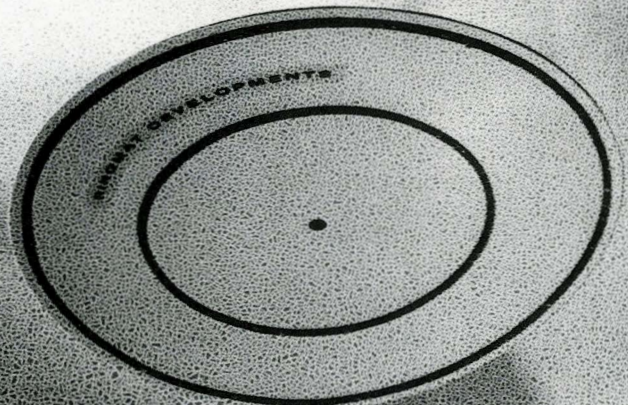
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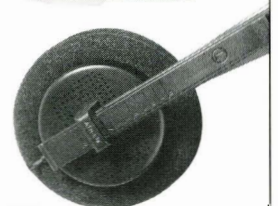
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Even the Gauss tweeter is absolutely vast, designed for professionals.

was the usual big speaker story — a little bit of heaven (rather a lot in this case actually) and a little bit of hell, which you just have to put up with and get used to. Utterly captivating and convincing throughout the vital range covering the main musical fundamentals, at the same time the overall balance remained rather dark and shut in, with some loss of air and higher harmonics.

The main clues to the *AP*'s strengths and weaknesses were very clearly highlighted by my usual in-room response plots. The most strikingly impressive finding is a real world broad-band sensitivity that registers an amazing 101dB even by my notoriously conservative ratings. This is 5-6dB higher even than the *Westminster Royals*, around 10dB above the Naim *DBL*, and something like 14dB above the average bookshelf loudspeaker. What this means in practice is that you can throw a party simply by directly connecting up a Walkman — or reach ear-shattering levels from any normal hi-fi system. This also means that you can get away with a very low power purist amplifier like a 3Watt single ended triode valve design (see later).

For such a large model, the *AP* also delivers an unusually smooth and even frequency balance, albeit across a rather limited bandwidth. The near five octave 100Hz-2.5kHz range is held within tight ± 3 dB limits, while relaxation to ± 5 dB extends the compass to 40Hz-4kHz. Either side things are rather less encouraging. The bass rolls off quite rapidly below 50Hz, registering -15dB at 30Hz,

while the presence/treble falls away a total of 9dB from 2kHz to 5kHz, and a further 9dB between 7kHz and 20kHz.

The designers mentioned an attenuating resistor in series with the feed to both mid and treble units, so I experimented with its complete and partial removal, to some good effect, eventually settling for feeding just the tweeter directly (via only its choke). This doesn't clear the presence band dulling, but does add some extra openness.

Although the balance limitations at both frequency extremes define one coloration element in the *Air Partner's* character, these are comparatively minor blemishes in the context of absolutely extraordinary speed and dynamic capabilities.

Ultimately, the *AP* is probably rather too revealing for its own good, so that finding partnering apparatus which is able to do it justice is going to be far from easy. I tried some half dozen reputable amplifier systems during the three week period, and the *AP* ruthlessly revealed inadequacies in each and every one.

Giving yourself Airs

My first impression, that the *AP* was quite seriously coloured, gradually gave way to the realisation that the speaker was seldom the cause. The bandlimited signature was there to be sure, and I detected a slight metallic hardening at high levels, but the vast majority of colorations came from flaws in the driving components or the software itself, which were all too clearly exposed by the speakers' superb dynamic grip and authority.

It came as little surprise to get the best results with the vintage *PX4* single-ended triode valve amp, the high speaker sensitivity compensating for the limited (3W) power output, revealing the subtlety and speed of this simple device without inviting any embarrassment at the frequency extremes.

The acid test of any review item is how badly it is missed after it has gone. In the *Air Partner's* case that amounts to a very great deal indeed, and it was only with great reluctance that I concluded

there was no way my room or lifestyle could accommodate them permanently. They're not perfect speakers, and are arguably less well balanced overall than many alternatives. But the things that they do well they do so extremely well, it's very easy to forgive the idiosyncracies — even the lack of serious subsonic bass — and just bask in wonderfully informative dynamic realism and coherence.

Adding a greater dimension

As a fully qualified tube amp junky I keep my ear to the ground as far as new valve products go, be they amps or speakers well suited to the piffing outputs of triode equipped power amps. The *Air Partner* is one such product, it was designed and built with mega efficiency in mind and as the numbers show, achieves this with ease. When I heard that Kevin Scott from Definitive and others were getting a serious horn speaker together I kept in close touch with them, hoping to get the beasts into my living room. As it turned out they were too big to get up my stairs and I handed the reviewing task over to Paul Messenger. However, I couldn't wait for a break in his busy schedule and — most uncharacteristically — went all the way to Nottingham to hear them in Kevin's Definitive listening room.

We listened to a variety of records, amplifiers, and even a turntable table through the substantial yet attractive *Air Partners*. The experience was extraordinary, the sheer sense of energy that the speakers could find in everything you played through them was breathtaking. By energy I mean a combination of dynamics, definition, tactility, solidity, speed and transparency. In other words a sense of shape and substance to music that usually only live performances achieve.

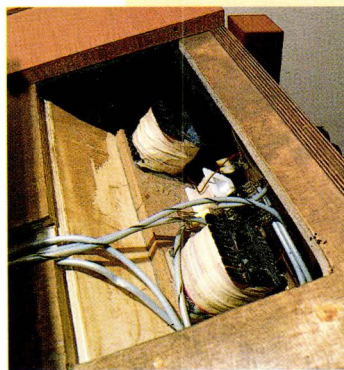
Such a state of exhilaration can't last forever and I finally settled down and got into Kevin's record collection. By the end of the day I'd started to get used to the speakers and all was dandy until I got home and listened to my own system.

The session at PM's, after he'd fiddled with the crossover, was perhaps less beguiling, the change bringing about greater levels of upper mid/treble transparency and a more analytical sound. As this proved very revealing of recordings and partnering equipment, it was a while before we arrived at a set up that was worthy of such an open window.

Once we'd found it, records started to sing.

The *Air Partners* aren't perfect — an extra octave or so in the bass wouldn't have gone amiss — but they are among the top three best speakers I've ever heard.

Jason Kennedy.



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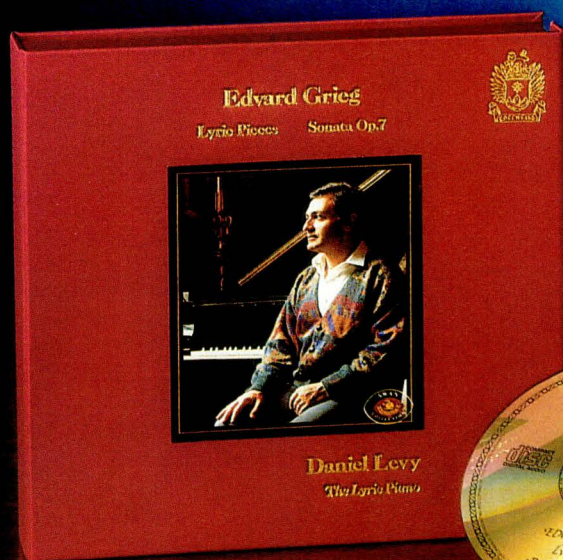
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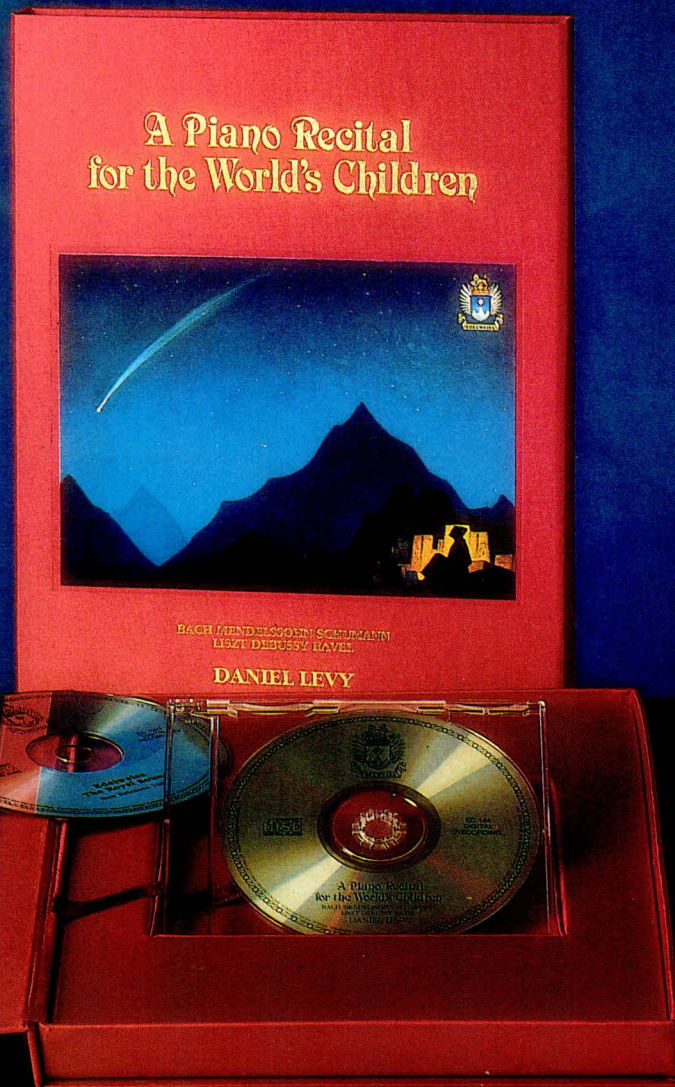
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und Isolde



The Funny Fish Farm

Dan Houston talks
to Fish, ex lead
singer of Marillion,
whose home outside
Edinburgh contains a
state of the art
recording studio.

Fish is lighting a cigarette and musing about the fickle nature of the record industry. The six foot four Scot from Dalkeith has just brought out his ninth album, *Songs from the Mirror*, featuring cover versions of his favourite songs from the Seventies. He's unhappy with the album, and blames the record industry contract system of having to come up with recordings every year. But while *Songs From The Mirror* should only be recommended to Fish completists, life at the Funny Farm, his home and recording studio south of Edinburgh, goes on.

Fish, aka 34 year old Derek Dick, and his backing group are preparing to go on a five month tour. They're together for two weeks in the studio honing up on both Marillion and his solo material, and will then do some shakedown concerts in Scottish pubs before starting off the tour

at the Town and Country Club in London.

When not on the road, Fish is one of those lucky people who can roll downstairs in the morning and go straight to work in a £300,000 recording studio. It's a facility which is open to hire, so you're as likely to find the local school band laying down a few riffs on DAT as Jools Holland or Deacon Blue. Then he can take his work home with him, stepping back through the glass doors that join his house to the studio, and playing the results on his hi-fi system.

"I wanted it to have different sound environments so a folk group or electric band could both create the sounds they want."

The studio has been built into the outhouses of the 18th century farmhouse which gets its real name of Spitalrig from being a hospital for tuberculosis sufferers during the last century. It's a comprehensive set up, conceived by Keith Slaughter — de-

signer of numerous studios from Abbey Road to a similar set up for Alan Parsons.

While the 56-channel DDA 232 fully automatic mixing desk, racks of effects equipment and state of the art analogue and digital recorders are very impressive, Fish claims to be non-technical. He



has a full time studio engineer leaving him time to concentrate on writing for the album he does want to do.

"The studio was a gradual thought at first," he explains. "I moved up here in 1988 from London, where basically I was living too close to Mrs Thatcher. Marillion didn't exist as a social entity by then and I was looking for a place with outbuildings where I could get together with a band and practice. I really liked the feel of this place and we used to use candlelight for all our rehearsals. When we started recording someone suggested a partition to improve the acoustics and we began to think of making a whole studio.

Just for the halibut

"I wanted it to have different sound environments so a folk group or electric band could both create the different sounds they want. We involved Keith Slaughter because he had experience in converting old buildings to studios."

Now the studio boasts several different acoustic environments, including a vocal room, dead room, guitar and drum rooms. It's also residential with eight bedrooms in other buildings. Fish recorded his second solo album *Internal Exile* here, though he is critical of this as well. "It was a bit rushed and I don't think the machine was in tune," he admits ruefully. "I think my first solo album (*Vigil in a Wilderness of Mirrors*) was a hangover from Marillion

days, but the songs from *Internal Exile* were written in batches while I was in legal trouble with my old record company EMI. It's impossible to write when the lawyer's ringing up every day, and I didn't want to come up with something bitter and twisted. So I think some songs were OK but as a whole the album didn't have a cohesive quality. It's much better to work within a time frame, or you can create a kind of Frankenstein."

As a result Fish doesn't consider he has made a proper solo album yet. And with a live album planned for the forthcoming tour he won't be able to get to work on one again until the autumn. "I have about 30 minutes of songs I can use," he says admitting that writing is difficult in an age where many of the basic chord structures have been heard countless times already. He always writes with other musicians, but says the band philosophy is not for him. "Eventually you run out of ideas and the energy levels are going to get sapped anyway. I'll never be in a band again."

Fish lives in the main farmhouse with his wife Tamara and their two year old daughter Tara. He describes the doors to the studio as being like the gates to Narnia. "It has a CS Lewis quality to it. You can open the door and walk into the wonderful, wacky world of rock and roll."

His two living rooms are geared towards hi-fi and TV respectively. The hi-fi system was brought north with him and re-installed by a local dealer. It comprises Quad equipment with bi-wired Musical Fidelity MC4 loudspeakers and a variety of sources including DAT. The room isn't as comfortable as his TV lounge since everyone walks through it, while the bare floorboards and lack of soft furnishings, as well as a wall of gold and silver discs make for a hard, ringing acoustic: "I'll put sofas in here soon," he promises.

Bookcases around the walls show a taste for history, with many books on warfare alongside biographies of William Morris or Van Gogh. "I always wanted to be a historian," Fish admits. "Instead Derek Dick became Fish, the nickname derived from a copious drinking ability, and a life of music beckoned.

Shelves of around a thousand CDs and a vinyl collection spanning the best of Seventies rock suggest he's as much avid listener as musician, but Fish says most of his serious listening is done on the road: "That's when you get time to get into the more obscure stuff, and I'll get a few CDs from the collection for late night listening on the bus. I listen to classical music on the radio as well and I'm into Dvorjak at the moment — that's space cadet city."

A cod's as good as a wink

The hi-fi here is often used for the critical monitoring of what has happened in the acoustically very inert studio environment. "We tend to bring stuff back through here and listen to it on a DAT or



No place like home: post production can be checked out on the domestic system.

cassette to see whether we've got it right next door. We even listen to things on a Hitachi ghetto blaster. That helps us check how post production affects sound quality." In the studio Dynaudio loudspeakers with Yamaha NS10s are also used with those of hi-fi pedigree like some Tannoy *Golds* and Mordaunt-Short monitors.

DAT is very popular among studio engineers who like both its sound quality and ease of use. It is also relatively cheap compared to CD-Recordable and Fish can listen to DAT away from home on his portable Sony DAT TCD D3 Walkman.

The studio also uses analogue tape equipment, a tried and tested Studer 24-track recorder using Dolby SR noise reduction standing waist high next to the similarly imposing Mitsubishi 32-track digital tape recorder.

"We use both analogue and digital tape here, and we often produce music with both together. There's a different quality to the sound of each, and post production or compression gives you different results as well. I think digital is great for things like acoustic instruments where you can get a really close sound to the instrument if you want to."

By the time the music is in the shops, however, Fish has a completely different view: "CDs are sold at unnaturally high prices, so it's not surprising many people are taping them from friends at home. Nobody's going to tell me that the 1,600 million blank tapes being sold every year are for recording hello messages to your granny in Australia. And I'm the one who's losing out; every time somebody makes a tape they're stealing from me.

"But then again, if you're charging people £13 for a CD you're just inviting them to cheat. The thing I can't stand is companies like Sony and others who have one arm coming down heavily against tape piracy while the other is supplying the hardware and great deals on blank tape for the pirates in the first place. If the price for CDs could be brought down and that of high quality tape increased then you'd induce people to buy the original product. And record companies would sell more albums."

As such Fish is all for a levy on blank

"If the price for CDs could be brought down and that of high quality tape increased then you'd induce people to buy the original"



Fish on chips: both digital and analogue equipment is used in the £300,000 studio which was designed by Keith Slaughter.

tape, but says it should be monitored by a group like the Performing Rights Society rather than record companies. He believes the money raised should be distributed fairly on a pro rata basis to recording artists: "The record companies shouldn't see the money; it should be put straight through to charity and the artists. It wouldn't be difficult to decide how much people get because everybody knows who is selling what."

Expensive CDs are one reason often suggested for its failure to become the ubiquitous music carrier of the Nineties. With only around a third of British households using CD, the market penetration of the digital medium is something of an underachiever. Rather than simplify matters, the record industry is now lining up in the separate camps of Sony and Philips with Polygram to foist MD and DCC on a digital-wary world. Fish sees these new media developments as too early. "I can't see anyone apart from the odd musician or hi-fi buff going out to buy it," he says, "it's just not going to mean anything to your average person in the street. But then I never thought CD sales would overtake vinyl and I suppose it'll be another way to regenerate the back catalogue."

There is neither a Digital Compact Cassette deck nor MiniDisc player at the



Funny Farm. As far as Fish is concerned the best digital home recording device at present is the CD-Recorder. "I made some acoustic recordings with one of those and the sound was incredible," he vouches.

Listening to a CD of The Sundays — sounding a little boomy in his room — the talk turns to the nature of success and he freely admits to a reduced profile since the Marillion split. "But nobody knows what's going to succeed in this business, you're only ever three minutes away from being a millionaire. The secret is patience. I remember seeing Tina Turner at The Venue in 1983. The circle turns and suddenly it goes blap again . . ."

Main System:

- Thorens TD166BC MkII turntable
- Audio Technica 33ML cartridge
- Denon 3 Head DRM44HX cassette deck
- Technics RST80R twin cassette deck
- Sony Walkman Pro
- Sony TCD D3 DAT Walkman
- Quad FM4 tuner
- Quad 33 preamplifier
- Quad 606 stereo power amplifier
- Musical Fidelity MC4 loudspeakers
- Loudspeakers bi-wired with QED F200 cable

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HELP!

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Transport on the cheap

Q I am in a dilemma at the moment. I bought a Meridian 203 D/A convertor and later found that I couldn't afford to give it the transport it really needs.

At present I am using a Sony CDP-790. It has been suggested that I sell them and buy a £450-£500 player. I have heard that Russ Andrews does a £150 upgrade to the Rotel £300 CD player. Will this do the job or should I look elsewhere?

I also have a CD303. I know that it is Philips' first CD player so is it now in demand as a relic? How does one find out about demand for old hi-fi components?

P Williams,
High Wycombe, Bucks.

A It is difficult to know what to suggest. It seems folly to trade-in the 203 for a lesser model, but if funds are tight, you will get a better sound out of a single box player like the Arcam Alpha Plus CD player or Sony CDP-X339ES. Otherwise, start saving for a Meridian transport. As you don't say what the rest of the system is, it is difficult to make any absolute suggestions.

It is a little early to look at the Philips CD303 as a collector's item. Although it was one of the first commercially available CD players, a good few years will need to elapse before it acquires rarity value. Box it up, store it in the attic with some Silica Gel (remembering to take it down and play it periodically) and in fifty years, your grandchildren will get something for it at the Antiques Roadshow. It is, however, unlikely to attain the desirability of classics like Quad II valve amplifiers, or Garrard 301 turntables, as it was not an enduring design.

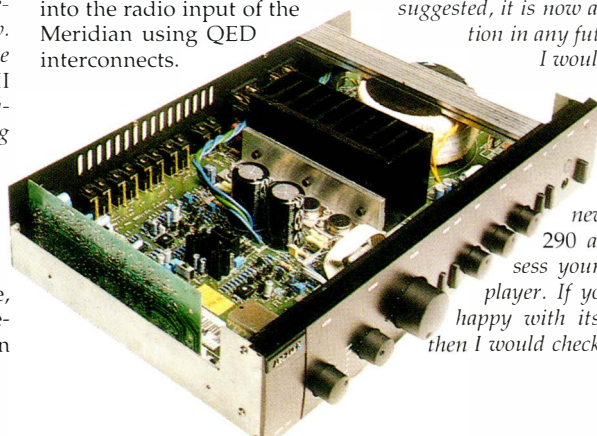
Change the amp to improve the CD

Q My system consists of a Rega Planar 3 turntable, Linn Trak cartridge, Meridian 101B/103 amp, Denon



DCD800 CD player, NAD 5224 tuner and Heybrook HB1 loudspeakers. However, I am disappointed with the CD performance, particularly when compared to vinyl which seems more musical. Therefore, I am considering replacing the CD player and would appreciate some suggestions before I start blindly auditioning. I listen to all types of music, although mostly rock/pop.

It also occurred to me that I ought to think about the CD to amp connection as it currently goes via a QED CD switching unit, into the radio input of the Meridian using QED interconnects.



Is this my best option for connecting these components, and is the Meridian, which is now nearly 20 years old, the right amp for a CD system? One dealer, in an attempt to get me to upgrade, had even suggested that the radio input of the Meridian was not really suitable for CD players.

I look forward to hearing your suggestions.

Robert Innes, London.

A The Meridian amplifier is suffering from old age. Although it is not as poor as has been suggested, it is now a major limitation in any future upgrades.

I would suggest that you replace the amp with the Audiolab 8000A or the new Arcam Delta 290 and then reassess your existing CD player. If you're still unhappy with its performance then I would check out the Rotel

The Meridian 203 D/A convertor: the 200 transport could solve a system dilemma if funds permit.

RCD-965BX or the Arcam Alpha Plus CD player.

More importantly, however, is that it is time to change the cartridge in the turntable. I have not seen a Trak in use for some years now and I can confidently assume that yours should be dead by now. I would be happier to see a cartridge like a Linn K9 in the Rega, but if you feel that you must use a moving coil cartridge, the Ortofon MC-15 Super, Empire Benz Micro MC-Silver, Glanz GMC-20E or Goldring Eroica LX would suffice.

Caught up with cable conundrum

Q My system comprises a Thorens TD 3001 turntable with a SME IV arm and both Grado TLZ and Ortofon Quasar cartridges, Meridian 206 CD player, Krell KSP 7B preamplifier, KST 100 power amplifier and Rogers LS5/9 loudspeakers.

At present I am using the original arm lead for the SME, Tara Labs Quantum CD for the Meridian, DPA Black Slink to connect pre to power amplifier and DPA 8S to the speakers. I would like to improve the cables for turntable, CD and loudspeakers. Which would you recommend?

Michele Romano
Florence, Italy.

A Although it is singularly difficult to prove subjectively, I have found that systems often sound better when using the same manufacturer's cable throughout. If you agree, then go for DPA Black Slink all round.

If you intend upgrading the arm cables, go for the van den Hul cables that are supplied with the SME V, which should be available as a special order item from your local SME dealer. Following that, you might like to try vdH cables throughout, following the same philosophy. We found The Source interconnect and

The Wind loudspeaker cables excellent samples, while the new metal-free interconnect cables, such as The First are interesting, but as yet untested, so we cannot pass comment with any accuracy.

Of the other cables on the market, Silver Sounds 12/3 interconnect and 12/2 loudspeaker cable or, if you are feeling brave, Cogan-Hall's Intermezzo Reference interconnect and the Full-Range loudspeaker cable all possess qualities that should get the best from your system.

Greater funds mean greater choice

Q At present I am considering upgrading my hi-fi. My system is made up of a Marantz 75DX CD player, Arcam BB1, Arcam Alpha amp and Mission 737R speakers. The interconnects are Furukawa FD1010 and speaker cable is Heybrook Heywire. The speakers have been moved to the end of my 7.5mx3.5m room which has made a more open sound. However, the speed of the system seems poor particularly with symphonies or complex pop music, and at higher levels the sound can become harsh, although at most listening levels the midrange is very good.

Therefore, I am thinking of upgrading, spending about £1,000 now and a further £1,200 or so later this year, possibly getting a new amp and speakers first and a front end when money is available. I'm considering the Arcam 290, Audiolab 8000a and Cyrus II with compact floorstanders such as Mission 753, Ruark Talismans, Castle Chesters. (Speakers have to be within six feet of the rear wall).

For the front end I'm thinking of either the Arcam 170 and BBV or a Meridian 200/203. A final upgrade would be to use QED Roomlink for remote operation.

Is this the right allocation of funds? The remainder of my system is a Revolver turntable and arm with an Audio Technica AT110E cartridge, Denon DMR07 cassette deck, Arcam Alpha tuner, Marantz SP50 Dolby processor, JPW Minim speakers and Sennheiser HD 560 Ovation headphones.

Will spending £2,000 plus bring significant improvements over a five year old system, or should I buy a Pioneer S801, A300X and a pair of Tannoy 607 as recommended by one local dealer?

Chris Haigh, Sale, Cheshire.

A Improving your system gradually seems like a good move, although you must also accept that upgrading in the way you



The Linn Keilidh: a worthy addition to Chris Haigh's speaker audition list.

suggest, the overall sound quality may lose its way slightly. Upgrading the CD first, followed by the amp/speaker combination, will not unbalance the system during the

Aiming for deeper bass

Q I am an avid reader of *Hi-Fi Choice* and I am writing to you in the hope that you will be able to give me some advice concerning upgrading my system.

My system comprises of the following, a NAD 3020A amplifier, 5120 turntable, 4020A tuner and 120 series loudspeakers, together with a Rotel 965BX CD player and Marantz SD-62 cassette deck.

Although I have a large LP collection, I now mainly listen to CDs. I like all types of music from rock to classical, with the exception of jazz. Unfortunately my present system lacks bass definition and depth although I recently bought some Audioquest Topaz interconnects which marginally improved the bass.

I have a budget of about £1,000. I think upgrading the amplifier and loudspeakers would give me the sound I'm after. I am considering auditioning the Audiolab 8000A, Exposure XX together with Mission 753s and KEF Q80s.

Am I on the right track or do I need to consider upgrading the CD player? I would welcome your views and advice.

Mr Bonner, Uxbridge, Middlesex.

A If it's deep bass you are looking for, then the Mission 764i or Tannoy 611 will go lower than either the Mission 753 or KEF Q80. The choice of amplifiers is more subjective, with the Audiolab being arguably more analytical, but less intrinsically musical than the Exposure design. It could also be worth investigating the Moth Series 30 modular amp and the Albarry PP1 integrated.

Another combination, although one that lacks formal testing in *Choice*, would be the John Shearne Phase 2, reviewed briefly in this issue, partnered with the floor-standing Ruark Templar loudspeakers. I would hesitate from going further until the front end is improved.

Lastly, I think that you are giving your record collection a raw deal by using the 5120 turntable, especially if it is the early type with the wobbly-wobbly arm. Have a listen to a Systemdek IIXE before you dismiss those LPs.

changeover period.

The Arcam Black Box 5 did not fare too well in our test, while the latest incarnation of the Meridian 200/203 (with the new delta-sigma convertor) is as yet untested. Otherwise the Teac P-500/D-500 combination, or the Arcam Delta 170.3 transport with a Sugden SDA-1 convertor, the single box Sony CDP-X77ES or perhaps the (untested) Teac VRDS-10 will prove a better bet.

Your shortlist of amplifiers and speakers would suit most kinds of tastes, although I would add the Linn Keilidh to your list for the sake of thoroughness. Finally, get rid of the Heywire cable. It may be nice and flat for running under carpets, but it puts a gun to the head of the sound quality in many systems. Try using Furukawa FS-2T14 or Mission Stranded cable instead.

Searching for surround sound

Q My hi-fi system is around 12 years old and consists of a Nad 3020, Mission 700s connected with 2.5mm T&E mains cable and a Sony CDP350 CD

player. I also have a 59M5 Soundline Ferguson Nicam TV, video and external speakers and would like to integrate the two systems and begin to improve the hi-fi.

My first step has been to rearrange the room and bring the 700s off the wall. However, I am worried that my children may knock the speakers off the stands so am considering Tannoy 607s and Target HS20s which impressed me via a Nad 302. I would connect the TV audio to the amp and drive the rear Ferguson speakers direct from the TVs surround sound outputs. Do you think this set up would be effective? Then, as the next step, would you recommend a new CD or amp, and what would you purchase for around £300?

Gerry Bond, Easleigh, Hants.

A We have not reviewed the Tannoy 607s as yet, but if you liked the sound through a NAD 302, it will sound similar through a 3020. If you are worried about knocking over the speakers, go for Tannoy's own stands, as they bolt into the speakers themselves and so make them less likely to topple.

Interfacing your hi-fi and Ferguson TV poses some tricky problems, especially as you don't mention what type of VCR is being used. The audio output phono sockets on the rear of the set can be used to feed stereo sound into your hi-fi, but will only do so from live off-air broadcast TV. Since these sockets are linked to the tuner of the TV, not the screen, any videotape replay (even from a Hi-Fi Stereo VCR and Dolby Stereo rented tapes), will only come out these sockets in mono (via the channel 36 RF link).

Assuming you do have a Nicam Hi-Fi VCR, there are several alternative ways to get stereo both off-air and off-tape into your hi-fi, all involving a modicum of inconvenience and compromise, and each having different implications for the Ferguson surround sound option you mention. Indeed I doubt the latter is really worth pursuing at all, since it's only a simple pseudo-surround circuit which falls a long way short of even Dolby Surround, never mind the Pro Logic enhancements. Consider instead adding a proper processor or AV amplifier.

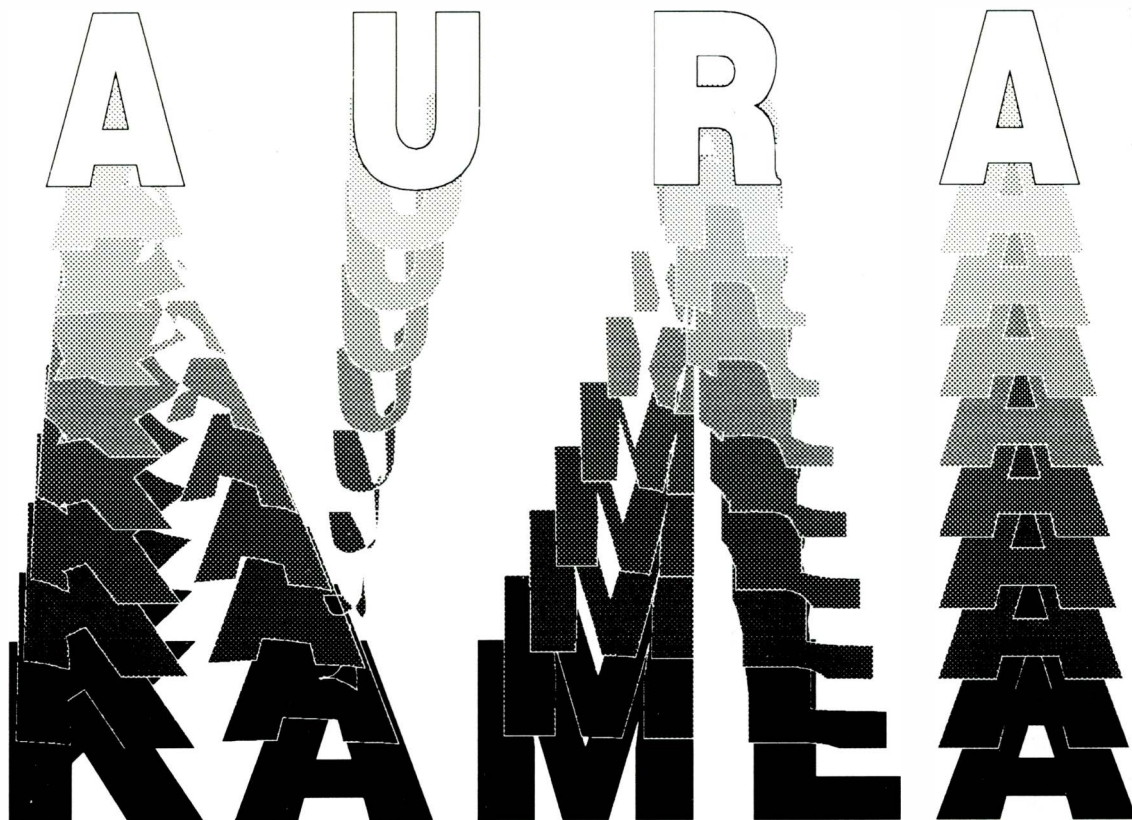
The most flexible connection approach is to feed both TV and VCR separately to the hi-fi amplifier. This means using up an extra amp input and having to select between the two sources, but it would allow the Ferguson's surround channels to be used, adjusting relative level via the set's volume control independently of the hi-fi.

LETTER OF THE MONTH

Isoda Interconnect cable winner



Audition the Audiolab 8000A, but we also have other suggestions for your shortlist.



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HELP!

Another idea is to take the stereo audio signal from the Ferguson's headphone or main speaker sockets, even if finding the right leads and adaptors might be tricky, and some sort of line attenuator might help match the TV and hi-fi for best noise performance. These sockets will stay linked to the screen image at all times, and give you off-tape as well as off-air stereo sound provided your VCR is connected via a Scart lead and the TV's AV input is selected. However, this approach involves compromising the sound by feeding it through TV set audio circuits which are more like ghetto blasters than real hi-fi.

Complex music lacks transparency

Q My current system consists of an Audio Innovations Series 500 amplifier connected to a pair of Snell JIII speakers on JPW stands using 2.5mm Supras speaker cable. These speakers are about 2.5m apart and about 0.5m from the rear wall, following Snell's own recommendations. The front ends consist of a Sony PD-8700 CD player and a Yamaha P750 turntable.

My problem is that only very few recordings sound really good and transparent. I find the problem especially noticeable when playing multi instrumental and complex rock music — the more instruments, the bigger the problem. I have heard that the model JIII is inferior to the earlier Snell models so I am thinking of replacing them with a pair of second-hand EIIIs. Do you consider this a wise move? Or should I take more drastic measures and change my entire system, or at least most of it? Would an outboard D/A convertor help? I have about £700 to spend at the moment and another £1,000 later on.

Mikael Fellman
Bromma, Sweden.

A Are you sure that your PD-8700 is made by Sony and not Pioneer? Changing from the Snell JIIIs to a second-hand pair of EIIIs, if in good condition, would seem like a logical move, if only for the extra depth and ease it gives to the music. However, I feel that this will not overcome the problems in your system and may even magnify them.

Try looking at a more suitable turntable for the Series 500. Although there are myriad designs to choose from, I favour turntables like the

Systemdek IIXE 900 AP, as well as more expensive designs from the Voyd and Pink Triangle schools. Once again, there are a plethora of arms and cartridges to choose from, but the Rega RB 300 arm and Goldring 1012 are good starting points.

The same could be said about the CD player. Look at players around the £700-£1,000 mark, like the Teac VRDS-10, or even look for a decent transport/DAC combo like the Teac P-500 or Meridian 200 with the new, albeit as yet untested Meridian 263. From here, try changing the cable over to Audio Note silver cables throughout and get some decent stands.

But finally, you may be finding fault in the recordings themselves. Often complex, multi instrumental recordings suffer from mixing desk blight, undermining a superb piece of music. It is rare to find complex music that is also well recorded, although there are exceptions. The Audio Innovation/Snell system you mention is highly revealing and will make such poor recordings sound congested. To get good sound from many recordings, without sacrificing the transparency of a good recording is a difficult task. So far, only designs like the Thiel CS2.2 seem to balance these two traits successfully.

Warmth injection required

Q I would like to change the sound of my system, which is currently a Philips 960 CD player, Ion Nexus pre-

The Systemdek IIXE 900 AP: one of a few more suitable turntables to partner the Series 500 amplifier.



Escape from clinical sounds with the Audio Innovations Series 700.

amp and power supply and Meridian M20 active speakers with Isoda interconnects.

The sound is too clinical for my taste, and I want to inject some warmth. It also seems a little light in the bass, although matters have improved after some fiddling with the tiny coloured switches on the back of the M20s, as recommended by the helpful souls at Meridian.

I have tried a Meridian 203 D/A convertor with the Philips, which improved the sound, but still didn't provide the mellower quality I'm seeking.

Do you think a valve preamp might be the solution (or part of it)? I listened to a wonderful Audio Innovations/Snell demo at the Penta show, and that's the kind of sound I'm looking for. And would you recommend the addition of a subwoofer? I can run another power amplifier from the Nexus if I need to, but I do notice your

magazine blows hot and cold about subwoofers in general — which ones do you currently recommend?

M R David
London SW.

A If you find the basic sound of your system clinical, no amount of subtle tweaking is going to shift that balance over to the warmth of an 'Innovations-style system. You could try changing CD, D/A convertor, preamp and even cables, but I still think that the system will sound fundamentally clinical.

Changing over to the Meridian 208, a combined CD and preamp may help, but if it is still too clinical then try listening to your own CD player in the system you have suggested, namely an Audio Innovations Series 300II or Series 700 integrated amplifier with a pair of Audio Note AN-J speakers on Huygens stands.

We do not blow hot and cold on subwoofers, but most in this country are dedicated to a particular speaker and are merely 'audio' instead of 'hi-fi'. The exception is the actively powered REL range. This normally runs direct from the speaker terminals of the amp, but REL can easily convert subwoofers to run from your preamp.



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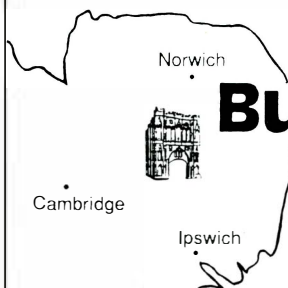
- Cables - Audioquest, Furukawa, Heybrook, Ixos, Ortofon, QED, Van den Hul
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WRITE ON!

AIR YOUR VIEWS AND WIN A SWEATSHIRT

Ambisonic upgrading

I've just read the *Aspirations* feature from May on Alan Booth's system, and am reminded that readers may be misled about Ambisonic surround sound.

Why wait for the Japanese when we already have Ambisonic technology, developed decades ago by Oxford and Reading Universities, in the form of Minim Electronics hardware and Nimbus software (to name but one supplier)?

An Ambisonic upgrade does not have to be expensive. Rear amplification need not be exotic, and the rear speakers can be simple satellites if they have the same acoustic characteristics as the front pair. Or at least this is so if the object is to simulate a seat in the auditorium, rather than a seat in the centre of the orchestra.

I use a pair of small open back full range drivers dating from the early Seventies to support my Jordan Watts front pair which also use full range drivers. The JW's are supported by SEAS metal tweeters via high pass filters and a B&W *Acoustitone* bass box via low pass filters.

Unlike the ill-fated Quadrophonics of yesteryear, Ambisonic surround sound is fully compatible with stereo (evidenced by replaying an Ambisonic recording in stereo), and stereo mode is switchable in the Minims. When in stereo replay mode the rear-pair can improve stage depth and room ambience. But is there any point in buying a decoder and two amps to achieve this, when the rear speakers can be connected (L-R & R-L) for much the same effect? Surely the objective is Ambisonic surround sound (a British development)? And surely we have at present access to both hardware and software?

J P Hills, Barras, Stonehaven.

Second-hand system joy on a budget

I have enjoyed reading your magazine from cover to cover ever since I discovered it in 1991.

However, many of the prod-

ucts are beyond my meagre means (I am still a student). Nevertheless, I do endeavour to purchase the best I can afford.

Last year following some of your recommendations I purchased my first hi-fi system consisting of a Technics *SLPG200* CD, a Rotel *950* amplifier and JPW *Sonata* speakers, which gave me good service until I had to sell the amplifier and CD player to pay my rent.

By that time the hi-fi bug had

bitten, and the quest for a replacement system began.

After reading your November issue, I seriously began to consider purchasing what you termed 'Golden Oldies'.

I stumbled upon a Leak *Troughline Mk III* tuner with a Leak *Stereo 30* amplifier, which I purchased for just £55. Needless to say great sounds are now coming out of my JPW *Sonatas*.

Abdul Malik, Pontypridd, Mid Glamorgan.

A plea for easier explanations

I have just finished reading *The Collection* and found it most enjoyable including the occasional 'Choice colloquialism' which brought a smile, sometimes a chuckle.

Manufacturers of hi-fi equipment at any level, but especially at the higher-end must be grateful, at least on balance, to magazines like *Choice* as there can be no doubt that such publications help sell their products. Indeed, it was through your pages that I learned to move up from a Goldring *Lenco/Tandberg* tuner-amplifier through the better Rotel separates to the *Michi* amplifiers. This means that I am now on that slippery downward path to the high-end (and accompanying bankruptcy) where I reckon I am entitled to be from the enjoyment point of view, yet have this peculiar guilt complex stemming from my ignorance of some of the finer points of the game. I will never master them all but I keep working at it.

I feel that manufacturers would be even more grateful the more your readers get to know their subject. I've written before to suggest *Choice* introduces explanations of hi-fi language in layman's terms, 'Ed' at that time said, 'not a bad idea, we'll look into it' since when... 'De mortuis...'. In fact, while reading *The Collection* I jotted down some things that I would love to have made fully clear to me, for example, active versus passive, suck out, headroom, push/pull, balanced versus unbalanced, bi-wiring, tag (or whatever) connected, and so on.

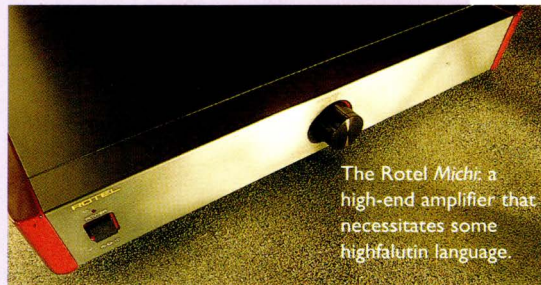
Leslie G Neville, Ashted, Surrey.

As you may have noticed in this issue, *Choice* is fully aware that not everyone has eaten and breathed hi-fi from the cradle. We have made some space to explain complex matters in simplified terms — at the same time maintaining our in depth analyses for the more technically minded.

The Production Ed, is the lay (wo)man in the office who must understand all terms before they are committed to print. If Janet can understand them, anyone can.

LETTER OF THE MONTH

Hi-Fi Choice
sweatshirt Winner



The Rotel *Michi*, a high-end amplifier that necessitates some highfalutin language.

Engine trouble

I would like your advice on a problem we have. We listen almost entirely to our own recordings made on location and using an Aiwa portable DAT recorder.

The subject of our recording is buses, but the results are disappointing. Our current system is Tannoy *Westminster Royales*, driven by an Audionote *Ongaku* amplifier. The digital output from a professional TEAC DAT player is fed to a Wadia D/A convertor.

The results with buses dating from the Seventies are acceptable, but the reproduction of the sounds of vehicles with modern turbocharged engines are a travesty of the original material. The system also fails to give an authentic account of the sounds of buses dating from the Forties and Fifties.

The deep throaty sound of a Leyland *PD3* sounds tinny and artificial, while the smooth sonorities of the AEC engines fitted to the London RT and Routemaster designs are muffled and coarsened.

We are thinking of bi-amping the Tannoy *Westminsters* with a pair of valve EAR *Yoshinko* monoblocks for high/midrange, and the transistor version for bass. Do you think this upgrade would effect the necessary improvement or would we be better off bi-amping with a second *Ongaku*?

K Watt & D Bell, Brighton.

I can sympathise with your problem. With the recordings from the Forties and Fifties very often it's the recordings themselves that are at fault as interfering background noise can overpower and distract, especially as gossiping in bus queues was far more prevalent then.

