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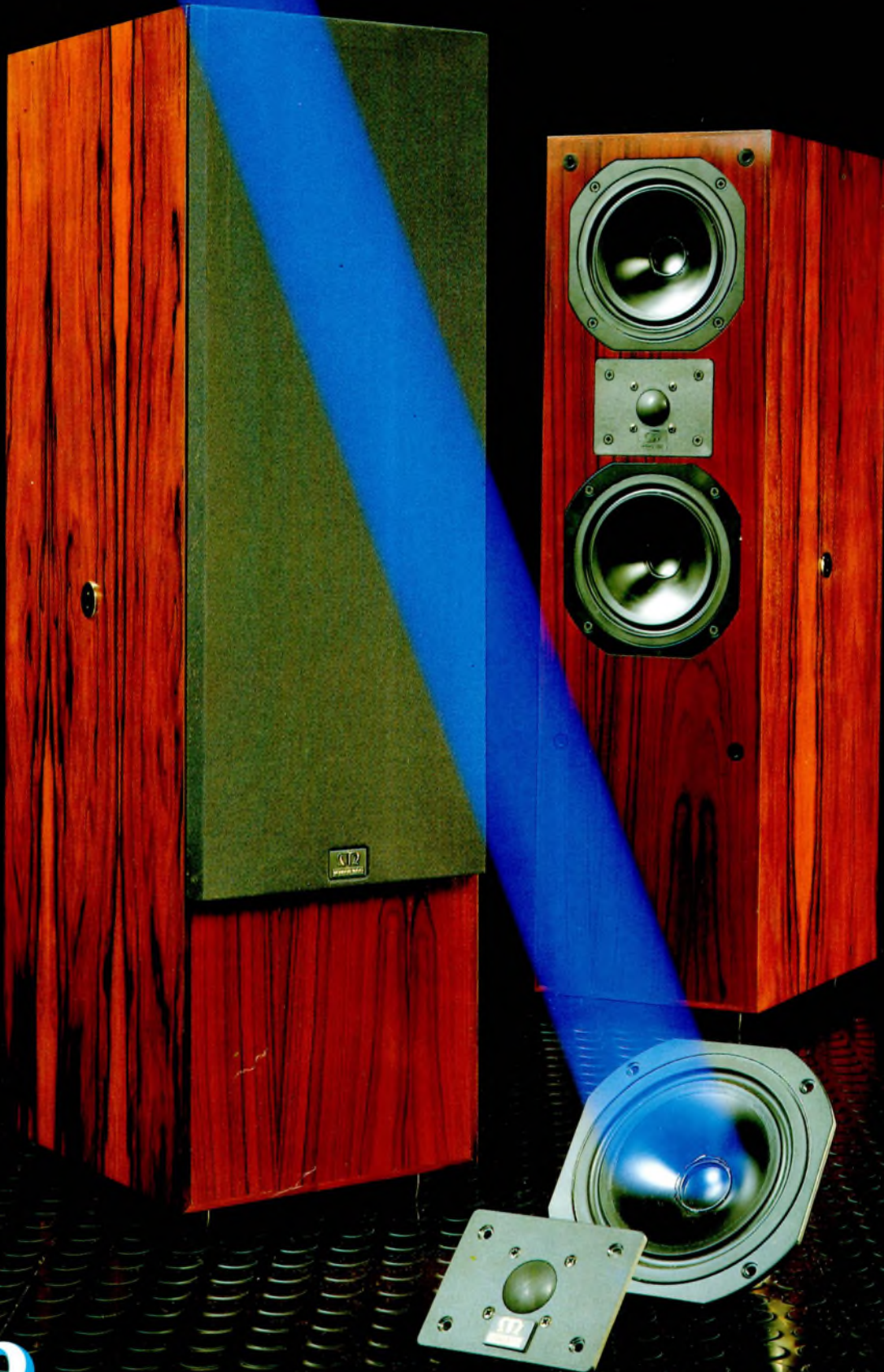
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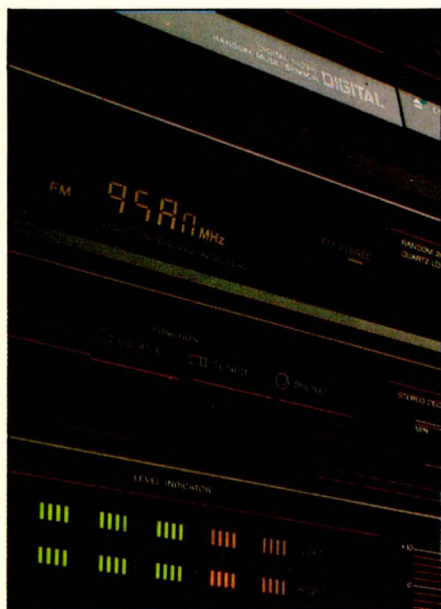
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# HI-FI CHOICE