Why not expand and update your hobby to sounds more suited to the Nineties? I have a collection of incredible jet engine recordings made on site at Heathrow which, when played back through speakers such as the WRs, really make you feel like you're standing on the tarmac.

Attached to the cover of your issue was a special gift, a CD from the Italian audiophile label, Edelweiss. Below you will find some information on the label

About your free CD

This month we are proud to be able to give you a very special free gift — a CD from the specialist audiophile label Edelweiss. When *Hi-Fi Choice*

gave away the first cover-mounted CD, nearly four years ago, it caused quite a stir. Nowadays, however, free CDs are becoming exceptionally common, and appearing on all sorts of magazines. However, *Hi-Fi Choice* has always believed in cover-mounting only the very best possible quality discs, and has not joined in the general rush to stick any old disc to the magazine. We hope you enjoy your free

CD and that you will want to hear more from what we think is an exceptionally interesting and innovative classical label.

The label was formed in 1989 and within the independent European recording industry this group of musicians, sound engineers, writers, painters and graphic artists base their work around the concept of the record as a precious objet d'art.

In its recording sessions, Edelweiss demands inspired and passionate professionalism from its artists, soloists and chamber music ensembles. Its recording system uses the bare minimum of microphones with the aim of achieving a rare and natural balance.

The choice of recording venue is also extremely important, with Edelweiss eschewing the recording studio in favour of carefully selected venues which add to the feeling of the piece.

The label's catalogue ranges from explorations into the world of the Renaissance with polyphonic works such as the *Mass of Guillaume de Machaut*, to the world of the Romantic era; from a series of piano improvisations to world music with Ravi Shanker and Imrat Khan.

The catalogue also includes a collec-

tion of Elizabethan music performed by the Arts Antiqua with the ethereal, multi-hued voice of the counter-tenor Joseph Sage, Venetian music from the 16th Century and music from the era of Jacopo Bassano.

Two of Edelweiss' most prized productions are Bach's *Sonatas and Partitas* for solo violin, performed by Nicolas Chumachenko. These recordings are internationally acclaimed and will delight all those who appreciate genius, precision, and spontaneous musicality. Further explorations into the works of Bach are the suites for solo cello played by David Geringas.

The famous pianist Daniel Levy is the performer of a great many works for the piano at Edelweiss. His superb performances are the expressive focal point of much wider experience. He performs Schumann's chamber music, Brahms, Liszt, Mendelssohn and Wagner's works for the piano with a passionate sense of music and exceptional professional mastery. *A Piano Recital for the World's Children* is a remarkably vivid and intense piece, dedicated to childhood, consisting of a program of music by Bach, Mendelssohn, Schumann, Liszt, Debussy and Ravel, recorded live during a Venetian gala concert.

The disc containing the complete series of Greig's Lyric pieces with *Sonata Op7* reveals the magic and enchanting landscapes of the North, while baritone Wolfgang Holzmair, an artist who is well known to the London public, is represented with Schumann's *Leider*, based on poems by Heine, Lenau and Geibel. These pieces are only very rarely performed and this is definitely one for the collector. Recorded

at the Zurich Tonhalle, Schumann's and Liszt's works for the organ are available in exclusive boxed sets in all their brilliantly shifting range of tonal colours.

The Edelweiss line-up also includes world music, with two CDs by a group of five great traditional Indian musicians, headed by Imrat Khan. The surbahar, the sitar, the sarod, the tabla and the tampura are united in strikingly original arrangements of duos and trios.

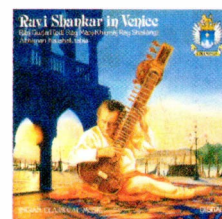
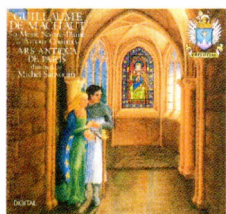
The boxed set *Ravi Shanker in Venice* contains a CD donated to Edelweiss by the greatest and most creative musician in India in what is one of the most inspired of his recordings.

Edelweiss' art of recording is revealed in the painstaking care devoted to every detail of production. Each CD is presented in a fine boxed case, covered in beautifully produced artisan cloth which highlights the artistic importance of such refined software.

In addition, Edelweiss intends to make its experience available to music lovers with exciting and original musical events. It has put on concert festivals and lesson-concerts, has brought out previously unpublished writings on music, has organised shows and educational listening seminars, and has helped to introduce the comparative study of non-European musical systems.

A series of events is currently under way which is intended to provide a harmonious framework uniting artistic, scientific, cultural and entrepreneurial aspects of music.

Edelweiss places special emphasis on its public, and is aware of the need for direct contact with its audience. Edelweiss' dynamic and efficient structure satisfies the requirements and requests of all those who want to share in the pleasure of the listening experience.



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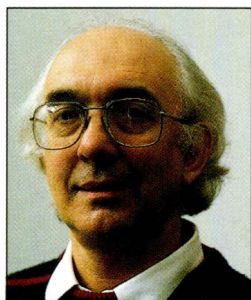
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Batteries, booze and mushrooms

Fed up with DCC and MiniDisc? So am I, for a month, anyway. The Tokyo based company Bodysonic is well-known in the audio industry for its musical chairs. Nothing to do with the childrens' game, Bodysonic's chair consists of a blooming great loudspeaker drive unit clamped to a lounge chair and fed with an amplified music signal to vibrate the body of anyone who sits in it.

Bodysonic is now expanding its horizons. Two recently published patent applications tell how musical vibration, using Bodysonic transducers, will improve the quality of drinking water, make alcoholic



Barry Fox steers clear of MiniDiscs, well almost, and looks at Bodysonic's moving developments.

drinks taste better, and help growers of cultivated mushrooms and vegetables. I kid you not.

Inventors Akira Komatsu and Toshio Fujihara got their idea when they realised that drinking water on a ship tastes good even after a long voyage. They also noted that liquor served on board appears very 'tasty'. Funny that, because I've often found booze to taste good on planes — and in pubs, or at home . . .

Be that as it may, these Japanese have concluded that alcohol tastes best at sea because the vibration of the ship affects the molecular structure of the liquid. The water molecules

arrange themselves in smaller clusters and the ethanol molecules in alcoholic drinks fill voids in the clusters of the molecules of water added to reduce the proof of the liquor. Likewise cultivated mushrooms and vegetables taste better when randomly vibrated as they are grown. The effect is most pronounced if the vibration fluctuates randomly, say the inventors, and the most convenient source of random vibration is a music signal.

Pots of mushroom compost and radish seedlings stand on shelves which have Bodysonic music transducers clamped to them. Drinking water is vibrated in tanks to which transducers have been clamped. Wine is fermented in the same way, with accelerated results as the music stimulates the yeast.

Bodysonic ran tests with a piece of music called *Wines Lullaby* composed by Toshio Fujihara. The wine tasted better too, say the inventors and can be romantically labelled: 'a special wine brewed by allowing it to listen to music'.

Well perhaps just one small mention of MiniDisc. I keep getting press releases about MD from Sony and Sony Music (born CBS) which contains a great quote from Bob Crasnow, Chairman of Elektra Entertainment. I quote: "It's the best format since Thomas A. Edison". In my ignorance I had always thought of old Tom as a person, an inventor, perhaps a bit like those Bodysonic chaps — but obviously not.

And onto, batteries. As they used to say of Errol Flynn, the one thing you can rely on is that they will always let you down.

Why, if Sony and others have now succeeded in making rechargeable Lithium batteries, isn't everyone using them? Lithiums are lighter and hold more charge than Nicads, and you can top them up with charge. Nicads develop a memory effect if you top up which can reduce capacity significantly.

Simple. Because a Lithium cell delivers three times the voltage of a Nicad, it is not a straight drop-in replacement for a Nicad. The portable equipment and the charger must be designed around the Lithium cell. This is no problem, provided that the manufacturer has secure supplies, but at the moment only a few companies in the world are capable of making Lithium ion cells. A shortage of cells could leave manufacturers with warehouses full of useless kit. The switch to Lithium will come in a year or so, once all the major electronics companies are making them.

Meanwhile Goodmans has announced three new XP personal CD players, which apparently play a magic trick. Instead of giving two hours playing time from one set of throwaway alkaline batteries, these three players give an average of twelve hours. Hence the XP tag, which stands for extended play.

How on earth can Goodmans increase playing time by a factor of six? The company explains:

Its original portable CD players ran on nine volts DC, from six alkaline batteries, and they were very power hungry. The computer chip in the XP players runs on 4.5 volts instead of 5.6 volts, the servo system runs on 5.6v instead of 7.9v and the laser drain has been reduced from 58 milliamps to 51mA. All this lets the player run on 4.5 volts, so the six batteries can be ganged in two parallel pairs of three. It seems a shame to remind Goodmans that other manufacturers have been getting long playing times from just two batteries for quite some time now.

Always be wary of comparative claims unless there is a base line reference. Goodmans' 12 hour instead of two hour claim reminds one of how Philips used to boast that sales of its Laservision players and V2000 video recorders had 'doubled', while refusing to say what the sales had actually been previously. Even now, Philips talks about sales of CD-I players being 'better than expected'.

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1. What is the name of the turntable that made Linn Products famous?
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3. Name Nakamichi's replacement to the *Cassette Deck 1*.
4. Who is the larger-than-life Managing Director of Linn Products?
5. What does HDCD stand for?
6. Which amplifier company is behind the *Ringmat*?



Entry form

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ADDRESS:

.....

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HFC/APRIL/93

Closing date: Monday, 3rd May, 1993

Your answers:

1.....

2.....

3.....

4.....

5.....

6.....

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Choosing and Using Cassette decks

With all the fuss and commotion that has surrounded the introduction of two new digital recording technologies, you might think that the old fashioned analogue cassette deck was in danger of becoming a dead duck. In a way you would be right. It's perfectly true that the excitement whipped up by the launches of DCC and MiniDisc has distracted attention from the humble cassette, and contributed to something approaching a hiccup in the sales of cassette decks — but so have the recent price rises following the slump in the value of sterling.

DCC and MD are only now beginning to appear in the shops, and neither system is even close to finding its natural level. There are some indications, however, that neither is doing well. The MD personal from Sony is selling, albeit in tiny numbers, and the rather frumpy full size Philips DCC model (dismissed to me curtly by a mole within Philips as 'suitable only for Germany') has attracted almost no interest at all from the money wielding public.

At this point in the narrative we move into the realms of speculative fiction. There is a possibility — I put it no higher (I might - *Ed*) — that a combination of confusion over our two digital protagonists and what can only be called corporate greed affecting the price of prerecorded material will cause both systems to fall out of the sky. Looking at it from the other point of view, the smart money is going to steer clear of both as long as the prices and technologies involved are so far from settling down.



Meanwhile, the humble old analogue cassette deck soldiers on, continuing to meet most requirements in an efficient and economical manner. Even in the group of ten cassette decks tested here you can choose a £200 model which can make two recordings at once, or dub from one to another, with full auto reverse and very presentable sound quality to match. Or you can pay £700 for a model that

readily exceeds the current performance standards achievable from MD and DCC, not necessarily in the headline noise and distortion results, but certainly in the ways that really count.

Actually choosing a cassette deck is complicated by the sheer variety of brands, price points and specifications. These days, all cassette decks have certain features: Dolby B and C, Dolby HX Pro (except Nakamichi) to help beef up the treble performance of ferric tapes, and automatic tape type recognition (except Nakamichi). Very nearly all have light-touch 'logic' controls and some rudimentary search features: track search, perhaps

a memory counter and so on. You can pay as little as £100 for such a deck, or nearly £1,000. It all depends on how well you want the job done.

But the choices don't end here. You could opt for an auto-reverse deck instead of the usual unidirectional type. Although auto-reverse mechanisms have acquired a poor reputation, the reasons are largely historical. Azimuth (geometry) errors tend to increase when a recording is turned over and played in the opposite direction, and there are inherent difficulties in making an auto-

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.



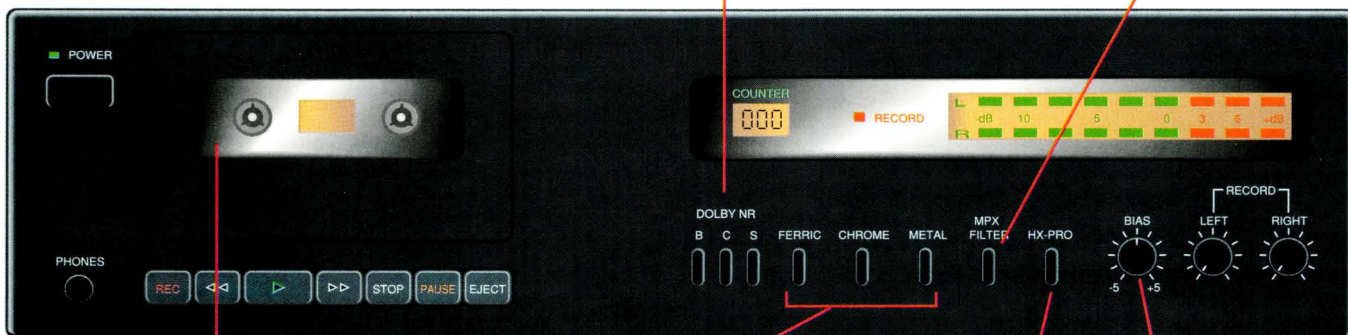
Dolby Noise Reduction

The first noise reduction system was devised by Ray Dolby in the late Sixties. Today, most cassette decks are fitted with both Dolby B and C. Both systems are essentially hiss removers, boosting high frequencies on recording and then reducing them during playback, thus artificially extending the dynamic headroom of the tape where hiss is most noticeable.

Dolby S goes one stage further. A spin-off from the latest professional system, Dolby S should increase the level of noise reduction with less degradation of the signal. The system is billed as 'backwards compatible' with Dolby B, and this can be very effective when played on in-car systems or Walkmen.

MPX filter

Occasionally, the output of some FM tuners produces interference that can upset recording quality. The MPX filter helps to overcome this problem.



Monitoring (Number of Heads)

A cassette deck has to perform three functions; replay, erase and record. It is possible to combine the recording and replay functions in the same head, with a separate erase head — useful for saving space internally and keeping costs low. This is known as a two head cassette deck.

With a three head machine, separate heads are fitted, making it possible to record and playback simultaneously, giving an instant guide to the quality of the recording. This is known as off-tape monitoring.

Tape Type

Tapes are grouped according to their formulation, equalisation (the amount of treble boost applied to the recording) and bias requirements. There are three basic settings: Ferric (IEC Type I), Chrome (Type II) and Metal (Type IV). Type III tapes, or ferrichromes are no longer popular. Bias and equalisation adjustments are often automatic.

Dolby HX-Pro

The problem with recording high frequencies is that they can influence the biasing of the tape. Dolby HX-Pro overcomes this self-biasing by limiting the combined bias current and high frequency signal to prevent overbiasing.

Variable Bias

Variable bias adjustment allows the fine tuning of different brands of tape that require different levels of bias, a pre-conditioning signal applied to the tape during recording.

Overbiasing will give less distortion, but at the expense of the high frequency performance, while underbiasing a tape will improve the high frequencies but increase noise. Bias adjustment has no effect on playback.

reverse transport that is as stable and as good sounding as a unidirectional mechanism. At least with the better examples, however, the problems can be solved, in one case (yes you guessed it, Nakamichi, though the models concerned are not reviewed here) by the brute force method of flipping the cassette itself around, rather than the magnetic heads.

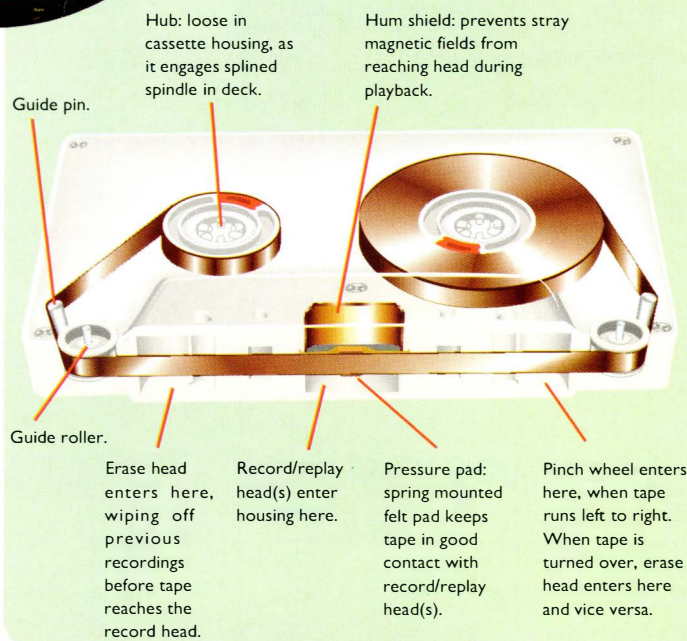
When you think about what a cassette deck is used for, there are very good reasons for going auto-reverse. If you have any interest in recording from the radio, for example, especially if you're likely to want to do so using an outboard timer, you will find the 60 minute absolute limit on a tape side a major shortcoming.

The other main genus of cassette deck is the twin or dual deck, which has two tape mechanisms, both of which are invariably auto reverse these days. Usually just one of the two mechanisms can be used for recording; the other can be used for sequential play operations, in which one tape is played automatically when the other has reached its end — a useful party trick for, er, parties. The real reason for having a twin deck, however, is to copy cassettes, which is useful for a variety of reasons, not all entirely legal.

Partly for historical reasons, twin decks have become firmly associated with the low end. Few cost more than £300, most are under £200, and as they tend to sell on the basis of an elaborate



specification at a relatively modest price, real engineering standards tend to be at a premium. The moral of the story is that most (though certainly not all) are underachievers, so it is sensible to ignore twin decks unless you really need the extra facilities they offer.





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Aiwa AD-WX929



On paper this deck is remarkable value. It is equipped with a wish list of just about every feature any twin deck owner could possibly want — all for an under £200 pricetag.

Like most twin decks it has two auto-reverse mechanisms, but unlike most the Aiwa records on both transports, simultaneously or sequentially. It also has a circuit that automatically sets bias and sensitivity for the tape inserted at the press of a button. The auto-reverse mechanism is also very elaborate, with optical end of side sensing which cuts the sometimes ten seconds of leader tape silence at the end of a tape to under a second.

The deck includes a full set of track search and cueing features, twin electronic tape counters, excellent meters, display on/dim/off switching, Dolby B, C and HX Pro — and to cap it all you even get remote control. At a paltry £200, it

hardly seems fair to ask what it sounds like.

Sound quality

Not too much should be expected of a fully equipped yet inexpensive dual auto-reverse deck. Not for the first time, however, Aiwa has proved more than equal to a demanding brief, and the end results are better than might have been expected.

Unlike many other low cost auto-reverse models, this Aiwa is sharp and lively and shows minimal loss of resolution except at the frequency extremes. Bass is on the lightweight side, and as a result recordings tended to lack authority and power; treble can sometimes sound coarse and forward, and the deck was at its best with more distant, spacious mixes.

But none of these things is likely to damp enthusiasm for what is always an engaging performer. It sounds a little soft with ferroc tapes (TDK AR) but was in its

element with good Type II tapes with Dolby B, and even with a Dolby C implementation which was less opaque than is often the case.

Dubbing performance was good. Normal speed dubbing is preferred of course, but the worst effects of high speed dubbing have been at least partly solved. The loss of treble energy and dynamics was small, and pitch errors which normally accumulate were mostly innocuous.

There was an audible difference in sound between the two transports. It didn't amount to much, but the balance of virtues favoured Deck I, which was a tad cleaner and sharper.

Conclusion

Here is a sharply priced and superbly equipped twin deck that works — and works well. It's ridiculously good value, and an obvious Best Buy.

Contact

AIWA (UK) LTD, UNIT 5,
HEATHROW SUMMIT
CENTRE, SKYPORT
DRIVE, WEST
DRAYTON, MIDDLESEX
UB7 0LY.

(081) 897 7000

Verdict

- +** Incredible value from twin recording transports.
 - Lack of weight and power, slight roughness in the treble.
- ▶ £200.00 RRP**

LAB REPORT

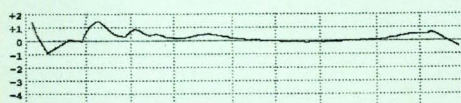
The two transports don't measure exactly the same. The figures are similar, but the wow and flutter energy spectrum shows the most prominent flutter sideband is at a considerably higher level on Deck 2.

Central pitch definition is good, however, wow and flutter levels are broadly comparable to a fairly decent unidirectional transport, and azimuth differences between sides are minimal. This is a deck which doesn't make you suffer unduly for the added convenience of auto reverse, on paper at least.

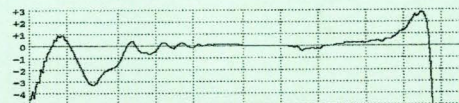
The performance of the heads is a little shaky at low frequencies but is generally good elsewhere, apart from a sharp, high Q resonant peak at high frequencies with lower bias tapes, which shows how the frequency response is buoyed artificially. Prerecorded tapes replay quite accurately and noise levels are slightly better than average, but high level headroom is somewhat limited with high energy Type II and IV tapes — a reflection on the grade of head fitted.

TEST RESULTS

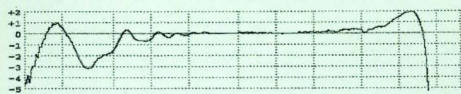
	Type I	Type II	Type IV
Wow & flutter IEC386 Q-Pk %			
Pk Wtd	0.137%		
Mean Wtd	0.108%		
Crosstalk ref 0dB			
100Hz	-43.5dB		
1kHz	-54.3dB		
6.3kHz	-47.2dB		
10kHz	-41.2dB		
Azimuth R-L phase (10kHz)			
Deck A	0 degrees forward, 20 degrees reverse		
Deck B	60 degrees forward, 60 degrees reverse		
Line input sensitivity/overload	83mV/5V		
Mic input sensitivity/overload	n/a		
Line output for 0dB/maximum	550mV/2.45V		
IM distortion 10kHz/1kHz	10% 0dB peak, 1kHz product		
VU indication at IEC 0dB	0dB		
Noise CCIR 468-3 Q-Pk IEC			
Peak Wtd	-42.5dB	-47dB	-46.1dB
Peak Unwtd	-47.0dB	-49.5dB	-47.6dB
Mean Wtd	-42.8dB	-47.2dB	-46.4dB
MOL 3% ref 0dB			
1kHz	-1.5dB	n/a	-2.2dB
Distortion (THD+N) @ +8dB			
100Hz	20.2%	17.5%	17.7%
1kHz	10.4%	15.4%	15.3%
6.3kHz	5.12%	4.64%	7.41%
Distortion (THD+N) @ -8dB			
100Hz	1.23%	0.53%	0.74%
1kHz	1.13%	0.76%	0.66%
6.3kHz	1.18%	1.63%	1.86%
Dimensions	43x14x31.7 (wxdxh)cm		
Average wind/rewind time (C90)	2 min 52 sec		
Typical Retail Price	£200		



Frequency response with pre-recorded cassette



Frequency response with Dolby C Noise Reduction



Frequency response with Dolby B Noise Reduction

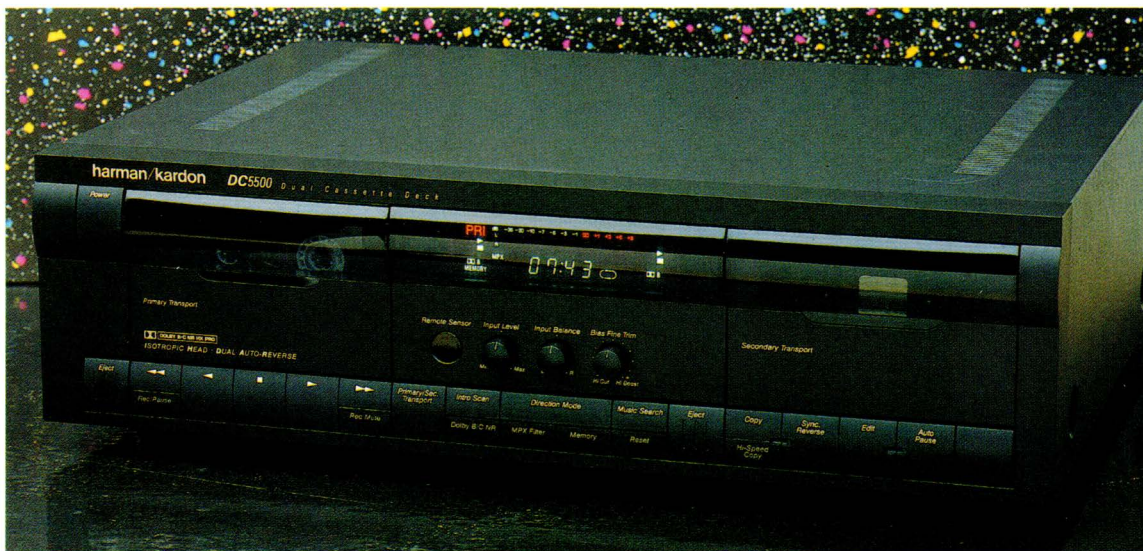


Frequency response with metal tape



Wow and flutter spectrum

Harman/Kardon DC5500



The basics are simple enough. In a standard size and characteristically stylish £500 package, the H/K DC5500 supplies a record/replay tape transport and a playback only one, both with auto-reverse. The deck has the standard Dolby B, C and HX Pro, and switchable MPX filter switching. All the usual features are present: one-key normal and high speed dubbing, an electronic tape counter (shared between the transports) plus intro and track search modes that will look up to fifteen tracks in either direction. Remote control is also included, with system control data links at the back.

And then there is the downright strange. Only one set of controls is available to serve both transports — with two tapes inserted you need to select which transport you want the controls to operate, and the two won't operate completely separately. You can play one while

winding on the other, but can't rewind a tape while recording, for example. The DC5500 also omits to include a timer standby facility, which is a bit restrictive for a product obviously oriented towards versatility and convenience.

One exasperating shortcoming of the DC5500 is that Dolby switching is not memory backed, and defaults to Dolby off every time the unit is powered up.

Sound quality

The DC-5500 largely justifies its maker's claims. This really is a 'dual well' cassette deck for those who want the convenience without too much compromise. But there is a price to pay. The deck is only really comfortable with Type I (femic) and Type II (chrome bias) tapes. Metal tape recordings tend to sound raw and edgy, especially if Dolby C is used. As with so many cassette decks, Dolby B is sonically prefer-

able, and represents the optimum compromise between sound quality and background hiss for most music and tape types.

Even with lower bias tapes (I and II), there's a tendency for the sound to be shoehorned into a single plane whereas the original had shown greater spaciousness and better depth differentiation. But this is about the extent of the weaknesses. The bass is notably solid and tuneful and the overall diagnosis is of an expressive, detailed and true to life performer.

Conclusion

This is a fine dual deck for the serious punter who doesn't want to sacrifice quality for the sake of being able to dub tapes. Unfortunately you pay for the privilege. The price is high — too high perhaps — the non-memory backed Dolby circuit is a silly error, and the lack of timer/standby feature a regrettable oversight.

Contact

HARMAN AUDIO LTD,
UNIT 1B,
MILL ST, SLOUGH,
BERKS
SL2 5DD.

0753 575 911

Verdict

- + Well engineered, good sound quality with Type I and II tapes.
- High cost, Dolby switch 'forgets' setting, no timer standby.
- ▶ **£500.00 RRP**

LAB REPORT

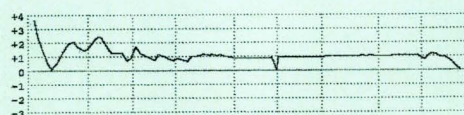
The DC5500 measurements earn a largely clean bill of health. In particular there is plenty of treble energy with all three tape groups, though it isn't as accurately calibrated as some, and Dolby C especially tends to exaggerate small errors to the point where they cannot be ignored. Treble extension is comparatively limited, but low frequency behaviour is good, and prerecorded tapes are also extremely well aligned, giving as near a perfectly flat response as it is possible to get.

Transport integrity is good by dual deck standards, though a -30dB flutter sideband reminiscent of the TD4600 is visible in the spectrum plot. Another point shared with the 4600 is unusually low distortion at very high levels, which shows that this Harman/Kardon can lay higher magnetisation levels onto tape with lower levels of distortion than most.

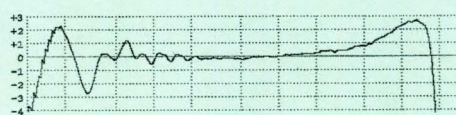
Wow & flutter IEC386 Q-Pk %	
Pk Wtd	0.135%
Mean Wtd	0.11%
Crosstalk ref 0dB	
100Hz	-34.8dB
1kHz	-60.6dB
6.3kHz	-46.3dB
10kHz	-42.5dB
Azimuth R-L phase (10kHz)	
Deck A	30 degrees forward, 50 degrees reverse
Deck B	80 degrees forward, 40 degrees reverse
Line input sensitivity/overload	56mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	915mV/4.34V
IM distortion 10kHz/11kHz	1.12% 0dB peak, 1kHz product
VU indication at IEC 0dB	+1.0dB

TEST RESULTS

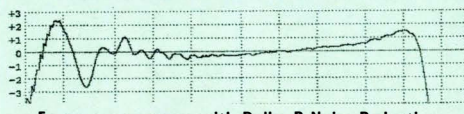
	Type I	Type II	Type IV
Noise CCIR 468-3 Q-Pk IEC			
Peak Wtd	-39.8dB	-46.9dB	-43.3dB
Peak Unwtd	-44.8dB	-49.1dB	-45.8dB
Mean Wtd	-40.0dB	-47.0dB	-43.5dB
MOL 3% ref 0dB			
1kHz	+3.1dB	n/a	+3.1dB
Distortion (THD+N) @ +8dB			
100Hz	7.31%	12.30%	11.3%
1kHz	5.13%	9.33%	7.81%
6.3kHz	2.29%	2.41%	2.19%
Distortion (THD+N) @ -8dB			
100Hz	0.85%	0.57%	0.66%
1kHz	%	0.71%	0.66%
6.3kHz	%	1.29%	1.27%
Dimensions	44.3x13.4x34.2 (wxhxd)cm		
Average wind/rewind time (C90)	2 min 40 sec		
Typical Retail Price	£500		



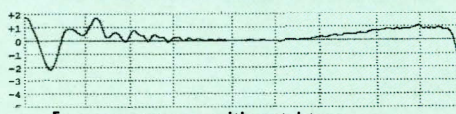
Frequency response with pre-recorded cassette



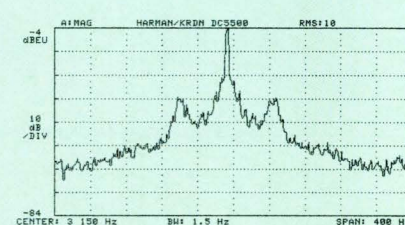
Frequency response with Dolby C Noise Reduction



Frequency response with Dolby B Noise Reduction



Frequency response with metal tape



Wow and flutter spectrum

Harman/Kardon TD4600



This model was originally released a couple of years ago, and was the first to embrace Dolby Labs' newest and most sophisticated noise reduction system — Dolby S. All decks which incorporate Dolby S have to comply with a strict set of specified standards, which is recommendation in itself.

Take my word, you don't buy this £600 machine for its features. It is just a two-head deck, and despite record bias and sensitivity adjustment, the circuit is more or less manual and less easy to use than, say, Pioneer's equivalent. You do get good quality metering, a memory tape counter, intro scan and track search. A remote control handset is also supplied.

Sound quality

The 4600 likes high bias tapes, and works best of all with metals, which come close reproducing the small instrumental parts

that tend to get lost with lesser tapes. With metals I was able to produce recordings which showed little obvious compression at high levels, making it easy to follow individual strands in the music. The stereo image was an excellent copy of the original. As shown in the test results, however, it wasn't hard to over-record treble rich material. Close miked female vocals are a natural for this, and to prevent intrusive hiss at high replay levels, noise reduction is definitely called for.

The good news is that the Dolby circuits cause little change in the sound. They merely clean up the hiss and leave the more subtle aspects intact. With powerful transient material it is possible to detect a certain synthetic quality at times, and the simpler Dolby B circuit is generally preferable to Dolby C for critical material.

However, the real interest factor in this machine is Dolby S. The original

TD4600 was not widely thought of as a good advertisement for the new process, but it has improved considerably. This latest version of the circuit now sounds fairly consistent, and leaves the dynamic structure of the music intact. Like Dolby B it is suitable for serious use, but it is also much more effective at banishing hiss, and also more tolerant of alignment errors.

Prerecorded cassettes sounded reasonable, but lacked high end presence, and never sounded as energetic or as solid as home made recordings made using good quality tape.

Conclusion

When first released this model cost £399. It remains a product of integrity and quality — indeed rather more so. But £600 is very pricey for a two head deck and it would have to be considerably better still to be more than worth considering.

Contact

HARMAN AUDIO LTD,
UNIT 1B,
MILL ST, SLOUGH,
BERKS
SL2 5DD.

0753 576 911

Verdict

+ First ever Dolby S deck, sounds good following a shaky start.

- Costly for a two header, not at best with musicassettes.

▶ £600.00 RRP

LAB REPORT

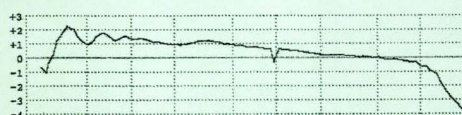
Both Harman/Kardon decks in this test have heads capable of accepting higher recording currents than the others, a fact indicated both by the very acceptable high level (+8dB) distortion results at low and mid frequencies, and to a lesser extent at higher frequencies, and by the result of the intermodulation distortion test. Maximum Output Level (MOL) is also unusually high, comparing favourably with many more costly decks. This should give the TD4600 a useful head start with the more exotic tape formulations, especially as bias noise levels are reasonably low and all the record/replay frequency responses are so accurately aligned. The deck is a little less well adjusted for prerecorded tapes, however, whose output falls noticeably with increasing frequency.

Prominent flutter sidebands spoiled the wow and flutter test result to some extent, though wow is extremely low, and pitch definition is consequently extremely good.

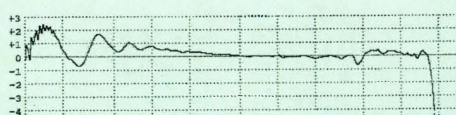
Wow & flutter IEC386 Q-Pk %	
Pk Wtd	0.15%
Mean Wtd	0.12%
Crosstalk ref 0dB	
100Hz	-49.7dB
1kHz	-48.6dB
6.3kHz	-39.5dB
10kHz	-38.8dB
Azimuth R-L phase (10kHz)	80 degrees
Line input sensitivity/overload	60mV/13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	1400mV/6.6V
IM distortion 10kHz/11kHz	0.6% 0dB peak, 1kHz product
VU indication at IEC 0dB	+1dB

TEST RESULTS

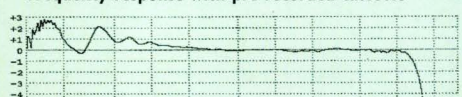
	Type I	Type II	Type IV
Noise CCIR 468-3 Q-Pk IEC			
Peak Wtd	-39.9dB	-46.3dB	-44.1dB
Peak Unwtd	-44.3dB	-47.1dB	-46.6dB
Mean Wtd	-40.2dB	-46.4dB	-44.3dB
MOL 3% ref 0dB			
1kHz	+8.4dB	+6.6dB	+7.4dB
Distortion (THD+N) @ +8dB			
100Hz	7.96%	10.8%	8.17%
1kHz	5.43%	8.23%	6.64%
6.3kHz	3.54%	3.36%	3.81%
Distortion (THD+N) @ -8dB			
100Hz	0.94%	0.58%	0.59%
1kHz	0.95%	0.62%	0.61%
6.3kHz	0.93%	0.90%	0.87%
Dimensions	43.5x12.3x33.5 (wxdxh)cm		
Average wind/rewind time (C90)	1 min 59 sec		
Typical Retail Price	£600		



Frequency response with pre-recorded cassette



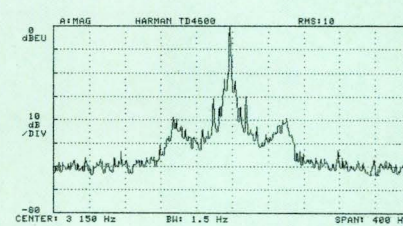
Frequency response with Dolby C Noise Reduction



Frequency response with Dolby B Noise Reduction



Frequency response with Dolby S Noise Reduction



Wow and flutter spectrum

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MARANTZ PM405E	£324.95	£354.95	£369.95	£384.95	£415.95
NAD 302	£289.95	£319.95	£339.95	£349.95	£379.95
NAD 304	£329.95	£359.95	£379.95	£389.95	£424.95
PIONEER A300X	£279.95	£309.95	£329.95	£349.95	£429.95
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OPTIONS

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DENON DCD890	159.95

DENON DCD1290	219.95
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MARANTZ CD52II	119.95
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JVC TD-X352



It may seem strange, but there is a market for cassette decks that don't strain credulity by being packed with layer upon layer of technology. The problem is that there are very few decks around that fulfil this requirement. You could go for something like a £1,000 Nakamichi that doesn't even have automatic tape type selection. Or you can go for this one, which is basic without going to such extremes, and costs just £150.

The TD-X352 is not only basic; it is also rather dour in appearance, and for some reason was supplied with a cassette well cover that suggested that it was an auto-reverse model. It isn't of course: the 352 is a unidirectional design; someone swapped the covers, probably inadvertently, before the unit was sent for review.

It may not be very exciting to look at, but it works smoothly and sweetly enough. The control layout is utterly conventional,

and the machine is equipped with standard transport functions, but no track search of any kind. An electronic tape counter readout can be switched into a peak indicator mode which is designed to help level setting when dubbing from CD.

Noise reduction is by Dolby B and C, with HX Pro acting as the mustard for low bias (Type I) tapes. The bias current can be adjusted, and you get good quality meters. And that, folks, is about it.

Sound quality

It is a fact of life that no matter how hard you may try to pin down a piece of hi-fi equipment in the test lab, you will sometimes be caught by a product that doesn't sound anything like as good as the numbers suggest. This is what happened with low-bit CD players, which from the first have tended to disappoint on audition, despite supposedly superior technical be-

haviour — and it is the case here.

The TD-X352 consistently sounds congested and lacking in detail. With hard driving rock and full orchestral music alike, it proved hard to separate the musical strands, and the result was a homogenised sound that lacked presence. This was even the case with metal tapes, and applied whether or not noise reduction of either flavour was employed.

There was no obvious explanation for this. The deck sounds stable enough, sustained notes don't vary audibly, and the sound remains impressively uniform irrespective of how the music is changing.

Conclusion

The lab tests suggest it's OK, but on audition this deck was consistently disappointing, even taking price into account, and no matter which tape type or noise reduction system was employed.

Contact

JVC (UK) LTD,
JVC HOUSE,
JVC BUSINESS PARK,
PRIESTLEY WAY,
LONDON NW2 7BA

(081) 450 3282

Verdict

- + Basic, gimmick-free deck, easy to use and measures well.
- Under achieves on audition with congestion and lack of clarity.
- ▶ **£150.00 RRP**

LAB REPORT

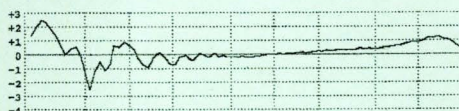
The TD-C352 has an impressively stable transport. The raw wow and flutter figures are low, and although there is some visible wow in the plot (the 'shoulders' near the central peak), the flutter residual is well distributed across the frequency band and should be fairly innocuous.

The FR plots show some output loss in deep bass, and a slight wayward quality in the treble, the rising trend which reaches its maximum around 8-10kHz being exaggerated by the action of Dolby noise reduction.

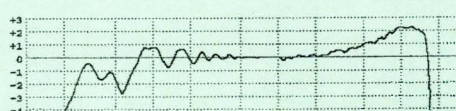
Type IV (metal) tapes look underbiased in this deck, but there is little technical advantage to be had from using this type of tape here anyway. Part of the lab story tells of a record head that cannot be pushed as far as the inherent limits of higher grade tapes allow, though there is some recompense in the well suppressed noise floor. Add these things together and everything points to the overriding suitability of a good, low noise Type II like TDK SA-X.

TEST RESULTS

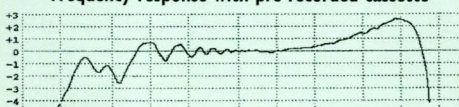
	Type I	Type II	Type IV
Wow & flutter IEC386 Q-Pk %			
Pk Wtd	0.08%		
Mean Wtd	0.07%		
Noise CCIR 468-3 Q-Pk IEC			
Peak Wtd	-43.8dB	-51.2dB	-47.0dB
Peak Unwtd	-47.1dB	-55.5dB	-49.9dB
Mean Wtd	-44.0dB	-51.4dB	-47.1dB
MOL 3% ref 0dB			
1kHz	-3.0dB	n/a	-n/a
Distortion (THD+N) @ +8dB			
100Hz	22.00%	21.20%	24.1%
1kHz	8.72%	17.20%	
Distortion (THD+N) @ -8dB			
100Hz	0.71%	0.71%	0.83%
1kHz	0.97%	0.83%	0.87%
6.3kHz	1.17%	1.46%	1.94%
Dimensions			
	43.5x13.3x33.2 (wxhxd)cm		
Average wind/rewind time (C90) 2 min 29 sec			
Typical Retail Price £150			



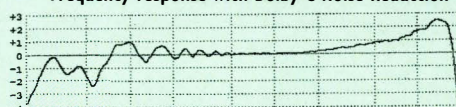
Frequency response with pre-recorded cassette



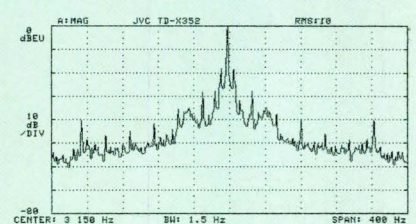
Frequency response with Dolby C Noise Reduction



Frequency response with Dolby B Noise Reduction



Frequency response with metal tape



Wow and flutter spectrum

JVC TD-R452



Building upon the platform set up by the 352, the £180 TD-R452 additionally includes an auto-reverse transport and a switch which allows the deck to be operated by an outboard timer. It also has a quick acting reverse mechanism (the record/replay head is bolted to a rotating platform which swivels by 180° in well under half a second), but this lacks the important refinement of an optical trigger to actuate the changeover at the junction between the magnetic and the leader tape, rather than needing to wait several seconds while the tape winds in and out of the leader segment.

Elsewhere the 452 retains key features of the cheaper 352 like the good quality meters and a peak level calibration system for setting up recordings from CD, and adds an extra 'CD direct' switch which connects up an extra input, stage rear. The transport is slick and smooth acting, with

a music (track) scan feature and direction key which can trigger a change of tape side at any point. Record bias is adjustable.

Sound quality

The good transport design translates directly into real stability. This isn't just pitch stability, but stability in the way stereo imagery is projected into the space around the loudspeakers. Instruments hold their positions independently of each other, irrespective of how the music changes around them.

The treble is also well behaved. Sibilance levels are low, while close-miked percussion remains clean and open.

The downside with this machine is that the sound being copied is still under-represented in the recording. The suspicious loss of sibilance is only one of the clues. Depth imagery tends to close up and there's a general loss of liveliness

when the music really needs more 'snap' and focus. The admittedly tuneful and coherent bass end is also a little lacking, this time in weight and power. Not for the first time, metal tapes fail to provide the answer, and Dolby C noise reduction clearly impeded the organic flow of the music. Dolby B, however, proved largely transparent and therefore acceptable.