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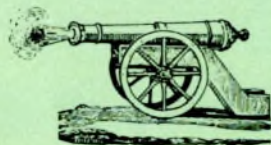
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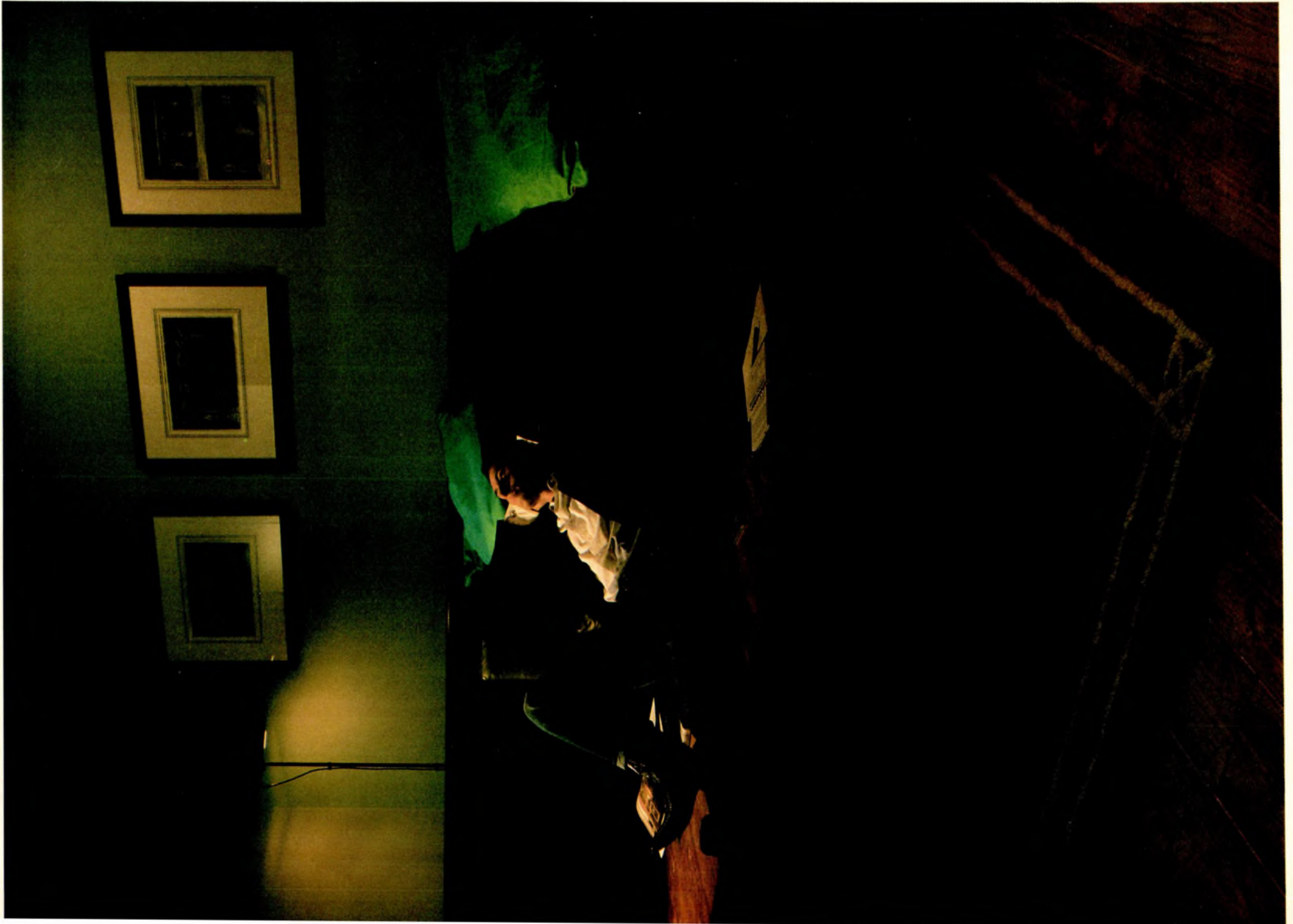
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“... the DCD-1700 possessed a marvellous sense of openness and immediacy that revealed the innermost subtleties without stripping the music of its essential warmth and delicate timbres.” *(Paul Miller, Which Compact Disc Sept 87)*

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## PRODUCTS

### NEW BABY FOR MARANTZ

Marantz Audio have announced the birth of their new 3-head cassette deck, the £349 *SD55*. Styled with rosewood end panels to match their *PM 94* integrated amplifier and *CD94* compact disc player, the *SD55* incorporates many features. Apart from 3-head off-tape monitoring, there is a 2-motor logic transport, Dolby B, C and *HX Pro* (Headroom Extension), bias fine tuning and microprocessor controlled programme search and intro scan.

### HITACHI'S OPUS 2

Hitachi's long promised new slimline compact disc system, the £699 *Opus 2*, has finally reached the shops.

Similar to *Opus 1* which is still available, this model has the extra features of infra red remote control, twin cassette with high speed dubbing, a 2 x 50Watt amplifier RMS and five band graphic equaliser. The desk-top style system comes complete with speakers and is available in black or white.

### BRACE OF DENONS FOR CHRISTMAS?

Hayden Laboratories have announced two new Denon CD players to replace the *DCD500/700* and *900* players. The £300 *DCD 800* is a 16-bit four times oversampling remote control model with dual power supplies, a highly rigid bottom plate, a floating sub-chassis pickup mechanism and 20-track programmable memory. There is also an auto edit function which allows the recordist to select correct tape length to avoid cutting tracks in half when copying. The facility selects the track in the middle of the disc and displays the playing times of the two halves.

The £250 *DCD 600* is a 16-bit two times oversampling player which also comes with remote control, and includes several of the other features of the *800*. Both players are full width, come in the usual black finish and are in the shops now.



*In full view for Yuletide: the new cassette deck from Marantz.*

### NIPPON GAKKI = YAMAHA

Yamaha's latest 3-head mid-price *KX-800* cassette deck sells for £330. The many features include 28-key remote control unit, independent record playback and erase heads, Dolby B, C and *HX Pro*, and Yamaha's ORBIT (Optimum Recording Bias Tuning) which allows critical bias level adjustment for individual tape characteristics.

Celebrating the 100th birthday of the Yamaha name, their parent company is dropping their Nippon Gakki tag in favour of the Yamaha Corporation.

### ACOUSTIC ENERGY'S SPRINGBOARD

London based loudspeaker manufacturer Acoustic Energy have launched their company name into the market with an

apparently diminutive, twin-ported loudspeaker called the *AE1*. Despite small dimensions [29.5 x 18 x 25.5cm (h x w x d)] it weighs a solid ten kilos and a 200 watt power rating, with specs claiming a useable frequency response from 35Hz to 30kHz. To achieve a low LF rolloff in a small box requires a tradeoff with sensitivity, at a lower than average 84dB/W.

Both the 5-inch bass/mid and 1-inch high frequency units employ metal diaphragms and edge-wound ribbon voice coils, the larger driver using a three layer alloy sandwich construction. Bi-wiring is available at very little extra cost as a simple modification which also takes the crossover out of the speaker for further decreased resonance.

Designed by Phil Jones, who has used a background in electronics and music production to produce his state-of-the-art speaker, AE also hope to introduce other loudspeakers in the Spring.

The *AE1* is priced at £695 and aimed at both the professional and home markets; it should be in the shops by Xmas. For further details contact: Acoustic Energy Ltd, 3a Alexandria Road, London W13 0NP. Tel: (01) 840 6305.



*"Play Misty for me" - a little hot-box from Acoustic Energy.*



*Enough features to fill a stocking. Denon's new CD player, the DCD 800.*

### MORE CONTROL

Harman Audio UK Ltd lit the blue touch paper to launch their new JBL *Control Five* loudspeaker in London on November 5. The £279/pair *Five* is the new addition to the Control Series and is cited as the 'big brother' to the popular *Control One*. It measures 15 x 10 x 9 inches and Harman say it is capable of handling up to 175W with a flat frequency response from 75Hz to 20kHz.

Specifically developed drive units include a one-inch titanium tweeter, while the six-and-a-half inch bass driver has been designed for low distortion even at very high levels. These sit in a structurally strong dense polypropylene moulded cabinet which has raked sides to allow flexibility of positioning. *Control Five* is designed with a wide range of mounting positions in mind (presumably to cater for the retail and pub trade), with wall and ceiling brackets, a rack mount, stand mount and tripod.

## PHILIPS GET BACK INTO SEPARATES

A new range of Philips separates will be available in the Spring (March). The electronics giant is introducing four amplifiers, two cassette players, a tuner and three speaker models to complement its new compact disc player range. Details such as gold plated CD and phono inputs, split power supplies and separate heatsinks feature the two more expensive *FA860* and *FA960* models. The \$299 *FA960* boasts 2 x 115 W (IEC) power output while the \$249 *FA860* has 2 x 70 W (IEC). The \$169 *FA568* is equipped with CTV and VCR inputs and therefore suitable as an audio visual control unit, while the \$119 *FA561* is the budget starter. The solitary \$129 *FT565* FM/AM tuner has 24 station memory and digital format.