Conclusion

If there's one key feature that makes the cassette a genuinely useful partner for an existing hi-fi system, it must be auto-reverse. Reviled by audiophiles, this function nevertheless makes the cassette practical for such handy tasks as recording long programmes off air. Despite the lack of optical sensing, this model is well suited to such tasks, so although performance is nothing special, sheer utility and the attractive price earns a Recommended flag.

Contact

JVC (UK) LTD,
JVC HOUSE,
JVC BUSINESS PARK,
PRIESTLEY WAY,
LONDON NW2 7BA.

(081) 450 3282

Verdict

- +** Affordable auto-reverse model, presentable sound quality.
- Lacks optical end of side change-over, a little bland musically.

▶ £180.00 RRP

LAB REPORT

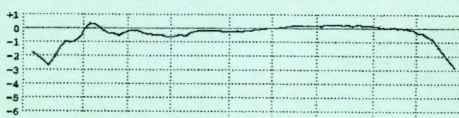
Pitch stability is extremely good, the direct drive capstan motor delivering negligible levels of wow or drift. There's quite a bit of flutter energy some 25-40dB below peak level, but it's all well distributed, with little correlated into specific areas.

The response shapes are all reasonably well tailored, but there is some loss of output at low frequencies, and some high frequency boost with Type II and IV tapes. Even this does little to sustain EHF response, however, the -3dB point being around 16kHz with Type II tapes, and no better than 18kHz even with Type IV.

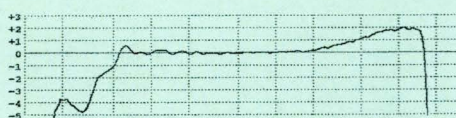
Other measured trends also seen on the TD-X352 include an inability to handle very high magnetisation levels, which militates against using high energy Type IV tapes, while tape hiss levels are actually somewhat inferior to those found with the cheaper JVC model.

TEST RESULTS

Wow & flutter IEC386 Q-Pk %		Type I	Type II	Type IV
Pk Wtd	0.08%	Noise CCIR 468-3 Q-Pk IEC		
Mean Wtd	0.06%	Peak Wtd	-43dB	-46.3dB
Crosstalk ref 0dB		Peak Unwtd	-35.4dB	-49.6dB
100Hz	-31.9dB	Mean Wtd	-43.3dB	-46.5dB
1kHz	-53.0dB	MOL 3% ref 0dB		
6.3kHz	-30.0dB	1kHz	-3.3dB	n/a
10kHz	-25.9dB	Distortion (THD+N) @ +8dB		
Azimuth R-L phase (10kHz)	20 degrees	100Hz	22.6%	19.7%
Line input sensitivity/overload	120mV/>13V	1kHz	13.8%	16.9%
Mic input sensitivity/overload	n/a	6.3kHz	8.62%	2.91%
Line output for 0dB/maximum	444mV/3.1V	Distortion (THD+N) @ -8dB		
IM distortion 10kHz/11kHz	3.5% 0dB peak, 1kHz product	100Hz	0.86%	0.88%
VU indication at IEC 0dB	+0dB	1kHz	0.61%	0.92%
		6.3kHz	1.42%	1.14%
		Dimensions	43.5x13.3x33.2 (wxdxh)cm	
		Average wind/rewind time (C90)	2 min 31 sec	
		Typical Retail Price	£180	



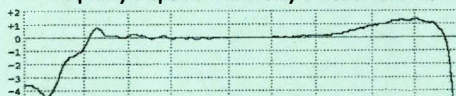
Frequency response with pre-recorded cassette



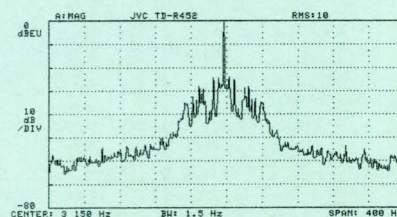
Frequency response with Dolby C Noise Reduction



Frequency response with Dolby B Noise Reduction



Frequency response with metal tape



Wow and flutter spectrum

Kenwood KX-3050



Given their physical complexity, it's not all that surprising that low cost cassette decks are rarely very adventurous in design. The £160 Kenwood KX-3050 is no exception. This standard budget cassette deck offers few real technological shocks, but visually enlivens a dull sector of the market with its flowing and vaguely art deco lines.

The most exotic features of the 3050 are the quiet, three motor transport, unusual though not startling at this price point, and the powered loading drawer — rapidly becoming de rigueur. The display includes an electronic rolling number tape counter and is conventional, except that the various elements can be progressively turned off to be completely dark if desired. MPX filtering is manually set, so remember to turn it off unless you're recording from a poorly filtered FM tuner.

The deck has Dolby B, C and HX Pro,

and a peak search feature to help set the record level for recording from Compact Discs. Various powerful track search options are available, and headphones can be connected, albeit at a fixed output level.

Sound quality

The measurements suggest that pre-recorded material will play back with a loss of treble energy and detail, but in fact such losses were small, the overall balance was acceptable, and imaging quite good. A piano quintet recording, used as one of the test tracks, sounded close and stable, but although the strings were vibrant and alive, the piano had a curiously leaden quality, as though heard through several layers of thick cloth. The effect is most marked in the middle registers, across the couple of octaves above middle C, and doesn't apply at higher frequencies.

Something similar was detected when

recording. The KX-3050 is capable of making clean, lively and tonally accurate recordings on most tapes, including Types II and IV chrome and metal types. There's relatively little of the 'top down' compression that is a traditional feature of the cassette medium, but again the midband tends to lack the three dimensional qualities of the source, and the treble (more effected by wow and flutter factors than when in replay only) sounds a little edgy and frazzled with close miked material.

Conclusion

The Kenwood KX-3050 is a cleanly executed and affordable design that marries attractive aesthetics with a useful but not extravagant set of features. Sound quality doesn't sustain close analysis in a high resolution system, but that was never the point. At the price it does well enough overall to merit a Recommended flag.

Contact

TRIO KENWOOD (UK) LTD, KENWOOD HOUSE, DWIGHT ROAD, WATFORD, HERTS WD1 8EB.

0923 816 444

Verdict

- +** Good sound, useful tape search facilities, and affordable.
- Some roughness and loss of midband with critical material.
- ▶** **£160.00 RRP**

LAB REPORT

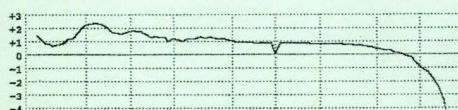
Although wow and flutter measures quite low in purely numerical terms, our more detailed spectrum analysis shows flaws that are not obvious in the simple mathematical expression. The central peak is quite well defined in the plot, but there is no shortage of wow energy (these are the low rate pitch changes that tend to be heard as a wobbliness on sustained notes, or a muddling when two or more notes are presented simultaneously). There are no discrete wow sidebands, which implies a random and rather 'loose' behaviour; the same is true of the flutter energy which is visible over a wide frequency range in the spectrum plots.

Noise levels are no better than routinely low, but the 3050's ability to handle reasonably high current levels through its record circuit is a welcome bonus in a budget machine. The frequency response trends are also satisfactory, but notice the loss of treble energy in the playback only test (see sound quality).

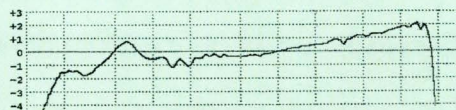
Wow & flutter IEC386 Q-Pk %	0.099%
Pk Wtd	0.091%
Mean Wtd	
Crosstalk ref 0dB	
100Hz	-36.8dB
1kHz	-50.7dB
6.3kHz	-40.1dB
10kHz	-34.6dB
Azimuth R-L phase	10kHz 80 degrees
Line input sensitivity/overload	106mV/±13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	870mV/2.9V
IM distortion 10kHz/11kHz	0.22% 0dB peak, 1kHz product
VU indication at IEC 0dB	+0dB

TEST RESULTS

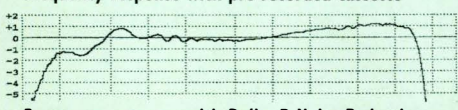
	Type I	Type II	Type IV
Noise CCIR 468-3 Q-Pk IEC			
Peak Wtd	-41.3dB	-47.9dB	-43.4dB
Peak Unwtd	-48.9dB	-49.1dB	-45.2dB
Mean Wtd	-41.5dB	-48.1dB	-43.6dB
MOL 3% ref 0dB			
1kHz	+4.7dB	n/a	+1.3dB
Distortion (THD+N) @ +8dB			
100Hz	10.70%	15.50%	13.6%
1kHz	9.14%	13.90%	12.7%
6.3kHz	3.32%	3.18%	4.17%
Distortion (THD+N) @ -8dB			
100Hz	0.50%	0.62%	0.80%
1kHz	0.43%	0.68%	0.73%
6.3kHz	0.98%	0.98%	0.86%
Dimensions	44x12.7x27.7 (hwxwd)		
Average wind/rewind time (C90)	1 min 57 sec		
Typical Retail Price	£160		



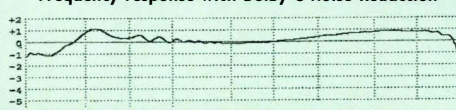
Frequency response with pre-recorded cassette



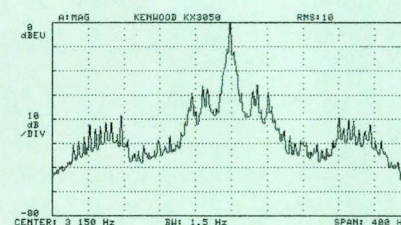
Frequency response with Dolby C Noise Reduction



Frequency response with Dolby B Noise Reduction



Frequency response with metal tape



Wow and flutter spectrum

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Nakamichi DR-1



The £780 DR-1 replaces the pretentiously named *Cassette Deck 1*, offering similar features at the same price. The basic roll call includes three heads (giving off-tape monitoring), Dolby B and C (hell might freeze over before Nakamichi includes Dolby HX Pro), counter search and adjustable bias.

The headline feature, however, is replay azimuth adjustment. This is needed because Nakamichi's particular three-head arrangement sticks to separate record and replay heads, to reduce mutual interference, rather than the more popular (simpler, cheaper) siamese arrangement, which fits both heads into the same structure. Separate heads demand some means of adjusting the precise azimuth (head alignment) to match them together. This necessity is also a virtue which gets the best performance from prerecorded tapes, or those recorded on other decks.

The DR-1 has a new styling and stronger, less resonant casework. The PCB layout has been rationalised, and is dual mono throughout, and the capstan motor has been upgraded. Also, the earlier mechanical tape/source monitor switch has been replaced by a gas-filled relay at a less intrusive point in the circuit.

The DR-1 omits features now almost universal elsewhere. As the press release wryly notes: 'Nakamichi owners are not afraid to select tapes or find tracks themselves.'

Sound quality

It's hard to pick fault with this deck as it has qualities that many others barely hint at. Particularly notable is the solidity, tunefulness and sheer evenness of the bass, and the way even close-miked cymbals can be resolved out individually.

Like all Nakamichis, the DR-1 is made

to exploit the qualities of metal tapes. It's possible to make fine recordings with high grade Type II/chrome bias tapes, but metals bring the sound alive, even though most tapes need bias adjustment to give a neutral, subjective balance.

Few people buy Nakamichis to play prerecorded tapes, and the measured playback response inaccurately promised disappointing results. In fact the contrary was true as it sounds vivid and alive, giving the same solidity and sparkling presence as its own recordings. And the azimuth adjustment, which couldn't be easier, proved effective at rescuing difficult tapes.

Conclusion

Prospective owners can rest easy: the DR-1 represents no retreat from Nakamichi's customary high standards. It's a highly desirable product despite some idiosyncrasies — and highly Recommended.

Contact

NAKAMICHI B&W
(UK) LTD,
MARLBOROUGH
ROAD, LANCING,
WEST SUSSEX.

0903 750 750

Verdict

- +** No compromise engineering and superb sound quality.
- Designed for the enthusiast with no track search, etc.

▶ £780.00 RRP

LAB REPORT

This Nakamichi's technical superiority was evident at almost every turn. It was only to be expected that the DR-1's discrete record head and amplifiers would be capable of handling high levels cleanly: the distortion levels at +8dB ref 0VU are class leaders at low and mid frequencies

Wow and flutter doesn't look all that low due to the presence of some wow components, which is one area where the direct drive capstan motors used elsewhere can show this more traditional Nakamichi way. However, flutter energy is almost entirely absent, and Nakamichi may have entered a pact with the devil here, trading one category of errant energy for the other.

The inherent treble response of the heads extends cleanly to around 20kHz and beyond with Type IV/metal formulations. There was some measured treble output loss from the prerecorded test tape, however, despite using the central position of the azimuth control and a test tape of guaranteed azimuth accuracy.

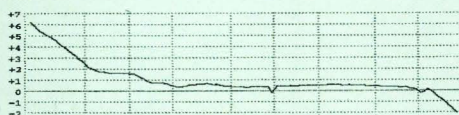
Wow & flutter IEC386 Q-Pk %

Pk Wtd	0.11%
Mean Wtd	0.07%
Crosstalk ref 0dB	
100Hz	-50.6dB
1kHz	-46.1dB
6.3kHz	-38.3dB
10kHz	-36.0dB
Azimuth R-L phase 10kHz	190 degrees *
Line input sensitivity/overload	70mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	650mV/6.1V
IM distortion 10kHz/11kHz	1.0% 0dB peak, 1kHz product
VU indication at IEC 0dB	+0dB

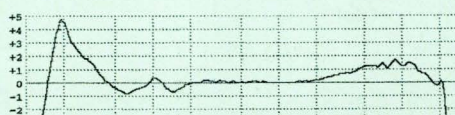
* centre position of azimuth control - readily correctable

TEST RESULTS

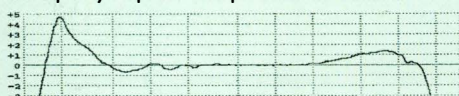
	Type I	Type II	Type IV
Noise CCIR 468-3 Q-Pk IEC			
Peak Wtd	-37.9dB	-43.3dB	-40.7dB
Peak Unwtd	-44.0dB	-46.8dB	-44.5dB
Mean Wtd	-38.1dB	-43.4dB	-40.9dB
MOL 3% ref 0dB			
1kHz	n/a	+0.7dB	n/a
Distortion (THD+N) @ +8dB			
100Hz	2.17%	4.86%	2.18%
1kHz	3.42%	5.55%	0.96%
6.3kHz	2.47%	3.89%	4.25%
Distortion (THD+N) @ -8dB			
100Hz	1.02%	0.53%	0.67%
1kHz	1.04%	0.59%	0.78%
6.3kHz	0.95%	0.90%	0.80%
Dimensions	43x10x32 (wrxhxd)cm		
Average wind/rewind time (C90)	2 min 22 sec		
Typical Retail Price	£780		



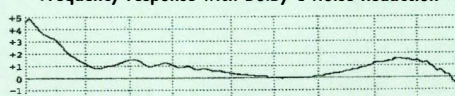
Frequency response with pre-recorded cassette



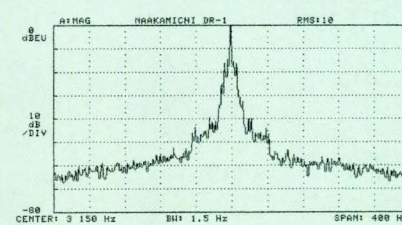
Frequency response with Dolby C Noise Reduction



Frequency response with Dolby B Noise Reduction



Frequency response with metal tape



Wow and flutter spectrum

Pioneer CT-S510



The £240 CT-S510 is a direct replacement for the CT-S410 which won itself a Best Buy flag in the last cassette deck project (issue 111). There are few changes between the two models, but two undoubtedly important ones are the addition of an infra-red remote control handset, and a new increased price, part of which is down to the handset, and part to the movements of the pound in relation to other currencies.

This is basically a beer budget three-head deck which features real time off-tape monitoring and also has the benefit of Super Auto BLE (Bias, Level, Equalisation) circuitry. This takes about 11 seconds from a standing start to record a test sequence and adjust the machine's electronic characteristics to give an accurate match of tape to machine. At the end of the sequence — accompanied by a tacky graphic display — the tape is rewound

ready for a recording to begin.

The deck has some other useful odds and sods, including three preset equaliser patterns which can add a little pizzazz to tapes meant for the car or personal stereo. Surprisingly, there's even a display which gives a 'time remaining' readout a few seconds after inputting the tape length.

Sound quality

Prerecorded tapes sounded satisfactory, and this Pioneer makes good recordings too, apart from a trace of electronic 'glare' highlighting the upper midband area. This may even be seen as an advantage by some as it gives the 510 a forward, explicit character that tends to produce snappy, well defined recordings.

As usual, however, any identifiable way of altering the music has its negative side. And with familiar acoustic instruments the Pioneer tends to sound a bit scrawny. On

the whole, good Type II tapes gave slightly better focused and cleaner results, well above average for the price.

Both Dolby circuits were responsible for a degree of compression which was typically audible only on background instruments. As usual, Dolby B was less affected than Dolby C.

Conclusion

There's nothing particularly special about this deck, but it meets all the basic requirements. Almost any tape from all three main types can be used with complete success, and the three-head construction has the important advantage of providing positive confirmation that recordings are being made to the required standard as they are happening. It's not a particularly classy sounding design, but is undoubtedly very attractively priced and equipped, and so earns a Best Buy flag for value.

Contact

PIONEER HIGH FIDELITY (GB) LTD,
1-6 FIELD WAY,
GREENFORD,
MIDDLESEX
UB6 8UZ.

081 575 5757

Verdict

- + Excellent value three header with auto tape set-up.
 - Some compression and roughness, horrible display.
- ▶ **£240.00 RRP**

LAB REPORT

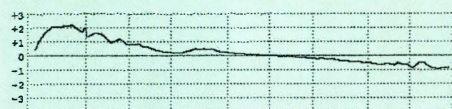
The measurements quickly showed up the weak points. The transport is not great, and the spectrum analysis reveals numerous wow and flutter sidebands, none disastrously high in level, but the combined effect suggests 'budget deck'.

The Super Audio BLE tape tuning system, however, once again proves its effectiveness. There's some treble loss with Type I tapes even after tuning, but all the other record/replay runs were ruler straight, and some crosschecks made with different formulations and brands shows the excellent tolerance of the system. Head contour effects are well tamed too. The only real oddity is a sharp high frequency peak when Dolby C is selected, which may be due to misalignment in the Dolby circuitry's anti-saturation network.

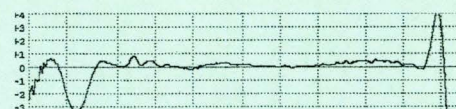
Operating dynamic range is average at this price, this is not a deck to be used without noise reduction, unless you turn the recording level up very high and happen to like the sound of tape compression.

TEST RESULTS

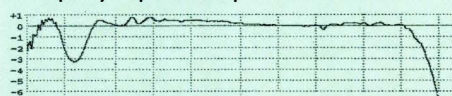
Pioneer CT-S510	Type I	Type II	Type IV
Wow & flutter IEC386 Q-Pk %			
Pk Wtd	0.097%		
Mean Wtd	0.073%		
Crosstalk ref 0dB			
100Hz	-47.9dB		
1kHz	-47.3dB		
6.3kHz	-38.9dB		
10kHz	-39.8dB		
Azimuth R-L phase 10kHz	40 degrees		
Line input sensitivity/overload	90mV/>3.6V		
Mic input sensitivity/overload	n/a		
Line output for 0dB/maximum	4.47mV/2V		
IM distortion 10kHz/11kHz	0.55% 0dB peak, 1kHz product		
VU indication at IEC 0dB	-3dB		
Noise CCIR 468-3 Q-Pk IEC			
Peak Wtd	-42.4dB	-44.7dB	-47.1dB
Peak Unwtd	-44.2dB	-44.5dB	-48.2dB
Mean Wtd	-42.6dB	-54.8dB	-42.0dB
MOL 3% ref 0dB			
1kHz	-3.3dB	-3.7dB	-0.8dB
Distortion (THD+N) @ +8dB			
100Hz	16.8%	14.7%	6.96%
1kHz	15.7%	12.7%	6.62%
6.3kHz	3.11%	3.28%	5.47%
Distortion (THD+N) @ -8dB			
100Hz	2.59%	0.58%	0.58%
1kHz	0.90%	0.63%	0.59%
6.3kHz	1.16%	1.08%	0.98%
Dimensions	42x12.6x27.2 (wxhxd)cm		
Average wind/rewind time (C90)	2 min 7 sec		
Typical Retail Price	£240		



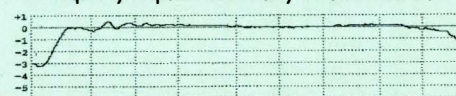
Frequency response with pre-recorded cassette



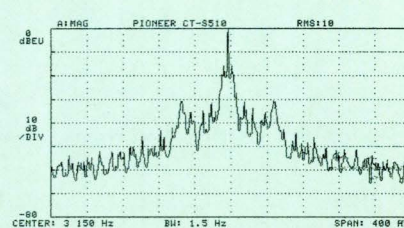
Frequency response with Dolby C Noise Reduction



Frequency response with Dolby B Noise Reduction



Frequency response with metal tape



Wow and flutter spectrum

Pioneer CT-S910



Featuring Pioneer's sophisticated 'slanted' mechanism, a more intriguing feature of which is that the capstan bearings are tilted back so that they load up under gravity, this superbly engineered £500 three-head/off tape monitoring deck is aimed at what might be termed the affordable high-end.

Look elsewhere if you're after extravagant levels of equipment and features. Though you do get Pioneer's absurdly named, effective Super Auto BLE tape alignment circuit and a range of goodies of special interest to the audiophile, such as defeatable Dolby HX Pro, a switchable display, a 'straight line' input, amorphous record and playback heads and extensive anti-resonance construction.

Sound quality

This is very nearly a first class deck. It's utterly stable with percussive instruments

which defeat many other cassette decks. The treble is smooth and refined, and the noise reduction circuits work immaculately, though Dolby B retains its edge.

Although the Super Auto BLE feature gave good measured results, it gave slightly anomalous perceived balances, and frequently needed tweaking using the bias adjust feature. But the 'straight line' switch, which shortens the signal path, for example by bypassing the balance control, was effective in improving transparency.

The ability to defeat Dolby HX Pro showed how effective that system is when recording onto ferric tapes. Without HX Pro the sound is crisp and lively, but the treble starts to compress audibly in concert with the music. The effect is at its most obvious with rock music where a combination of cymbal with bass drum causes the treble to 'duck' — until HX Pro is switched on. With Type II tapes, how-

ever, HX Pro had very little effect, and with Type IV metal tapes I couldn't hear any contribution from the circuit at all. In principle it's best to switch Dolby HX Pro off with metal tapes, if only because it simplifies the signal path.

Although this is nearly an excellent deck, the adrenalin factor is reduced on playback. Given beautiful source material, the 9010 makes beautiful recordings, but with vital and aggressive music — Tom Waits, or the finale of Mahler's *Sixth* — the recordings are a little slow and restrained.

Conclusion

Pioneer has exorcised nearly every trace of the cassette's humble origins from the sound of this impressive machine. The engineering of this deck is first class, and musically it is refined and sweet. Unaccountably, however, the deck is a little deficient in terms of dynamics and timing,

Contact

PIONEER HIGH FIDELITY (GB) LTD,
1-6 FIELD WAY,
GREENFORD,
MIDDLESEX
UB6 8UZ.

081 575 5757

Verdict

+ Superbly engineered three header, fabulous transport.

- Sound quality is softer and less communicative than expected.

▶ £500.00 RRP

LAB REPORT

The technical sophistication of this deck is amply justified by its superb measured performance. There is a small amount of residual wow in the spectrum analysis, but very little else, and this means practically no measured flutter at all, residuals being typically -50dB or below.

All the frequency responses, run after alignment using the Super Audio BLE feature, can be contained within an envelope little more than 1dB deep, and the Type I and IV responses are all but ruler flat. The playback only response shape is equally impressive, and output uniformity is well maintained to the lowest measured frequencies, though high frequency extension is limited to below 20kHz even with Type IV tapes.

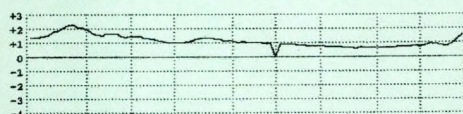
There is plenty of current to drive metal tapes cleanly through the bass and midband especially. Hiss levels are low, and the operating dynamic range is good enough to use without noise reduction if care is taken over the choice of music.

Wow & flutter IEC386 Q-Pk %

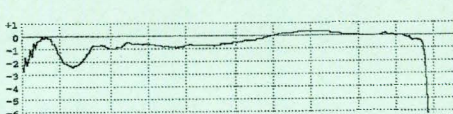
Pk Wtd	0.083%
Mean Wtd	0.06%
Crosstalk ref 0dB	
100Hz	-42.2dB
1kHz	-46.7dB
6.3kHz	-37.7dB
10kHz	-33.8dB
Azimuth R-L phase	
10kHz	180 degrees
Line input sensitivity/overload	85mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	450mV/4.1V
IM distortion 10kHz/11kHz	1.3% 0dB peak, 1kHz product
VU indication at IEC 0dB	0dB

TEST RESULTS

	Type I	Type II	Type IV
Noise CCIR 468-3			
Q-Pk IEC			
Peak Wtd	-42.1dB	-48.6dB	-46.3dB
Peak Unwtd	-47.0dB	-48.6dB	-47.7dB
Mean Wtd	-42.4dB	-48.8dB	-46.5dB
MOL 3% ref 0dB			
1kHz	0dB	-1.9dB	n/a
Distortion (THD+N) @ +8dB			
100Hz	11.7%	13.7%	5.92%
1kHz	11.7%	11.0%	2.80%
6.3kHz	2.05%	3.43%	4.09%
Distortion (THD+N) @ -8dB			
100Hz	0.70%	0.62%	0.59%
1kHz	0.72%	0.54%	0.52%
6.3kHz	0.78%	0.96%	0.83%
Dimensions	42x14.6x37.5 (wxdxh)cm		
Average wind/rewind time (C90)	1 min 49 sec		
Typical Retail Price	£500		



Frequency response with pre-recorded cassette



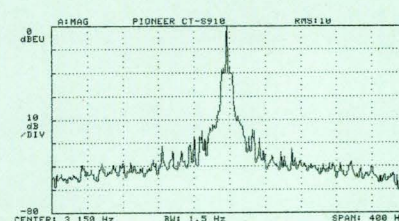
Frequency response with Dolby C Noise Reduction



Frequency response with Dolby B Noise Reduction



Frequency response with metal tape



Wow and flutter spectrum

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 Royd/Sony ES/Yamaha/Revox/Magnepan Incc
 Sony ES/Yamal
 Yamaha/Revo
 Magnepan Incorporated/Acoustic Energy/De
 nepan Incorporated/Acoustic Energy/De
 Acoustic Energ
 Acoustic Energ
 Mission Cyrus/Marantz/Nakam
 Mission Cyrus/Marantz/Nakamichi/
 Mission Cyrus/Marantz/Nakamichi/Sonus Faber
 michi/Sonus Faber/Onkyo/Orto
 Onkyo/Ortofon/Mordaunt Short/Mantra/Radfo
 Ortofon/Mordaunt Short/Mantra/Radford/Tasc
 Creek/Celestion/Sound Org
 Tascam/Creek/Celestion/Sound Organisation/
 Creek/Celestion/Sound Organisation/Koetsu/
 Celestion/Sound Organisation/Koetsu/SME/Ak
 Sound Organ
 Koetsu/SME/AI
 SME/Akai (video)/AKG/Beyer Dynamic/Audio
 Akai (video)/AKG/Beyer Dynamic/Audio Techn
 AKG/Beyer Dyr
 Beyer Dynamic
 Audio Technica/Sony DAT/Linn/Naim Audio/Re
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 Sonus Faber/O
 Ortofon/Mordaunt Short/Mantra/Radfo
 Mordaunt Short/Mantra/Radford/Tasc
 Mantra/Radfor
 Radford/Tascam/Creek/Celestion/Sound Org
 Tascam/Creek/Celestion/Sound Organisation/
 Creek/Celestion/Sound Organisation/Koetsu/
 Celestion/Sound Organisation/Koetsu/SME/Ak
 Sound Organ
 Koetsu/SME/AI
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 Akai (video)/AKG/

Sherwood DD-3010C



This dual transport deck is cheap, and well kitted out, two key factors that help it stand out from the crowd. The competitive £150 price is achieved because it is imported as a selected item (with no need to market the entire Sherwood range) by Richer Sounds.

As usual there is one record/replay transport and one for playback only. Both have full auto-reverse, Dolby B and C and Dolby HX Pro, and with the two transports together the deck can play tapes sequentially (relay play) or dub from tape to tape. High speed dubbing happens at 1.5 times instead of twice normal speed, which improves its most pernicious effects. Other features include blank skip, and a mechanical memory tape counter which is hard to read in subdued lighting.

Unlike certain dual cassette decks costing over three times as much, the Sherwood has separate sets of controls for

each transport, yet still manages to look uncluttered and comprehensible. It even includes a timer standby facility, to help make absentee off-air recordings, and again not all dual decks have this feature.

The least attractive feature is the record level metering, which has determinedly sluggish ballistics and only covers a mere 16dB dynamic range in six coarse steps. Like the tape counter, the meters are also hard to read in low lighting, but these are common failings at this end of the market.

Sound quality

The first track recorded by the Sherwood was *The Hard Way*, a typical enough recording from Mary Chapin Carpenter. Using Type II tape with Dolby C, the result was compressed and dull, with precious little sense of depth. Pitch accuracy seemed OK on this track, but the layering of the sound was replaced by a homogenised

quality where the lead sound or instrument appeared to swamp everything else.

Classical piano recordings showed up the unevenness of the transport design in all its wobbly glory. With sustained notes the Sherwood was a trial; at other times it was pleasant enough in a low key way. There was little presence or detail, but the deck was capable of making recordings which were warm and cuddly.

Metal tapes sounded thin and raw and were considered completely unsuitable. Similar condemnation applies to the Dolby C circuit which audibly mistracked, a failing that happily did not afflict Dolby B.

Conclusion

Well equipped and attractively priced, the Sherwood just passes muster as a basic twin deck, but the engineering is on the rough and ready side, and there is little to interest anyone fastidious about sound.

Contact

RICHER SOUNDS PLC,
RICHER HOUSE,
202 LONG LANE,
LONDON
SE1 4QB.

071 407 5525

Verdict

+ High value deck, usefully equipped with good ergonomics.

- Lacks transparency and can sound raw and compressed.

▶ £150.00 RRP

LAB REPORT

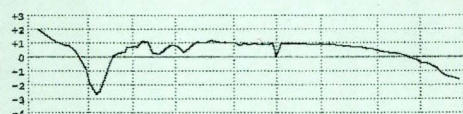
Somewhat inevitably the record/playback heads on this machine are no great shakes. Low frequency head contour effects are quite marked, and high frequency extension is limited, even with metal tapes (accepting that the latter are only nominally compatible, as the frequency response plot below clearly shows).

However, the Sherwood DD-3010C is well adjusted for Type II tapes, and Dolby processing doesn't appear to affect the measured behaviour in the least.

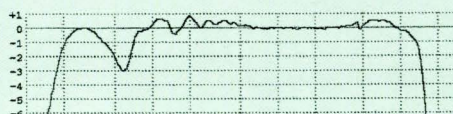
The traditional weakness of low cost cassette decks is the tape transport mechanism, and this Sherwood runs true to form. Wow & flutter levels are above 0.26% peak weighted, and the spectrum analysis looks more like cross section through the Himalayas, with relatively massive pitch variations and substantial amounts of flutter (high frequency) energy.

TEST RESULTS

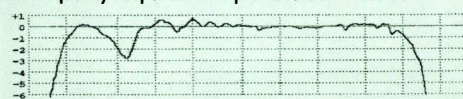
	Type I	Type II	Type IV
Wow & flutter IEC386 Q-Pk %			
Pk Wtd	0.26%		
Mean Wtd	0.20%		
Crosstalk ref 0dB			
100Hz	-44.6dB		
1kHz	-57.5dB		
6.3kHz	-37.6dB		
10kHz	-34.9dB		
Azimuth R-L phase 10kHz			
Deck A 20 degrees forward, 140 degrees reverse			
Deck B 10 degrees forward, 100 degrees reverse			
Line input sensitivity/overload	126mV/>13V		
Mic input sensitivity/overload	0.68mV/60mV		
Line output for 0dB/maximum	621mV/3.25V		
IM distortion 10kHz/11kHz	1.0% 0dB peak, 1kHz product		
VU indication at IEC 0dB	+3dB		
Noise CCIR 468-3 Q-Pk IEC			
100Hz	-40.9dB	-45.6	-44.2dB
Peak Unwtd	-46.8dB	-49.8	-48.9dB
Mean Wtd	-41.1dB	-46.0	-44.3dB
MOL 3% ref 0dB			
1kHz	-0.5dB	n/a	-2.5dB
Distortion (THD+N) @ +8dB			
100Hz	13.7%	12.9%	14.4%
1kHz	6.00%	10.1%	12.2%
6.3kHz	4.56%	6.62%	5.72%
Distortion (THD+N) @ -8dB			
100Hz	1.00%	0.87%	0.61%
1kHz	0.90%	0.90%	0.64%
6.3kHz	1.04%	1.61%	2.16%
Dimensions	44x12.5x24.5(w/h/x)d/cm		
Average wind/rewind time (C30)	2 min 57 sec		
Typical Retail Price	£150		



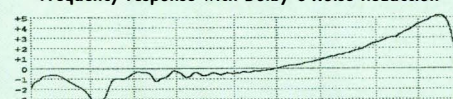
Frequency response with pre-recorded cassette



Frequency response with Dolby C Noise Reduction



Frequency response with Dolby B Noise Reduction



Frequency response with metal tape



Wow and flutter spectrum

Conclusions, Best Buys & Recommendations

Market trends in cassette decks are dominated by the continuing recession, by recent falls in the value of the pound sterling — and by confusion following the simultaneous introduction of two new digital recording systems (DCC and MD), only a short time after another (DAT) flopped on its second re-launch. This topic is explored further in *Choosing and Using Cassette Decks* on page 46, but the effect has been to slow the rate of new analogue model introductions, which accounts for the much smaller size of the test group than usual.

The dearth of new models means there are few obvious technical trends. About the most encouraging highlight is that Pioneer is continuing to invest in new transport designs like the 'slanted' mechanism found in the *CT-S910*, which just failed to win a commendation for reasons completely unrelated to a fine transport performance.

Turning to the Recommendations and Best Buys, Aiiwa's *AD-WX929* is a £200 twin deck which appears to be a sincere attempt to put the company's competitors out of business! The headlines include two auto-reverse, record capable transports with optical end of side recognition to give a fast side change and an auto-tape alignment circuit similar to Pioneer's BLE circuit. Although there are limitations, the remarkable fact remains that the *AD-WX929* sounds more than merely respectable on audition, amply justifying its Best Buy status.

The only unidirectional Best Buy this time around goes to the Pioneer *CT-S510*, which is a simple derivative of a previous Best Buy, the *CT-S410*. The new model is about £20 more expensive, for which you get a remote control handset; otherwise it's all as before, but the list was already an impressive one.

First and foremost this is a three-head deck, which allows recordings to be monitored in real time, and which produces some musical benefits through the use of dedicated record and playback heads. The deck also has Pioneer's BLE circuit, which takes a few seconds to adjust all the important variables apart from record level for the specific tape sample in use at the time. Sound

This month's Best Buys

Aiiwa's £200 twin deck, the *AD-WX929*, appears to be a sincere attempt to put the company's competitors out of business!



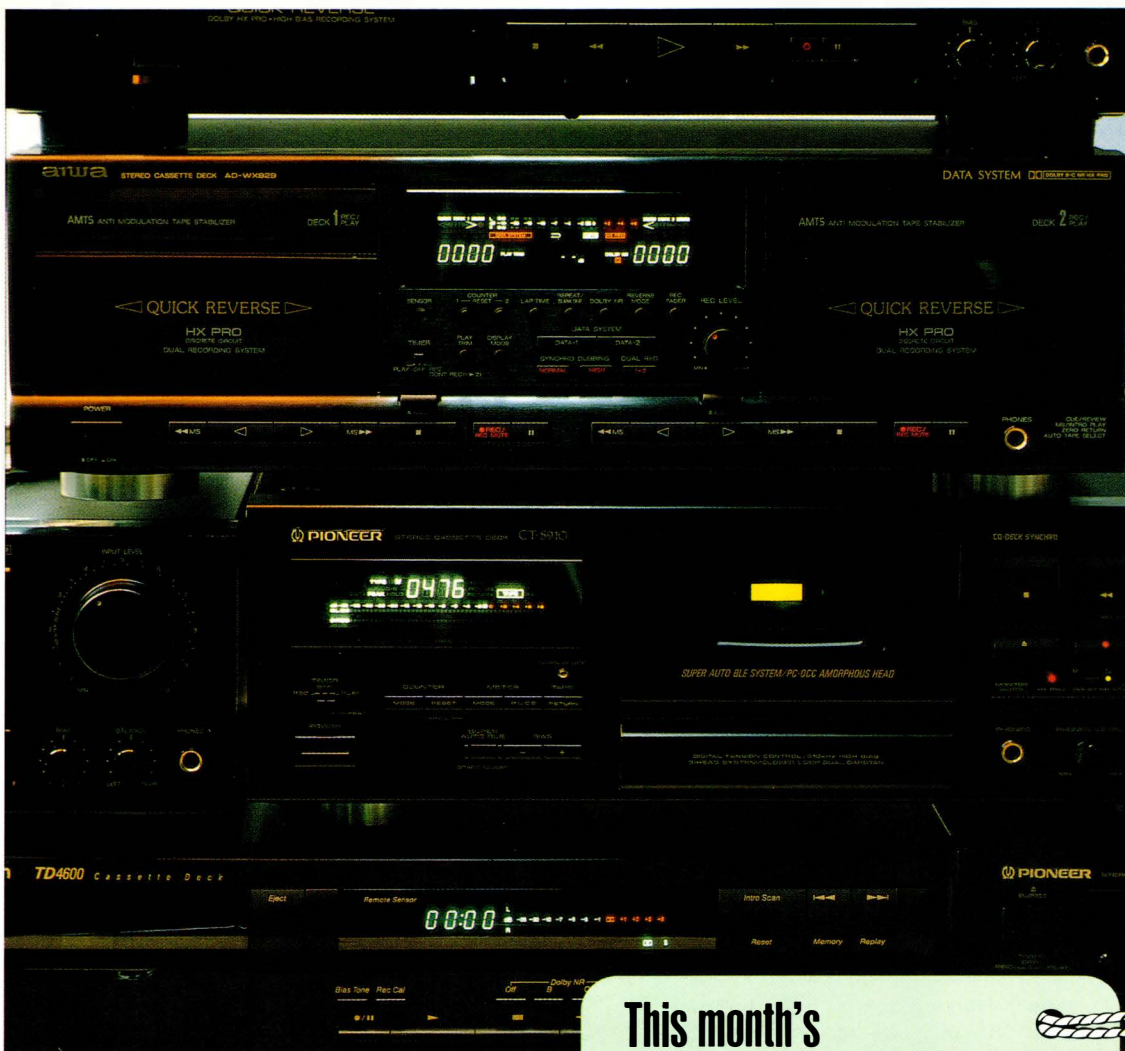
Pioneer's £240 *CT-S510* offers all the flexibility of a three head deck with a very impressive list of features.



quality is more than commensurate with the price.

£160 is a nice price for a basic cassette deck, being clear of the very basically engineered models around £100, while not completely out of touch with the size of the average person's dole cheque. The Kenwood *KX-3050* is one of the better units at this price, enlivened by a nice, flowing fascia design, and by such niceties as a three motor transport, a powered loading door and a display whose elements can be progressively shut off. It offers a good, workmanlike standard of music making, and unlike a number of its peers, goes a long way toward exploiting the extra potential of Type IV/metal tapes.

For a very similar sum (£180) JVC offers the *TD-R452* auto-reverse deck. This model drew some flak for the lack of an optically triggered end of side change, which means it will try to play or record the leader in both directions when it gets to



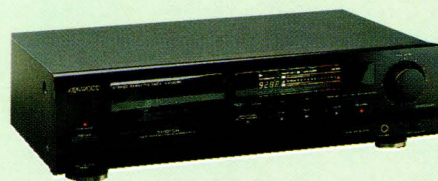
the end of the tape — a slightly ironic omission as JVC justifiably brags of the snappy way in which the heads change direction. The *TD-R452* is otherwise a simple but adequately equipped deck capable of making recordings to broadly the same standard as a good budget unidirectional deck. In stability and pitch integrity, the one area where auto-reverse decks tend to be suspect, this JVC was beyond reproach, thanks in part to a well engineered direct drive capstan motor.

The (Recommended) Nakamichi *DR-1* was easy the best engineered of the models tested, and also offered the best sound, as it damn well should at £699! The *DR-1* borrows some styling and engineering details from much more expensive Nakamichi models, but is essentially a repackaging exercise based on the *Cassette Deck 1* with modest improvements specified, and found. With fully discrete record and play heads, and the possibility of changing azimuth relationships between the record and play heads in long term use, the *DR-1* offers azimuth adjustment feature, accompanied by a small indicator which tells you when the setting is correct, although it's easily set by ear.

Otherwise features are almost non-existent, and the *DR-1* exemplifies Nakamichi's stubborn refusal to countenance even such basic conveniences as automatic tape-type recognition. On the other hand there's considerable pleasure and satisfaction in simply using the controls, while engineering excellence and long term serviceability provide their own rewards.

This month's Recommended decks

Kenwood *KX-3050* — £160 buys a nicely designed deck with good sound quality.



JVC *TD-R452* — Another very affordable model at £180, simply but adequately equipped.



Nakamichi *DR-1* — Excellent engineering and sound quality but £699 is the price to pay.



Choosing and Using Digital Compact Cassette

Digital Compact Cassette is just that: a tape with the same dimensions as the familiar Compact Cassette, albeit protected by a sliding metal guard, but one that records music in a digital rather than analogue form. So the noise and wobbles of the humble cassette are banished in one stroke. Nevertheless DCC is backwards compatible, so there's no need to junk an existing collection of cassettes — simply pop them into the DCC machine, select either Dolby B or C noise reduction and hit the play button. However, when it comes to recording you'll have to use new blank DCC style tapes with their classy housings and video-based chrome formulation.

Pre-recorded DCC software is now starting to appear alongside conventional analogue music cassettes in the major music stores, and these are rather more than simply 'repackaged CDs'. Most DCC releases come complete with Text Data information, including the album title, artist(s) name, track titles and other details that are shown on the player's fluorescent display. In Text Mode it's even possible to select tracks by title rather than by number.

Being a digital format, recording on DCC also offers a fair degree of flexibility. A variety of markers may be recorded alongside the music, including a Start marker to flag the beginning of a track, a Next marker which prompts the machine to fast-forward to the beginning of side B and a Reverse marker which causes the deck to spin instantly on its proverbial heels and reverse the direction of play. Any of these markers may be erased at a later date, but all are invaluable tools for creating a customised selection of tracks. Nevertheless the nature of the

beast means that skipping from track to track remains a time-consuming process, especially compared to the near-instant track access of CD players.