Philips return to separates next spring.



## AKTIV ACTION

Linn Products' much demonstrated and exhibited active drive *Isobarik* system is now finally in production and should be available from and audible in a limited number of dealers by the time this issue appears. The current passive/active DMS/PMS *Isobarik* variants are now replaced by a single convertible version.

The new component that gets it off the ground is the \$800 *Aktiv*, an electronic crossover 'black box'

The *FC566* and *FC567* cassette decks are both electronic auto-reverse solenoid types with index scan, quick music search (QMS), skip and Dolby B and C. The \$259 double deck '567 does a bit more besides, offering optional remote control, high and normal speed dubbing, microphone mixing for playback and dubbing, and simultaneous recording with both decks (the bootleg mode). The cheaper single transport *FC566* will cost \$179.

Three new loudspeakers will be marketed under the 'Digital World Series' title. Top of the range is the \$219 *FB 565* with an eight-inch ABR and eight-inch woofer, one-inch dome midrange and three quarter inch supertweeter. PTC power absorption protects against overload. The \$169 *FB563* uses the same woofer, midrange and supertweeter as above, omitting the ABR. The budget model is the \$119 *FB561* with an eight-inch woofer and one-inch tweeter.

with filter and equalisation characteristics that are precisely tailored to the inherent characteristics of the *Isobarik* drive units. Besides apportioning the right parts of the frequency spectrum to the respective drivers, *Aktiv* also compensates by equalising (!) amplitude, phase and time responses. Though factory pre-set to the 'most likely' balance, fine gain adjustment to individual frequency bands allows some tailoring to the specific site and system.

## ANOTHER MAXWELL HOUSE

Sir Robert Maxwell, the publishing tycoon, has spent \$24 million to acquire a majority holding in Nimbus Records – Britain's foremost producer of compact discs.

The deal, which was signed on November 3, will allow Nimbus to maintain investment into research and electronic publishing – particularly with CD-ROM (Read Only Memory). The company envisages CD-ROM being increasingly used as a data storage system by libraries and firms.

The launch of CD-ROM and its consumer CD-I equivalent, and the ensuing potential for CD users who may want to keep a dictionary or encyclopaedia at home for example, has been something of a wet-rag affair so far – formats looking for applications perhaps. Nimbus optimistically predict the medium will take off in general use next year.

## FBA AGM

Assembled for their November AGM, FBA members seemed in a confident mood (the term bullish now being decidedly unfashionable). The Federation represents the majority of UK specialist hi-fi manufacturers (including OEM suppliers), and a broad consensus view indicated that the industry's current overall annual growth rate was around 20 per cent.

Much of the discussions centred around the thorny question of FBA-sponsored exhibitions, the collective face of the Federation having attracted its fair share of yolk and albumen in the past. A likely possibility that many companies are considering is the BBC Radio Show, to be held next September/October at London's Earls Court.

## SWINGS AND ROUNDABOUTS

There was some private nervousness that the recent stockmarket slides would damage sales, though most felt it would only affect the very expensive end of the market.

It would also appear to affect some areas of the country rather than others. The North of England seems to be hi-fi's healthiest patch at present – Cheshire's Aston Audio has sold the first two UK pairs of \$8,000 *Apogee Divas*, plus a set of Krell *Reference* amplifiers. Meanwhile, one dealer serving

stockbroking communities reportedly turned back his large regular consignment of luxury consumer electronics recently.

Potentially more serious for UK manufacturers is the drop in the value of the dollar, which is bound to hit either price competitiveness or profitability in this major export market, and which could also presage a degree of recession in the US economy. KEF chairman Peter Gaskarth seemed unworried, however, and commented that they would have transatlantic assembly capability within nine months which could help cushion currency swings.

What may make life a little tougher for exporters can also provide either windfall profits or improved competitiveness for dollar zone importers. Agents bringing US exotica to the UK should be sitting fairly comfortably at the moment, probably ruminating on whether or not to pass on the savings in view of their high end vulnerability to recession.

At the other end of the scale, dollar-linked Korea and Taiwan have yet another golden opportunity to improve competitiveness over Japan-sourced products still further. It is likely, for example, that Japanese tape brands (now often assembling in Europe) could join EEC producers in shouting 'foul' over alleged Korean tape dumping.

## LEVY DISCARDED

The blank tape industry is now smugly contemplating the recently published Copyright bill. Many man-years of PR and column miles of press coverage have accompanied the on/off saga threatening to impose a levy/tax on blank audio tape sales in order to compensate for presumed copyright theft.

Now it appears that the prospects of a levy are firmly back in the pending tray, though it's worth pointing out that the issue is something of a two-edged sword. The imposition of any new tax must be deployed on principle, if only for the hiccups and loopholes that are inevitably created (parallel importing etc.), but the benefit of a levy system is that it provides a degree of conscience salving authorisation for the practice of home taping.

It is no coincidence that the first European countries to receive their stocks of Sony DAT recorders are levy-bound France and Germany, the very existence of a levy helping defuse the antagonism of any anti-home-taping lobby. (Meanwhile Sony remain exceedingly shtumm regarding their UK DAT launch.)

## COMET GROWTH

Comet will shortly be expanding 50% by adding a hundred or so new outlets, following the sale by Harris Queensway of the Ultimate chain to Woolworth Holdings. Ironically, Comet was only bought by Woolworths a couple of years ago, after a tense takeover battle against HQ's rival bids.

## RETAIL TROUBLES

The beechwoods of England were particular sufferers in the recent hurricane, so the demise of Beechwood Audio, with branches in Bury St Edmunds and Braintree, is a particular irony. Though not trading long enough to qualify for full BADA membership, Beechwood were associates, so any outstanding guarantees are being honoured by The Audio File in Bishops Stortford. Locals might also note that The Audio File is holding a Linn Clinic early in December (check date/time on Tel 0279 506576).

Brighton outlet Melos, started by CARA moving spirit Gary Waugh, closed recently for a couple of weeks 'refurbishment'. It has now re-opened with Gary Ousted by Audio Innovations management, the company who had backed him in the first place and whose products were a feature of the shop.

## TECHNOLOGY

### STEREO TV SHAFTED

The BBC has dealt a savage and foul blow to the UK consumer electronics industry by announcing it is not now even considering broadcasting stereo sound with TV before 1991, though hitherto it has been encouraging CTV and VCR manufacturers to develop equipment ready for the market.

Test transmissions have been made from Crystal Palace for over two years, and all the hints pointed towards a regular service at least in the London area during 1988. Stereo sound TV has been available in Japan, Germany and the US for some years, so the BBC's NICAM system was already late in the day, though it offers some significant technical advantages (being digital and partly MAC-satellite compatible in format).

At the Trade Shows last May JVC gave some convincing demonstrations 'off air' using a VCR with on-board NICAM stereo decoding, for which they had already designed and developed chips and which they and J2T

partner Ferguson were planning to market in the new year. Stereo sound with TV is considered the vital next step in developing the consumer electronics marketplace, by providing a persuasive rationale for consumers to move towards combined Audio/Video hi-fi systems, and in turn promoting sales of hi-fi VCRs and stimulating such new media as CDVideo.

The BBC appears to have chosen to pillory stereo TV in retaliation for the government's recent decision to index-link license fee increases. Looked at in isolation and as irrevocable it seems a particularly spiteful and childish move designed to create the greatest harm to the country. Looked at as the first move in a political battle for increased funding to match increased services it makes an unpleasant sort of QUANGO sense. Let's hope the next few moves are not delayed too long. And let's hope the IBA (reportedly planning a limited area 1988 start-up) show a greater sense of public responsibility.

### OPTICAL RECORDING

The record-capable CD took another step closer to reality – and another step sideways from consumer audio applications – with the announcement from Philips and Sony of an agreed format for consumer applications, ready for licensing next year.

Though using 12cm discs and likely to be CD and CD-ROM compatible, the major system snag is that it is a non-erasable WORM (write once read many times), and as such is likely to have an even more limited appeal than DAT, while probably costing considerably more.

A 'domestic' WORM format is at least a step towards developing erasable re-recordable optical discs, towards which many companies are working. PA Technology of Cambridge have now jumped on the bandwagon by forming a European consortium to seek Esprit EC financing of £5-10m for research into magnetic-optical disc technology.

### RADIO 1

Wonderful or not, Radio 1 is now available on full permanent FM stereo to listeners able to pull in the Croydon transmitter operating on 104.8MHz. Now you can clearly hear the compressors, limiters and other less reputable tricks of the broadcast trade used with the insensitivity that has made the Station notorious – plus the one or two good bits now and again that seem to slip through the common denominator net.