Prior to making a recording, an Append facility will search out the start of the tape or the conclusion of the last recorded segment, ensuring very clean edits. It's possible to record directly from a digital source such as CD, DAT or even another DCC player, but only so long as this is a first-generation copy. If you try to dub from a copy-of-a-copy the SCMS (serial copy management system) will be activated and the recording won't. There's no such problem copying from an analogue source. Just hook up to the deck's analogue source and the internal ADC (analogue to digital convertor) will digitise the signal before passing it on for recording.

However, you will need to adjust the recording level carefully, making quite sure that no musical peak exceeds the 0dB point. Unlike a conventional cassette deck, thumping a DCC recording into the red will induce serious clipping.

How DCC differs from DAT and CD

Once the designers of DCC had decided to base it on the old Compact Cassette they faced an immediate and apparently insurmountable problem: just how do you squeeze 60 minutes of digital music onto a tape that will only accommodate a fraction of this information.

The answer is provided by PASC (precision adaptive sub-band coding), which selectively reduces the amount of information prior to recording. This is an adaptive process based on two established psycho-acoustical principles.

The first is that we only

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.





Blind listening

Each month *Choice* puts two or three categories of hi-fi components through our careful testing procedures. The blind listening tests are so called because the panel is unaware of either the name or price of the individual product. Objectivity is further ensured by our lab results and measurements which are always our own, not manufacturers' claims.

perceive sounds that persist above a certain level of loudness, a level that varies with frequency and is known as the Absolute Threshold of Hearing. Secondly, loud sounds tend to obscure (or mask) quieter sounds in the same vicinity. In practice both principles are entwined because the phenomenon of masking continues to alter our Threshold of Hearing on a note-by-note basis. So at any point in time the nature and complexity of the music itself determines just how clearly we can perceive the individual performers and instruments. And it's what we hear, rather than what is obscured, that PASC aims to capture.

In 'throwing away' this masked information, the remaining 'audible' part obviously takes up less space. Since DCC has only one quarter the capacity of CD or DAT, this concept of 'adaptive data reduction' is crucial to its success. The PASC processor works by sub-dividing the incoming music signal (say, from the digital output of a CD player) into 32 evenly-spaced sub-bands (which are marked-out on a graph in each *Lab Report*). When 12 samples of each sub-band have been collected they are cobbled together into what's called a PASC frame. The information in each frame is then condensed both by scaling (which reduces the size of 16-bit digital words) and by discarding any sub-bands whose level either falls below our Threshold of Hearing or is masked by

the dominant presence of an adjacent sub-band.

A minimum number of 'bits' is allocated to each and every PASC frame, so that the greater the number of sub-bands that are deemed to be inaudible, the more 'bits' are released to describe the information that remains.

This is the 'adaptive' part of PASC, responding in a flexible manner by optimising the restricted 'bit pool' available to describe each frame.

This is graphically illustrated in each *Lab Report* by the 3D Data Reduction graphs. A bold frequency sweep extends to 10kHz together with lower-level tone at 20kHz. As the sweep begins (at lower frequencies) the PASC processor tries to encode everything it passes across even though a chunk of information beyond 15kHz goes missing as the bit-pool quickly dries up. But as the sweep extends to higher frequencies the PASC 'brain' knows we cannot hear those quieter sounds off to the immediate right, so it deliberately discards this information. This then tops-up the bit-pool and allows that missing chunk beyond 15kHz to be properly described.

Although these Data Reduction plots might look fairly horrendous (after all no CD player would ever do this) it's important to remember that DCC records what the music sounds like, not what it looks like. That's the theory, just turn the page to check out the practice!

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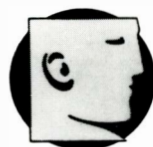
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Marantz DD-82



If you have already rushed hot-foot to purchase an early sample of Marantz' 'budget' DCC recorder, then prepare to be miffed, because the latest DD-82s now incorporate all the internal revisions originally scheduled for the DD-92.

With nary a hiccup in its £650 retail price, the DD-82 now benefits from some 23 'customised' components' (including many Cerafine caps) in both the power supply, ADC and DAC circuitry. The mains transformer has been beefed-up with 22-gauge secondary windings (to reduce its impedance) while a CCNE (current conversion noise elimination) filter brings further peace to the power supply rails.

Otherwise the DD-82 is very obviously based on Philips DCC-900. The transport mechanism has been moved to the far left of the chassis, and the elegantly contoured fascia has a clear empathy with

Marantz' other separates, but the PASC core of the DD-82 is identical to both the DD-92 and DCC-900. Marantz has simply substituted an 18-bit resolution (bitstream) ADC and DAC7 D/A converter for good measure, if you'll pardon the pun.

Sound quality

Our listeners announced that this player struck an acceptable balance between the stridency of the DD-92 and the restraint of the DCC-300. In practice the DD-82 is simply less contrived, any residual 'two-channel effect' being offset against a passable sense of urgency and atmosphere, even if the end result is still, well, more polite than the original CD.

Recordings are still somewhat euphonic but are also more dynamic, punchy and clean than with other DCC recorders. On the other hand, recordings derived from

the analogue input were lighter and brighter in balance, vocals were generally less distinct and performers seemed subjectively distant, their humour and humanity now represented at arms length.

Fortunately the shine returned with prerecorded software, the music enjoying realistic life and clarity. String detail was sharper while pop sounded more upbeat. Yet conventional musicassettes sounded coarse, muddy and lifeless.

Conclusion

Marantz' entry-level recorder proved significantly more inspiring than either of the Philips players, despite its brutal dismissal of analogue musicassettes. Of course, the DD-82 is first and foremost a DCC player, and in this regard it was the only one of our quartet to retain a measure of the compassion and feeling of the music at hand.

Verdict

- + Good enough sound quality to give DCC a chance.
- Very poor replay of normal analogue cassettes.

▶ **£650.00** RRP

LAB REPORT

In common with other DCC recorders the DD-82's technical performance might easily be mistaken for that of a CD player. The SM5840 eight times oversampling filter, for example, gives rise to the familiar V-shaped stop-band images on the 3D plot while the improved differential output of the TDA1547 (DAC7) banishes any trace of second harmonic distortion from the scene.

Nevertheless the PASC data reduction ensures that other measurements are far removed from CD. The frequency responses show a loss in treble output as the overall recording level is reduced. According to psychoacoustical theory we cannot hear such quiet high frequency detail, a situation that changes at louder levels. So at 0dB to -15dB the PAS-coder attempts to describe the entire frequency range even though its available 'bit-pool' is quickly plundered by the priority bass and midrange frequencies — hence the jagged treble response.

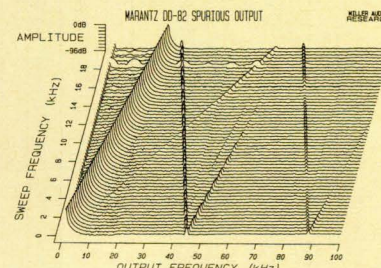
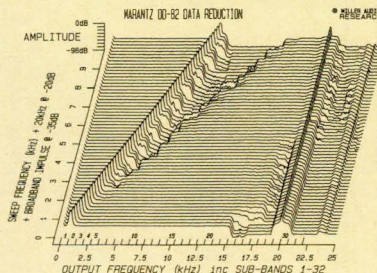
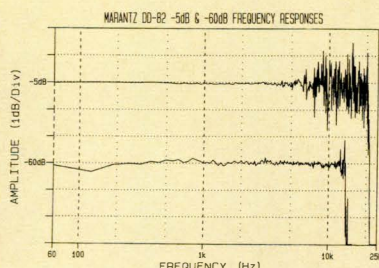
TEST RESULTS

Channel Balance	20Hz	1kHz	20kHz	Output Impedance	463ohm
Channel Separation	116.4dB	104.7dB	79.1dB	1Hz Noise Modulation	+9.9dB
THD vs Level, 0dB	-101.5dB	-105.2dB	-74.7dB	CCIR IMD, 0dB	-95.8dB
-30dB	-80.5dB	-80.7dB	-54.4dB	Suppression of stop-band IMD	60.7dB
-60dB	-47.1dB	-47.5dB	-24.4dB	De-emphasis Accuracy, 1kHz	-0.01dB
-80dB	-27.4dB	-31.6dB	-2.9dB	5kHz	-0.05dB
Dithered, -90dB	-17.0dB	-22.1dB	+5.5dB	16kHz	-0.03dB
Dithered, -100dB		-18.4dB		S/N Ratio (A-wtd), w emp, 0LSB	109.9dB
Dithered, -110dB		-13.4dB		w/o emp, 0LSB	103.4dB
Resolution @ -60dB		0.00dB	-0.03dB	w/o emp, 1LSB	104.8dB
-80dB		+0.22dB	-0.65dB	Digital Input/Output	Coaxial/Optical
-90dB		+0.38dB	-2.25dB	Crystal Clock Accuracy	+33.8ppm
-100dB		+0.70dB	no signal	Typical Retail Price	£650
Peak Output Level, L		2.205V			
R		2.204V			
Relative Output Level		+0.85dB			

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Marantz DD-92



Take one DD-82, spray it a rather luxurious champagne gold, copper-plate the chassis and then sandwich it between two hefty cast-alloy sidecheeks and what you end up with, broadly speaking, is an £800 DD-92. Even the remote handset comes in for the Midas touch though its range of features remains quite unaltered.

In practice the DD-82 and DD-92 are copies of one another, and both are better arranged, slicker in operation and generally more inspiring than their Philips rivals. A bold fluorescent display carries full text information including the artist, track and album title (when available on prerecorded DCC software) along with details of track timing, record level, play/record mode and choice of input. The analogue plus coaxial and optical digital inputs must be manually selected on the

DD-82/92 but other features can be performed automatically.

All in all this is a tour-de-force of modern engineering, equipped with a top-spec AK5328 bitstream ADC, plus a DAC7 Bit Stream convertor prior to the output.

Sound quality

Our listeners commented on the 'peaky' sound of this player — a touch of 'boom and tizz' that lent the impression of a wide dynamic range. Bass was full but also slightly defocused and lacking the resonant quality of the DD-82.

Vocals adopted a slightly strained perspective, yet this (and the DD-82), were the only players to reveal Jennifer Warnes' harmonies without making them sound monotonous. Once again some elements within the music would overshadow others: Christy Moore would leap into the

mix and cause one of the accompanying guitars to disappear, only to reappear once he paused.

Recordings made via the analogue input were light in tone, bland and soft. Violins had a hint of Mantovani about them, a cascade of strings that placed euphony ahead of crisp detail. Pre-recorded DCCs sounded fairly vivid and appealing, but only a flat and dull noise was extracted from analogue musicassettes.

Conclusion

The heritage of this machine is evident from both its appearance and sound, and the copper-plated chassis really appears to influence the sound. Whether that influence is worth an extra £150 is debatable, however, as our panel placed it second to the DD-82, due to slightly contrived 'boom and tizz' coloration.

Verdict

+ Gorgeous finish combined with a classy sound quality.

- Rather pricey, very poor analogue cassette replay.

▶ £800.00 RRP

LAB REPORT

Bearing in mind that the DD-82 and DD-92 are from the same mould, the latter would appear to derive some benefit from its slabs of alloy and acres of copper-plating. The overall S/N ratio has squeezed up to 105-106dB while any error in its linearity at 20kHz has dropped from 2.25dB to 1.85dB (ref -90dB).

The 61dB stop-band rejection and familiar-looking 3D plot remain unchanged because these are 'fixed' by the SM5840 oversampling filter and DAC7 chipset. Then again, the DD-92 exhibits rather less interference and undulation in its HF noise floor than our other contenders — even the low level frequency response looks a little cleaner!

Meanwhile the data reduction plot shows PASC in action, the wholesale masking of (musical) signals to the right of the sweep serving to replenish the 'bit-pool' and so release extra bits to code signals surrounding the 20kHz tone.

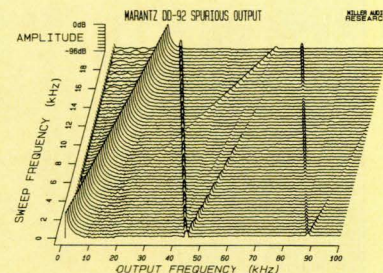
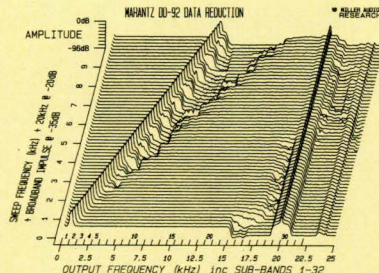
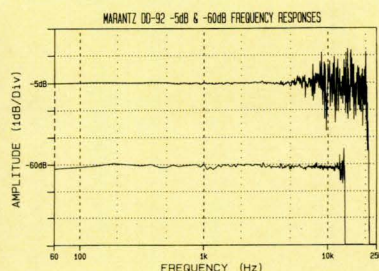
TEST RESULTS

Channel Balance	0.11dB	0.11dB	0.13dB	Output Impedance	454ohm
Channel Separation	115.7dB	105.3dB	79.3dB	1Hz Noise Modulation	+9.6dB
THD vs Level, 0dB	-102.6dB	-104.3dB	-75.1dB	CCIR IMD, 0dB	-97.8dB
-30dB	-82.7dB	-79.4dB	-54.4dB	Suppression of stop-band IMD	60.6dB
-60dB	-52.4dB	-47.4dB	-40.1dB	De-emphasis Accuracy, 1kHz	-0.02dB
-80dB	-27.1dB	-31.8dB	-26.2dB	5kHz	+0.15dB
Dithered, -90dB	-18.2dB	-21.8dB	-2.5dB	16kHz	+0.15dB
Dithered, -100dB		-17.3dB		S/N Ratio (A-wtd), w emp, 0LSB	110.4dB
Dithered, -110dB		-7.5dB		w/o emp, 0LSB	110.4dB
Resolution @ -60dB		-0.01dB	-0.03dB	w/o emp, 1LSB	105.5dB
-90dB		+0.16dB	-0.75dB	Digital Input/Output	Coaxial/Optical
-90dB		+0.12dB	-1.85dB	Crystal Clock Accuracy	+41.3ppm
-100dB		+0.50dB	no signal	Typical Retail Price	£800
Peak Output Level, L		2.331V			
R		2.360V			
Relative Output Level		+1.38dB			

Contact

MARANTZ HI-FI (UK) LTD, KINGSBRIDGE HOUSE, PADBURY OAKS, 581 BATH ROAD, LONGFORD, MIDDLESEX UB7 0EH.

(0753) 680 868



Philips DCC-300



Ten months since the official launch of DCC and Philips' new mid-sized DCC-300 is the closest we have come to a genuine second-generation player. This is also the first recorder to roll-off European production lines, complete with new sideways-loading RE-D mechanism and a simpler fluorescent display.

A coaxial digital input and fixed analogue outputs will have to suffice on this occasion though useful goodies like direct track access are still available via the remote control. Advanced features such as Append are simply pared-down, searching out the start of the tape or the end of the last recorded segment but not, by all accounts, the start of side B.

Similarly the various Next and Reverse markers are all buried under a single Write Mark key. Other marker functions plus Dolby B/C noise reduction for music cassette

replay are labelled accordingly. One final point: there is no overflow indication on the 13-element meters so care will be needed when recording from an analogue source, otherwise the DCC-300 may transgress beyond 0dB and into clipping.

Sound quality

As the opening act on our playlist, the DCC-300 impressed our panel with its 'minimal level of disruption'. Our digital recordings certainly lacked the spaciousness and depth of the original, for example, but ironically the overall sound was both tidier and less antiseptic.

Treble details were more brightly-lit via the analogue input but still lacked the life of the original. Classical violins sounded heavily synthesised, bereft of the shine and brilliance that graced the source CD. This in turn was allied to an over resonant bass,

a sustained heaviness that brought a murky, cloudy quality to the likes of Christy Moore.

Pre-recorded DCC material was bleached of impact as great chunks of detail were abandoned in wholesale fashion. In fact our selection of analogue music cassettes sounded vastly more entertaining, dynamic and refreshing.

Conclusion

'Very restrained, very tidy and very adequate', concluded our panel adding that the DCC-300 was 'inevitably less interesting over a period of time'. At its best (via the digital input), some sense of acoustic is lost and the recording is more obviously 'two-channel' yet, because the music remains 'sugar-coated', it's easy enough to swallow. Unfortunately the indelicate handling of pre-recorded DCC software undermines the value of this machine.

Verdict

+ Very competitive price for Digital Compact Cassette.

- Poor pre-recorded replay; rather bland sound.

▶ £450.00 RRP

LAB REPORT

A memo from Philips suggested the DCC-300 would use an Asahi Kasei ADC married-up with an SAA7323 DAC, a partnership somewhat at odds with the Crystal CS5339 ADC and SAA7321 DAC discovered in our sample! This DAC is responsible for the 10dB increase in peak-level distortion over other models in this test (witness the third and fifth harmonics on the 3D plot), just as the rippled stop-band images come from the initial four times oversampling stage.

The broken noise floor visible towards the top of the audio band (top LHC of plot) is a function of the PASC processor, though any further tracks of interference are caused by Philips' congested digital circuitry. The second 3D plot shows that more data reduction is occurring at very high frequencies.

Other de-merits include an additional HF roll-off of some 0.4dB, a poor 91dB S/N ratio and an inaccurate de-emphasis response.

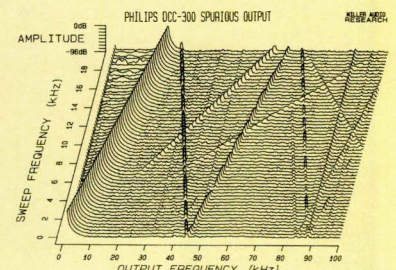
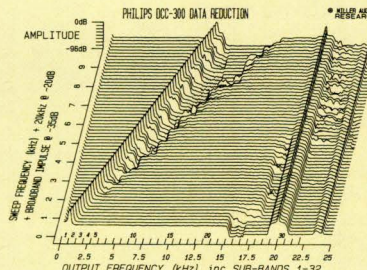
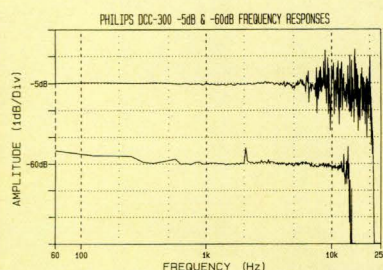
TEST RESULTS

	20Hz	1kHz	20kHz		310ohm
Channel Balance	0.04dB	0.04dB	0.02dB	Output Impedance	+1.8dB
Channel Separation	101.4dB	103.4dB	79.7dB	1Hz Noise Modulation	-95.5dB
THD vs Level, 0dB	-93.6dB	-92.0dB	-68.5dB	CCIR IMD, 0dB	54.3dB
-30dB	-74.2dB	-67.5dB	-58.6dB	Suppression of stop-band IMD	-0.39dB
-60dB	-50.2dB	-35.4dB	-31.5dB	De-emphasis Accuracy, 1kHz	-1.30dB
-80dB	-16.4dB	-14.2dB	-10.1dB	5kHz	-1.24dB
Dithered, -90dB	-9.6dB	-5.25dB	+1.8dB	16kHz	93.5dB*
Dithered, -100dB		+2.5dB		S/N Ratio (A-wtd), w emp, 0LSB	91.0dB*
Dithered, -110dB		+2.5dB		w/o emp, 0LSB	91.1dB*
Resolution @ -60dB		+0.06dB	-0.15dB	w/o emp, 1LSB	91.1dB*
-80dB		+0.41dB	-0.85dB	Digital Input/Output	Coaxial
-90dB		+0.08dB	-2.95dB	Crystal Clock Accuracy	+3.8ppm
-100dB		+2.50dB	no signal	Typical Retail Price	£450
Peak Output Level, L		2.160V			
R		2.170V			
Relative Output Level		+0.69dB			

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Jack-XLR	4m.	£17.00 ea.
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Philips DCC-900



This is the recorder that started the DCC ball rolling, the star turn of our extended DCC feature back in issue 110. Its sculptured fascia and matt grey livery lend a rather gothic appearance but the controls are both clearly marked and positive in operation. Transport keys are located directly under the centralised mechanism and fluorescent display, providing access to tracks by number or title while also automatically seeking out fresh areas of tape for new recordings.

A variety of digital (optical and coaxial) and analogue inputs are provided which may be selected manually or automatically, leaving Philips' ESI BUS to synchronise recording from any of its 900 Series CD players onto the DCC tape. It's also possible to over-ride the track numbering facility manually, a useful option when recording long classical pieces that occupy

a very wide dynamic range.

The machine still has trouble identifying the precise start of selected passages, typically catching the last few seconds of a previous track before launching into the desired selection.

Sound quality

This latest version of the 'original' DCC deck was greeted with rather less enthusiasm than its forebear in issue 110, our listeners drawing confident parallels with the DCC-300 but placing the DCC-900 well behind both Marantz models. Specifically it shares the same disdain of dynamic contrast and ambient detail as the DCC-300, smearing the percussive sounds on the Jennifer Warnes track as the vocal effort mounted to a peak.

Indeed, regardless of the style of music, as intensity increases the overall effect

quickly becomes dirty and unappealing. Recordings made from analogue sources provided a gentler sound with a fatter but fuller bass, lending a forward but bloated character to male harmonies.

Pre-recorded DCC music was more alive than it had seemed with the DCC-300, even if it lacked the vibrancy and thrill of the Marantz DD-82. Analogue music cassettes were described as 'tonally undemourished'.

Conclusion

This machine was described ignominiously as the 'grimmiest' player of the test, a sad epitaph for a creation that had shown such promise in pre-production form. In today's guise, however, the DCC-900 was heard to pitch individual performers against one another as every instrument vied desperately for 'bits'.

Verdict

+ Feature rich model, comes at a decent price for DCC.

- Sound quality is worse than the early sample we tested.

▶ £550.00 RRP

LAB REPORT

Since moving into full-scale production the DCC-900 has contracted one or two serious wrinkles. Nothing is obviously amiss with its AK5326 ADC or SAA7350 DAC for example, even if the overall S/N ratio has now mysteriously dwindled by a good 5dB (see issue 110).

Much more important is the huge increase in distortion and discrete jitter sidebands that occur around the -30dB level, leaping from 0.0017 to 0.16 per cent in a sector that's at the heart of the music. There is clearly something awry either with the scaling or sub-band filter, judging by this and the erratic nature of the -60dB frequency response, while the -30dB response is exceedingly uncertain.

Otherwise the results are fairly typical of a combination of the NPC SM5840 oversampling filter and Philips BS DAC.

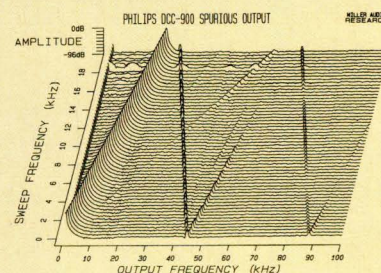
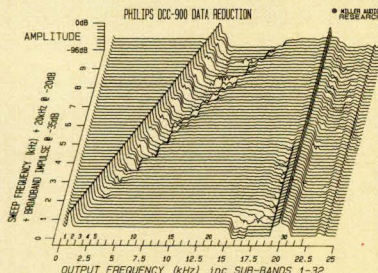
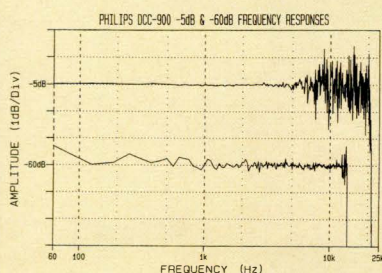
TEST RESULTS

Channel Balance	0.21dB	0.00dB	0.02dB	Output Impedance	458ohm
Channel Separation	117.0dB	106.5dB	82.7dB	1Hz Noise Modulation	+8.4dB
THD vs Level, 0dB	-97.8dB	-95.3dB	-75.8dB	CCIR IMD, 0dB	-92.5dB
-30dB	-76.6dB	-56.1dB	-56.1dB	Suppression of stop-band IMD	60.6dB
-60dB	-39.5dB	-41.4dB	-26.6dB	De-emphasis Accuracy, 1kHz	-0.03dB
-80dB	-19.5dB	-23.4dB	-6.5dB	5kHz	-0.12dB
Dithered, -90dB	-12.8dB	-20.3dB	+4.2dB	16kHz	+0.03dB
Dithered, -100dB		-14.4dB		S/N Ratio (A-wtd), w emp, 0LSB	102.5dB*
Dithered, -110dB		-11.3dB		w/o emp, 0LSB	97.0dB
Resolution @ -60dB		+0.11dB	+0.01dB	w/o emp, 1LSB	98.8dB
-80dB		+1.38dB	-0.45dB	Digital Input/Output	Coaxial/Optical
-90dB		+3.65dB	-1.05dB	Crystal Clock Accuracy	+52.5ppm
-100dB		+4.30dB	no signal	Typical Retail Price	£550
Peak Output Level, L		1.951V			
R		1.951V			
Relative Output Level		-0.22dB			

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Choosing and Using CD multiplayers

Ten years on and the little silver disc continues to replace the vinyl LP in the mass market, for although the cost of the discs themselves seems hardly to have budged, the price of players has tumbled year after year. Now it is possible to choose from a clutch of perfectly adequate players that cost no more than £130, while multiplayers — the subject of this survey — kick-off at a thoroughly affordable £170.

Magazine Loaders

The bulk of multiplayers fall into either the magazine or the carousel camps. The magazine-loader was originally introduced by Pioneer five or six years back. Each magazine typically houses some six retractable CD trays, all stacked one upon the other in a secure and virtually dust-free environment. Many users end up storing their entire Compact Disc collection by artist or by style in a library of these magazines, which can be very convenient.

Extra magazines are available for around £15-£16 a throw and many will also be compatible with in-car autochanging systems, though this needs checking not assuming in every case.

Carousel style

The carousel-style multiplayer is a different kettle of digits, less flexible from the point of view of building a library of loaded magazines, but more flexible for changing the odd disc from time to time,

and often capable of a superior performance. In this instance five or six CDs are loaded onto a large rotating platform (the carousel) incorporating separate disc trays that, in most instances, glides out from the front of the player. The individual discs are substituted manually every time a new selection of material is desired. Fortunately most carousels will rotate in segments, ensuring easy access to each CD in turn.

The same mechanism is used to load the selected CD onto the player's internal laser transport, often leaving a disc in play while the remainder are ejected on the carousel for replacement.

Features to expect

Full remote control duplicates a broad range of facilities already incorporated on the player itself. Basic track location, fast music search, disc/track repeat and program play options can be taken for granted, while peripheral features like tape edit (fitting selected tracks onto predetermined lengths of tape), peak search (an invaluable aid when setting recording levels) and random disc/track replay still creep in on most low cost players. Costlier multiplayers may also offer extended memory, storing favourite tracks from all six discs over 20 or more magazines — simply press home the magazine and the player will instantly recognise this clutch of CDs.



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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.





Blind Listening

Each month Choice puts two or three categories of hi-fi components through our careful testing procedures. The blind listening tests are so called because the panel is unaware of either the name or price of the individual product. Objectivity is further ensured by our lab results and measurements which are always our own, not manufacturers' claims.

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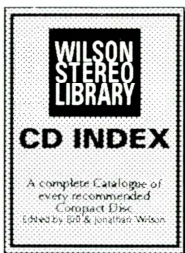
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Goodmans GCD-658



Where both space and convenience are at a premium, magazine-based CD players should always win out ahead of the more cumbersome carousel. In the case of the Goodmans GCD-658, however, there are mitigating circumstances.

In tried and tested Goodmans tradition this 6+1 multichanging model combines high value features with aggressive pricing. Aggressive? Well how else would you describe a feature-packed player that is both a single and multi-disc machine and that sells for a highly competitive £170.

Press home the six-pack magazine (loaded from bottom to top) and the player will rifle through the stack, checking each tray for contents. Trays that house a CD are indicated on the back-lit LC display, allowing direct track location without first having to re-read the disc's TOC

(table of contents). Yet even armed with this advantage, the 658 still seems clumsy in the disc/track access department, and features like 10-second intro scan, 32-track memory, repeat and random play don't offer much by way of recompense.

Sound quality

This is a shy-sounding player, or so the panel thought. In the classical presentation it certainly proved affable enough, if slightly muted, but at this point everything seemed to bob along pleasantly enough. Individual instruments were nicely separated even if the *Serenade* as a whole lacked gusto, weight and urgency.

Yet as the pop and jazz selections were played a more strident character emerged. Suzanne Vega's voice was obscured while the attack and fizz of that metal-stringed guitar were accentuated.

After the diffident classical performance this came as something of a shock.

The Girl from Ipanema was equally boomy and clamorous. 'He's all over the place' muttered one listener as the lower reaches of the baritone spilled over the accompanying instruments. Exaggerated, emphatic and decidedly coloured was the final judgement — exciting but hardly the stuff of hi-fi legend.

Conclusion

In view of the low asking price, Goodmans might consider its GCD-658 immune from criticism. A 6+1 autochanger priced at £170 is something of a triumph, if only Sherwood hadn't shown that budget multiplayers can also sound rather fine into the bargain. With the 685 an aggressive pricing policy has unfortunately contributed to an equally pugacious sound.

Verdict

- +** Ultra competitive price; feature rich.
- Sounds boomy and strident on pop, bland on classical.
- ▶** **£170.00 RRP**

LAB REPORT

Buried in the heart of the Goodmans is a very fine CXD2551 oversampling filter (first seen in Sony's CDP-790), but a rather crude hybrid multi-bit/PWM DAC hampers its good qualities. This DAC is responsible for the delicate second to seventh harmonics (typically 0.029-0.12 per cent) and visible swarths of stop-band noise (-28dB) on the 3D plot.

Higher-order sampling distortions fall within the audio band (ie -63dB at 15.9kHz), and at -80dB there's an almost uniform lurch in THD and linearity before recovering 'above' and 'below' at -70dB and -90dB respectively. The frequency responses betray a distinctly 'fizzy' treble, and the large clock error results in a 5Hz shift at 20kHz. Distortion increases to 0.15 per cent at 5kHz with its de-emphasis network engaged, while the signal-to-noise ratio is compromised by spurious data frame tones at 7.35kHz, 14.7kHz and 22.05kHz.

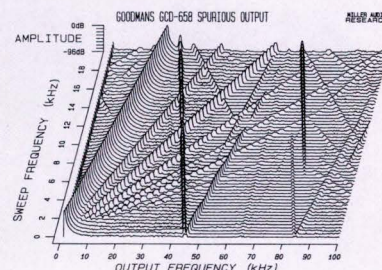
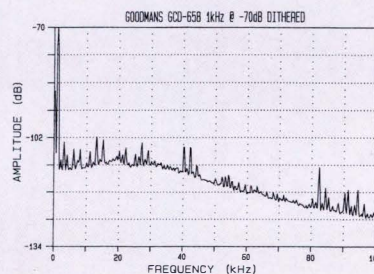
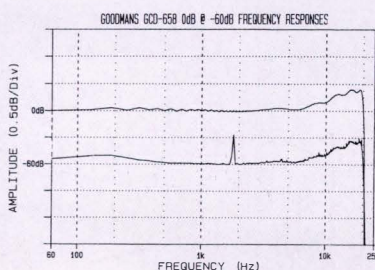
TEST RESULTS

Channel Balance	0.00dB	0.00dB	0.04dB	Output Impedance	849ohm
Channel Separation	81.5dB	95.5dB	68.5dB	Radio Frequency Spuriae	2mV/Broadband
THD vs Level, 0dB	-70.9dB	-68.9dB	-58.2dB	1Hz Noise Modulation	+15.6dB
-30dB	-60.7dB	-60.7dB	-72.6dB	CCIR IMD, 0LSB	-69.0dB
-60dB	-24.6dB	-34.8dB	-36.2dB	Suppression of stop-band IMD	27.7dB
-80dB	-3.50dB	-18.8dB	-6.30dB	De-emphasis Accuracy, 1kHz	-0.05dB
-100dB	-18.5dB	-17.7dB	-11.5dB	5kHz	-0.28dB
Dithered, -90dB				16kHz	-0.03dB
Dithered, -100dB				S/N Ratio (A-wtd), w emp, 0LSB	106.6dB
Dithered, -110dB				w/o emp, 0LSB	105.9dB
Resolution @ -60dB				w/o emp, 1LSB	105.9dB
-80dB				Digital Output	None
-90dB				Crystal Clock Accuracy	+250ppm
-100dB				Access Time (Disc 6, Track 99)	9.5secs
Peak Output Level, L				Typical Retail Price	£170
R					
Relative Output Level					

Contact

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Harman Kardon TL8500



This is a top-loader with a difference. The £500 TL8500 is a carousel multichanger, but instead of ejecting the customary five-slot tray, the HK allows you to drop CDs in from above. Press Door Release and a huge transparent dome rises from the body of the player, exposing four of the five loading trays. Simply press Skip or any of the five direct disc access keys and the desired CD is deposited, with much whirring and clanking, onto the laser mechanism.

All operations including continuous, repeat, program and random disc/track play can be achieved with the lid open or closed. As a result it's possible to replace four CDs while the fifth remains in play, relying on an internal cover to protect the linear-tracking laser mechanism from grief.

This certainly adds to the player's convenience, even though its sheer physical

bulk and sluggish disc/track access times are rather cumbersome. A costlier version called the TL8600 adds a series of direct access keys while duplicating the front-facing display on the top surface.

These are cosmetic revisions only, however, as both machines share the same range of disc/track access, 15-second intro scan, index and 30-track programming facilities. A variable output is the only real extra offered on the TL8600, despite the hefty £100 premium.

Sound quality

HK's TL8500 was not a great success with our panel. In many respects it's very civilised, 'neither thunderously clear' nor 'offensively muddled'. Our main reservation was the bass performance, where a boomy, persistent quality regularly spilled over into the vocal range, slowing and colouring

the most exciting performers.

Elsewhere the sense of mid and treble detail is impressive enough, capturing the steely tone of Suzanne Vega's acoustic guitar with the same matter-of-fact certainty that was heard with the vibes and sax on Marty Paich's jazz CD. This is a player that seems able to cut through the fogginess of its own soundstaging without aggravating any natural sibilance, but equally without much finesse.

Conclusion

A warm, rather bland but pleasantly inoffensive sound is created by a player that looks as far removed from the run-of-the-mill as it's possible to get. But although the TL8500 appears very grand indeed, £500 remains a high price for a source better suited to the provision of background music than the needs of serious listeners.

Verdict

- + Unusual top-loading package, very classy finish.
- Comes at a classy price, bland sound with boomy bass.
- ▶ **£500.00** RRP

LAB REPORT

Any attempt to break inside the machine is hampered by its unorthodox construction, so our evaluation of the technology must come solely from measurements. In the event this posed no difficulty, the familiar second/third harmonics and partial V-pattern on the 3D plot indicating a typical implementation of Matsushita's MN6471 MASH/PWM bitstream DAC.

Compare this and the peculiar 11 kHz 'bump' on its -60dB response with the HD7500II and HD7600II CD players in issues 95 and 100. The heart of the TL8500 is a watered-down execution that pushes 0dB distortion from the anticipated 0.0011-0.02 per cent range to a poorer 0.002-0.04 per cent. Similarly, the weak 97dB A-wtd signal-to-noise ratio is reflected in the poor dynamic range visible from the -70dB plot. Substantial 170mV bursts of RF noise occur every 14.7µsecs, which is not a favourable omen!

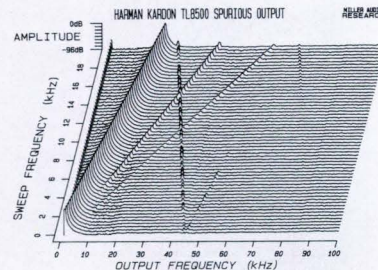
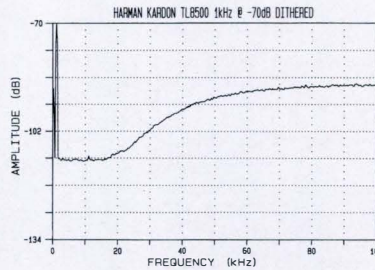
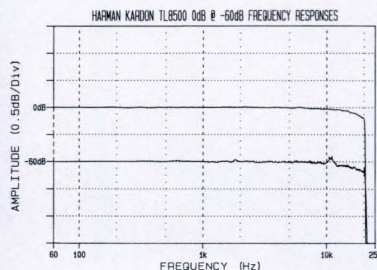
TEST RESULTS

Channel Balance	20Hz	1kHz	20kHz	Output Impedance	105ohm
Channel Separation	0.05dB	0.06dB	0.06dB	Radio Frequency Spuriae	170mV @22.6MHz
THD vs Level, 0dB	105.8dB	115.0dB	94.9dB	1Hz Noise Modulation	+5.1dB
-30dB	-89.2dB	-95.1dB	-68.5dB	CCIR IMD, 0dB	-95.2dB
-60dB	-74.2dB	-77.2dB	-50.5dB	Suppression of stop-band IMD	82.3dB
-90dB	-40.6dB	-50.5dB	-23.9dB	De-emphasis Accuracy, 1kHz	+0.03dB
Dithered, -90dB	-14.4dB	-28.2dB	-4.25dB	5kHz	+0.24dB
Dithered, -100dB	-15.2dB	-20.5dB	+4.50dB	16kHz	+0.43dB
Resolution @ -60dB	-100dB	-11.3dB	-10.5dB	S/N Ratio (A-wtd), w emp, 0LSB	110.8dB
-80dB	+0.02dB	+0.01dB		w/o emp, 0LSB	109.8dB
-90dB	+0.10dB	+0.02dB		Digital Output	97.4dB
-100dB	+0.25dB	+0.71dB		Crystal Clock Accuracy	+40.0ppm
Peak Output Level, L	+0.40dB	+0.30dB		Access Time (Disc 5, Track 99)	10secs
R	2.038V			Typical Retail Price	£500
Relative Output Level	2.024V				
	+0.13dB				

Contact

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JVC XL-M406



JVC's £270 XL-M406 looks individual enough, yet it has more in common than you might expect with other autochangers in this survey. The 6-pack magazine, for example, is the very same unit supplied with both the Kenwood and Goodmans players, all three of these 6+1 CD changers using a similar Sony-based transport mechanism.

Additional XC-M75 magazines are available at £15.54 a throw, enabling you to store a library of discs for use in both domestic and in-car autochangers. Unfortunately JVC's magazine is not entirely user-friendly, so you'll just have to remember that the top tray is for disc 6 and the bottom for disc 1. A seventh CD is accommodated in a conventional loading tray that's slung under the magazine slot.

Otherwise the XL-M406 is jolly convenient, not the slickest operator in

town but equipped with entertaining widgets like continuous, program and random play, a 32-step (track and disc) memory, auto search, track and disc intro search and, naturally enough, direct disc and track access. A remote control is also provided.

Sound quality

With the dulcet tones of Harman's TL8500 still ringing in our ears, the XL-M406 was described as 'totally different, though not necessarily any more entertaining'. The full, blowsy and boomy sound of the HK was replaced by a leaner and brighter perspective, with steely top-end detail well ahead of any deep bass.

Our classical selection lost weight and impact, and even though brass and percussion sounded vivid and alive, these instruments were simply too prominent,

drawing the attention away from the central theme of the piece.

On a more positive note, vocals enjoyed good definition, the forward, sharp and positive delivery being achieved without aggravating any extra sibilance from the likes of Jennifer Warnes or Astrud Gilberto. Nevertheless, while this clarity was certainly appreciated, our listeners still interpreted the overall sound as rather synthetic.

Conclusion

Our previous CD player tests have shown that JVC's PEM DAC technology is capable of some very fine results — given a following wind. But the choice of supporting chips and hardware on this occasion have reduced what might have been a star autochanger into something of a mixed bag.

Verdict

- +** Plenty of features in an easy to use package.
- Sound is rather steely, lacking in weight and impact.
- ▶** £270.00 RRP

LAB REPORT

As the XL-M406 has the latest JCE4501 PEM DAC, much of its measured performance is very impressive. Distortion, for example, holds between 0.00075 and 0.009 per cent at 0dB and 0.0012-0.01 per cent at the musically crucial -30dB. The wide 110dB signal-to-noise ratio and textbook -70dB trace are great results for a bitstreamer of any ilk.

Unfortunately, JVC has opted for an all-in-one signal processor and eight times oversampling filter, the Yamaha YM7121. This chip is responsible for the swathes of stop-band noise (V-patterns) on the 3D plot. It's also the cause of the irregular treble response and sharp 0.9dB dip at 20kHz, as in the Yamaha CDC-625. However, though both players share a certain technical heritage, the choice of DAC and analogue filtering circuitry play an equally important role in determining the final sound quality of each machine.

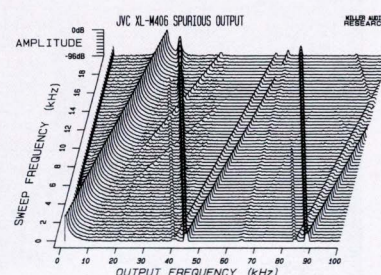
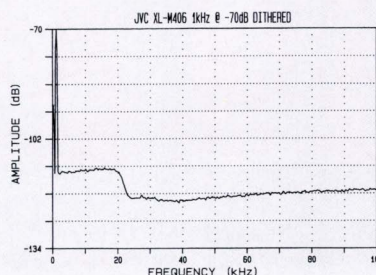
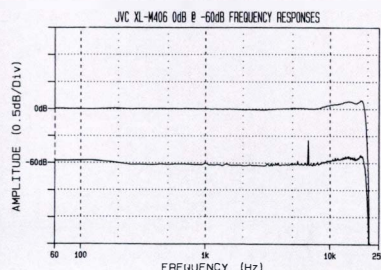
TEST RESULTS

Channel Balance	20Hz	1kHz	20kHz	Output Impedance	464ohm
Channel Separation	0.05dB	0.04dB	0.08dB	Radio Frequency Spurious	1mV broadband
THD vs Level, 0dB	120.2dB	103.1dB	78.8dB	1Hz Noise Modulation	+9.2dB
-30dB	-92.4dB	-102.5dB	-80.1dB	CCIR IMD, 0dB	-96.1dB
-60dB	-98.2dB	-82.4dB	-78.2dB	Suppression of stop-band IMD	19.4dB
-80dB	-55.9dB	-54.1dB	-51.5dB	De-emphasis Accuracy, 1kHz	-0.02dB
-100dB	-29.5dB	-29.7dB	-30.9dB	5kHz	-0.19dB
Dithered, -90dB	-18.2dB	-21.4dB	-23.2dB	16kHz	0.00dB
Dithered, -100dB		-14.3dB	-10.4dB	S/N Ratio (A-wtd), w emp, 0LSB	113.8dB
Dithered, -110dB		-0.33dB	-0.17dB	w/o emp, 0LSB	110.3dB
Resolution @ -60dB		-0.03dB	0.00dB	w/o emp, 1LSB	109.9dB
-80dB		-0.17dB	-0.10dB	Digital Output	None
-90dB		+0.03dB	+0.32dB	Crystal Clock Accuracy	-21.3ppm
-100dB		-0.50dB	-3.90dB	Access Time (Disc 6, Track 99)	10.5secs
Peak Output Level, L		2.055V		Typical Retail Price	£270
R		2.062V			
Relative Output Level		+0.25dB			

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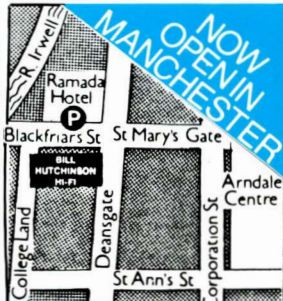
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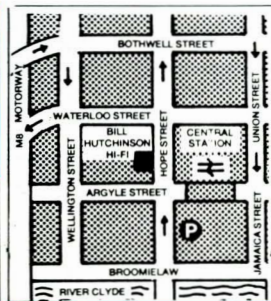
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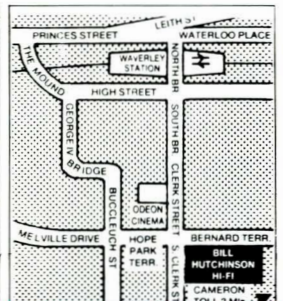
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Kenwood DP-M6640



Although Kenwood's £250 DP-M6640 is far from perfect, it is reassuringly chunky, versatile and very keenly priced. It also sounds pretty classy too. The 'chunkiness' stems from a bigger, bolder (and noisier!) version of the multi-play transport used in the JVC and Goodmans players. All three players use the same 6-pack disc storage magazine, but only Kenwood has bothered to label the trays correctly from bottom to top. Adding in the traditional single disc loading tray brings the total disc count to seven, one more than that offered by the Pioneer players. Extra magazines are available at £15.95.