## PRODUCTS

### CYRUS PHOENIX

Mission dealers were startled recently when they received notification that their accounts with the company were to be closed forthwith. (Mission in turn were startled when one major dealer, tongue firmly in cheek, requested they send a truck for the hundred or more sets of electronics and loudspeakers his shops currently held in stock.) In fact the excitement was merely the first shot in the launch campaign of an all new *Cyrus* range of amplifiers and tuner, part of which will involve refining and reducing the number of dealers handling *Cyrus* in the UK.

UK competitors can take a little heart from *Cyrus One's* £30 price rise to £180, but this is the only crumb of comfort. Other prices are being held, yet the new components are claimed to offer substantial improvements over

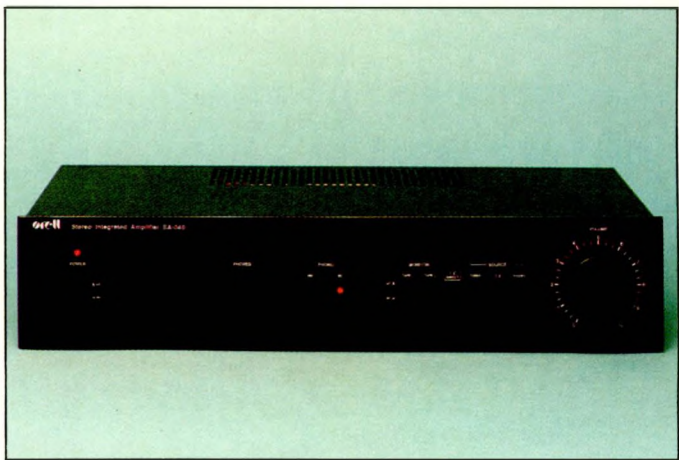
their predecessors both under and on the surface.

New tooling gives an attractive 'etched' fascia to the highest standards of finish, and extensive non-ferrous die-castings provide good mechanical and electrical characteristics while incorporating generous heatsinking. Extra features include a balance control and headphone socket plus an additional input. Extensive internal changes include uprated power transistors and better quality PCBs.

Full protection circuitry – described as 'entirely acoustically transparent' – should counter the fragility under abuse that was an Achilles heel of the original *Cyrus* range. Mission boss Farad Azima describes the sound of the new amplifiers as: "Kinder and warmer, but we believe equally precise", and claims that the revamping brings a new level of maturity both to the *Cyrus* concept and to 'audiophile' hi-fi products as a whole.



The new "kinder and warmer" *Cyrus*.



Future Champ or just another amp? Orell's new-year offering.

### NALTY ORELL

A new integrated amplifier, the launch product of Orell Electronics Ltd, is due to hit the market in the new year. The SA-040 was shown at the Heathrow Penta show in prototype form and will retail for £359. The SA-040 promises 45 watts per channel into 8 ohms and has five inputs including one

dedicated to CD plus switchable MM/MC.

Designed by Graham Nalty of DIY fame, Orell say there has been no compromise where build quality is concerned. Although not restricting outlets Orell still face stiff competition from the likes of the Mission *Cyrus 2* and Audiolab 8000A.

Orell Electronics Ltd, 25 Nathans Road, North Wembley, Middlesex. Tel: (01) 908 5890.



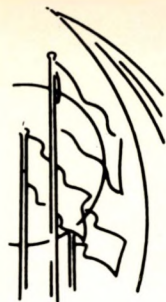
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# AND THE SHOW GOES ON . . .

*Edinburgh's new hi-fi show established itself firmly with much that glisters and some golden sounds. Jason Kennedy reports.*

**T**his year's Sound and Vision show was held in the Sheraton Hotel in not so sunny Edinburgh, but a bonny place nonetheless. The large modern building proved to be an excellent place for a show, the rooms being spacious enough for exhibitors to at least attempt to make good sounds. And most of the time it was possible to get into the rooms, with the exception of those run by Automation Sciences and Absolute Sounds with their illusory entry-by-ticket demonstrations.

Spread over six floors were representatives from the majority of the audio industry, including a few such as NEC who concentrated on the visual side of home entertainment. CD video seems to be taking hold, despite the diminutive amount of software available. The *Hi-Fi Choice* team now know the entire selection off by heart as they were situated next door to the Marantz room where this new medium was being pumped out eight hours of the day.

The search for new products started at the top of the building on the seventh floor where, directed by a mime artist, we finally found the Roksan room, at the end of a long corridor. The hike was worth it though, as they had a humdinger of a system in the form of the Roksan *Xerxes* turntable, *Darius* speakers, SME V arm, with the superb Ortofon MC3000 cartridge and active amplification from Omtec and Orange.

The only really new piece of equipment I could find on this floor was the Audio Research *SP 11 MkII* pre-amp. You've heard of the world's best pre-amp; here's an improvement on it, perhaps. The price doesn't seem to have increased dramatically and now stands at \$5,250, which is hardly a bargain.

In the Mission room there was, surprisingly, no sign of the new *Cyrus* range which is rumoured to be on its way, so taking the oversubscribed lift down a floor, I made my way through rarely kilted Scotsmen into the Presence room where some oddly-shaped new Spica speakers were making the most of an Omega *Point* turntable and the nicely finished YBA amplifiers. The speakers, dubbed *Angelus*, will retail for £1,195.



*The £292 SEE Revolver turntable with new 'Super' arm; on show for the first time.*



*New from QED was their Passive Control Centre - a six-input passive pre-amp being virtually given away at £79.*



*Cello's Etude, probably the world's most expensive passive pre-amp, imported by Automation Sciences and going (for that special song) at £1,000.*

Next stop, The Music Room (a Glasgow dealer), where the US imported Meitner amplifiers were being demonstrated. Consisting of a remote control pre-amp, the *PA 6* (£1,695), and either the stereo *STR 50* or monoblock *MTR 100* power amps at £970 and £1,895 a pair respectively, they could hardly be called cheap but were quite attractive and not too imposing. A&R had brought along their *Live Wire* cable range and meaty stuff it is too. It's made in the US by Audioquest, whose cartridges didn't seem to be in evidence, but are also being imported.

Ortofon were making some good sounds with their new £800 MC3000 cartridges, but apparently supplies are still pretty slow and even we couldn't get hold of one for review.

Another show first was the Revolver *Super* arm which is sold separately at £165 or with the deck for £292, a price increase

that takes it into *Axis* and *Mantra* territory. If nothing else, this must be the most colourful range of turntables on the market.

Yamaha were showing their Centenary edition 10,000 series system which was certainly very appealing with a brass and matt-silver theme, though still characteristically Japanese.

On the fifth floor JVC were showing off their new toy - the *XDZ 1100* (no not a new Michelin tyre) DAT machine. They'd brought it along to show that they had one too, but were going to sit on it until the time was right, whenever that may be . . .

Denon are not resting on their laurels and had a new 3-head cassette deck - the *DRM 24HX*, which will retail for £289 and features Dolby HX Pro and manual bias adjustment. They also had a couple of new CD players, the *DCD 600* and *DCD 800* - the latter featuring 4X oversampling.

Totally new to the country were some rather attractive French speakers called Microphase. Comprising very small two-way satellites at £240 a pair, with the option of separate subwoofers acting as supports for each unit, they are easily the most domestically acceptable speakers I have seen.

Jacob Zelinger's Automation Sciences dems were altering the Scottish concept of hi-fi with a similar set-up to that used at Penta, and I hear that Cello will soon be marketing a refined version of what used to be the Zarathustra turntable, but when it will hit these shores is not clear. Whether it will be affordable is a little more predictable - probably not.

Portfolio marketing had dedicated almost an entire room to their new Teac combined-CD player and cassette deck. This organises the tracks on CD so as to get the best fit on one side of a tape, avoiding having a track cut off half-way through. On static display were some new products from Proton, including separate pre- and power amps.

All in all it was a most enjoyable show thanks in no small part to the energetic team who organised the event. Perhaps they'll have it in the Summer next year so that I can get to see Edinburgh in a better light (*ie* sunlight).

A photograph of a wooden bookshelf. The top two shelves are empty, showing a dark brown wood grain. The bottom two shelves are filled with a large collection of compact discs (CDs), their spines creating a dense, colorful pattern. The lighting is warm and slightly dim, highlighting the texture of the wood and the edges of the CDs.

**Spend £250 on CD, and you'll  
Spend £250 on a cart**

When you have more than £150 to spend on a cartridge, you are into a new realm. The realm of the moving coil.

Unlike the moving magnet cartridge you are probably used to, in which magnets are attached to the cantilever, the cantilever of a moving coil has very fine metal coils wound round it. Which makes it much lighter and far more responsive to the transients cut into the grooves of a record.

As a result, a moving coil cartridge gives a much sharper, more clearly defined sound, with appreciably greater depth and spaciousness. It will also pick up the leading edges of the transients; the more detailed elements of the music that moving magnets can miss.

A moving coil is more expensive, because it demands more costly components and highly exacting engineering.

But it will not only make your records sound much better. It will actually reveal subtleties in the original recording, which you never knew existed. To say buying a moving coil cartridge is like getting a new record collection is no idle boast.