A bold fluorescent display supplies disc, track, time and status information while the bulk of the sculptured black fascia is filled with direct disc and track selection keys which are duplicated on the

small infra red remote control. Two Edit buttons enable a pair of CDs to be stripped down for transfer to tape, while other widgets include repeat, random and program play. A Program File can memorise details of 20 tracks from up to eight separate 6-disc magazines.

Sound quality

The pedigree of this machine was evident from the outset as our listeners applauded its 'polish and refinement', echoing sentiments previously expressed regarding Kenwood's DP-3040 (issue 112). Voices took on a fair measure of solidity and the atmosphere, ambience and 'electricity' in tense pieces of music was much more convincingly developed, in a manner only bettered by the Sherwood player.

The DP-M6640 reveals genuine delicacy and freedom with string and percus-

sive instruments, free from the rough 'saw-tooth' edginess we had endured earlier in the day and verging on a tidy and civilised sound, albeit rather lacking in what was described as 'dynamic colour'.

While this neatness was appreciated on our pop and jazz selections — clean strings, clear, lucid and focused vocals for example — the classical repertoire lacked a sense of virility. The sound is detailed, certainly, but colour, life and dynamics were sadly diluted.

Conclusion

As it stands the DP-M6640's blend of quality construction, versatile features and a sophisticated sound all add up to a hearty Recommendation. Nevertheless, I'm left with the suspicion that improved analogue signal housekeeping could have reaped even greater rewards.

Verdict

- + Polished and refined sound, classy build and features.
- Better engineering might have improved things still further.

▶ £250.00 RRP

LAB REPORT

There are a few creases to be ironed out from the DP-M6640, but these are of an analogue rather than digital nature. At its heart is the same NPC bitstream DAC found in the DP-3040, a chip whose oversampling filters give rise to the distinctive V-patterns on the 3D plot and a marked frequency response ripple.

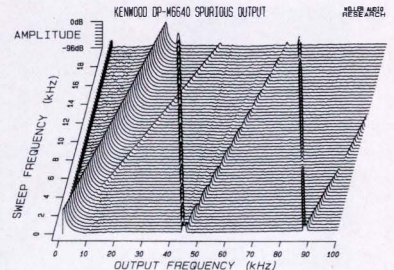
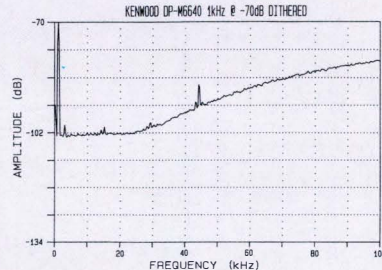
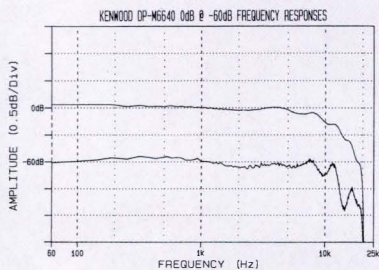
However, the significant 1.5dB loss at 20kHz, reduced 1.5V peak output, high 3.4kohm source impedance and poor 'real life' signal-to-noise ratio of 90dB are all due to the post-DAC analogue filter. The dithered -70dB plot shows a clear reduction of 8-10dB in dynamic range over most other players in this survey, implying a resolution that's little better than 15 bits.

Distortion is consistently high at the frequency extremes (typically 0.013-0.024 per cent at 0dB and 0.1-0.4 per cent at -30dB), blights that are at least partially submerged beneath this innocuous carpet of noise.

TEST RESULTS

Channel Balance	20Hz	1kHz	20kHz	Output Impedance	3.36kohm
Channel Separation	0.04dB	0.02dB	0.05dB	Radio Frequency Spuriae	20mV @ 2-40MHz
THD vs Level, 0dB	88.1dB	85.3dB	62.4dB	1Hz Noise Modulation	+3.0dB
-30dB	-77.8dB	-89.2dB	-72.5dB	CCIR IMD, 0dB	-84.9dB
-60dB	-59.9dB	-72.0dB	-47.6dB	Suppression of stop-band IMD	31.8dB
-80dB	-49.5dB	-39.5dB	-17.4dB	Digital Output	-0.02dB
-100dB	-23.5dB	-18.5dB	-2.50dB	De-emphasis Accuracy, 1kHz	-0.08dB
Dithered, -90dB	-16.3dB	-9.80dB	+5.50dB	5kHz	-0.81dB
Dithered, -100dB		-0.05dB		16kHz	-0.81dB
Dithered, -110dB		+3.50dB		S/N Ratio (A-wtd), w emp, 0LSB	116.4dB
Resolution @ -60dB		+0.04dB	+0.26dB	w/o emp, 0LSB	116.2dB
-80dB		-0.26dB	+2.14dB	w/o emp, 1LSB	90.1dB
-90dB		-0.22dB	+5.53dB	Crystal Clock Accuracy	-32.5ppm
-100dB		+0.25dB	+7.95dB	Access Time (Disc 6, Track 99)	11.5secs
Peak Output Level, L		1.533V		Typical Retail Price	£250
R		1.537V			
Relative Output Level		-2.30dB			

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Pioneer PD-M701



D estined to meet such players as JVC's XL-M406 head-on, Pioneer's mid-priced autochanger kicks off at something of a disadvantage. This is yet another six-pack magazine-loader, but the PD-M701 lacks the extra single-CD tray of its competitors. In fact the entire mechanism is different, requiring each CD to be loaded silver-side up into the magazine. In this instance disc 1 occupies the top tray while disc 6 sits at the bottom.

Press home the magazine and the player will automatically retract the top tray, alternatively press play and it'll shuffle through the stack until it arrives at the uppermost disc.

More unusual is the ADLC (automatic digital level controller) feature which bypasses the player's 25-step digital volume control and normalises the relative output of different music discs. The idea is to

avoid leaps in volume as the player changes from disc to disc during program or random play. Neat but hardly hi-fi.

Add to this direct disc/track access, a seven-mode repeat, 'hi-lite' scanning, a 32-track memory, time/auto fade and tape edit options and the result is a very comprehensive package. And if you wish to play a lone CD, simply purchase a Pioneer 'Single-Compact-Disc' magazine.

Sound quality

The listeners came up with a series of subjective impressions that were surprisingly close to those of the PD-201 in issue 112 (see lab report). Meanwhile the contrast with Pioneer's rather depressing PD-M901 couldn't have been greater...

This 701 was considered dynamic and fresh sounding with an even, yet extended, tonal balance. However, strong vocal per-

formances could be a little untidy. Such was certainly the case on our Suzanne Vega selection which was handled rather sloppily compared to the depth and subtlety demonstrated by Arnold's *Serenade*.

Nevertheless our pop and jazz discs were energetic, guitars enjoying a great sense of dynamics and double bass and vibes sounding rich, weighty and resonant. Sloppy or otherwise, the music always remained very clean. The player was likened to a 'lively version of the Yamaha multichanger', offering a similar weight and warmth but with a flair all its own.

Conclusion

The sonic similarities between this and the PD-201 are gratifying indeed. Pioneer should be congratulated on producing such an exciting sounding budget player, autochanger or no.

Verdict

- +** Sounds exciting, dynamic, fresh and evenly balanced.
- Lacks extra single disc playing mechanism.
- ▶** £300.00 RRP

LAB REPORT

It's odds on that Pioneer's budget PD-201 CD player lies at the heart of this flexible autochanger. Both players are equipped with the PD2026A Pulse Flow DAC but the congruence of their test results suggests a far closer kinship.

Compare the V-shaped stop-band images on the 3D plot with those for the 201 in issue 112. The dithered -70dB trace is all but identical, while the -60dB frequency response shows the same 0.6dB treble cut and anomalous 1.8kHz 'spike'.

The numerical results clinch the case: linearity holds within 0.7dB at all frequencies from 0dB to -100dB; distortion is within 0.0016-0.03 per cent at -30dB, noise modulation is held to a low +1.5dB and the 99dB signal-to-noise ratio is just inside the 16-bit target. This is the PD-201 or PD-M701 in a nutshell.

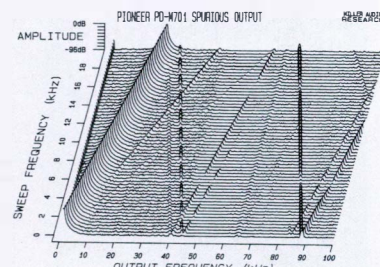
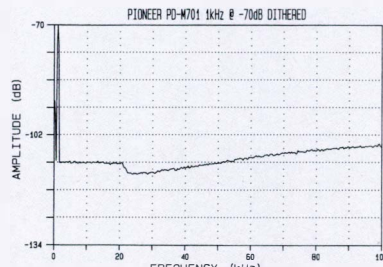
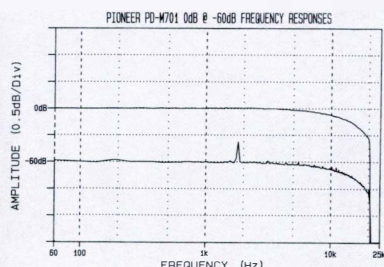
TEST RESULTS

Channel Balance	20Hz	1kHz	20kHz	Output Impedance	1.02kohm
Channel Separation	0.04dB	0.01dB	0.01dB	Radio Frequency Spurious	25mV @ 29MHz
THD vs Level, 0dB	108.8dB	104.9dB	87.7dB	1Hz Noise Modulation	+1.5dB
-30dB	-95.7dB	-94.8dB	-82.5dB	CCIR IMD, 0dB	-95.8dB
-60dB	-95.7dB	-79.9dB	-70.2dB	Suppression of stop-band IMD	63.7dB
-80dB	-60.1dB	-51.7dB	-40.7dB	De-emphasis Accuracy, 1kHz	+0.01dB
-100dB	-28.2dB	-29.2dB	-20.3dB	5kHz	-0.02dB
Dithered, -90dB	-17.6dB	-19.3dB	-11.6dB	16kHz	-0.32dB
Dithered, -100dB		-11.7dB		S/N Ratio (A-wtd), w emp, 0LSB	104.7dB
Dithered, -110dB		-3.70dB		w/o emp, 0LSB	105.0dB
Resolution @ -60dB		-0.03dB	-0.02dB	w/o emp, 1LSB	99.1dB
-80dB		-0.12dB	-0.15dB	Digital Output	None
-90dB		-0.56dB	-0.62dB	Crystal Clock Accuracy	-36.3ppm
-100dB		-0.70dB	-0.65dB	Access Time (Disc 6, track 99)	8.5secs
Peak Output Level, L		1.921V		Typical Retail Price	£300
R		1.922V			
Relative Output Level		-0.35dB			

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Pioneer PD-M901



Who needs tone control when you've got a PD-M901? With this zany autochanger's DSP (digital signal processing) 'Sound Field' effects it is possible to dial-up the venue of your choice and have hours of fun enjoying the sound of Pavarotti in a dingy jazz club or Motorhead in a church — other choices include dance, stadium and hall modes in addition to a flat (bypass) setting.

Features are fairly routine and include direct disc and track access (remote only), 'hi-lite' scanning, 'compu-edit' and time fade, random and a seven-mode repeat plus ADLC (automatic digital level controller). A single-CD magazine is also supplied gratis with this costlier model.

In addition Pioneer has expanded the player's memory for both storing and recognising programmed tracks (40 selec-

tions for every six discs), the music type (listed variously as pop, rock, jazz, dance, classic, country, new age, R&B or 'other') and any DSP setting for up to 20 separate 6-disc magazines.

This is achieved by using the first CD in every 6-pack as a prompt, so if you don't change the running order of discs 2-5 the player will immediately recall the program, music type and DSP mode of each disc in the magazine. Of course, if there's no disc in the number one tray then the Multi-Memory Store is instantly defeated.

Sound quality

'Suzanne Vega has a six-foot mouth', quipped one listener in response to the unusually wide soundstaging. Our classical selection sounded fairly busy, detailed and dynamic but its composure was quickly lost once the simplest pop disc was played.

A lean but ragged quality brought out the rasp of brass instruments successfully enough, but the vagueness of the imaging was simply too distracting. Listening to this player, I was informed, is very hard work.

Nevertheless the various effects were endured 'blind' and each venue was reliably identified. 'Not up to the quality of a dedicated processor like the DSP-E1000' the panel decided, 'but more than a match for the effects modes incorporated in modern midis'.

Conclusion

This player is a cocktail of ideas. The various DSP options might find a role in a bar or restaurant setting where the background music needs an extra lift. But as one of our less sympathetic panelists commented, the PD-M901 is otherwise unsuited to the field of hi-fi equipment.

Verdict

- + Loads of features including DSP ambience simulation.
- Complexity hampers sound quality. Not for hi-fi buffs.

£400.00 RRP

LAB REPORT

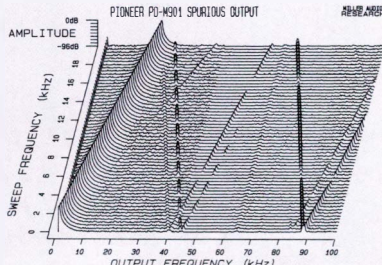
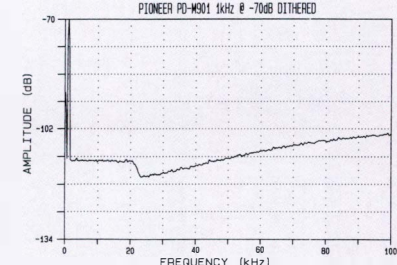
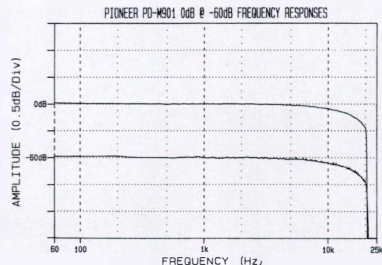
DSP aside, this player shares the same digital electronics as the PD-M701 but incorporates a different analogue filter and higher quality op-amps better able to handle the DAC's differential output. In this respect the 901 has more in common with Pioneer's PD-S501 CD player (issue 112), showing a clear improvement in the dynamic range of its dithered -70dB trace.

Elsewhere the compound 384 times oversampling filters are responsible for the same 64dB stop-band rejection and familiar-looking 3D plot that have been a Pioneer feature since issue 100. Incidentally the signal-to-noise ratio varies from 90dB to 103dB depending on the DSP selection. 'Dance' mode (especially) suffers from a range of spurious harmonics radiating out from 750Hz, while the noise modulation level changes between +7.1dB, +9.3dB, +7.3dB, +9.4dB and +9.7dB with jazz, church, dance, hall and stadium modes respectively.

TEST RESULTS

Channel Balance	0.02dB	0.01dB	0.02dB	Output Impedance	1.16kohm
Channel Separation	102.9dB	104.9dB	94.4dB	Radio Frequency Spurious	21mV @ 84.7MHz
THD vs Level, 0dB	-97.4dB	-96.4dB	-82.6dB	1Hz Noise Modulation	+4.2dB
-30dB	-90.7dB	-80.5dB	-70.4dB	CCIR IMD, 0dB	-95.4dB
-60dB	-58.9dB	-52.4dB	-40.9dB	Suppression of stop-band IMD	-0.01dB
-80dB	-28.0dB	-29.7dB	-19.3dB	De-emphasis Accuracy, 1kHz	-0.02dB
Dithered, -90dB	-18.1dB	-20.5dB	-11.1dB	5kHz	-0.27dB
Dithered, -100dB		-15.0dB		16kHz	-0.27dB
Dithered, -110dB		-5.30dB		S/N Ratio (A-wtd), w emp, 0LSB	111.9dB
Resolution @ -60dB		-0.03dB		w/o emp, 0LSB	112.4dB
-80dB		-0.14dB		w/o emp, 1LSB	102.4dB
-90dB		-0.55dB		Digital Output	None
-100dB		-0.45dB		Crystal Clock Accuracy	+191.2ppm
Peak Output Level, L		2.069V		Access Time (Disc 6, Track 99)	8secs
R		2.063V		Typical Retail Price	£400
Relative Output Level		+0.28dB			

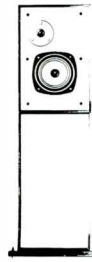
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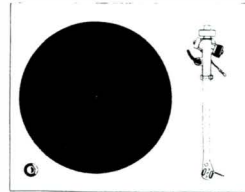


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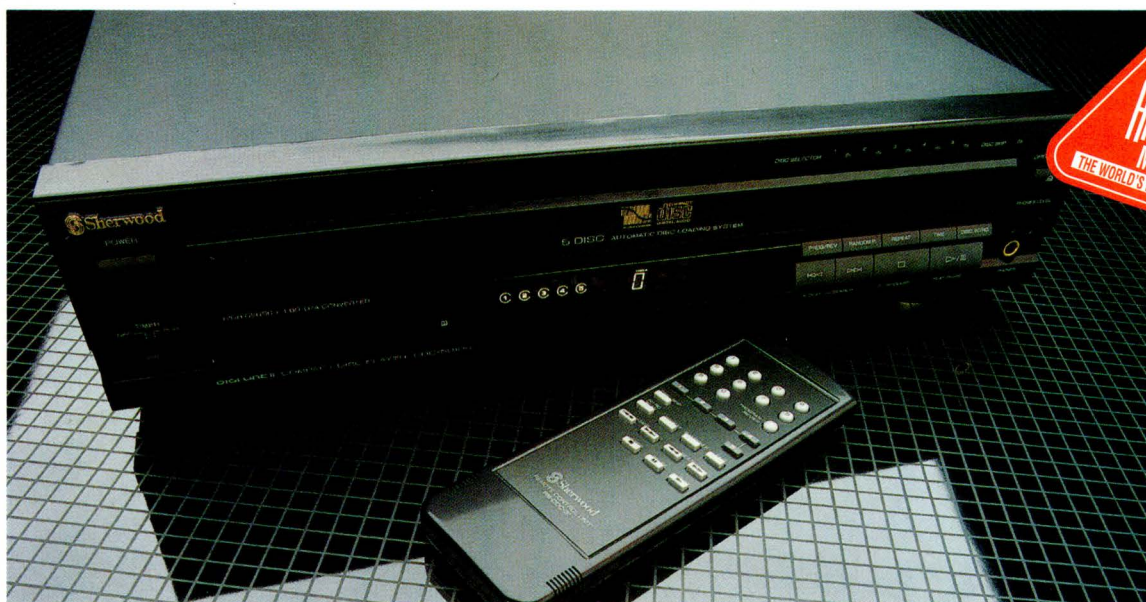
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Sherwood Digilink CDC-5010R



No question about it, Sherwood's CDC-5010R is cheap; very cheap. Yet thanks to star quality engineering, this carousel player neither looks nor sounds cheap. Instead it offers a level of performance typical of £300+ competition, a feat achieved by establishing an assembly plant in the UK and simplifying distribution by supplying via leading discounter Richer Sounds.

Despite the rather restricted availability, the Sherwood range consists of some six Compact Disc players, including two autochangers, with the CDC-5010R as the flagship. However, there are few 'flagship' features to speak of, the most advanced including a ten-second intro scan, random and repeat play, a 32-track memory and timer facility.

Direct disc/track selection and disc skip options are provided as standard and

it's also possible to eject the carousel tray while the fifth CD is still playing, so the stream of music can remain continuous.

In this respect the CDC-5010R mirrors Yamaha's costlier CDC-625 though the latter is still the more attractive from an operational angle. The 'DigiLink' phono's fitted to the rear of the player are not pukka digital outputs but a communication link, synchronising the CDC-5010R with other Sherwood separates.

Sound quality

For once the music enjoyed a decent sense of depth and airiness as all our selections burst into space. The flutes from Arnold's *Serenade* were clarified by the polished performance, which suffered none of the boomy bass or synthetic detailing that hindered some competing players. Our panel described this machine

as 'forward but still spacious and balanced in presentation'. There are plenty of conventional single players around that don't sound this good.

Although its music is slightly thick or dark sounding and the bass could do with a hint of reinforcement, the Sherwood resolved details consistently overlooked by the others. Yet, above all it was the freshness, the immediacy and sheer believability of its music that had us enthralled from one disc to the next.

Conclusion

Undoubtedly the Best Buy of the bunch, this is a well-rounded and keenly-priced CD player with the added bonus of a carousel loading tray. Sherwood has demonstrated through the CDC-5010R that multiplayers need no longer be seen as poor relations in terms of sound quality.

Verdict

- + Multiplay bargain; sounds good despite the low price.
- A limited feature count and restricted availability.
- ▶ **£200.00 RRP**

LAB REPORT

This is a treasure in every respect, for buried within this budget wonder is a genuine Bit Stream DAC, the Philips SAA7350. This is responsible for the excellent low-level resolution and the characteristic ultrasonic spectrum visible on the -70dB plot. Compare it with Aiwa's XC-700 and XC-900 (issues 95 and 100), players that also run the SAA7350 at a correct 384 times oversample rate.

Distortion appears to be consistent across the audio band even though the analogue circuitry contributes to the 0.003-0.005 per cent at 0dB and the 0.012-0.04 per cent at -30dB — slightly higher than expected. The signal-to-noise ratio is similarly compromised, though 96dB is just about acceptable.

Allied to this DAC is an eight times oversampling filter from Yamaha (the YM3433) so the 3D plot is very similar to that of Yamaha's CDX-560/860 players (issue 112). Either way, this is a fine result for such a low cost machine.

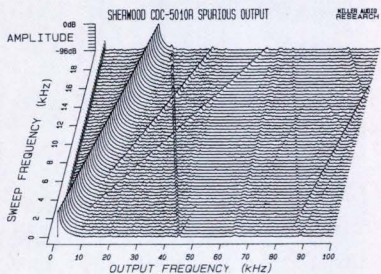
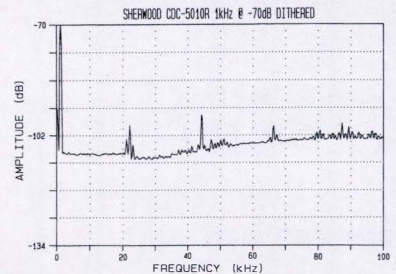
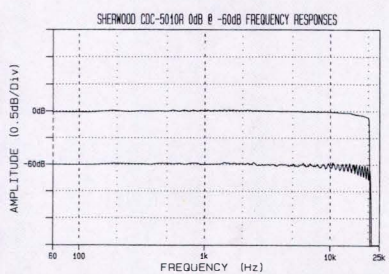
TEST RESULTS

Channel Balance	0.17dB	0.17dB	0.17dB	Output Impedance	255ohm
Channel Separation	92.4dB	94.3dB	76.8dB	Radio Frequency Spurious	20mV @ 21MHz
THD vs Level, 0dB	-89.6dB	-89.6dB	-86.3dB	1Hz Noise Modulation	+1.4dB
-30dB	-78.3dB	-74.6dB	-67.4dB	CCIR IMD, 0dB	-83.5dB
-60dB	-44.1dB	-46.5dB	-37.1dB	Suppression of stop-band IMD	72.4dB
-80dB	-17.1dB	-25.4dB	-17.4dB	De-emphasis Accuracy, 1kHz	+0.07dB
Dithered, -90dB	-15.2dB	-16.1dB	-6.80dB	5kHz	+0.49dB
Dithered, -100dB		-7.40dB		16kHz	+0.10dB
Dithered, -110dB		-1.00dB		S/N Ratio (A-wtd), w emp, 0LSB	100.9dB
Resolution @ -60dB		0.00dB	-0.06dB	w/o emp, 0LSB	97.8dB
-80dB		-0.22dB	-0.22dB	Digital Output	95.6dB
-90dB		-0.12dB	-0.17dB	Crystal Clock Accuracy	None
-100dB		-0.65dB	+2.50dB	Access Time (Disc 5, Track 99)	+72.5pm
Peak Output Level, L		2.023V		Typical Retail Price	8.5secs
R		2.062V			£200
Relative Output Level		+0.18dB			

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VALVES AND VINYL

New valve amplifiers are sprouting up everywhere – to the delight of many people. At the Bristol Show in February, visitors to the HiFi News room – which featured valve amps from their April review – said they heard some of the best sound at the event.

But not all valve amps are created equal. In particular many have trouble controlling speaker cones in the bass. Here the new **Lumley Reference 120** watt excel, producing bass which is *deep*, full, tight, fast and tuneful – all this *and* the flowing, breathing and involving mid and top which only valves can give. People would buy Lumleys, to borrow a phrase!

Other power amps in the Lumley range include a 60 watt stereo chassis and 250 watt and 500 watt monoblocs. There are also phono and line preamps now available and soon a Signature phono preamp to rival the best in the world.

While valve pre and power amps will make CD more enjoyable, as most Bristol visitors agreed, they naturally bring out the best from vinyl sources. Here we get wonderful sounds from the **Basis** Ovation and Debut Gold turntables. With the **Graham** arm, the Debut is rated as the world's No. 1 source in the US. A perfect partner for good vinyl systems is the **Transfiguration** cartridge, increasingly used by other dealers and manufacturers to demonstrate their equipment.

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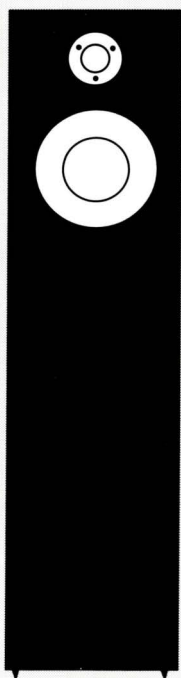
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Yamaha CDC-625



Reassuringly solid, well equipped and very slick in operation, the CDC-625 is a new carousel multiplayer that draws upon the technology of existing SL-Bit and older S-Bit CD players. Little of this is evident from the sleek black alloy fascia but load up a few discs, hit any disc/track combination and you'll find the CDC-625 bursting into song well ahead of its immediate competition.

Switch to 'Single Mode' and the CDC-625 behaves like any ordinary CD player with 20-track programming, direct track access, index cueing, random and repeat play reserved for the chosen disc. Return to 'All Mode' and these facilities are spread over the entire five discs where extra widgets like bi-directional disc skip come into their own.

An adjustable fluorescent display, digital volume control and headphone socket

make for an impressive package. Yamaha is also keen to boast of its PlayXchange mechanism, though other competing players will also retain a disc in play while the main carousel is ejected.

Sound quality

Another good 'un, remarked the listeners, tempering their reaction with the thought that this player was neither as spacious or astringent-sounding as the Sherwood. Instead there is a smoother, cultured and delicately proportioned sound, albeit one that is slightly softer in both tone and stereo focus.

The vocals from our Getz/Gilberto CD were exaggerated in scale, magnifying the images of these performers at the expense of their natural solidity and drive. Instruments were clear and voices lucid yet, however grand the overall picture, the

whole thing still remained uncommitted.

By contrast Suzanne Vega's CD was applauded for its balance as, on this occasion, the player really captured the contrast between her powerful voice and the backing instruments. The reckless vigour of the recording was brought successfully into check, even if this same sense of restraint led to criticism of Arnold's *Serenade* sounding 'too silky-smooth'.

Conclusion

Although this Yamaha cannot hope to compete with crazy knock-down wonders like the Sherwood, £300 is an entirely fair and realistic price for a multiplayer of this calibre. The CDC-625 combines a smooth and unforced sound with high quality engineering and a handsome appearance. More than enough, in fact to ensure a firm Recommendation.

Verdict

+ Smooth, unforced sound, class engineering, slick operation.

- Indifferent oversampling filter, a little soft sounding.

▶ £300.00 RRP

LAB REPORT

In common with its latest 'SL-Bit' CDX-560 (issue 112), Yamaha's CDC-625 is also equipped with a brand-new PCM69P DAC. This hybrid DAC, manufactured by Burr Brown, combines a conventional 10-bit network with a PWM bitstream output, thereby marrying a low 0.003-0.01 per cent distortion (at peak level) and a wide 109dB S/N ratio with the promise of improved low-level resolution.

Unfortunately this promise is all but scuppered by the ill-fated YDC-101B eight times oversampling filter. This chip also contains the digital volume control and was last seen incurring similar cries of derision back in issue 100.

Poor stopband rejection, wobbly frequency response and wayward low-level linearity are its trademarks. The DAC, meanwhile, is responsible for the third harmonic spike seen on the -70dB plot, the high +9dB noise modulation and 30-fold increase in THD from 0dB to -30dB.

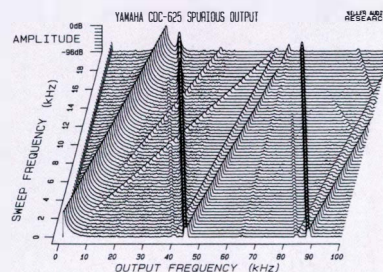
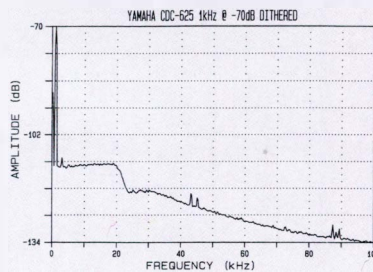
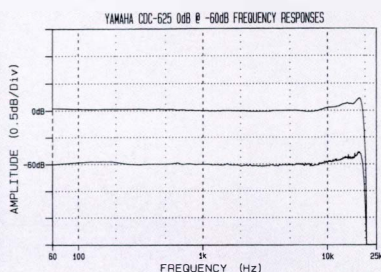
TEST RESULTS


	20Hz	1kHz	20kHz		1.05kohm
Channel Balance	0.20dB	0.20dB	0.23dB	Radio Frequency Spuriae	1.5mV broadband
Channel Separation	99.3dB	101.5dB	77.6dB	1Hz Noise Modulation	+8.8dB
THD vs Level, 0dB	-90.3dB	-90.3dB	-77.1dB	CCIR IMD, 0dB	-95.9dB
-30dB	-61.9dB	-60.1dB	-66.6dB	Suppression of stop-band IMD	19.0dB
-60dB	-41.6dB	-49.2dB	-52.2dB	De-emphasis Accuracy, 1kHz	0.00dB
-80dB	-21.4dB	-29.1dB	-33.0dB	5kHz	+0.08dB
Dithered, -90dB	-17.1dB	-19.7dB	-25.4dB	16kHz	+0.08dB
Dithered, -100dB		-13.6dB		S/N Ratio (A-wtd), w emp, 0LSB	109.5dB
Dithered, -110dB		-5.90dB		w/o emp, 0LSB	109.3dB
Resolution @ -60dB		-0.10dB	-0.09dB	w/o emp, 1LSB	109.5dB
-80dB		-0.58dB	-0.60dB	Digital Output	None
-90dB		-1.46dB	-1.55dB	Crystal Clock Accuracy	+11.3ppm
-100dB		-2.20dB	-4.30dB	Access Time (Disc 5, Track 99)	4.5secs
Peak Output Level, L		2.051V		Typical Retail Price	£300
R		2.098V			
Relative Output Level		+0.32dB			

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Visit us Monday to Friday to choose your new Hi Fi, TV or Video.

**22
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Nationwide**



Getting it Together

Once you've chosen your new hi-fi, a small additional expenditure on a quality interconnect, stand or other accessory can enhance its performance. In fact, if you buy a quality interconnect or stand from us and you don't think your sound has improved, just return it in 'as new' condition and we'll refund your money in full.

Interconnects

We carry a comprehensive range of superb interconnects. Choose from **Audioquest, Monster, IXOS** and **Furukawa**. There's one ideally suited to your system. We also stock a complete selection of Speaker Cables.



Loudspeaker Stands

You need a strong stable platform if your speakers are to sound their best. Our extensive range includes **Partington, Target** and **Apollo**.



Consoles and Racks

Our extensive range includes **Alphason** universal and expandable variable height units in smoked glass and Nextel coated MDF, **Partington** and **Target** rigid steel.



Headphones



Keep the sound in and the neighbours happy. We have a range of headphones to suit all budgets. Choose from leading names; **Sennheiser, Audio Technica** and **Beyer**.

Too Numerous to Mention

We sell a huge number of essential and useful accessories; audio and video tape – switching boxes – leads – record, tape, CD and stylus cleaners. All too numerous to mention. If you have a particular requirement, ask us, we probably have the solution.

Choice accessories

Let our fine range of accessories help boost your system performance

Isolation cones

Supplied in packs of four, these cones are ideal for supporting just about any item of hi-fi, from sub-woofers through to amplifiers and CD players. The cones provide effective isolation and decoupling, thereby increasing the stereo image and fidelity. Available in precision turned brass or black anodized aluminium, some experimentation will reward the listener with improved sound quality, at a minimal cost.

Order ref: JE12A £14.00

4 Isolation cones (brass)

Order ref: JE11A £14.00

4 Isolating cones (black coated aluminium)

Goldring Magic Record Cleaner

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

Order ref: JE13A £11.95

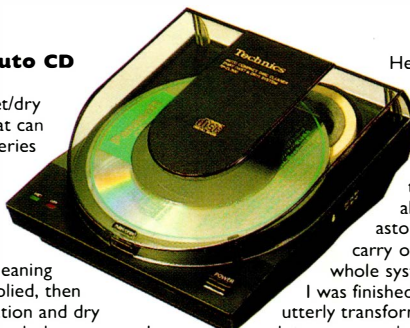
Technics Auto CD Cleaner

A powered wet/dry CD cleaner that can be run off batteries or the mains. It works by rotating the disc and applying the wet cleaner first (cleaning solution is supplied, then reversing direction and dry cleaning it. The whole process takes just 40 seconds and a set of batteries should clean 80 discs.

Order ref: JE20A £39.95

Kontak Cleaning Solution

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



Here's what Paul Messenger had to say when he tried some on his system:

"The effect on the power amps alone was so astonishing I had to carry on and cover the whole system. By the time I was finished the system was utterly transformed. Timing and coherence were back with a vengeance; surface noise and coloration were both much less audible and the soundstage had liberated itself from the boxes".

Order ref: JE17A £19.90

The Purifier

A ferrite cable clamp designed to reduce RF induced noise in audio, video and computer systems. The clamps will accept single or multiple cables of up to half an inch in diameter and can be used on both signal and mains cables. Can be particularly beneficial for digital interconnects.

Order ref: JE14A £16.90 per pair

Nagaoka Anti-Static Record Sleeves No 102

Packs of 50 plastic record sleeves that can be used on their own or inserted into an existing card or paper sleeve. The sleeves keep records dust free and eliminate static.

Order ref: JE15A £6.99

Gold Plated 4mm Banana Plugs

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

Order ref: JE24A £7.95

Audio Technica CD Lens Cleaner AT-6078

The focusing assembly for the laser head of a CD player is a very delicate affair and yet it requires cleaning from time to time to give of its best. Rather than fumbling about with cotton buds, we would suggest you employ an Audio Technica AT-6978 CD lens cleaner.

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

Ten seconds later, a clean laser assembly and a cleaner sound from your Compact Discs.

Order ref: JE21A £16.95

CD Jewel Case (Five Pack)

Everyone has them, now replace broken CD jewel cases and ensure your discs are properly protected.

Order ref: JE33A £5.00

DISC CLEANING AND MAINTENANCE

Last SF-100 Extra Strength Record Cleaner

Designed to remove the stubborn mould release compounds present in every LP from the pressing process. Use to deep clean new records as well as to revitalise older vinyl.

Order ref: JE25A £22.50

Last SF-200 Record Preservative

Last SF-200 interfaces with the vinyl and prevents gouging, fracturing and wear of the groove wall. A single application will maintain LPs in 'brand new' condition for 200 plays or more. The use of Last 100 and 200 improves fidelity and maintains precious LPs.

Order ref: JE26A £25.00

Last SF-300 Record Cleaner

SF-300 is the cleaner to use on a day-to-day basis on LPs which have been treated with SF-100 and SF-200.

Order ref: JE27A £18.50

Last SF-600 CD Clean And Protect

Yes CDs do need cleaning and Last have introduced a specially formulated cleaner and polish for CDs which removes grease, dirt and finger marks. The kit provides vinyl covers for the continued protection of cleaned CDs. Clean CDs sound better.

Order ref: JE29A £20.00

Last SF-601 CD Cleaner

Exactly the same as CD-600, but without the vinyl protective covers.

Order ref: JE30A £16.00

Last RCM Record Cleaning Machine Fluid

Last Record Cleaning machine fluid is formulated for use in conjunction with proprietary record cleaning machines, for the removal of grease, dirt and grime from Vinyl LP's.

JE35A £18.00

In order to introduce vinyl users to a meaningful protection and maintenance system, we have negotiated a special price on a full size bottle of SF-100 and SF-200 (SC012) complete with applicators for just £38.50. **Trial Pack, SF-100 And 200 (Full Size) Order ref: JE31A £38.50**

We've also secured trial samples of all three products, SL-123 and these are available at only £26.00. We sincerely recommend the use of these products to all who wish to maintain their record collections in pristine condition. **Trial Pack, SF-100, 200 and 300 Order ref: JE32A £26.00**

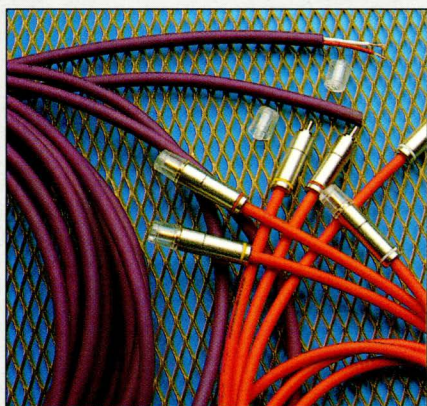
FURUKAWA CABLES

SPEAKER CABLE

It doesn't matter how good a system's speakers playback or amplification components may be, if the signal between these components is transmitted via cables which are unworthy. An investment in quality cables can introduce a cost-effective improvement in performance, of an order usually associated with the replacement of an amplifier or speakers etc. Hi-fi Choice tests have proven, Furukawa cables are among the best available.

FS-2T07

Speaker Cable
Furukawa PCOCC
0.7 sq mm stranded speaker cable with a polypropylene insulation, available in custom made lengths. (See copy elsewhere in this magazine).



FS-2T14

Speaker Cable

Furukawa PCOCC 1.4 sq mm stranded speaker cable with a polypropylene insulation, available in custom made lengths. FS-2T14 was rated a HFC Best Buy, because of its 'natural sense of dynamics and scale'.

OPTICAL INTERCONNECTS

FO-1110 with Toslink connectors £50.00

Voted a "must for 'optical only' transports" the FO-1110 employs a FMMA fibre. Glass and multi glass versions, the FO-1210 and FO-1310 were also recommended by HFC, for better quality systems in order to provide more detail, and are also available.

DEDICATED FURUKAWA PCOCC INTERCONNECTS

FV-3010 PCOCC Interconnect £35.00

Each Furukawa interconnect is designed and dedicated to a specific purpose in the hi-fi chain. The FV-3010 carries the signal between a CD and DAC or a video signal. (See copy elsewhere in this magazine).

FD-3010 PCOCC interconnect £70.00

The FD-3010 interconnect is designed to take the unbalanced analogue signal between a CD player and amplifier. The improvement in quality this interconnect provides is often of a far higher order than may be achieved from upgrading equipment. Therefore the inclusion of an FD-3010 in any hi-fi system will prove a worthy investment.



Choice sounds

Choose from our superb selection of specialist label recordings.

SHEFFIELD LABS

The Power of Seven: "Up-Front"

"The Power of Seven" are seven of the most sought after and talented female vocalists in the recording industry. This recording showcases their versatility with songs ranging from 90's urban contemporary, to stylish ballads. High energy variation on "Dancin' In The Streets", "When Something Is Wrong With My Baby", "Will It Go Round In Circles" and many others make this CD a must.

Order ref: CD-33 £21.50



Thelma Houston & Pressure Cooker: "I've Got The Music In Me"

This blend of R&B and rock featuring the extraordinary powerhouse vocals of Thelma Houston is the biggest selling audiophile recording of all time. The Pressure Cooker band is still cited as one of the greatest ensembles ever. Tracks include: "To Know You Is To Love You", "Don't Misunderstand", "Got To Get You Into My Life" and many more.

Order ref: CD-2 (CD) £21.50
Order ref: ST-200 HQ (180 gm Vinyl) £30.00

The Usual Suspects: "The Usual Suspects"

For this project Jeff Weber employed 37 outstanding musicians. "The Usual Suspects" is a unique musical review of jazz/rock instruments and pop vocals. Tracks include: "Life Is What You Make It", "Come On In", "Good Friends" and many more.

Order ref: CD-32 (CD) £21.50

KLAVIER JAZZ

Si Zentner & His Orchestra: "Alive in Las Vegas"

This is a rarity. Big Band Jazz from another famous Audiophile label. Si Zentner thrills audiences of all ages with the great sounds of the 30's and 40's. Twenty great standards recorded live to two track include: "Up The Lazy River", "Take The 'A' Train", "Caravan" and "Cherokee" among others.

Order ref: KCD-77002 £13.99

Remembering Fats Waller: Lytle & Floutnoy, Duo Pianists

Fats Waller had a gargantuan capacity for life, and it's captured in his music. Waller's music in this live to two track recording, really comes to life. Tracks include: "Vipers Drag", "Alligator Crawl", "C Fats Blues" and more. Buy it for the sound of great 'cooking' piano play. Your loudspeakers will get a great treat, if they're fast enough to cope, and so will you.

Order ref: KCD-77003 £13.99

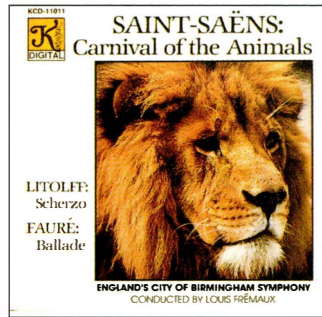
KLAVIER CLASSICAL

From Baroque to Mozart: Academy of St Martin-In-The-Field

The Academy of St. Martins-In-The-Fields, directed by Neville Marriner, with Josef Suk,

Violin. Introduction to Klavier's live to two track, audiophile recording techniques, beautiful and selected pieces from Albinoni, Vivaldi, Mozart and Corelli.

Order ref: KCD-11006 £13.99



Saint-Saëns: Carnival of the Animals. Birmingham Symphony Orchestra, Louis Fremaux conducting

This is Saint-Saëns best known work, the 'Grande Fantaisie Zoologique' is written for a modest orchestra, consisting of flute, clarinet, two pianos, xylophone, glass harmonica and strings. The fourteen amusing sections contain, Hens & Cocks, Wild Asses, The Elephant, Kangaroos, Persons with Long Ears etc.

Order ref: KCD-11011 £13.99

Saint-Saëns 'Organ' Symphony: Birmingham Symphony Orchestra, Louis Fremaux conducting

The unique combination of organ and orchestra creates special problems of balance between musical forces, problems involving timbre, pitch and dynamics. Klavier's controlled recording conditions have not only met the challenge but have also done much to keep this symphony most deservedly alive. Buy this superb recording and give your hi-fi a real treat.

Order ref: KCD-11010 £13.99



Bizet: 'Roma'/Symphony in C Major Birmingham Symphony Orchestra, Louis Fremaux conducting.

'Roma' is a fascinating work by a master of orchestration with a genius for vivid expression and the deliciously unexpected turn of phrase. In this piece, Bizet lives on, in Saint-Saëns words, as "the embodiment of youth, vigour, gaiety and good nature!"

Order ref: KCD-11012 £13.99

Britten's War Requiem/Stravinsky's Symphony of Psalms: The William Hall Chorale and Orchestra. (Double CD)

The 'War Requiem' could be conceived as being a dissonant work speaking able for the

times in which we live. There is however, no denying that the work has a profundity and awesomeness in its statement of the non-reconciliation of man with man, and man with his Creator. Buy this for the big sound of an orchestra, organ and choirs.

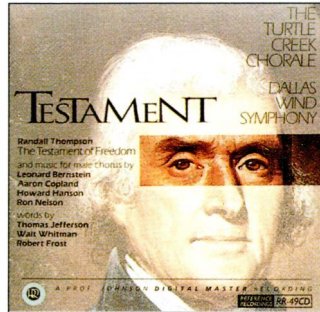
Order ref: KCD-11017 £26.00

REFERENCE RECORDINGS

Eileen Farrell: It's Over

Arranged and conducted by Robert Farnon, this album gives Farrell the opportunity to demonstrate her considerable skills, in touching songs of lost love. Contains 'I get the blues when it rains', 'How about me?', 'Easy to remember', 'Gone With The Wind', 'I remember April'. (1993 Grammy nominee for "Best Instrumental Arrangement Accompanying Vocal(s)")

Order ref: RR-46CD (CD format) £13.99



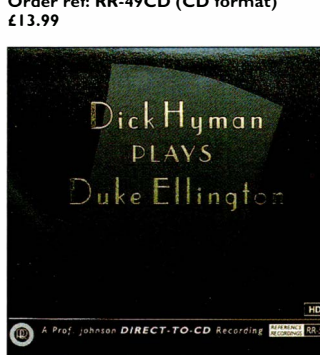
The Turtle Creek Chorale: Testament*

A stirring programme of American music with words by Thomas Jefferson, Walt Whitman and Robert Frost introduces the magnificent sound of the 150-voice chorus, accompanied by the Dallas Wind Symphony. This is the world's first HDCD (High Definition Compatible Digital) recording. The quality improvement over conventional CDs is immediately apparent and the process represents a mile-stone in digital recording techniques. Buy it for its quality and be amazed at the depth, width and definition.

Order ref: RR-49 (LP format- 2 LP set) £28.50

HDCD™ Process

Order ref: RR-49CD (CD format) £13.99



Dick Hyman: Dick Hyman plays Duke Ellington*

Not only is this the world's Second Direct-to-CD Recording, it's also the world's second HDCD, and it's supplied on a gold CD, a first for Reference Recordings and a true collector's item.

The piano sound from the Bosendorfer can only be described as awesomely realistic. The rise and fall of transients will test any hi-fi system to its absolute limits, but buy it for its unforgettable tunes. It contains such greats as: "Jubilee Stomp", "Sophisticated

Lady", "I Let A Song Go Out Of My Heart", "Prelude To A Kiss" and many more.

Order ref: RR-50DCD (CD format) £35.50

*HDCD discs. For information, please refer to the Sessions section of this magazine.

Albert Fuller: Albert Fuller plays Rameau

Required listening for those who consider the harpsichord 'unexpressive'. Albert Fuller was the first to record the complete keyboard works of Rameau and he welcomed the opportunity to record his re-thinking of these epochal pieces. Audiophile journals have declared this to be the most vivid, realistic recording of the harpsichord yet made.

Order ref: RR-27LP (LP format) £19.00

Order ref: RR-27CD (CD format) £13.99

Nojima: Nojima Plays Liszt

Sonata in B minor - Mephisto Waltz - La Campanella - Harmonies du Soir

The recipient of more rave reviews than any piano recording in recent memory, this is truly one for the history books.

Order ref: RR-25LP (LP format) £19.00

Order ref: RR-25CD (CD format) £13.99

Stravinsky: L'Histoire du Soldat suite. Blackwood: Capriccio Espagnol. Chicago Pro Musica

Stravinsky's landmark composition for a mixed ensemble of seven. Grammy winning performances.

Order ref: RR-17LP (LP format) £19.00

Order ref: RR-17CD (CD format) £13.99

Respighi: Church Windows Keith Clark, Pacific Symphony Orchestra

This grandiose work, scored for full symphony orchestra, pipe organ and tam-tam, has at last been given its due, musically and sonically, in this celebrated recording.

Order ref: RR-15LP (LP format) £19.00

Order ref: RR-15CD (CD format) £13.99

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

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

Order ref: RR-11LP (LP format-2 LP set) £28.50

Order ref: RR-11CD (CD format) £13.99

Walton: Facade Suite, - Strauss/Hasnohri: Till Eulenspiegel - Scriabin/Elliott: Waltz in A-flat - Nielsen: Serenata in Vano. Chicago Pro Musica

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

Order ref: RR-16LP (LP format) £19.00

Order ref: RR-16CD (CD format) £13.99

Copland: Appalachian Spring Suite, Eight poems by Emily Dickinson, Keith Clark/Pacific Symphony Orchestra, Marni

Nixon, Soprano (in the poems).

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

Order ref: RR-22LP (LP format) £19.00
Order ref: RR-22CD (CD format) £13.99

Holst: Dallas Wind Symphony, Howard Dunn conducting

Suite #1 in E-flat - A Moorside Suite - Suite #2 in F - Hammersmith
 Seminal band works, together on one disc, all played in the exact instrumentation specified by the composer.

Order ref: RR-39LP (LP format) £19.00
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Nojima: Nojima Plays Ravel. Miroirs:

Noctuelles - Oiseaux tristes - Une baroque sur l'océan - Alborada del gracioso - La valse des cloches - Gaspard de la Nuit: Odine - Le gilet - Scarbo

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

Order ref: RR-35LP (LP format) £19.00
Order ref: RR-35CD (CD format) £13.99



Robert Farnon: Captain Horatio Hornblower R.N.

Widely known as 'Arranger to the Stars', Robert Farnon has written for Frank Sinatra, Tony Bennett, Lena Horne, Eileen Farrell, and many more. He has scored feature films by the dozen, and composed an impressive array of concert works. This album features the debut on RR of the Royal Philharmonic Orchestra, recorded in Watford Town Hall.

Order ref: RR-47LP (LP format-2 LP set) £28.50
Order ref: RR-47CD (CD format) £13.99

Malcolm Arnold: Conducts the London Philharmonic Orchestra

A Sussex overture - Bechus - Dandi Pratt - The smoke - Anniversary overture - The fair field - Flourish for orchestra - The Commonwealth Christmas Overture

On this very latest Reference recording the London Philharmonic Orchestra is conducted by the composer, Malcolm Arnold, at the Town Hall, Watford. This Keith Johnson production includes first recordings of Britain's leading living composer's lesser known works.

Order ref: RR-48LP (LP format-2 LP set) £28.50
Order ref: RR-48CD (CD format) £13.99

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All the issues you wish you'd never missed. Here's how to order back numbers and binders for your copies of Hi-Fi Choice.

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FO-1210 (each)	NA	120.00	NA	NA
FO-1310 (each)	NA	145.00	NA	NA

Vector PCOCC Interconnects with gold Plated Plugs

FV-3010	1 metre	£35.00
FD-3010	1 metre	£70.00

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

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FS-2T14	59.00	66.50	74.00	81.50	89.00	96.50	104.00

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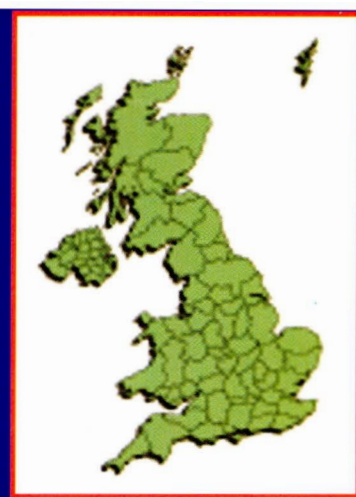
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PETERS HI-FI, 4 St Michaels Sq, Grosvenor Precinct, Chester. (0244) 322063/19392. Arcam, Technics, Sony, Marantz, Dual, Denon, Tannoy, Wharfedale, Quad. 2 Single speaker Dem rooms, no appts nec, free installation service dept. Access, Visa, Amex. Peters credit chargecard. Mon-Sat 9-5.30.
PETER MARTIN HI-FI, 4 Duke St, Congleton (0260) 273206. 1 Stanley St, Leek (0533 383780), Celestion, Creek, Exposure, Musical Fidelity, Pink Triangle, Rotel, Ruark, Sony, Systemdek, Tannoy, Technics, 2 Demo Rooms. No appts nec, Home trial, Free install, Service dept. Access, Visa, Lombard Tricity. Open 4-5.30, 6 days a week.

SWIFT HI-FI, St Annes Parade, Wilmslow. (0625) 526213. Aura, B&W, Denon, Kenwood, Marantz, NAD, Pioneer, Rotel, Systemdek, Tannoy, Revolver, JPW. Open 9:30am-6:00pm dem room. No pressure! **BADA**

CLEVELAND

ACTION ACOUSTICS, 155-157 High Street, Redcar, Cleveland TS10 3AN. 0642 480723. Audio Innovations, Cambridge, Harman-Kardon, JBL, Michell, Musical Fidelity, Pink Triangle, Revox, Rogers, Thorens, etc. Dem Room. Appts nec. Home trial facilities, free installation, service dept. Access, Visa & H.P. Open 9.15-5.30.

GILSON AUDIO LTD, 172 Borough Road, Middlesbrough. (0642) 248793. Linn, Exposure, Arcam, Mission, Cyrus, Denon, Marantz, Rotel, Pioneer, Audiolab, Tannoy. Demonstration facilities in main shop and 1 dem. room, appt nec, home trial facilities, free install, on request, service department. Access, Visa, HP. 10-5 - 6 days.

CORNWALL

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

CUMBRIA

MISONS SOUND & VISION, 11 Warwick Road, Carlisle CA1 1DH. Tel (0228) 22620. Bang & Olufsen, Arcam, Quad, NAD, Yamaha, Sony, Demo Suite, No appts nec, Home trial facilities. Free Installation, Service Department. 9-5:30 Mon-Fri. Thurs 9-1. Sat 9-5.
PETER TYSON, 6 Abbey St, Carlisle, Cumbria, CA3 8TX. "Cumbria's premiere hi-fi centre". Part exchange welcome. (0228) 46756. Linn, Musical Fidelity, Cyrus, Marantz, Denon, Philips, Nakamichi, Technics, Pioneer, Creek & more. Dem room. Demos without obligation. Home trial, Free install. In-house service dept. Access & Visa. HP 9-5.30pm.

DEVONSHIRE

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

DORSET

SUTTONS HI-FI, 18 Westover Road, Bournemouth. 0202 555512. Linn, Arcam, Mission, Quad, Audiolab, Rotel, Yamaha, Denon, etc. 2 Single Speaker Listening Rooms, Home Demonstrations, Free Installations. Mon-Sat 9-5:30. Call for details. **BADA**

ESSEX

AUDIO T, Gants Hill, 442-444 Cranbrook Rd, Gants Hill, Ilford, Essex
IG2 6LL. Tel: 081 518 0915 Fax 081 554 8463. Arcam, Audiolab, Cyrus, Denon, Kef, Meridian, Rotel, Micromega, Yamaha & many more. Tues-Sat 10-6. 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms 2 single spker dem rooms. **BADA**
1ST AND FOREMOST HI-FI CENTRE, 49-55 North Station Road, Colchester, Essex CO1 1RQ. Tel: (0206) 549842. Fax: (0206) 762900. Tlx: 987873 SAIDG. Trio Kenwood, JVC, Akai, Aiwa, Sony, Pioneer, Technics, Nakamichi, Panasonic, Revox, etc. Home trial, free installation. Service dept. Instant credit available + all credit cards accepted. Mon to Sat 9am-6pm.

BRENTWOOD MUSIC & HI-FI CENTRE, 2 Ingrave Rd, Brentwood. (0277) 221210. Alphason, Denon, Marantz, Quad, DNM, Rock/Glastonbury, E.A.R., Exposure, Kelvin Labs, Rotel, plus many more. Dem facilities, home trial, evening appts, (high end). Home installations. System problem diagnosis. Mon-Sat 9.30-5.30 (Thurs from 10am, Sat from 9am). Credit facilities. Access, Visa, Hi-Fi Markets Chargecard. Service facilities.

LYON AUDIO, 16 Peartree Business Centre, Peartree Road, Stanway, Colchester, Essex CO3 5JN. (0206) 560259. Mission, Cyrus, Arcam, Denon, Rotel, Kef, Rogers, Marantz, NAD, Tannoy. Dem facilities. Mon-Sat 9-6. Installations. Access, Visa, Instant credit. Service dept.
RAYLEIGH HI-FI, 44a High Street, Rayleigh, Essex. (0268) 779762/747571. 216 Moulsham St, On-the-Parkway, Chelmsford. (0245) 265245. 132-134 London Road, Southend-on-Sea. (0702) 435255. A&R, Creek, Cyrus, Denon, Epos, Ion, Linn, Mission, Naim, Quad, Rega, Roksan, Rotel, Royd. 0% finance. **BADA**

THOMSONS, 2 High Street, Great Baddow, Chelmsford, Essex. Tel: (0245) 71465. Fax 0245 77528. JVC, Kenwood, Mitsubishi, Toshiba, Tannoy, Mordaunt-Short, Wharfedale, Philips, Audio-Visual dealer. Home trial. Free installation. Service dept. Access, Visa, HP. Open 9-1, 25.30 Mon-Sat. Open 9-1 Wed.

GLOUCESTERSHIRE

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

Open 8.30-5pm 6 days.

HAMPSHIRE

AUDI O T, 4 Feathers Lane, Basingstoke, Hants RG21 1AS. (0256) 24311. Fax (0256) 24430. Great hi-fi from Linn, Arcam, Audioblab, Cyrus, Denon, Linn, Merideian, Mission, Rotel, Yamaha and many more. Mon-Sat 9.30-5.30pm. 3 yr gnteeon Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. Single speaker dem room. Free del, and instal. **BADA**
HAMPSHIRE AUDIO LTD, 2-12 Hursley Rd, Chandlers Ford. (0703) 252827/26532. Quality CD and analogue agencies. 5 dem studios. Large free car park. Closes late Thurs **BADA**
JEFFERIES HI-FI (Portsmouth) 29 London Road, Portsmouth PO2 0BH. Tel: 0705 663604. 2 Dem Rooms, closed Mondays. Late night Wed. Free Parking Bus route. Credit facilities. **BADA**

HEREFORDSHIRE

ENGLISH AUDIO, 95 Whitecross Road, Hereford HR4 0DG. (0432) 355081. Musical Fidelity, Arcam, Pink Triangle, Denon, Marantz, Mission-Cyrus, Tannoy, Rotel, NAD, Nakamichi, TDL, and others. Single Speaker Dem room. Home trial. Free install. Service dept. Access. Visa. Credit arranged. Open Mon-Sat 10am-6pm
GOSPEL MUSIC AUDIO, 32A High St Kington, Herefordshire. (0544) 230254. New Shop open: Castle Video, 1 Spa Centre, Station Crescent, Landindod Wells (0587 8240200) 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, Audioblab, Chord, Denon, Marantz, Mendian, SME, TDL, Teac. Tues-Sat 9.30-6.00. **BADA**
AUDIO FILE, 27 Hockenill St. Bishops Stortford, Herts CM23 2DW. (0279) 506576. 9.30-5.30 open 6 days. Dealer of the Year 1988/89. Linn, Naim, Quad, Cyrus, Arcam, Roksan, Denon, Epos, Rotel, KEF, ProAc. 0% credit. **BADA**
RADLETT AUDIO, 141 Watling Street, Radlett, Hertfordshire, WD7 7NQ. (0923) 856497. Mark Levinson, Proceed, PRO AC, Magnepan, Martin Logan, Tube Technology, Teac, Roksan, Audioblab, Rotel. Home trial facilities. Free Install, Service Dept. Visa. Access 9.5-30 Mon-Fri 10-5.30 Sat
STUDIO 99, 82 High Street, Harpenden. (0582) 764 246. Linn, Naim, Meridian, Rega, Nakamichi, Mission/Cyrus, Quad, Creek, KEF, Bang & Olufsen, Yamaha etc. Quiet single speaker dem room. Appts nec. Home trial, free install. Service Dept. Visa/c. Access/c & finance terms. 9-5.30pm (Mon/Sat). Closed Weds. **BADA**

NORTH HUMBERSIDE

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

KENT

CANTERBURY HI-FI, 50 Bargate, 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, ProAc, 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) 3043272. Pioneer, Technics, Kenwood, Denon, NAD, Aiwa, Tannoy, Mission, Wharfedale, B&W. Separate dem room, no appt nec. Free installation. Service Dept. Instant credit facilities. 9.30-5.30. No early closing.
PANATEC SOUND & VISION CENTRE, 83b High Str, Gillingham. (0634) 5731141. B&W, Bose, Dual, Kenwood, Marantz, Pioneer, Philips, Sony, Tannoy, Technics. Dem room facilities. 0% credit, Service Dept. Free Installation. Pioneer Reference Point Dealer.

PANATEC SOUND & VISION, 17 Week Str, Maidstone. (0622) 661488. See above for details.
SOUNDCRAFT HI-FI, 40 High St, Ashford (0233) 624441. No.1 in Kent for Linn, Naim, Rega, Roksan, Exposure, Onix, Epos, Royd, Creek. But before you choose equipment choose where to buy it. Dem room, appts necessary. Home trial and free installation Visa, Access, Bada Chargecard. 9-5.30 Mon-Fri (Wed & Sat to 5 only). Service Dept. **BADA**
VOLUME ONE, 41 Upper Wickham Lane, Welling, DA16 3AD. 081 304 4622. Arcam, Dual, Epos, Exposure, Mordaunt Short, Monitor Audio, JPW, Marantz, Micromega, Nakamichi, Pink Triangle, Rotel, Royd, Ruark, Sony, Systemdek. Large 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. V J HI-FI, 119 High Street Margate. (0843) 226977. For full details see our above entry.

LANCASHIRE

NORMAN AUDIO, 131 Fnargate, Preston, Lancs. PR1 2EE. Tel 0772 53057. Fax 0772 562731. Marantz, Pioneer, Yamaha, Audioblab, Arcam, Mission, Cyrus, B&W, KEF, Sendor Catalogue. Home Cinema Dem room. No appt nec. Home trial facilities, free installation. Instant credit subject to status. Open 9.30-5.30, late night Wed till 8.00pm. **BADA**
NORMAN AUDIO, also at 216 Church Str, Blackpool, (0253) 295661, Fax (0253) 295722.
ROMERS HI-FI CENTRE, 94-96 High Street, Rishton, Blackburn, Lancs. BB1 4LQ. Tel: 0254 887799. Musical Fidelity, Technics, Pioneer, Marantz, Revox, Tannoy, Celestion, Sony, Panasonic, Mission. Single Speaker Dem Room. Also wired for pro logic. No appts nec. Home trial fac by arrangement. Free Install. Service Dept. Access. Visa. Switch, Interest free on selected products. Open 9-5:30 Wed 9-1:00

LEICESTERSHIRE

MAYS HI-FI, 27/33 Churchgate, Leicester. LE1 3AL. (0533) 625625. Sony, Technics, Denon, Kenwood, Pioneer (Reference Point) Philips, B&W, Tannoy, Mission/Cyrus, Dual. Listening room. free install. service dept. Full range of credit facilities. Open Mon-Sat 9-5:30 Thurs 9-1:30
LEICESTER HI-FI CO, 6 Silver Walk, St Martins Square, Leicester LE1 5EW. Tel: (0533) 539753. Fax (0533) 626097. Acoustic Energy, Arcam, Marantz, Micromega, Mission/Cyrus, Musical Fidelity, Nakamichi, Meredian, Rogers, Roksan, "and oodles more". 2 Dem rooms, home trial arranged, free install. service dept, Credit facilities, Access, Visa, Diners, Amex. 6 days 9.30-5.30. Bada Member **BADA**
LISTEN INN, 6 Hotel Street, Leicester. (0533) 623754 (Fax) 0533 623758. Linn, Arcam, Royd, Heybrook, Creek, Neat, Mission, Cyrus, Audioblab, Quad, Denon, etc. 2 Dem Rooms. **BADA**
SOUND ADVICE, The Factory, Duke St, Loughborough LE11 1ED. (0509) 218254. Shahinian, Rega, Naim, Linn, Royd, Yamaha, Rotel, Arcam, Nakamichi, JPW. 3 demonstration areas, no appts necessary, free installation, service department. Lombard credit charge. Access, Visa. Mon-Fri 9.30-6.00, Sat 9.30-5.30.
STEREO SHACK, 1-3 Guildhall Lane, Leicester. Tel 0533 530330, Aiwa, A.R., Denon, Kenwood, Jamo, Mission, NAD, Philips, Pioneer, Rotel, A/V Speciality. Free Install Open 9.30 - 5.30 6 days. Credit available.

LINCOLNSHIRE

BOSTON HI FI CENTRE, 65a Wide Bargate, John Adams Way, Boston, Lincs PE21 6SG (0205) 365477. Quad, Nakamichi, Arcam, Marantz, NAD, Castle, JPW, Rogers, etc. Separate demo studio. Home trial Free installation. Access, Visa. Tues - Sat 9-5 pm. **BADA**
STAMFORD HI-FI CENTRE, 9 Red Lion Square, Stamford, Lincs PE9 2AJ. (0780) 62128. Pioneer, Technics, Cyrus-Mission, Rotel, NAD, Yamaha, Kenwood, Marantz, Quad, plus all major speaker manufacturers. Expert advice, comparator demonstrations, on two floors, part exchange Hi-Fi purchased for cash. No appointments necessary, hometrial facilities, free installation, service department. Mastercard, Visa & credit charge, finance available. Mon-Sat 9-5.30pm, closed Thursdays.
SUPERFI, 271A High Str, Lincoln LN2 1JG. (0522) 520265. See main entry under Nottinghamshire for full details.

LONDON

ANALOG AUDIO, 849 High Road, London N12. (081) 445 3267. Cambridge, Denon, Rotel, Yamaha, Marantz, Wharfedale, Teac, Mordaunt-Short, Cerwin Vega, Nad. Free install. Service dept. Instant credit up to £1000. Visa & Access. 9.30-6 6 days.
AUDIO T, 190 West End Lane, West Hampstead, London NW6 1SQ (071) 794 7848, Fax (071) 431 3570. Great hi-fi from Linn, Arcam, Audioblab, Cyrus, Denon, Meridian, Mission, Philips, Rotel, Proac, Micromega, Yamaha, and many more. Tue-Sat 10-6pm. 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms. A/V Dept. **BADA**
BILLY VEE SOUND SYSTEMS, 248 Lee High Road, London SE13. (081) 318 5755. Arcam, Linn, Naim, Quad, etc. 2 dem rooms. Int. free credit. Access, Visa. Closed Thurs. **BADA**
CORNFLAKE SHOP, 37 Windmill St (just off Tottenham Court Rd), London W1. (071) 631 0472 (domestic). (071) 323 4554 (multiroom). Fax. (071) 323 4554 Fax. (071) 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. Photo CD, DCC, CD, & 16X9 TV'S. Audioblab, 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 Bntain, Ameca and Japan. 3 dem rooms. Closed Monday **BADA**
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 **BADA**
HI-FI COMPONENTS, 84 Battersea Rise, London, SW11 1EH. Tel: 071 2231 110. Tannoy, Kenwood, Rotel, NAD, QED < Wharfedale, Dual, Shure, Ortofon, Celestion. Appts nec. Service Dept. Access, Visa, Diners, Amex. Open 10-6 Closed Wed.
KJ WEST ONE, 26 New Cavendish St, London W1M 7LH. (071) 486 8262/63. Fax (071) 487 3452. Arcam, Audio Alchemy, Audio Lab, Audio Research, Croft, Deltac, Epos, Marantz, Meredian, Mission, Musical Fidelity, Pink Triangle, Roksan. Appts nec. Home trial. Free installation. Service dept. Major credit cards. Mon-Sat 10-6pm. (Late night Thur til 7pm).
MUSICAL IMAGES LTD. See under Middlesex & full page advert in the Product Directory.
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. Nam, Rega Quad, Meredian, 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. **BADA**
SUPERFI, 2-4 Camden High Street, Camden, NW1 0JH (071) 388 1300. See main entry under Notts for full details.
UXBRIDGE AUDIO - CHISWICK, 109 Chiswick High Road, Chiswick, W4 2ED (081) 742 3444 Fax (081) 742 3295. 2 Demo Rooms, Installations, 2 Year Guarantee, 7 day exchange. Major credit cards, Tues - Sat 10 - 6. See Middx entry for brands stocked. **BADA**

VOLUME ONE, 41 Upper Wickham Lane, Welling, (081) 304 4622. For full details see entry under Kent.
ZEBRA, 18-24 Brighton Road, South Croydon CR2 6AA. (081) 688 2093. Audioblab, Arcam, KEF Reference, Marantz, Mission, Micromega, Pioneer, Rotel, Sony, Tannoy, and large range of AV equipment. 52 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, Harman Kardon, Dual, Thorens, Pioneer. Service Dept. Free installation. Access, Visa, Switch. Interest Free and standard. Credit available. Mon-Sat 9-5.30.

THE AUDIO COUNSEL, 12 Shaw Road, Oldham, Manchester OL1 3LQ. (061) 633 2602. Linn, Yamaha, Rega, Rotel, Arcam, Micromega, EPOS, Creek, Nakamichi, Denon. 2 dem rooms. Free install. Visa. Access, Licenced credit brokers up to £1000 instant credit. 10.00-5.30 Tues, Weds, Sat: 10.00-7 Thurs & Fri. Closed Mon.

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! **BADA**

MIDDLESEX

AUDIO T, 159a Chase Side, Enfield, Middx EN2 0PW. (081) 3673 132. Fax (081) 367 1638. Great hi-fi from Arcam, Audioblab, Cyrus, Denon, Mendian, Micromega, Mission, Philips, Rotel, Yamaha and many more. Tue-Fri 10-6pm. Sat 9:30 - 5:30 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 3 dem rooms. A/V Dept. **BADA**

HARROW AUDIO, 27 Springfield Rd, Harrow. (081) 863 0938. Mon-Sat 9.30-5.30. A&R, Audioblab, Cyrus, Denon, Epos, Monitor Audio, Musical Fidelity, Nakamichi, Quad, Rotel, Tannoy, Thorens, Yamaha, etc. **BADA**

MUSICAL IMAGES LTD, 173 Station Rd, Edgware (081) 952 5535. fax (081) 951 5864 and 45 High St. Hounslow. Tel (081) 569 5802. fax (081) 569 6353. Most brands available - see full page advert in Product Directory. Interest free credit available, ask for details. Demo Room, Repairs & Service, Mail Order facilities

RIVERSIDE HI-FI LTD, 422 Richmond Road, East Twickenham, Middlesex TW1 2EB. Tel. (081) 892 7613. Fax (081) 892 7749. A.R., Arcam, Audio Innovations, Castle, Dual, Denon, KEF, Luxman, Michell, Musical Fidelity, Micromega, Marantz, Nakamichi, Rotel, Spenhdor, Systemdek, Tannoy, Yamaha. One demo room, in-car demo for car hi-fi systems. Appts not always necessary. Home trial facilities. Free installation, service dept. Lombard Tricity. Access, Visa, Amex, Diners Club. Mon-Sat 9.30-6. Thurs, Fri 9.30-7.

SIGHT N SOUND, The Treaty Centre, Hounslow, Middlesex TW3 1ES. (081) 572 5418, fax 081 572 5417. Sony, Kenwood, Finlux, Toshiba, Philips, Sanyo, Grundig, Pioneer, Technics, Akai. No appts nec. free 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. **BADA**
P & A AUDIO (BIRKDALE) LTD 31 Liverpool Road, Birkdale, Southport (0704) 68373. Arcam, Cambridge, Creek, Denon, Michell, Mission/Cyrus, Mordaunt-Short, NAD, Pink Triangle, QED, Revolver, Rogers, Rotel, Royd, Tannoy. 3 Single speaker demo rooms and Nicam surround sound dem room. Free delivery, installation (Merseyside) Service dept. Mon-Sat 9 - 5.30 Half day Tues. Access, Visa, Lombard.

DEALER Directory

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, appts preferred, service available, installations, B&O link install, home trials. Access, Visa, interest free credit available subject to status. 9.30-6pm 6 days.

FRANK HARVEY HI-FI EXCELLENCE, 163 Medieval Spon Street, Coventry. (0203) 525200. All major agencies. Free inst. Service dept. Part ex. 3 dem rooms. Mon-Sat 9.30-5.30. Wed til 8pm. **BALITA**

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. **BALITA**

MUSICAL APPROACH, 37 High Street, Aldridge, Walsall, W. Mids. (0922) 57926. Linn products, Arcam, Creek, NVA, Revolver, Onix, Epos, Marantz, Rotel, Quad & more. Dem facs. Home trial. Service dept. Credit facs available. Access, Visa. 9.30-5.30 Mon-Sat. 9.30-1 on Thurs.

MUSIC MATTERS, 351 Hagley Road, Edgbaston, Birmingham B17 8DL. (021) 429 2811. Roksan, Nakamichi, Arcam, Audiolab, Musical Fidelity, Mission/Cyrus, Meridian, KEF, Monitor Audio, Pink Triangle. 2 single speaker luxury demo rooms. Appts nec, home trial facilities, free installation, service dept. Access, Visa, instant credit up to £1000, interest free credit available, Tue-Thur 10.30-6, Fri 10.30-8, Sat 10-5.30.

NAAM HI-FI VISION, 122-123 New Street, Birmingham. (021) 633 4944. Pioneer, Akai, Aiwa, Panasonic, Yamaha, Toshiba, Hitachi, Bose, Wharfedale, Sony. Demo facilities available, appointments preferred. Access, Visa. 10 month interest free credit. Amex, Lombard Tricity Creditcharge. Mon-Sat 9-6.00.

NORFOLK

BASICALLY SOUND, The Old School, School Rd, Bracon Ash, Norwich NR14 8HE. (0508) 70829 Arcam, Linn, Naim, Denon, Spondor, Exposure, Audio Technica, Creek, Rega, Epos, etc. 2 comprehensive dem rooms. Home trial. Free installation. Visa, Access, HP facilities. Tues-Sat 9.30-1, 2-5.30.

MARTINS HI-FI, 5 High Street, Kings Lynn. (0553) 761683. Est. 1968. Making good vibrations for 20 years **BALITA**

MARTINS HI-FI, 85/91 Ber Street, Norwich. (0603) 627010. Est. 1968. Making good vibrations for 20 years **BALITA**

NORTHAMPTONSHIRE

AUDIO CRAFT 23-25 Demgate, Northampton, NNI 1TY. Tel: 0604 36291 Bang & Olufsen, Kenwood, Technics, Marantz, Celestion, Mordaunt-Short. No appts nec. Free Install. Service Dept. Open Mon-Sat 9-5.30pm

CLASSIC HI-FI + VIDEO, School Lane, Kettering, Northants. (0536) 515766. Rotel, Musical Fidelity, Wharfedale, Yamaha, JBL, Cyrus, Nad, Pioneer, Marantz, Kenwood, Kef, Celestion, and many more. Home trial, free instal, service dept. Access, Visa, credit facs. 9.30-5.30pm.

LISTEN INN, 32 Gold Street, Northampton. (0604) 37871 (Fax) (0604) 601430. Linn, Naim, Epos, Royd, Mission, Cyrus, Arcam, Audiolab, Neat, Creek, Quad, Denon etc. 2 Dem Rooms **BALITA**

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 appt. DEFINITIVE AUDIO, (0602) 813562. For a carefully considered approach to building a true hi-fidelity audio system with components derived from the following manufacturers: Audio Innovations, Snell, Wadia, Micromega, Deltec, Voyd, Systemdek, SME, Revox, Ortofon, Pioneer. Demos by appt. Please phone for further details. Installation free of charge Mon-Sat 10-7pm, Closed Wed am.

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. **BALITA**

PETER ELLIS AUDIO, 29 Kirkgate Newark, Nottingham. NG24 1AD (0636 704571) Quad, Castle, Arcam, QED, Sugden, Tannoy, Thorens, Marantz, Denon, Teac. Demo Room. Free Install, Service Department. Access, Visa, Mon-Sat 9-5:30 Close at 1:00pm on Thursday.

SUPERFI, 15 Market Str, Nottingham NG1 6HY. (0602) 412137. Kenwood, Technics, Denon, Aiwa, Rotel, Wharfedale, Mission, Marantz, NAD < Celestion, and many more. 2 single speaker dem rooms. Free install on systems, service dept. Access & Visa, Amex. Open 9-5.30, 6 days.

OXFORDSHIRE

ASTLEY AUDIO LTD, 3 Marketplace, Wallingford. (0491) 39305/34349. 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 9-5. Records & CDs stocked.

AUDIO T, 19 Old High St, Headington, Oxford OX3 9HS. (0865) 65961, Fax (0865) 60415. Great hi-fi from Arcam, Audiolab, B&O, Cyrus, Denon, KEF, Meridian, Mission, Rotel, Sony, Yamaha and many more. Open Mon Fri 10-6pm, Sat 9.30-5.30. 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms. AV Dept OXFORD AUDIO CONSULTANTS LTD, Cantay Hse, Park End Street, Oxford OX1 1JE. (0865) 790879 fax (0865) 791665. NAD, Rotel, Musical Fidelity, Pioneer, Marantz, Rogers, TDL, Thorens, Audio Research, Proceed 2 Dem rooms. Service Dept. Home trial and free installation. Instant credit. Access, Amex, Visa. 10-6 Mon-Sat.

WESTWOOD AND MASON, 46 George Street, Oxford. Tel: 0865 247783 Arcam, Rotel, Rega, Epos, Tanoy, Royd, JPW, Mission, Nakamichi, Denon, Aiwa, Naim, Quad, Aura, Teac. Open 9:30-5:00pm. Dem room. Closed Thursdays **BALITA**

WITNEY AUDIO VISUAL, 28 High St, Witney, Oxford. (0993) 702414. Aiwa, Akai, AR, Bose, B&W, Cambridge, Dual, Mordaunt-Short, NAD, Onkyo, Pioneer, Roberts, Sony & Sony ES, Tannoy, Wharfedale, Yamaha, Reference Point Dealer. Dem facilities. Mon-Sa 10-6 Free installation, credit to £1,000. Access, Visa. Service dept.

SHROPSHIRE

AVON HI-FI, 12 Barker Street, Shrewsbury, Shropshire SY1 1JQ. (0743) 55166. NAD, Quad, B&W, Arcam, Kenwood, Aiwa, Bose, Nakamichi, Revolver, Onkyo Dem room. Home trial. Free install. Service dept. Access, Visa. £1000 instant credit. Mon, Tues, Wed, Fri, Sat 9-5.30.

CREATIVE AUDIO, 9 Dogpole, Shrewsbury, (0743) 241924. Linn, Naim, Roksan, Mission, Arcam, Rogers, Denon, Marantz, Rotel, Celestion, etc. Dem room. Home trial and free installation. Credit to £1000. Access, Visa. Tues-Sat 9.30-5.30. Service dept.

MID-SHROPSHIRE AUDIO, 4 Holland Court, Dawley, Telford TF4 2EX. (0952) 630172. Audio Innovations, Marantz (inc Music Link), Denon, Tannoy, Ortofon, Pink Triangle, Ion Systems, Systemdek,

Ruark, Monitor Audio etc. 2 dem rooms. Home trial, service dept. Instant credit up to £1000 Access, Visa, Amex.

SOMERSET

MIKE MANNING AUDIO, 110 Middle Street, Yeovil, Somerset BA20 1NE. (0935) 79361, Fax (0935) 32923, Mobile (0850) 325965. Naim, Roksan, Pink Triangle, A+R (Arcam), ION, NAD, Pioneer, Rotel, Denon, etc. Dedicated listening lounge, for relaxed and unpressured demonstrations. Appts not usually nec. but best to phone first. Home trial facilities on request, free installation, service department. Instant credit, Access & Visa, etc. 9-5.30 closed Mondays.

STAFFORDSHIRE

GRANGE HI-FI LTD, 153 Branston Rd, Burton-on-Trent, Staffordshire DE14 3DQ. (0283) 33655. Albary, Audio Innovations, Arcam, Castle, Denon, Pink Triangle, Marantz, Rotel, Rogers, Systemdek, SME, Tannoy, TDL. Dem fac, appts 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

BURY AUDIO, 47 Churchgate Street, Bury St Edmonds, Suffolk, IP 33 IRG. Tel 0284 724337. Arcam, Furukawa, Heybrook, Infinity, Marantz, Meridian, Michell, Pink Triangle, Proac, Rotel, Target, Roksan, Shahinian, Quad, Etc. Single Speaker Room. No appointments necessary. Home trial facilities. Free Installation. Service Department. Access, Visa, Switch. Open 6 days a week. Mon/Tues/Sat 9.30-5.30 Thurs/Fri 9.30-7.00. Closed Wed

EASTERN AUDIO, 41 Bramford Rd, Ipswich. (0473) 217217. Quad Audio Lab, Denon, Dual, Marantz, Mission, NAD, Nakamichi, Technics, Arcam. Mon-Sat 9.30-6. **BALITA**

SURREY

AUDIO SOUTH, 24 (The Woolmead) East Str, Farnham, Surrey GU9 7TT. (0252) 714555 Audio Innovations, Audio Note, Deltrec, Yamaha, Cary, J PW, Marantz, Rotel, Snell, Voyd. Dem room and evening appointments available. Home trial facilities. Free installation. Access, Visa. 10.30-6 Mon-Sat. Closed Tuesday.

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. Part exchange, large free car park, service dept, instant credit available, Access, Visa, Switch.

DATASOUND, 23 South Street, Dorking, Surrey RH4 2JZ. (0306) 882897. Arcam, Celestion, Denon, Dual, Marantz, Mission, Musical Fidelity, NAD, Rotel, Tannoy. Dedicated listening room. Free install. Service dept. Up to £1000 instant credit subject to status. 9.30-5.30 6 days.

PJ HI-FI - the Hi-Fi Shop, 3 Bridge Street, Guildford, Surrey GU1 4RY. Tel: (0483) 504801. 9-6 Mon-Sat. Linn, Meridian, Creek, Arcam, Quad, Revox, Musical Fidelity, Rotel, NAD, Nakamichi, Marantz. **BALITA**

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, appts preferred, home trial facilities, free install, service dept. Access, Visa. Open 9-5.30 Mon-Sat.

SPALDINGS HI-FI, 352-4 Lower Addiscombe Rd, Croydon, Surrey. (081) 654 1231/2040. 3 dem rooms and home dem. Free installation, credit. Mon-Sat 9-6. Tues to 8. Closed Wed. Service dept. **BALITA**

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)

DEFINITIVE AUDIO, Brighton. (0273) 208649. Audio Innovations, Impulse, Voyd, Snell, SME, Audonote, Micromega, Golding, JPW, Pioneer, Demonstration by appointment, home demonstration a pleasure. Free installation, Access, Visa. Mon-Sat 9.30-6.00pm.

JEFFRIES HI-FI, 69 London Road, Brighton, East Sussex. Tel 0273 609431. 2 Dem Rooms. closed Mon. Late night Wed. Free parking. Bus route. Credit Facilities. **BALITA**

JEFFRIES HI-FI, (Poutrsmouth), 29 London Road, Portsmouth, PO2 0BH Tel: 0705 663604. 2 Dem Rooms. Closed Mondays. Late night Wednesday. Free parking. Bus route. Credit facilities. **BALITA**

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. **BALITA**

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 appts 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. Linn, Naim, Alphason, Arcam, Rotel, NAD, B&W, Quad, Tannoy, Thorens, TEAC, etc. Very comfortable listening room. No appts nec., Home trial facilities, free installation, service dept. Access/Visa. 9.30-6:00 Mon-Sat, late Tue till 8pm.

BOWERS & WILKINS LTD, 1 Becket Buildings, Little Hampton Rd, Worthing (0903) 2 64141. B&W, Nakamichi, Castle, Denon, Dual, JVC, Mordaunt Short, Philips, Quad, Sony, Technics. 3 dem rooms. Mon-Sat 9-5.30, Wed 9-1pm. Home trial facilities, free install. Credit to £1000, Access, Visa. Service dept.*

CHICHESTER HI FI, 7 St. Pancras, Chichester, W. Sussex PO19 1SJ. Tel: (0243) 776402. Linn, Naim, Rega, Creek, Nakomichi, A&R, Denon, Roksan etc. Tues-Sat. 10-1, 2-5.15 (closed Mon). **BALITA**

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. A/V 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 4HCE. Tel (0926) 499963. AR, B&W, LPW, Jensen in car, Marantz,

usical Fidelity, NAD, Pioneer, Rogers, TDL, Yamaha, Dolby Pro Logic. Dem Room. No appt nec, Home trial facilities, Free Installation, Service Department. Interest 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 Thursdays. **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, CV3 9QW. Tel (0789) 414533. Please call for further details.

WILTSHIRE

AUDIO T, 60 Fleet St, Swindon, Wiltshire. SNI 1RA. (0793) 538222. Fax (0793) 487260. Great hi-fi from Arcam, Audiolab, Cyrus, Denon, Linn, Meridian, Mission, Rotel, Sony, Yamaha, and many more. Tue-Sat 9.30-5.30. 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms. AV Dept. **BADA**

PR SOUNDS, 58 Castle Street, Trowbridge, BA14 8AU. Tel 0225 777799. Also at Melksham & Devizes. Pioneer, Technics, Kenwood, Denon, Marantz, B&W, Tannoy, JPW, 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, WRI 3PZ. Tel 0905 726375. Denon, Marantz, NAD, Musical Fidelity, Acoustic Research, Harman Kardon, Sony, Technics, Akai. Appts nec for demonstrations. Installation 7 days a week up till 9pm. Interest Free credit over £400. Open 9-5:30 Mon-Sat.

WEST MIDLANDS AUDIO, 158 Ombersley Road, Worcester WR3 7HA. (0905) 58046. Nakamichi, Naim, Rega, Absolute Sounds, Meridian, Arcam, Ion Systems, Roksan. 3 dem rooms for budget & high end audio. Appointments necessary. Free installation. Service Dept. Access, Visa, Amex, Diners, Lombard/ Hitachi. Mon-Fri 9.30-8.30 by appt Sat 9-5.30.

YORKSHIRE (NORTH)

THE AUDIO CLINIC, 22 Lord Mayors Walk, York, Yorkshire, Y3 7HA. Tel: 0904 646309. Mission, Revox, Yamaha, JVC, Audio Innovations, Celestion, NAD, Musical Fidelity, Allison, Thorens. No appts nec. Home trial facilities, Free Installation. Service Department Access/Visa. Credit Open 10-5:30 Mon-Sat.

SCARBOROUGH HI-FI CENTRE, 14 Northway, Scarborough, N. Yorks YO11 1JL. (0723) 374547. Aura, B&W, Mission, Quad, NAD, Oxford, Alphason, Rogers, Nakamichi, Ruark, Voyd. Dem room, appointment preferred. Home trial facilities. Free installation. Service dept. Access/Visa/Creditcharge/£1,000 instant credit/Amex/Diners. 10-6 Tuesto Sat. HARROGATE HI-FI CENTRE, 15 Commercial Street, Harrogate, N. Yorks HG1 1UB. (0423) 504274. Aura, B&W, Mission, Quad, NAD, Oxford, Alphason,

Rogers, Nakamichi, Ruark, Voyd. Dem room, appointment preferred. Home trial facilities. Free installation. Service Department. Access/Visa/Creditcharge/£1,000 instant credit/Amex/Diners. 10-6 Tuesday to Saturday.

SOUND ORGANISATION YORK, 2b Gillygate, York YO3 7EQ. Tel: (0904) 627108. Linn, Meridian, Micromega, Naim, Rega. 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, Albany. 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 Nicaam TV's, VCR's and camcorders. Yamaha, Philips widescreen TV's, CD-Interactive Players. Dolby Pro Logic AV Surround Systems. Reproduction Furniture. Telarc, CD- Audio, CDI and DCC. Demo's. Free expert install. Panaservice in-store service dept. Access, Visa, credit charge. Mon-Sat 9-5:30.

CLEARTONE (Formerly Emicks), 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). **BADA**

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. **BADA**

HUDDERSFIELD 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, Del & Instal Mon-Sat 9:30 5:30 pm **BADA**

IMAGE HI-FI, 8-10 St Annes Road, Headingley, Leeds, LS6 3NK (0532 789374) Arcam, Linn, Meridian, Mission, Quad, Rotel, Etc. 3 Listening Rooms. Free

Dem & Instal. Mon-Sat 9:30-6:00pm **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 Thursdays.

COUNTY DOWN

ASTON AUDIO, Unit 8, Kings Road Shopping Centre, Kings Road, Belfast. Tel: 0232 402220. Akai, Technics, JVC, Mitsubishi, Samsung, Toshiba, Panasonic, and many more. Demos available, Open Mon-Fri 10-8pm Sat 10-5pm

LONDONDERRY

ZEUS AUDIO, 23a Kingsgate Str, Colrairie, BT52 4LB. (0265) 56634. Marantz, Mission Cyrus, Aiwa, Akai, Alphason, Sony, Pink Tri, Celestion, Rotel. Open Mon-Sat 10-5:30, Closed Thurs. **BADA**

IRELAND

DUBLIN

LAFAYETTE HI-FI, 50 Wellington Quay, Dublin, Tel: 353 1 77 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, Kilmarnick, Ayrshire, KA11DH. Tel 0563 40292. Audiolab, Aiwa, Celestion, Cyrus, Denon, Dual, Mission, Philips, Pioneer, Rotel, Ruark, Systemdek and Tannoy. Dem Room, A/V 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

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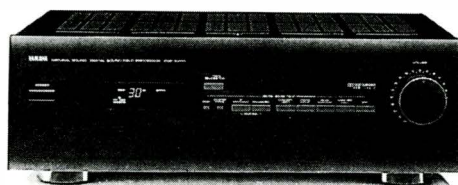
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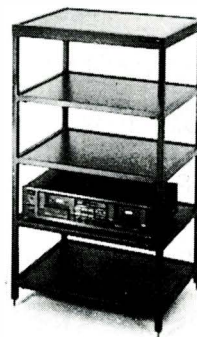
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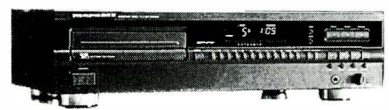
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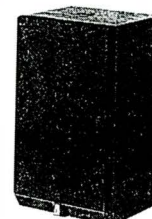
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SONY

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TAF730ES	299.99	—
TAAV670	649.99	Mission 760i loudspeakers
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ATOC20	129.99**	69.99	ATH305	26.99
ATOC3	94.99**	52.99	ATH611	39.99
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			ATH911	62.99
			ATH9000	189.99
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*Any make of moving coil cartridge, we require your old unit first.

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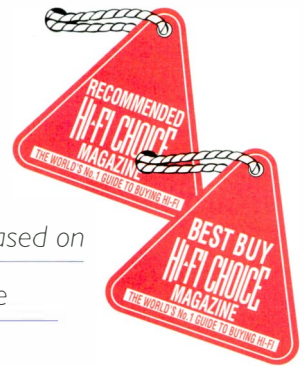
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The Directory



This is the legendary Hi-Fi Choice Directory, the only audio buying guide that is entirely based on comprehensive in-house 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 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 quite that simple.

These ratings make a useful guideline for shortlisting components, but only experiencing the actual combination will tell you whether it works for you.

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 ancillary 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 reviewers 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. Every *Choice* issue contains a *Back Issues* page.

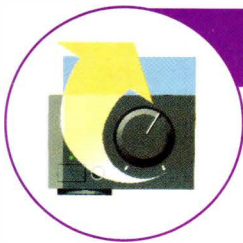
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The Directory entry for the AMC CVT3030 amplifier, an integrated model with a 35 watt output, five line inputs and an MM phono input.

Amplifiers

Product	Price	Comments	Output (W/R.L)	Line inputs	Integrated MM MC	Headphone socket	Remote control	Power amp	Preamp	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 over-load characteristics within a given system (valve

amplifiers invariably sound more powerful than their rating would suggest). The listing of features provides some indication to the complexity of an amplifier: many users prefer to retain the option of tone controls to 'shape' the overall sound according to taste; many others have found living without tone controls surprisingly easy, with additional benefits in terms of transparency.

An increasing number of amplifiers are supplied without RIAA disc stages, or with the phono stage as an optional extra, reflecting the turntable's slow demise in the marketplace. If you use a turntable, make sure that it has a MM or MC stage to suit your cartridge.

Amplifiers

Product	£Price	Comments	Output W/8Ω	Line inputs	Integrated MM	Integrated MC	Preamp	Headphone socket	Remote control	Issue No.
AMC CVT3030	460	A 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	A 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	G+ Plenty of widgets and an unexpectedly sharp, open and detailed sound. Looks ghastly but sounds strain free.	104	4	•	•				104
Akai AM-95	630	A- 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	A- 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	G+ Available with or without various MM/MC options, the 'basic' PP1 has an attractively warm, earthy sound.	48	4			•			104
Alchemist Kraken	444	A 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	A Generally lacklustre and bland sound offered on this occasion met with (unexpected) disapproval.	53	3	•	•				104
▲ Arcam Delta 110/120	1300	G 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	VG 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	G+ 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	950	VG Switchable triode/ultralinear output stage. In triode mode these are 15 of the sweetest watts around. Surprisingly gutsy	15/25						•	10
Audio Innovations Series 200	850	G 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	G+ 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	G+ 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	E 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	G+ It'll successfully tackle the most difficult of speakers and still provide a very warm, rich and euphonic sound	46		•	•	•		•	116
▲ Audiolab 8000A	430	VG 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	G Very distinctive, almost stark neutrality that will not appeal to all listeners. Good value engineering, nevertheless	157	7	•	•		•	•	97
▲ Aura VA-100 Evolution	300	G+ 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	VG 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	VG 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	G+ 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	G+ A substantial British monoblok power amplifier, but not a great deal more impressive than the P35	70					•		50
▲ Concordant Excelsior	1040	E 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	E Fabulous preamplifier. Beautiful imaging, superb detail, plenty of gain on the phono stage; classy build quality too.	4		•			•		78
▲ Conrad-Johnson Premier 7	11000	E 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	G 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	A+ 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	G 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	VG Exceptionally load tolerant and very refined in delivery. Extra options available in future	74							80
▲ Denon PMA-350	190	G 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	G+ Denon's latest integrated amp swept the board with its big, brassy if somewhat extravagant sound.	99	5	•	•				116
▲ Dual CV600RC	160	G 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	VG Valves imitating trannies give exceptional power delivery but not the delicacy and transparency one expects	200					•		60
▲ E.A.R. 802/509mkII	4200	VG 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	G+ 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	VG 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	G+ 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	G+ 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	G+ 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	G 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	A Heybrook has improved the manufacture of its power amp though flaws in the preamp's disc input remain	146	4	•	•		•	•	104
▲ Heybrook Signature	2014	G+ A stunningly powerful and vivid-sounding combination which is equally impressive via vinyl or CD	148	4	•	•		•	•	109
JVC AX-A342	170	A A value-conscious budget amp offering plenty of power but a slightly untidy and inconsistent sound	77	5	•	•				109
▲ JVC AX-Z1010	650	G+ One of the best behemoths: a big amp with a big, boppy and unmodded sound and a couple of ancient 16-bit DACs for good measure!	124	6	•	•	•			109
▲ Jadis JP30/JA30	10750	E French tubes. Beautiful build, nostalgic styling and delightful sounding midrange transcend limitations at frequency extremes	30	4	•			•	•	60

Amplifiers continued

Product	£Price	Comments	Output W/8Ω	Line inputs	MM	MC	Integrated Preamp	Power amp	Headphone socket	Remote control	Issue No.
Kelvin AZI	700	A 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	G+ An unassuming little amplifier that turns in a remarkably balanced and entertaining sound. Lively, detailed and engaging	66	5	•						97
Kenwood KA-4020	200	A+ 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	A+ 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	G+ 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	A 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	G Underpowered but with the flexibility of four independent power amps. Very deep, captivating sound with 3D soundstaging.	40	5	•	•					92
Lecson Stereo	230	G+ Can reflect the full weight of a classical performance. Genuinely deep, detailed and enthralling sound	76	6	•	•					104
Linn Intek	448	A+ Linn's no-nonsense Intek still lacks the authority and confidence to support its forward balance.	55	5	•	•					104
▲ Magnum A-Class	599	G+ 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	G+ 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	A 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	A 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	G+ 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	G+ 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	G+ 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	P+ 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	G+ A spritely and uplifting performance. Sounds loud but never intrusive or fatiguing.	39	5	•	•					116
▲ NVA AP20	260	G+ Utilitarian amplifier sounds gentle and restrained but is euphonic and utterly engaging. Optional phono stage	35	4							109
Onix OA-21S/SOAP	730	G- 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	A+ 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	A+ 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	G- 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	A+ 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	G+ 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	A- 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	A- 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	G+ 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	G 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	A 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	A+ 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	G+ Valve monobloks represent good value. What they lack in musical subtlety they make up for in sheer muscle.	75								78
Rega Elex	298	A 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	G+ 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	G+ This budget wonder captivated our listeners with its clean, vibrant and thoroughly involving sound	53	3	•	•					104
▲ Rotel RA-940BX	250	G 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	G+ 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	G- 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	A 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-X111	100	A 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-X911DG	800	G+ 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	G 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	G- 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

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Amplifiers continued

Product	£Price	Comments	Output W/8Ω	Line inputs	MM	MC	Integrated	Preamp	Remote control	Headphone socket	Issue No.		
Sugden A21a	469	G 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	A- 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	G 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	A+ 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	A- 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	G+ Almost valve-like limpidity and excellent soundstaging are star qualities of the Threshold amps	100	7	•	•		•	•			Col	
Woodside ISA230	900	A 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	G+ Synergistic pairing with a cool, controlled sound, good focus and transparency. More about poise than grunt	35	5				•	•			100	
▲ YBA 1 power amp	3999	E 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	E A front line French audiophile product. Great stereo and a fine Krell style finish		5	•	•			•			62	
▲ YBA 2	3624	G+ Superbly finished with very good space and transparency, slightly softened bass. Needs transformer for MC cartridges	70	5	•	•			•	•		56	
YBA 3	2350	G 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	G Neutral yet lacks the ability to involve on an emotional level	131	5	•	•	•				•	•	97
Yamaha AX-750	400	A Impressive handling, but two samples split the opinion of our listeners, one sounded squashed the other fast and articulate	149	5	•	•	•				•	•	104



Cassette decks

The bad odour of copyright theft hangs around the compact cassette, but there is no doubt it is the world's most versatile and ubiquitous music storage medium. Hi-fi buffs may wrinkle their noses pointedly, but are still happy to use cassette decks to make up tapes for the car or personal – at the same time complaining loudly about the quality of pre-recorded material. (In fact the very best decks can do a surprisingly good job with musicassettes.)

There is no problem in connecting a cassette deck to any normal amplifier, but some care

needs to be taken in choosing the best tapes for a specific machine. (Tonal and error is one effective technique, but many decks have manual bias adjustment and some match up to the tape automatically.) Lab performance and sound quality often go hand in hand, and are frequently somewhat dependent upon factory alignment. The mechanical integrity of the mechanism is another crucial factor, that is reflected in the price.

All modern hi-fi decks have Dolby B and the majority have Dolby C and the HX Pro system which gives significant treble improvements with

low cost femic (Type I) tapes. Some advanced decks feature Dolby S, a spin-off from the professional world. Remote control remains rare, though it is gradually becoming more widespread as a result of the couch potato effects of Compact Disc.

Three-head recorders allow simultaneous checking of the recording being made. Auto-reverse is a useful convenience feature, but usually with some mechanical compromise, while double-mechanism 'dubbing' decks of dubious quality are fashionable at the bottom end of the market.

Cassette decks

Product	£Price	Comments	Dolby B	Dolby C	Dolby HX Pro	Dolby S	3 Head	Auto calibration Bias adjust	Twin deck	Autoreverse	Issue No.	
▲▲ Aiwa AD-F410	100	A Comparable to AD-F500 but cheaper: Good all round performance, well adjusted, useful basic and not so basic features	•	•	•				•		99	
▲ Aiwa AD-F500	160	G 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	G First class budget 3-head machine with a dual capstan transport that really works at reducing the 'fudge' factor	•	•	•				•		99	
▲▲ Aiwa AD-WX929	200	A Superbly equipped twin deck that works and works well - remote control	•	•	•	•				•	117	
▲ Aiwa XK-S9000	700	G+ Fabulous build, clunky transport and sharp, refined sound quality with Dolby S or B and metal tapes	•	•	•	•			•	•	105	
Akai DX-57	220	G 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	A Fine ungimmicky middle ranking deck with simple, purposeful controls, works best with metal tapes. Performance fair to good	•	•	•	•					87	
▲ Akai GX-95II	440	G+ Sharp, clear and articulate sounding deck, with superb performance extending to frequency extremes	•	•	•	•			•	•	99	
Akai GX-R35	220	A Middling sound quality at best with Dolby B; deteriorates with Dolby C	•	•	•	•			•		99	
▲ Akai GX-W45	320	A 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	E Superb transport and a ripe, spacious sound. The Dolby S installation more successful than most. Some replay incompatibility	•	•	•				•		111	
▲ Denon DRM-510	150	A+ 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	A 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	G Unique loading mechanism provides stability, and the deck has a crisp, clean quality. Occasionally anaemic bass.	•	•	•				•		111	
Denon DRS-810	300	A Basically good deck with non-stressful material let down by an inability to deal with high energy tapes properly.	•	•	•	•			•		105	
▲ Denon DRW-650	200	A This simply equipped model is a little fiddly to operate at times, but sound quality is generally workmanlike - good value	•	•	•					•	93	
Dual CC800RS	170	A- 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	A Workmanlike sound quality offset by high price and inexplicable shortcomings like 'forgetful' Dolby switching and no timer support.	•	•	•	•				•	•	117
Harman Kardon TD4600	600	A 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	A- Tidy, stable but ultimately rather soul-less experience. Auto-reverse is useful though.	•	•	•						•	117
▲ JVC TD-V1010	400	E Very high grade enthusiasts deck with almost CD-like resolution and stability, especially with Type IV tapes	•	•	•	•			•		111	
JVC TD-X352	150	A- Disappointingly amorphous sound despite decent measured results.	•	•	•				•		117	
▲ Kenwood KX-3050	160	A Acceptable sound quality marred only by a loss of midband analysis and slightly edgy treble.	•	•	•						117	
Kenwood KX-5030	200	A 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	A- Neat looking, well equipped deck, adequately engineered but somewhat lacking musically. Worth considering if auto-reverse is a must	•	•	•	•				•	105	
▲ Kenwood KX-7030	260	G Fine, articulate middle price cassette deck whose only (mild) failing with some programme material is a just perceptibly synthetic glaze	•	•	•	•			•		99	
▲ Marantz CP230	330	A This is a competitively priced portable recorder though not suited to replay of musicassettes	•	•	•					•	52	
▲ Marantz CP430	400	A Uniquely flexible and compact package for outside work which at a pinch can double as a domestic cassette deck	•	•	•				•		87	
Memorex SCT-5	150	P Poor example of a twin cassette deck where everything has been sacrificed on the altar of flexibility	•	•	•						87	
▲ Nakamichi DR-1	780	VG Typically idiosyncratic Nakamichi with manual everything, Good azimuth adjustment and dynamic, authoritative sound.	•	•	•						117	

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.
▲ Nakamichi RX-202E	600	G+ Fine, clear and articulate sounding player. Excellent with prerecorded material, but idiosyncratic and sometimes obstructive control	•	•							•	63
▲ Pioneer CT-339	150	A Auto BLE tape alignment is the most interesting feature. Sound quality is a little flaky.	•	•							•	105
Pioneer CT-676	250	P Dull, compressed and hard sounding deck, which is hamstrung by high measured transport flutter.	•	•							•	99
Pioneer CT-900S	500	A High spec and well built derivative of CT-93, but disappointingly lacklustre sound	•	•	•	•					•	99
▲ Pioneer CT-91a	550	G+ 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	E State of the art deck, built like something out of NASA's shuttle, with superb all round performance	•	•	•	•					•	99
▲▲ Pioneer CT-S410	200	A+ Powerful selection of features, excellent ergonomics and the fine, explicit sound with metals, though some instability was noted.	•	•							•	111
▲▲ Pioneer CT-S510	240	A- Slightly highlighted balance, but open and detailed, and backed by a basic but excellent set of features	•	•	•	•					•	117
▲ Pioneer CT-S610	270	G+ Exactingly engineered and highly articulate up-market cassette deck. Imagery and dynamics are finely resolved	•	•	•	•					•	111
Pioneer CT-S910	500	G+ Refined and able performer, strong detail and excellent imagery, but slightly laid back.	•	•	•	•					•	117
Pioneer CT-W601R	200	A- Mediocre performance attributable to flimsy build and less than stable transport. Frequency responses not wholly accurate.	•	•	•						•	111
▲ Pioneer CT-W650R	200	A There were some intermittent problems with the tape alignment system on the test sample, but the deck was otherwise good,	•	•	•						•	105
▲ Revox B215	1322	G+ 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	G+ This is a superbly engineered deck with a classically fine performance that almost transcends the stereotypes.	•	•	•	•					•	75
Revox Professional Series C115	1083	G Not for the numbers freaks, it's unobtrusively musical, with a slightly wayward top and a very clean, extended bass	•	•	•	•					•	111
Sansui D-X111E	120	P 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	P 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	G+ Clean, stable and open sounding recording quality distinguishes this player. - and auto-reverse too. Excellent value.	•	•	•	•					•	93
Sansui D-X311WR	250	A- 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	P Good range of features, let down by poor transport and iffy electronics.	•	•							•	117
▲▲ Sony (WMD6C) Pro Walkman	280	G+ 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	G Fine, assured and detailed performer with a very well designed and straightforward user interface	•	•	•	•					•	87
Sony TC-K870ES	350	A+ Good but not outstanding deck which proved slightly disappointing on audition. This model is no standard setter	•	•	•	•					•	99
TEAC R-9000	500	G Much better than average auto-reverse deck, well worth considering. Nicely engineered too.	•	•	•	•					•	105
TEAC V-7000	480	G Intrinsically sharp, clear and solid sound spoiled by exaggerated detail with prerecorded material and losses imposed by Dolby circuits	•	•	•	•					•	99
▲ TEAC V-8000S	700	G 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	G 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	G 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	A Lively, entertaining deck that trades gadgets for a convincing performance at an attractive price point	•	•	•	•					•	111
Yamaha KX-360	200	A Performance has both dryness and precision. Good - but doesn't 'breathe,' and occasionally sounds unstable	•	•	•	•					•	111
▲ Yamaha KX-650	260	G Fine audio manners, especially in the midband and treble, mark this high class deck out from the crowd	•	•	•	•					•	99
Yamaha KX-W362	250	A- Almost a good deck, it is let down by audible levels of wow & flutter, apparent even with prerecorded material The 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. Remote control is now almost universal. 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.

Prices average out at a little over £200, although entry level models are now available for little more than £100. Even the most basic models can sound very good indeed and employ state of the art decoding chips and the most useful play features. Extra money can buy audio 'tweaks', plus improved build and component quality control. Digital outputs facilitate easy upgrading. Machines can be split into low-bit and multi-bit with each school having its adherents. Bitstream is the newer technology and will proba-

bly win in the end, although the development time spent on multi-bit systems means that excellent results can still be obtained. The DAC type column indicates the specific chip used in each player, multi-bit indicates the standard 16-bit, four times oversampling rate that is the basis of CD system. Low cost Japanese systems, like Pulse Width Modulation and MASH are all low bit designs, while DAC 7 represents a Philips variation on the Bitstream theme.

CD Players

Product	£Price	Comments	DAC type	Electrical digital output	Optical digital output	Track entry keypad	Headphone socket	Phase invert	Issue No.
▲ Acoustic Research CD-07	300	G AR's first Bit Stream CD player relies heavily on Rotel know-how to produce a smooth, detailed but undemanding sound	SAA7321	•	•	•			100
▲ Aiwa XC-300	130	A+ Cheap, cheerful and gratifyingly free of digital 'nasties', well-equipped but safe rather than thrilling on the sonic front.	Toshiba BS	•	•			•	107
▲ Akai CD-57	180	A+ A very flexible machine with a slightly lumpy but fullsome bass, model of clarity but very entertaining!	PWM	•	•	•		•	107
▲ Arcam Alpha Plus	420	G+ As its name suggests, this is the 1992-version of a classic 16-bit player with an all-round smoother sound!	multi-bit	•	•			•	112
Arcam Delta 70.3	650	G+ A distinctly rugged, beefy sound. Plenty of power behind individual instruments but lacks a feeling of involvement	7350 PDM	•	•			•	95
Cary Audio Design CAD-955	899	A+ Rotel with add-on valve processor to filter-out any RF. Nice idea but sounds very dry and taut, lacking warmth and body.	multi-bit	•	•			•	107
Creek CD60	500	G A big and confident sound from a player that's 'into' green. So it looks ghastly even if the internal design is very thoughtful.	multi-bit	•	•			•	107
Denon DCD-1290	319	G- 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	570	G 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	G- Similar to the DCD-1290 in its execution, sounds lively and powerful but lacks subtlety.	18-bit	•	•	•		•	112
Dual CD1080RC	200	A- Strange-sounding player with a top-heavy treble that does little to redress its lack of vibrancy and emotion	MASH/PWM	•	•			•	107
Harman Kardon HD7450	260	A+ Dominated by a budget decoder/oversampling IC. Good bass nevertheless but pop tracks can sound fizzy and tiring.	18-bit	•	•			•	107

CD Players continued

Product	EPrice	Comments	DAC type	Electrical digital output	Optical digital output	Remote control	Track entry keypad	Headphone socket	Phase interlock	Issue No.
▲ Harman Kardon HD7500II	300	G+ Tonal integration is very good, packed with detail that's expressed with enthusiasm.	MASH	•	•		•	•	•	95
Harman Kardon HD7600II	400	A+ HD7500II with a motorised volume control and extra-heavy casework. Lacks the transparency and sparkle of the cheaper machine	MASH/PWM	•	•					100
Harman Kardon HK7300	200	A- Budget low bit technology, does t deliver enough for a recommendation	low-bit						•	83
JVC XL-V152	130	A Based on earlier budget designs but minus a remote control. The voluminous but vague sound is equally familiar.	PEM BS						•	112
▲ JVC XL-Z452	180	G+ Another lightweight player but graced with a surprisingly bold and detailed sound. Impressive stuff for the money.	PEM BS	•					•	112
▲ Kenwood DP-3040	180	G+ The sophisticated sound of this budget player could teach Kenwood's costlier offerings a thing or two!	NPC BS	•						112
Kenwood DP-5040	200	A Better built and technically superior to the older DP-5030 but its untidy, detached treble quality proved a real disappointment	PLM	•	•				•	107
▲ Kenwood DP-7040	300	G A classy, polished sound from a decidedly refined piece of engineering	PLM	•	•				•	107
Kenwood L-1000D	830	G A beautifully constructed and very stylish player that really only gives off its best when used in balanced	multi-bit	•	•	•			•	100
Marantz CD-72	400	G+ A heavily-constructed player. This implementation sounds astonishingly solid and immediate but also rather too 'clean'	Bitstream	•	•				•	107
Marantz CD-72SE	500	G+ A recommendation just eluded the grasp of this superbly built player thanks to its very polished but restrained sound.	Bitstream	•	•				•	112
▲ Meridian 208	1550	E State of the art CD sound combined with a decent preamp and full remote control	Bitstream	•	•	•	•		•	83
Micro Seiki CD-M100	5541	G Extravagantly styled, finished and built. The good lab performance led to an only 'good' sonic display	multi-bit	•						72
Micromega Logic	500	G 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	A+ 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	G+ Oddball player with a cheap top-loading transport and appalling digital gubbins yet saved by the euphony of its valves!	hybrid							112
▲ Philips CD604	130	A+ Slightly ponderous but weighty-sounding player is the older CD610mklI minus remote control. Good sound at a daft price	multi-bit						•	107
Philips CD930	180	G- Featuring digital circuitry similar to Marantz's players but a sound that's a little too ripe and soft.	Bitstream	•	•				•	112
▲ Philips CD950	350	G+ 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	G A budget player with a genuinely fizzy and exciting sound. Hardly neutral but audacious and entertaining nevertheless.	PDM BS	•					•	112
Pioneer PD-75	800	G+ A confident yet beautifully poised and relaxing sound from an equally luxurious package. Oodles of refinement	PDM BS	•	•				•	107
Pioneer PD-S501	190	A+ The cheapest player to be equipped with a Stable Platter mechanism, but compromises elsewhere have suffocated its flair	Bit Stream	•					•	112
Pioneer PD-S801	300	G Pioneer's Legato Link digital filtering provides an unpredictable sound. Capable of poor or superb results, depending on system	low-bit	•	•				•	112
Revox B226S	840	A Top quality build and finish for the Revox system enthusiast. For high value sound look elsewhere	multi-bit	•					•	76
Rotel RCD-955AX	260	A Repackaged version of the evergreen RCD-855. Our sample disappointed, lacking the clean, cohesive quality of the original	multi-bit	•	•				•	107
▲▲ Rotel RCD-965BX	320	E An exceptionally refined bitstreamer; transparent, exquisitely detailed and powerfully emotive. A landmark player	SAA7323	•						100
Sansui CD-X317	300	A t in the same class as older CD-X311mklI. Same technology but the sound is neither as responsive or engaging	MASH	•	•				•	107
Sansui CD-X617	300	A 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	G+ Luxury features, finish and sound from this classy Sansui; excuses required here	Low-bit	•	•				•	83
▲▲ Sony CDP-397	140	G The first CD player to be almost entirely composed of miniature surface-mount components. Unsophisticated but enthusiastic sound	PLM							112
▲ Sony CDP-797	200	G- Succeeds with its taut imaging, clean and impressive soundstaging. Can seem a little too lean or dry, however.	PLM	•	•				•	107
Sony CDP-X229ES	300	G- Built to the same standards as the CDP-X339ES but with a colder and less forgiving sound. Lacks a sense of integration	PLM	•	•				•	112
TEAC CD-P3500	170	A 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	G TEAC's first genuine 1-bit player its sound described as having a certain 'organic warmth', very composed and easy-going.	SAA7350	•	•				•	107
▲ Technics SL-PG320A	140	G+ 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	G+ Offers an open, transparent and uncommonly fresh sound but a little of the 'magic' is missing.	MASH	•					•	107
▲ Technics SL-PG520A	200	G+ A cracking player. Superb clarity and dynamics, thrilling but musically involving too	MASH	•	•				•	107
▲▲ Technics SL-PS620A	230	G+ 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-PS900	350	G- Just about the quietest transport in existence and a sound that is equally unobtrusive, polite and refined	MASH	•	•				•	100
Wadia WT-2000/Digimaster 2000		G+ Very high grade transport and DAC which provides state of the art in believable music making from CD	multi-bit	•	•	•	•			Col
Woodside WS2	1095	G+ Responded well to our jazz and classical selection but sounding bright and grainy with the pop CD's	multi-bit	•	•					95
Yamaha CDX-560	180	G An advance on the CDX-450 the light, up-front if t entirely welcoming sound of this newcomer could shock the timid listener	18-bit	•					•	112
▲ Yamaha CDX-860	280	G+ Probably Yamaha's best player to date: powerful and confident yet delicate and nimble when the occasion demands	PDM	•	•					112

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- VAN DER HULL
- WHARFEDALE
- YAMAHA
- AND MANY MORE



CD Transports and DACs

A CD player can be split into two basic components, the mechanism which reads the information from the disc, known as the transport, and the device which turns the digital numbers contained on the disc into the music that comes out of your speakers, this device being referred to as a digital to analogue converter or DAC. Although at the lower end of the market both of these are contained in a single box, at the top end of the market two box machines consisting of a CD transport and a separate DAC become more common.

This gives the added flexibility when upgrading. Improvements to transports and DACs occur on a regular basis. Having the two units separated allows the enthusiast to keep up with the latest developments.

Although many of these units will be purchased as two box machines, which are generally considered to sound better than a one box equivalent, a DAC can also be used to upgrade an existing CD player. A good example is where an early machine with a satisfactory drive unit but a rather dated DAC can be brought up to the latest spec by the addition of a new DAC.

The problem here is that an elderly CD player may be too old to be saved by an off-board DAC. In this case, while this can be a handy stop-gap in the upgrade path, do not blame the new DAC if the overall sound does not improve until partnered with a new, well matched transport.

When upgrading an existing player best results are usually obtained using the electrical digital output rather than optical, and obviously

to be upgradeable your CD player must have a digital output in the first place.

The choice of interconnect is crucial in linking drives and DACs and conventional interconnects used for analogue signals should be avoided, a dedicated 75ohm digital cable will give far better results. Some companies are 'sync locking' transport to DAC, improving the sound quality, but further clouding the compatibility issue.

Mixing and matching transports and DACs from different manufacturers can be a bit of a lottery and readers are referred to the full reviews where this subject is discussed in more detail. Clearly superior partnerships are noted in the Comments. It is also recommended to listen to DACs in demonstration wherever possible, to find the perfect match for your transport.

CD Transports

Product	£Price	Comments	Remote control	Electrical digital output	Optical digital output	Class 1	Issue No.
Kenwood DP-X9010	500	A+ 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	G+ Broadly compatible and offering a light, fresh and very bubbly sound that is both natural, engaging and unfatiguing		•	•	•	96
Meridian 602	1750	G 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	G+ 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	G Beautifully styled and constructed but sound is bleached and generally less inspiring than that of the P-10		•	•	•	96
▲ TEAC P-500	649	G+ 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	G Has the unusual limitation of only optical output. Reassuringly solid and more immune to vibration than most			•	•	88
Wadia WT2000	5614	G+ Active digital output and alloy casework. Dynamic and crisp sound best realised with Wadia DACs, otherwise less impressive.		•	•	•	96
▲ Wadia WT3200	1800	VG 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	G+ 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	G 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	VG 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	G+ 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	G 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	A- Clad in a wooden case this marriage of digital technology and valves has hit the rocks, a disappointingly flat sound	multi-bit	•	•	•	113
▲ DPA Digital Bigger Bit	700	G 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	VG Works especially well with Meridian's 200 transport but does require the services of Deltec's 'Power' mains filter	SAA7350	•	•	•	101
DPA Digital PDM1 Series 3	1280	G+ Bears technical comparison with both PDM2 and Bigger Bit but - in terms of sound quality - is great advance on the latter	DAC7	•	•	•	103
▲ ds/d Decode-1	495	G 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	VG A typically big and full-blooded sound, infiltrated by a slightly euphonic quality but never hard or gritty.	DAC7	•	•	•	103
▲ Meridian 203 DAC7	560	VG A broadly compatible DAC that's free of fatiguing nasties yet remains bubbly and exciting	DAC7	•	•	•	101
Meridian 606 DAC7	1350	G By refining the 203's sound further Meridian have also tempered its vibrancy and 'life'. Fickle with other transports	DAC7	•	•	•	101
Micromega Duo BSII	550	G 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	A+ Described as a modest but entertaining performer, achieving its sweetest balance with Arcam's D170.3 transport	SAA7321	•	•	•	113
▲ Mission DAC5	299	G+ 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	G+ 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	G- Does the business with Meridian's 200 but can sound bloated, smeared and even vaguely electronic other transports	18-bit	•	•	•	103
▲▲ QED Digit	139	G+ Bearing in mind its expressive but very forgiving performance the Digit is almost embarrassingly cheap	SAA7323	•	•	•	113
Roksan ROK-DA1/ROK-DS4	995	G+ A creditable affair, both expansive and expressive in character but rather also lean in balance.	Crystal	•	•	•	113
Stax DAC-Talent	1400	G+ 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	G+ A pleasant surprise from the fuddy-duddies of audio, judging by its 'masses of high resolution detail and tremendous dynamics'	TDA1541it	•	•	•	113
Sugden Stermfoort PDA-10	1200	G+ Unfortunately this 'upgraded' SDA-1 is less impressive than the original, losing out on dynamics, airiness and subtle detailing	multi-bit	•	•	•	113
Sugden Stermfoort PDA-10	1750	G+ Unfortunately this 'upgraded' SDA-1 is less impressive than the original, losing out on dynamics, airiness and subtle detailing	multi-bit	•	•	•	113
▲ TEAC D-500	400	G+ Combination of NPC O/S filter and two Philips' DACs. Its broadly compatible. A dynamic and 'interesting' sound	multi-bit	•	•	•	103
Threshold DAC 1/e	3150	G+ Can sound beautifully detailed with a marvellous sense of scale and sharp, solid images. Compatibility is unpredictable	MASH	•	•	•	103
Wadia DigiMaster X-32	2000	G 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	G+ The X-64.4 positively buzzed with vibrant, sharply-etched detail. An exciting sound	18-bit	•	•	•	101
Woodside DAC1	909	G Fine but slightly dated and costly package in performance terms - but flexible, musical and t well built	multi-bit	•	•	•	87
▲ Woodside DAC2	510	G+ Offering a sharp and dynamic sound, all the more captivating for its lack of graininess and 'tizz'. A reliable upgrade	multi-bit	•	•	•	101

DAT



DAT, or digital audio tape, has been on the market for quite some time now but has never really 'made it' as a consumer medium, probably due to the fact that very little prerecorded software has been made available.

In the last year or so it has begun to carve itself a niche at the top end of the market replacing reel to reel tape recorders as the audiophile's

tape based medium.

The DAT standard specifies a 48kHz sampling rate, which is higher than CD, so direct copying in the digital domain is only possible on those machines with dual sampling frequencies, ie 48kHz and 44.1kHz. Some machines also record at 32kHz to give a longer recording time for a given length of tape.

To try and get around the copying problem many machines incorporate SCMS, the Serial Copy Management System, a device which enables you to record from a CD but not to 'clone' one digital tape from another.

Portable machines are now entering the market but make sure the price you are quoted includes an analogue to digital converter.

DAT

Product	Price	Comments	Remote control	Optical in/outputs	Electrical in/outputs	AES/EBU in/outputs	S/PDIF in/outputs	Issue No.
JVC XD-Z1010TN	1050	A+ 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	G Competent middle market DAT with uncomplicated (but still flawed) user interface, but good basic sound quality	•	•				105
Kenwood DX-7	500	A 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	A- 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	G Slightly soggy, earth-bound sound quality, this model trails the other DAT decks tested so far						63
Panasonic SV-3700	1111	A Slick, powerfully equipped, this pro DAT has a clear, quick and colourful sound somewhat lacking in weight and substance			•		•	111
▲ Sony DTC-55ES	550	G Broadly comparable to a middle ranking CD player sonically, the Sony is particularly well equipped and well priced.						93
Sony DTC-77ES	1000	A Superb engineering, many nice features (including off tape monitoring) but perceptibly slowed, thickened sound	•	•	•	•		105
▲ Sony DTC-M100	799	G+ Clean clear sounding second generation model with most of the features and sound of the DTC-1000ES						63
▲▲ Sony TCD-D3	500	G+ At the time of writing, this model represents the state of the art, and beats all comers.	•				•	94
Tascam DA-30	1199	A+ Interesting pro DAT deck with solid, tangible sound quality which is nevertheless lacking in analysis	•			•		111



Headphones

There are a variety of different approaches to headphone design. Amongst the more expensive models, electrostatic drivers are used in square open-backed phones. The majority of these come with some form of transformer which takes the signal initially from the speaker terminals on the amplifier.

The more down to earth models feature dynamic, or moving coil, drivers in circular open-backed designs. The advantage of open backs seems to be a correspondingly open sound, but one can also of course hear external noises.

The third category are closed-back designs, which are useful in situations where it is neces-

sary to block out background noise.

Another means of distinguishing different types is the way they sit on your head.

There are three styles: circumaural models enclose the ear and rest on the side of the head; supra-aural designs press on the outer ear (pinna); and intra-aural rest inside the ear itself.

Headphones

Product	Price	Comments	Type	Open back	Closed back	Dynamic	Electrostatic	Issue No.
▲ AKG K1000	500	E 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	A 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	G Something of a classic, these AKGs are very user friendly in all respects; sonically on the warm side of neutral	Circumaural	•		•		63
▲ AKG K280 Parabolic	90	G+ 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	E Heavyweight cans in most respects, the K340 with its electrostatic tweeter is a very revealing headphone	Circumaural			•	•	75
AKG K44	40	A Good quality personal oriented phone, could have a better sense of space but is musically quite communicative	Supra-aural	•		•		99
▲ AKG K500	119	G+ 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	G- A flashy personal stereo phone which alternatively could be used at home. A slight LF tonal preference colours the response	Supra			•	•	75
▲ Audio-Technica ATH-308	26	A- Small cans have 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	A- Warm feeling and sounding with impressive physical substance for the price, could be more relaxed and open	Circumaural	•		•		99
Audio-Technica ATH-611	51	G Same basic design as 609 but bigger thinner diaphragm makes this a more relaxed and informative headphone	Circumaural	•		•		99
Audio-Technica ATH-9000	246	G 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	G 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	VG Nicely finished dynamic headphones with all the trimmings, plus a very clean and subtle sound	Circumaural	•		•		63
Beyer DT411	49	G A reasonable but not very thrilling headphone that doesn't really offer enough at the price	Supra-aural	•		•		111
▲ Beyer DT911	179	VG Probably too revealing for many headphone amps these are very subtle and fine if expensive cans	Circumaural	•		•		111
▲ Beyer DT990	102	VG A significant pair of dynamic headphones; they have a smooth and yet revealing neutral sound that is hard to criticise	Circumaural	•		•		55
▲ Beyer IPS690	203	VG 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	A Competent but rather undistinctive cans, a bit middle of the road and well suited to aggressive sources	Supra-aural			•	•	111
▲ Jecklin Float Electrostatic	399	E 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	G+ Whilst very unusual in appearance, the Floats give remarkable sound quality and openness at a reasonable price	Circumaural	•		•		55
▲ Jecklin Float Model Two	99	G+ Helmet shaped and pretty unflattering but open sounding and comfortable in the long term. te lack of adjustment	Circumaural	•		•		63
Koss TD/60	20	A Devoid of channel identification with a decidedly Stateside approach to sound, these are very listenable phones for the price	Supra-aural			•	•	75
Pioneer SE-72	30	A- Neat, very nicely made personal stereo phones. Sound is on the veiled side, good for aggressive sources	Supra-aural			•	•	75

Headphones continued

Product	£Price	Comments	Type	Open back	Closed back	Dynamic	Electrostatic	Issue No.
Quart Phone 30 X	40	A Slightly dark character makes these more suitable for some material than others, specifically music that needs bass weight	Supra-aural	•		•		99
▲ Quart Phone 95 X	100	G+ Can sound even handed, relaxed and open with a good drive system but may be a bit too transparent for lesser headphone outputs	Circumaural	•		•		99
Realistic Pro-X	25	A- Robust, unanimously uncomfortable and heavily veiled in sonic terms. Not a great success	Supra-aural			•	•	75
▲ Sony MDR-CD750	73	G+ Reasonably comfortable and eminently listenable these Sonys have characteristically good bass power and relaxed hf	Circumaural			•	•	111
▲▲ Sennheiser HD 480II	50	G t the most accurate cans on the market but amongst the most enjoyable	Supra-aural	•		•		111
Sennheiser HD 540II	100	G+ 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	G- Very light and comfortable headphones with an even sonic balance that will suit most sources. 6.3mm jack	Supra-aural	•		•		75
Sennheiser HD450II	40	G- 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	G 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	G+ 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	G+ 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	G+ 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	G+ A fine sounding and comfortable headphone that's likely to work well with most sources	Circumaural			•	•	111
▲ Sony MDR-CD3000	300	G+ 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	G Very impressive, possibly the most open sounding cheap closed back can around, lightweight in balance but transparent	Circumaural			•	•	99
▲▲ Sony MDR-CD550	50	G+ 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	E 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		E 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		E The Signature when combined with the SRM-T1 valve driver must be the most transparent headphone available	Circumaural	•			•	72
▲ Stax SR Gamma		G+ 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		G+ An industry reference, frighteningly revealing, bringing across more information than loudspeakers costing twice as much	Circumaural	•			•	55
▲ Stax SR Lambda Pro/SRM-1		E 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	G+ The electret driven SR34s are lively and rhythmic with good tight bass and a sweet midrange	Supra-aural	•				55
▲ Stax SR84	210	G+ The stepping stone between dynamics and full electrostatics, these electret phones are revealing, open and highly enjoyable	Supra-aural	•				63
Technics RP-F3	100	A Robocop styling coupled with a turbo bass switch and an uncomfortable fit, rhythmically OK but no t up to the price	Supra-aural			•	•	111
Yamaha YHD-1	46	G 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) 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.

For good stereo they need to be more or less the same distance from nearby walls, and preferably on rigid stands.

Loudspeakers

Product	£Price	Comments	Size: HxWxD (cm)	Bass from	Sensitivity	Site close to wall	Site in free space	Issue No.
ATC SCM20	1461	G+ Massively built, invariably informative but the rather forward presentation can be uncomfortable	44x24x31	28	82	•	•	86
Acoustic Energy AE1	764	G Amongst the best miniatures around, shows exceptional mid focus and coherence, but is pricey and could be more agile	29.5x18x25	48	84	•		102
▲ Acoustic Energy AE3	1650	G+ Solid, authoritative and impressively accurate – if a shade ponderous and slow	63x26.5x37	23	85		•	86
Acoustic Research Pi 3	219	A 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	A- 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	G Cutely shaped miniature delivers splendidly unboxy bass and midrange, but is a little marred by a rather bright treble	27x20x26	30	85	•		110
▲▲ Allison AL100	100	A 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	A- 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	G- 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	A Pretty well balanced if slightly mid forward, but sound quality is a little disappointing for the price	63x28x27 floor	30	88		•	98
Allison MS 200	220	A- 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	G+ 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	G 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	G+ 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	G+ 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	G+ 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 610	220	A Bass extension and impressive loudness credentials, but rather indifferent integration and coherence	49x23.5x30	25	89		•	102
▲▲ B&W 620	370	G 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	A+ An impressively smooth overall balance, but sound is a touch bland with it	35x20.5x25	30	85		•	98

Loudspeakers continued

Product	£Price	Comments	Size: HxWxD (cm)	Bass from	Site close to wall	Site in free space	Issue No.
▲ B&W Matrix 801	3495	G+ 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	G Stylish, with remarkable imaging properties, good balance and low coloration, though less successful at musical communication	42x26x22.5	30	87	•	98
▲ Bose 305	390	G- 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	A 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	A The pre-equalised multi-driver 901 is cleverly engineered to deliver exceptional loudness	33x54x32	28	89	•	86
Bose Interaudio 3000XL	170	A- 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	A 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	A+ Omnidirectional design with rococo styled urn-shaped ceramic enclosure. Distinctly bass light, but impressively coherent	48x29 (diam)	50	85	•	106
▲ Cabasse Bisquine	600	G+ 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	A+ 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	A+ 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	G+ A brilliant throwback, using horn-type approach to provide startling midrange dynamics and coherence.	94x23x27	45	87	•	98
▲ Castle Pembroke	400	A+ Comfortably recommended, a sweet smooth sound with good overall balance of engineering-based performance	55x37.5x30.5	46	88	•	31
▲ Castle Trent	169	A This miniature wall-mount sounds lively and engaging, if a bit rough at the top.	33.5x18x20	50	88	•	102
▲ Castle Winchester	1499	G+ Unconventional and beautifully crafted, large for its bass extension but engagingly agile and attractively open and airy	114x24x47	25	87	•	90
Castle York	340	A+ 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	A 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	G 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	A Good balance and stereo imagery, with a character which leans more towards offensiveness than excitement	31x18.5x21	55	86	•	78
Celestion 5	169	A 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	G+ 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	A+ 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	A Nicely presented and fair material value, with impressively flat bass-to-mid balance	49.5x20.5x24	30	89	•	102
Celestion SL12Si	629	A 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	G Has certain remarkable qualities that some will find irresistible, but needs careful system and room matching	27x20x23	52	82	•	68
Celestion SL6Si	429	A+ 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
Creek CLS 10	119	A Almost identical to the Goodmans Maxim 3, this neat miniature is very competently engineered, but not desperately exciting	26x17x21	50	85	•	114
Dali 102	230	A 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	G Compact floorstander with superb coherence but rather forward midband. Would suit smaller rooms best	91x26x21	30	86	•	114
▲ Diamond Acoustics Reference III	895	G+ 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	G+ 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	G+ Substantial stand mount delivers delightful midrange focus and delicacy with good bass control. System sensitive	49x22.5x29	25	85	•	98
▲ Faraday FS1	225	A+ Concrete box on a budget, works surprisingly well despite cheap drivers, wood veneers here Direct sale only	47x27x28	45	86	•	114
Faraday FS5	589	G 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	A- Interesting if ugly high mass concrete cabinet is let down by imbalance of ageing driver combination	46x27x27	48	87	•	94
Genexxa SE100	150	A 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	A Smooth and accomplished wall-mount miniature makes a worthy replacement for the bestselling Maxim 2	26x17x21	50	85	•	106
Harbeth HL Compact	584	A Clean, neutral sound lacks resolution and gives rather unsubtle though well differentiated stereo.	52x27.2x28.1	65	87	•	59
Harbeth LS3/5A	379	A 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
Heco Presto Superior 750	650	A 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	A 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	G Latest version of long established favourite delivers good liveliness and fine coherence for the price	47x29x24	30	88	•	98
▲ Heybrook Prima	120	A+ 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	G+ Engagingly coherent and a highly analytical, partly due to distinct and t always comfortable upper-mid forwardness	96x27x20	25	85	•	102
▲ Heybrook Solo	170	A+ Discreetly styled, sounds a little untidy in both bass and treble but handles complex rhythmic material much better than most	36x23x22	28	87	•	90
Infinity Modulus	795	A+ 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	A An engaging and lively sound from a prettily finished and substantial small bookshelf size model	36x23x23	50	87	•	98
Infinity Reference 20	230	A Well presented and balanced with good bass control, but somehow lacks convincing cohesion and agility	46x27x24	27	88	•	102
▲ Infinity Reference 30	330	G 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	A- 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	A Sub-miniature with forward midrange and real bass; highish price partly justified by near-indestructible Pro build	23x15.5x14	50	89	•	90
▲ JPW AP2	180	A 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	A+ 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	A- 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	A+ 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	A 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	A+ 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	A- 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	G+ A fair share of cosmetic deficiencies do little to spoil the impressive coherence and timing	59.5x28x36	28	86	•	86
▲ JRT AD1 Micro	389	G 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	A- 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	A 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	A 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	A+ 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	A+ 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

Loudspeakers continued

Product	EPrice	Comments	Size: HxWxD (cm)	Bass from	Site in free space	Issue No.	
▲ Jordan JH400	504	A+ 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	G- 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	G+ 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	A Physically pretty and sonically competent but undistinguished bookshelf size model has good sensitivity but limited extension	34x20.5x26	45	87	•	106
▲ KEF Q80	549	A+ Uni-Q floorstander has good stereo and fine midband coherence, but bass lacks extension, drive and resolution	85x24.5x26.5	45	87	•	106
Kammerzell Ref Mini Mon	545	G 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	G Impressively communicative bookshelf model has fine vigour, scale and dynamics, if not the smoothest sound around	48x27x25	25	89	•	106
▲▲ Linn Index II/KuStone	374	G 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 LS500	1198	G+ Trades sensitivity for fine bass extension and midbass performance; little relentless but has prodigious dynamic capabilities	93x19x28	28	86	•	82
Linn Kan II	530	A+ 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	G+ 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	G 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	G+ Offers a very crisp and articulate sound, particularly revealing of upper mid vocal details	155x8x57	40	88	•	72
Magneplanar SMGa	688	A Tonally 'rich', in the right room it proved a satisfactory musical experience	122x48x4.5	56	85	•	46
Marantz DS110	200	A+ 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	G+ 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	G+ 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	G 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	A 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	G+ 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	A+ 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	A 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	A Large floorstander lacks low frequency authority, which is probably a function of its comparatively modest price	88.5x25x32.5	20	87	•	94
Mission 765i	680	A+ Big heavyweight floorstander has good sensitivity and bandwidth, but somehow lacks agility, authority and dynamic grip	102x25x33	22	91	•	110
▲ Mission Cyrus 780	200	A+ 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	G 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	A+ 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	A 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	G 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	G 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	A 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	A 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	A 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	A+ 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	A+ 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	G 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	A+ All metal diaphragm luxury miniature has splendid presence coherence but sound can be aggressive and lacks welly.	32x18x20	28	83	•	98
Mordaunt-Short 5.10	130	A 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	A 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	A- 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	A+ Luxuriously finished, beguiling mid transparency, bass is altogether less convincing	37x22x27	45	86	•	102
Morel Bassmaster 602		G+ Superbly built compact stand-mount, did well in listening tests but suffers (enjoys?) upper midband peak	24.5x40x22.5	25	84	•	114
▲ NVA Cube 1	720	G+ 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	G A rude but exciting miniature, with unusually accomplished bass capabilities for its size	28.5x27x28.5	48	85	•	82
NVA Cubix	1400	G 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	G 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	G+ Impressive scale, full bandwidth, coherent, attractively discrete, coloured midband, very well balanced and agile	88x26.5x17-27	25	86	•	102
▲ Neat Petite	525	G+ Far from perfect, but one of the most entertaining and enjoyable speakers around, colorations notwithstanding.	30.5x20x18	33	86	•	102
Nobis DM7	560	G 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	G 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	A Big-but-less-than-beautiful three-way is well enough balanced but lacks communication skills in the time domain	86x27x35or	28	87	•	98
▲ Philips FB825	700	G Generous sounding and impressively uncongested, loudness and bass extension don't quite match plasticky looks	110x29x41	25	88	•	90
▲ Pro Mon Co LB1	998	G+ Delightful smoothness and transparency, though bass extension and sensitivity are both limited	53.5x18x26	33	86	•	110
Professional Monitor Co AB1	1600	G 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	A Model One exaggerates the Signature's rich and heavy midbass and lacks its velvet smoothness	35x25x27	28	85	•	82
QLN Signature	1100	G 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	G+ This classic electrostatic may not be punchy in the bass, but has strengths that some cant live without	92x66x27 open	34	84	•	60
▲ Rega ELA	405	G 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	G 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	A- Neatly presented small reflex design can sound engagingly communicative, but is flawed sonically and technically	38x19x23 on	80	88		68
▲▲ Rogers LS2a/2	220	G 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	A+ 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	G 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	A+ 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 1a	599	G- 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

Loudspeakers continued

Product	£Price	Comments	Size: HxWxD (cm)	Bass from	Sensitivity	Site close to wall	Site in free space	Issue No.
▲ Roksan Darius	0	G+ Provides an exceptionally impressive combination of transparency and delicacy with fine information retrieval and speed	47x27x40	20	82			86
Royd Topaz	173	A+ Cheerful, articulate and essentially communicative miniature can also sound a trifle scrappy and shut in; well worth trying	30.5x20.5x19	50	87	•		114
Ruark Swordsman Plus	299	A Real wood variation on the Swordsman theme looks and measures rather better than it sounds	38x20x28	27	84	•		98
SD Acoustics Ribbon	2295	G+ 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	G+ 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	G 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	G Tall slim floorstander has fine balance, good bass extension and lovely open midband transparency	100.5x20x30.5	25	85	•	•	114
Sequence 30	200	A 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	G Unusual and occasionally wonderful small floorstanding omni; too bright but exceptionally coherent and revealing	69x35x25	24	85	•	•	110
▲ Sony APM-101ES	120	A 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	A- 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	A 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	G Maintains Spendor's tradition for peerless mid-to-treble coherence and perspectives. Bass is rather unconvincing.	38x22x26	25	83	•		102
Spica Angelus	1295	A 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	G 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	G 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	G+ 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	G 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	G Genuinely extended bass from a compact enclosure, very detailed but a shade clinical and detached in presentation	76x23x33	25	84	•	•	78
▲ Tannoy 603	125	A+ 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	A+ Largish bookshelf size hexagon is potentially fine performer, though unusual stand sensitivity makes optimisation difficult	40x27.5x18	25	85	•		106
Tannoy 605LE	189	G Mass-loaded audiophile variation of 605 sounds lively, with decent weight and timing	40x27.5x18	30	87	•		114
▲▲ Tannoy 609	270	G Hexagonal cabinet and dual concentric driver is sweeter than its predecessors, making this one very superior speaker	50x32x22	25	90	•		102
Tannoy 611	399	A This compact floorstander would seem to have plenty going for it, but somehow failed to gel musically	72x32x24	25	92	•	•	110
▲ Tannoy Westminster	6000	G+ 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	A Nicely presented, well built and decent size enclosure sounds solid but somewhat dull	48x23.5x27	20	86	•		98
▲ Technics SB-RX50	650	A+ A smooth and well balanced loudspeaker, its minor weakness being a mildly excessive low bass	48x30x26	40	86	•		46
▲ Thiel SCS	1069	G+ Luxury piano-gloss compact sets class-leading standards for coherence and communication, can sound a shade dark and shut in	40x22x23	45	87	•		114
Vandersteen Model One	1395	G+ 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	P 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 515	260	G 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	A 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	A 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	A 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	G+ 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	A+ 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

Satellites and subwoofers



Satellite and subwoofer systems, sometimes referred to as three way systems, consist of a small pair of speakers (the satellites) and an extra box (or two) to handle the low frequencies (bass).

By freeing the main speakers of the necessity of generating deep bass they can be made much smaller than a standard design and as a result sat and sub systems are usually visually unobtrusive.

Positioning of the sub-woofer is usually not as critical as the positioning of a conventional speaker and as a result the largest part of the sys-

tem can be hidden away entirely. Although this inevitably does not apply to every system, and best results will be achieved with experimentation.

In general the sonic performance of these systems will fall below the performance of a good, comparably priced, conventional speaker. The value ratings given below are judged in the context of sat and sub woofer systems only and are not judged by the same criteria as the main speakers, thus a Recommended sat and sub system probably won't sound as good as a

Recommended traditional speaker.

If you are prepared to compromise slightly in terms of sound quality then a sat and sub-woofer system might represent a good solution for those situations where the loudspeaker need to be heard but not seen.

N.B. This section only includes dedicated satellites and subwoofer systems. Aftermarket subwoofers designed to operate with specific loudspeakers, or those designed to add bass to any existing speaker are generally too specialised to be included in this category.

Satellites and subwoofers

Product	£Price	Comments	Sat. Size: HxWxD (cm)	Sub. Size: HxWxD (cm)	Bass from	Sensitivity	Issue No.
▲ Allison MS 205	420	G- Tasty high quality satellites give this quite pricey 3-box system a touch of class. Subwoofer is very compact and only slightly boomy.	25.5x14.5x15	29x29x36	30	86	104
Bose Acoustimass AM3	289	A Ultra compact 3-box is well balanced though limited in loudness and bass. Tiny satellites are a bit fierce, and grilles unhelpful	9x11x11	20x37x19	48	85	104
▲ Bose Acoustimass AM5	596	A+ Pricey but cleverly engineered 3-box system is well balanced and uses tiny twin-driver satellites to good effect	16x7.7x12	36x19x48	40	85	104
Heco Libero	375	A Attractive 3-box package uses neat metal satellites with versatile mounting accessories, but subwoofer is boomy in the midbass	18x11x12	21x55x32	45	85	104
▲ Jamo SW/SAT300	300	A Attractively finished 3-box package has 'tunable' subwoofer that allows boom to be minimised and a good balance achieved	21x15x8	21x48x35	40	85	104
RSS Solid/Bass Station	550	A Multi-driver macho subwoofer adds mucho muscle to Solid satellites, but it's much more midbass than serious extension	24x12x12	47x48x20	45	91	104
▲ Wharfedale 2130	300	A+ Marred by indifferent boomy sub not rescued by novel wide dispersion satellites that give an open sound	14x24x11	19x32x50	48	86	104

Tuners



The radio medium operates at a much lower profile than TV, but in areas outside pop music the BBC service is the envy of the world. Live Prom concerts can rival all other sources from a hi-fi perspective.

Only the FM (VHF) bands give stereo hi-fi sound, though AM (MW & LW) are useful for certain transmissions in the UK.

Something of a hi-fi afterthought, tuners are often selected merely to match a chosen amplifier cosmetically. However, the task they carry out

is far from simple (or cheap), combining the skills of RF (reception) and audio (signal processing) engineering.

The importance of the former will depend on local reception conditions, but money invested in a high quality outside aerial system is well spent. For more information on choosing and aerial see the feature in issue 108

Tuners come in two basic types. Analogue models tune gradually (and usually manually) across the bands, and can have analogue or digi-

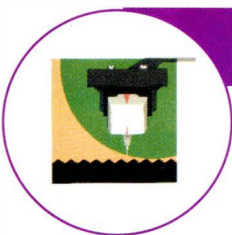
tal displays; they are often preferred for sound quality, and are certainly best for AM bands. Digital tuners offer convenient automatic tune facilities and hold many station positions in pre-set memories. (The Lab and Sound results for models tested in issue No. 65 refer to FM only. For AM results see under Comments.)

In the future, we can expect to see Digital Audio Broadcasting to run alongside analogue radio, although this is currently in an experimental stage.

Tuners

Product	£Price	Comments	Presets	FM	LW	MW	Signal strength meter	Automatic tuning	Manual tuning	Issue No.
Aiwa XT-003	110	A- 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	G+ By AM standards presentable (good) while FM delivers the goods	20	•	•	•	•	•	•	65
▲ Arcam Alpha 2	185	A+ Arcam's cheapest tuner makes up for its lack of features with a sensitive front-end and mellow sound.		•		•		•		93
Aura TU-50	260	G Tonally neutral, but with rather poor imaging and a certain woodenness to the sound.	16	•				•		109
Creek T40S3	250	A Analogue tuner. Sample was hampered by an obvious bass 'hump', production units are said to be cured		•				•		93
▲▲ Denon TU-260L	120	G+ Bare minimum of features. Careful designwork promises a surprisingly open and vivacious sound, so don't overlook it!	20	•		•		•	•	93
▲ Denon TU-660L	200	G Not so successful under 'ideal' conditions, made a fair fist of real reception if a little muddled and lacking life.	30	•	•	•			•	108
Harman Kardon TU9200	200	A The listening panel appreciated its liveliness, but found it a little muddled.	32	•		•		•	•	109
▲ Harman Kardon TU9400	270	G+ 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	G Good bass and detail, and good - perhaps slightly enhanced dynamics	24	•		•		•	•	109
▲ Magnum Dynalab FT101	795	G+ Although expensive for its fairly minimum set of facilities, its excellent sound makes up for what it lacks elsewhere		•				•	•	72
▲ Marantz ST-40L	120	G 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	G Pleasant sounding with a fine finish but does not make the grade at this price		•				•	•	55
▲ Naim NAT 01	1425	E There may be better sounding tuners in the world, but we have yet to hear one		•				•		50
Nakamichi ST-7E	765	G+ Exceptionally good for weak-signal areas, and good all round	16	•	•	•		•	•	55
▲ Pioneer F-676	200	VG+ A tuner that's detailed and clean-sounding. Perhaps a little bright, but not unpleasant.	36	•		•		•	•	108
▲ Quad FM4	424	G+ Fine sound, excellent ease of use, good build and finish and a more than satisfactory technical performance	7	•				•	•	50
▲ Rotel RT-930AX	160	G- A competent rather than exciting performer, with low audible interference though slightly compressed and muddled sound.	20	•	•	•			•	108
Sony ST-S570ES	230	A A host of features, but the sound is muddled, compressed and lacking in frequency extremes.	30	•	•	•		•	•	109
▲ Technics ST-G70L	200	G+ 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	G+ Very clean and civilised, tonal balance, detail and clarity are all very good, lots of useful features	40	•		•		•	•	108

Turntables – cartridges



Very much the 'slave' of turntable and tonearm and to some extent undermined by the supply of free 'starter' cartridges on many turntables, the cartridge is still worth taking seriously. It is unwise to use an expensive cartridge in a cheap turntable and arm. The quality of both the stylus itself and the cartridge's tracking performance are important in preserving that most important part of the hi-fi system – the records – and the cartridge also plays a significant role in determining the system balance.

Cartridges fall into two groups: high output

models, capable of working directly into any amplifier, and more expensive low output models. Stereotypically, low output cartridges use the moving coil principle of operation, have better mechanical integrity and tighter tolerances, and give better performance but at much higher cost. Some of the most exotic designs even dispense with a body, in an attempt to reap the best from the phono cartridge. 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. Still more important, the mechanical cartridge characteristic of cantilever compliance ('springiness') needs to be considered in the light of the effective mass of the tonearm, although it is rare to find a significant cartridge/arm mismatch these days.

Turntables – cartridges

Product	£Price	Comments	Arm effective mass (g)	Output	MM	MC	Issue No.
▲▲ Arcam C77	30	A+ A sensible moving magnet package with good bounce at a competitive price	6-16	N	•		48
▲▲ Arcam C77Mg	40	A 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	A 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	A+ 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	E One of the best, giving 'an extraordinarily relaxing midrange clarity', needs a transformer	8-18	VL		•	100
▲ Audio-Technica ART1	850	VG This is a delicate and very fluid-sounding MC that tracks well, offers very low distortion and exceptionally good separation	9-18	L		•	72

Turntables – cartridges continued

Product	£Price	Comments	Arm effective mass (g)	Output	MM	MC	Issue No.
▲ Audio-Technica AT-420E	36	A 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	A Clear, dynamic if richly balanced, the magnetic '95E is a definite Best Buy	8-14	N	•		48
▲ Audio-Technica OC-10	320	G+ Good treble and good detail too, but some congestion and coloration reduces its informativeness.	4-12	L		•	103
▲ Audio-Technica OC-5	130	G 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	G+ Slight harshness detracted from the performance of this otherwise clear-sounding and detailed cartridge	8-16	L		•	84
Audioquest AQ 7000	1300	G+ 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	A Offers high-output benefits but the drooping frequency response and severe VTA error preclude recommendation	10-20	N		•	54
Denon DL103	99	A+ 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	G 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	G 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	VG Uncolored, detailed, neutral, superb tracking; top notch altogether, and a top notch bargain too.	4-12	L		•	103
▲ Dynavector 17D2	298	VG Clear, detailed, neutral and generally very informative - excellent	6-18	L		•	91
▲ Dynavector DV-50X	110	A A high-output MC model with impressive lab performance, but whose tip and sound quality both disappointed	6-14	N		•	48
▲ Dynavector DV10X IV	138	A+ Fine sounding and realistically priced, damping is recommended to ensure successful tracking ability	8-18	N		•	48
Dynavector DV23RS	245	G Sound quality was described as "shut-in", lacking energy and sparkle but with some "edginess" in high frequencies	10-22	L		•	28
Dynavector XX-1	698	G+ Good, but not immensely competitive at the price, and not helped by comparison with the low output version	7-15	N		•	84
▲ Dynavector XX-1L	698	VG 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	G 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	G 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	G+ Offers a warmer and very transparent account of the music. Its tracking prowess is slightly limited	5-12	L		•	72
Glanz GMC-10LX	80	A+ 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	G+ Very good tracking, smooth sound and good detail. Very slight surface noise enhancement	5-10	L		•	91
▲ Goldring 1012	50	G Slightly harsh sound but plenty of life and quite good detail. Some very high frequency coloration apparent	6-12	N	•		85
▲ Goldring 1022	70	G 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	G Not terribly subtle, and not such good value alongside 1012 and 1022. Quite lively, though	7-12	N	•		91
▲ Goldring Elan	20	A 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	G 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	A+ An excellent budget choice though the limitations of the stylus are rather obvious at higher frequencies	5-12	N	•		67
Goldring Eroica H	100	G- More confused and coloured than low-output LX, high output less of an issue these days	8-15	N		•	84
▲ Goldring Eroica LX	100	G Not the most subtle cartridge in the world; can sound edgy at times, but lively and informative	8-14	L		•	84
Goldring Excel	549	G 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	G+ 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	A Bass and treble are a trifle coloured but the midband proved highly enjoyable. Ideal for budget systems	6-13	N	•		54
Kiseki Blackheart	1995	G 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	G+ Good bass and imaging, but hints of spit and coloration let the side down slightly	8-15	L		•	84
Kiseki Lapis Lazuli	5000	G+ 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	G+ 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	A+ Not as crisply focused as the costlier Linn magnetics, the K5 offers a smoother presentation	7-16	N	•		67
▲▲ Linn K9	98	G 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	A+ Now manufactured under the London brand name this Decca cartridge is as iconoclastic as ever	9-20	N	•		67
London Super Gold	339	A- Immediate and detailed, but very coloured, very nonlinear and questionable effect on records. Devotees swear by it	9-15	N	•		84
▲ Militek Aurora	299	G+ An overall feeling of relaxed ease characterised this clear and atmospheric Kiseki-built cartridge	8-16	N		•	Col
▲ Militek Olympia	349	G+ Warm and detailed sound packs the punch of the best MCs with high output as a bonus	12-20	N		•	54
▲ Nagaoka MM4	9	A- Clear punchy sound that delivers the rudiments of a good performance	6-16	N	•		54
▲ Nagaoka MP10	19	A 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	G+ For the price, a good blend of virtues weight, clarity and neutrality.	3-11	N	•		85
▲ Ortofon 520	50	A+ Very sensitive to load capacitance this new Ortofon maintains the company tradition for a lively, effervescent SQ	7-16	N	•		67
▲ Ortofon 530	80	G+ Very clean and assured sound; transients not quite perfectly pure but plenty of detail.	4-11	N	•		85
Ortofon 540	100	A 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	G "What a delightfully sweet-sounding cartridge this is . . ." we said	5-15	L		•	48

Turntables – cartridges continued

Product	EPrice	Comments	Arm effective mass (g)	Output	MM	MC	Issue No.
▲▲ Ortofon MC15 Super	100	G+ 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	G 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	E 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	G 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	G Lively, quite detailed, and a touch bright, the Quartz has many qualities of the much dearer Quasar	3-12	L		•	91
▲ Ortofon Quasar	350	G+ Many of the qualities of the MC3000, although a touch bright. Good detail and delicacy	8-15	L		•	84
Ortofon Quattro	210	G+ Undoubtedly a competent performer. Generally neutral, but can be edgy and bright in loud passages.	6-18	L		•	103
▲ Rega Bias	34	A+ 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	G 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	A 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	G Recognisably related to Corus Blue, but distinctly more civilised and smoother.	7-12	N	•		91
Roksan Corus Blue	75	G Roksan-specified modified Goldring 1012; slight harshness detracts from otherwise good sound.	7-12	N	•		91
Shure M110HE	67	A 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	A Though lacking depth, the overall sound quality was competent, but treble was not its forte	10-15	N	•		43
Shure ME75ED	27	A- Rather bright and splashy in the high frequencies but nevertheless a competent model	5-10	N	•		38
▲ Shure ME97HE	55	A+ 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	A+ 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	G+ 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	G+ 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	G+ 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	G+ 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	G+ If woody midrange coloration could be tamed, the excellent imaging and admirable security would make it excellent	7-15	L		•	103



Turntables

The schizophrenic split between consumer electronics and 'real hi-fi' is most obvious amongst turntables. The former are supplied simply as a means of playing vinyl in a system context. Cheaply manufactured in the Far East, these are complete 'record players' with a variety of automatic facilities, sometimes tied into a system remote control. But engineering compromises usually severely limit sound quality, cartridge choice may be restricted, and nowadays such machines are on the decline.

Specialist turntables offer big sound quality improvements, but lack so-called convenience

features (that practiced users often find irksome). Such turntables at the cheaper end of the market (sub-£350) tend to be supplied with matching tonearm, and often include a 'starter' cartridge.

Still better quality is found at higher prices amongst the separate motor units and tonearms. Careful partnering and set-up is essential for these components, but 'naturally sympathetic' combinations exist, and a good dealer can help.

Listed separately as integrated players and as motor units and tonearms, our sound quality rating is based on results achieved using a high quality system – but in point of fact the deck is usually

the limiting factor soundwise in any system.

The tonearm's physical characteristics also define a range of compatible cartridges. See the Cartridges intro for an explanation.

It is generally unwise to fit an expensive tonearm to a cheaper turntable. Although there are a few exceptions, such a match often shows up the failings of the turntable.

Certain turntable/tonearm combinations are not recommended, for a variety of reasons. It is best to seek the advice of the manufacturer, importer or a specialist dealer before spending indiscriminately.

Turntables – integrated

Product	EPrice	Comments	Arm effective mass (g)	Suspended subchassis	Manual Cartridge	Automatic Cartridge	Electronic PSU Belt drive	Issue No.
▲ Alphason Sonata/HR100S MCS	1785	G+ 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	A 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	A Consistent sounding and well isolated turntable. It is slightly lacking in balls, but compensates with a consistently unmuddled				•	•	103
Dual CS-750	330	A- Attractive but lazy performance from a deck with many good ideas and which is a pleasure to use. 78rpm facility				•	•	103
▲ Dual CS430	120	A- Ragged, sometimes unpleasant cartridge mixes with a modest pleasing player in a very sharply priced package	5			•	•	67
▲ Kuzma Stabi/Stogi Reference	2000	G+ 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	A+ 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	A+ 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	G 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	G+ 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	G Poor lab results but midrange and treble are very pure and clean; idiosyncratic sound and styling should be tried!	10		•		•	91
▲▲ Rega Planar 3	250	G 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	G- Quite lively and detailed but not the strongest on subtlety, with slightly lumpy bass. Motor breakthrough audible	12	•	•		•	91
Revox B291	1003	A- Subjective bandwidth is narrow and the music lacks grace and energy. Ease of use however is unrivalled				•		55
▲ Roksan Radius/Tabriz zi	740	G 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	G At its optimum with a relatively inexpensive arm/cartridge unless upgrade to full Xerxes is contemplated. XPSII PSU	9		•		•	103
▲ Roksan Xerxes/Artemis/Artaxerxes	2114	E 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	A- 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	A As with the QD33 though better value. P-mount cartridge	7.5		•		•	48
▲ Technics SL-QD33	180	A 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

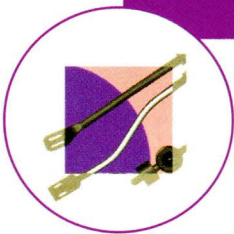
Turntables – integrated continued

Product	£Price	Comments	Suspended subchassis	Arm effective mass (g)	Manual	Automatic	Cartridge	Belt drive	Electronic PSU	Issue No.
▲ Technics SLBD-22	130	A- 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	G Excellent middle ranking esoterica, with strong all round abilities rather than excellence in particular areas			•	•			•	103
▲▲ Thorens TD166 VMUK/RB250	280	A- Refined and articulate sound with well focused imagery, suitable for use with good MM and budget MC cartridges		11.5	•	•			•	103
Thorens TD2001	650	G- Similar to TD320 but much dearer - why? Sound is comfortable but not very detailed		15	•		•		•	91
▲ Voyd Reference	5950	E 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	G+ Intriguing/challenging design. Musically it is not ideal, but has a limpid quality and a lack of artificiality that sets standards		7.5	•				•	67

Motor units

Product	£Price	Comments	Suspended subchassis	Solid plinth	Belt drive	Electronic PSU	Issue No.	
▲ Michell Gyrodec	697	G Sweet and natural sounding player, well suited to Rega RB300. Aesthetics, and the acres of clear acrylic are very distinctive		•		•	•	55
▲ Michell Syncro	325	G 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	G- Rather coarse sound lacking resolving power - but lively sound may appeal. Industrial appearance		•		•	•	79
Origin Live Oasis B	199	A+ Not very beautiful but lively and articulate, if idiosyncratic, sound will please some. Sensitive to feedback. 33 only			•	•	•	79
▲ Pink Triangle Anniversary	1495	E Possibly the most detailed, clear and neutral deck around. Likeness to master tape is uncanny		•		•	•	91
▲ Pink Triangle Export	890	E The PT T00 with built in PS. Retains features of great transparency and neutrality. Review sample had highish motor noise		•		•	•	91
▲ Pink Triangle Little Pink Thing	500	G+ Semi suspended, leads the field for clarity and neutrality at the price. It also looks good. Excellent value				•	•	79
Revolver	200	A Nicely balanced, but unimpressive timing and lightweight bass made this deck rather average for the price			•	•	•	48
▲▲ Systemdek IIX/900	230	G A high performance budget turntable which is particularly strong at fine detail resolution and imagery		•		•	•	103
▲ Systemdek IIXE/900AP	388	G+ 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	E Halfway between standard and Reference Voyds with the latter's platter and bearing. Superb finish, colourful and dynamic sound		•		•	•	72
▲ Voyd Valdi	955	VG Acrylic plattered twin motor deck is remarkably capable, revealing and neutral, for dynamics it's hard to beat at the price		•		•	•	79

Tonearms



Of all the components in the hi-fi chain, only the tonearm offers the enthusiast hands-on adjustment that can dramatically alter the sound of the system. It is also the part of the system that benefits most from good engineering — something that is increasingly costly in our mass-produced world.

There are a number of different tonearm types, but all fall into two basic categories. The vast majority are hinged at a single pivot, but a handful of upmarket models feature parallel tracking bearings (sometimes called radial or tangential).

Pivoted designs fall into two sub-divisions:

those with 'rigid' (force-loaded) bearings and mass-loaded unipivots, both of which involve some compromise in lateral tracking angle geometry and require bias (sidethrust) compensation.

Parallel tracking arms avoid this effect, but the shifting bearing can pose problems for softly sprung subchassis turntables, and air bearing types need a supply of air pressure, usually from a fish-tank pump in another room.

In the past, most tonearms used detachable headshells, but this has fallen from grace as arm manufacturers began to understand the importance of structural integrity.

The effective mass of the tonearm is an

important guide to judge how well that arm will interface with any given cartridge to give good overall groove security. High compliance cartridges (many MM types) need low mass arms, and low compliance cartridges (many MC models) prefer more rigid higher effective mass arms. See the Cartridge section for more information.

All arms have some degree of adjustment, to allow for a variety of cartridges. Unfortunately, the Comments cannot list which tonearms and turntables match one another. It is crucial to get specialist advice in finding an arm that suits the turntable, otherwise the entire vinyl replay procedure will be severely compromised.

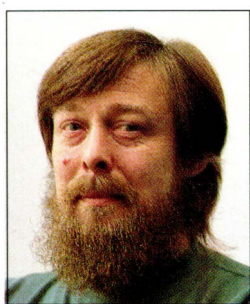
Tonearms

Product	£Price	Comments	Effective mass (g)	Height adjustment	Parallel tracking	Pivoted	Issue No.
▲ Airtangent 1B	3000	E A complex but superbly built arm for high quality systems, giving excellent stereo and resolution	7.5	•		•	60
▲ Alphason HR100S	490	VG S-shaped arm sounds smooth, but nevertheless reproduces transients with fine attack	10	•	•		C86
▲ Alphason Xenon	286	G+ Trimmed down HR100S, has inferior bearings and a simpler finish. Sounds crisp and coherent	12.8	•	•		55
▲ Audio Technica AT-1130	141	G Well suited to most cartridges. Smooth and tonally neutral, if slightly lacking 'balls'	8.5	•	•		67
▲ Kuzma Stogi Reference	1000	VG Large, solid and well made arm, gives exceptionally clear sound with just a hint of brightness	12	•	•		79
▲ Linn Ekos	1297	VG Superb, state of the art design which builds significantly on predecessor Ittok's strengths	9	•	•		67
▲▲ Moth arm	95	G+ The ultimate budget arm? Refined, detailed, sweet and natural	12		•		60
Naim Aro	780	G Unipivot designed for Linn LP12 and Troika, a little bright and congested but has a strong following	10.5	•	•		91
▲▲ Rega RB300	139	VG Despite its modest price it sets exceptional performance standards and could be used on many high end turntables	11.5		•		60
Roksan Artemiz	690	G Interesting design which worked a treat on the Xerxes deck. Fits Rega cut out	8	•	•		67
▲ Roksan Tabriz	190	G+ Targetted at the Xerxes, this is a good alternative to the Rega arms in many cases - a trifle bright	9	•	•		91
SME 3009 Series III	319	A+ Comprehensively adjustable and very well made - suited to higher compliance carts	5	•	•		48
SME 3009 Series IIIS	230	A+ A simplified less flexible (adjustment-wise) Series III with a similar 'soft' character	5	•	•		48
SME 3009R	424	A+ A higher mass version of the Series III designed for lower compliance carts	12	•	•		48
▲ SME 309	568	VG Beautifully made and finished, fully adjustable, a highly neutral performer	10	•	•		79
▲ SME Series IV	828	VG Superb engineering and finish with a finely balanced sound, impressive stereo focus and low coloration	10.5	•	•		60
▲ SME Series V	1232	E Excellent in all respects, this arm arguably sets the standard for pivoted arms regardless of price	10.5	•	•		60

No more Messing — Paul's back

The extremely observant among you may have already picked up on a subtle but significant change in the *Hi-Fi Choice* staffing arrangements. For those who've missed it I'll come clean and admit I've been talked into embarking on my third spell in the editorial chair, following — the very persuasive — Andy Benham's elevation to Publisher.

Before you bill this change as the 'Revenge of the Old Lags', I should point out that I shall be continuing with most of my freelance writing activities, such as this column and the loudspeaker reviews. I've also talked Andy into continuing his monthly *Menu* piece,



Paul Messenger returns to take the helm of *Choice* while battling along the AV learning curve.

now under the infinitely more appropriate title *Gut Feelings*. So not much has really happened at all — except for the complete redesign, you'll already have encountered, and the production of our AV-oriented sister magazine *Home Entertainment* (second issue now out).

One implication is of course that this column becomes by definition The Editorial, though I don't really plan to treat it as such — any more than I have to, that is. But before moving on to my normal rambling peregrinations, I should draw attention to the redesign and the hard work put in by Art Editor Andy Ryan in particular,

but everyone in general. We hope you like the results, and would appreciate post or fax feedback. I'm particularly pleased with the way we've managed to retain our traditional high tech reviewing standards while making the end result more accessible to the less technical reader.

The Lexicon of love?

Such formalities over, I shall return to my current hi-fi preoccupation all about the vexed question of whether a fully accredited hi-fi nut like yours truly can expand an audiophile standard hi-fi system to embrace the new surround sound capabilities and multi-channel processing of AV feature film home cinema, without throwing away the stereophonic music capability I've worked so hard to achieve.

I say vexed because I don't think anyone (not even Dolby Labs) has got this whole home cinema thing anywhere near worked out yet. Having recently jumped in at the deep end myself, I'm already

pondering rather more questions than answers.

My column last month discussed the problem of trying to integrate a small centre-front dialogue speaker with large and very different main stereo speakers. I've discovered Alvin Gold has been running into similar difficulties with other combinations and is travelling along a similarly hyperbolic learning curve. One of his tentative findings is that the best overall soundfield homogeneity is achieved when the various loudspeaker distribution characteristics are similar, especially for the three channels across the front. This strikes a chord with both my own experience, and perhaps with B&O's recent multi-channel system launch — but it flies right in the face of received wisdom from home cinema pacesetters Dolby and Lucasfilm. Some learning curve.

More surprising was the very obvious improvement (in front soundstage integration and coherence) I found after changing from the Lexicon CP3 to Harman Kardon's AVP1 processor unit. But I'm still not sure whether to blame the Lexicon for this, or to praise it for revealing inherent integration difficulties in a decidedly ad hoc system.

This Lexicon processor is a most intriguing device. It costs three grand, needs three extra stereo power amps and was reportedly delivering state of the art home cinema all over the recent Las Vegas show. I spent a day last Autumn being introduced to a quite extraordinary range of capabilities that go far beyond the movie-oriented Dolby Pro-Logic and Home THX functions, and include something most intriguing called Panorama which is expressly designed to enhance normal stereo programming.

Panorama's probably unique trick is to widen a normal stereo soundstage to something altogether more wraparound, a little like the headphone experience. The trick (and it's some trick) is done by cancelling the acoustic crosstalk between the normal stereo speaker pair, which is the consequence of the right ear hearing what the left speaker is up to and vice versa.

It's done by generating and adding carefully calculated 'pre-echo' signals, and the extraordinary thing is that it works pretty much as advertised, and does achieve a remarkable 'envelopment'.

But there is a catch, which won't be popular with one sector of audiophiles; in order to do the pre-echo trick, the main sound has to be delayed for just a fraction while the pre-echo is calculated and applied. As this is all done digitally, those wary of the sound of digital audio in general are not going to go for the CP3, which is — and sounds — digital squared.

However, those who can handle its resolutely digital nature should find the vast range of options, and the precision with which they are executed, a source of endless fascination and fun. But don't even try to mix it with the analogue high-end.



Thorens TD280/IV

Portfolio Marketing, 67 New Road, Little Kingshill,
Great Missenden, Bucks HP16 0EU. Tel: (0494) 890 277



The ever popular turntable manufacturer Thorens has redesigned the *TD280/UK/II* and given it an ingenious new name, the *TD280/IV*. I have no idea what happened to the *TD280/III* nor to the UK part of the name — perhaps in a unified Europe, a turntable that is country specific is no longer politically correct. I'm now waiting for the *TD280/Maastricht/IV*.

Cynicism aside, the £200 *TD280* capitalises upon the success of the *MkII* by improving the arm fitted to the turntable. The new *TP35* arm sports an improved geometry over its predecessor, together with a considerably more rigid metal bearing block and tonearm base. Aside from all the conventional movements common to such arms, this one is capable of adjustments to the cartridge in the horizontal plane as well as the vertical, by physically shifting the counterweight assembly.

In the rather Germanic English of the manual, it suggests that turntables supplied fitted with cartridges will be set up beforehand. In this country at least, the *TD280/IV* is supplied with an Audio Technica *AT-95E* as an optional extra. I would suggest that if you are feeling particularly tweaky, resetting the tonearm is a worthwhile exercise, as it makes a great difference to the sound quality. The addition of the new arm gives the Thorens more potential for fine tuning, yet without compromising its convenience.

There are also substantial improvements to the turntable itself. Aside from the thicker lid, Thorens has radically modified the *TD280/IV* by changing over to an inverted main bearing, in the style of the up-market manufacturers Roksan and Pink Triangle among others. The split phase power supply provided with the *TD280/IV* is normally seen in

turntables far beyond this price band, and shows an attention to quality rare at this level.

Although in hi-fi circles, the *TD280/IV* could be considered a budget design, its build quality never discloses this fact and is beyond criticism. The standard of finish is very high, bettering many more expensive 'audiophile' designs. Thorens has attempted to keep the automatic arm lift as noiseless as possible.

Automatic arm lift arrangements have fallen from grace in purist hi-fi circles, yet outside of the cognoscenti, this is often a major selling point in budget tables — finding one that makes no clunking noises is an obvious plus point.

Sound quality

Following the trend set by its predecessor, the *TD280/IV* is an expressive beastie. It communicates detail, especially treble detail, with plenty of drive and speed. Performances are always hewn into 'edge of the seat' stuff and this is the Thorens' greatest asset, yet at the same time its major downfall. While the fast, punchy presentation is very impressive — reminiscent of the Roksan *Xerxes* — the compromises made in a low cost turntable manifest themselves in a rather scratchy top end.

I feel that the overall balance of the turntable suits those who like their music lively and exciting, rather than mellow and laid back. The unrelenting nature of the turntable is, well, unrelenting. And although this means that it can make sense of surprisingly difficult music, the *TD280/IV* can also be hard to sit in front of for long periods of time.

Also, the standard choice of cartridge, an Audio Technica *AT-95E*, capitalises on this

sheer detail. With the wrong disc (Zodiac Mindwarp's *Prime Mover* sticks in my mind here), the combination of *TD280/AT-95E* falls into strident brightness.

Changing from the Audio Technica to other cartridges showed up the tweakability of the turntable, as well as the ultimate limitations of the arm in particular. It is not the sort of arm that can readily support a decent moving coil cartridge, as it wasn't exactly over the moon with a Denon *DL-304*, but then only fools and reviewers use £200 cartridges on £200 turntables. I wouldn't look any further than a Roksan *Corus Black* or a Goldring *1042* to use in the *TD280*. With judicious arm adjustment, such cartridges go a good way towards ameliorating the brightness inherent in the turntable.

It was suggested that in the past, *TD280s* have suffered from instability of pitch. The latest Thorens appears remarkably pitch stable by comparison. It will not stand up to the likes of a Linn *LP12* with *Lingo* power supply, or even that of the cheaper Linn *Basik*, but the *TD280's* rhythmic abilities are up there with the best in its class. In my system, I detected a static crackle each time a record was removed from the platter which could well be a fault of my system, but I have encountered this on very few occasions before.

Looking back at the review of the previous *TD280/UK/II*, in issue 103, it was suggested that the improvements to the previous turntable helped lighten the sound while maximising the imaging and detailing properties, although it still lacked authority, stereo depth and focus. I feel that the inclusion of the inverted bearing does much to address the imaging properties, as the soundstage has tangible image depth and good stereo focus. It still lacks some ultimate solidity and weight to the sound, but the lightweight character will go unnoticed on a small loudspeaker.

What does not go unnoticed is the way in which the bass notes can blur together into an amorphous whole, but this is still small beer, when compared to the overall performance.

Conclusion

The *TD280* was a Best Buy in its previous guise and the *Mk IV* version does nothing to countermand that label. Although there are a few turntables that are as well built for the price I can think of no other that is as complete.

Perhaps a little rough edged and relentless, its clarity and excitement makes music full of sound and fury. I'm still not convinced by the new arm, but it offers a level of tweakability not normally associated with semi automatic arms. Besides, at £200 for the package, who's complaining?

MISSION

because...