**FIRST THEN. FIRST NOW.** Back in 1948, Ortofon were the first people to produce moving coil cartridges. Prior to that, the company had spent many years using the same principle in the construction of state-of-the-art cutting heads.

This parallel between the manufacturing of records and their reproduction explains, in part, the superior accuracy of moving coil cartridges.

Since then, Ortofon have been consistently developing and refining them. The MC30 Super exemplifies how much progress has been made.

The stylus is the new FG Type 1, named after Fritz Gyger, the Swiss diamond manufacturers who are the only company in the world capable of cutting such a minute diamond with the necessary precision.

# need a new record collection. ridge and you'll have one.

Its shape has been designed to make contact with the walls of the groove, where musical information is embedded, without touching the bottom and picking up surface noise.

The aluminium cantilever is tapered, to eliminate standing vibrations which can start distorting sound at source. And the coils surrounding the cantilever are made from pure silver, one of the finest conductors known to science.

To get the best from such sensitive components, the cartridge body must combine minimum mass with maximum rigidity, to prevent resonance. To achieve this, the MC30 uses two aluminium extrusions, bolted together for extra rigidity, and a carbon fibre base-plate, to repel static.

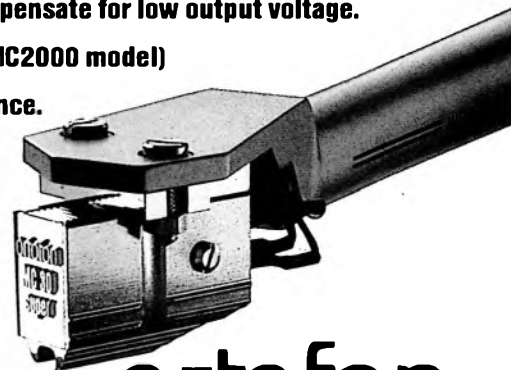
**HEARING IS BELIEVING.** While delivering superb sound reproduction, the MC30 Super also avoids a drawback traditionally associated with moving coil cartridges. Namely, the need for a step-up device to compensate for low output voltage.

A tiny, cross-shaped armature (originally developed for Ortofon's legendary MC2000 model) allows extra coil windings, without an increase in mass or any reduction in performance. And a more than adequate voltage output of  $>0.2\text{mV}$  at 1kHz.

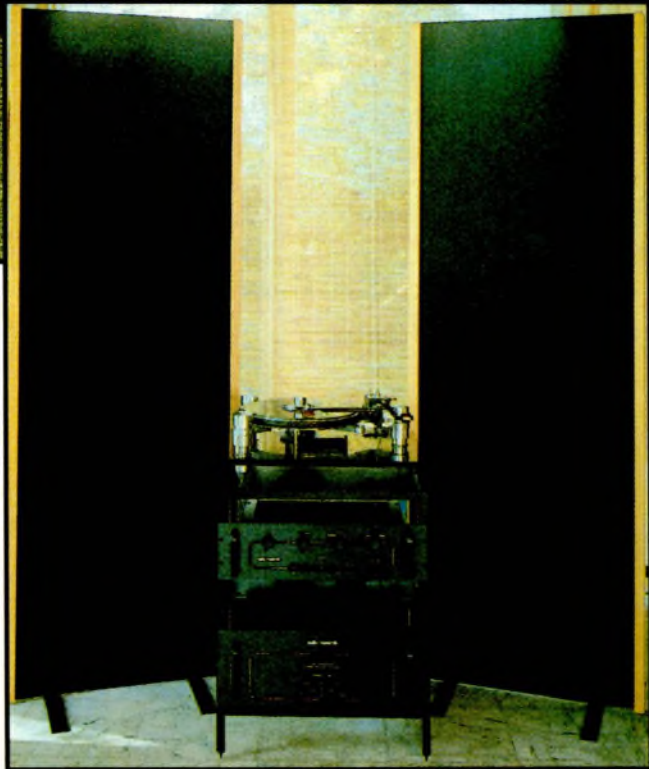
You can get full information on the MC30 Super and other models in Ortofon's moving coil range, by writing to: Ortofon (UK) Limited, Denmark House, Tavistock Industrial Estate, Ruscombe, Twyford, Berks RG10 9NJ.

But an even better idea might be to take your favourite album along to your nearest Ortofon dealer, and ask to hear it through an Ortofon moving coil cartridge.

The few minutes you spend doing so could make you think twice about spending years building up a new collection.



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## PART TWO

*Don't miss the chance of a lifetime competition. Ten thousand pounds worth of Absolute Sound esoterica, the short cut to audio nirvana, must be won!*

**H**ow long have you dreamed of owning the ultimate state-of-the-art hi-fi system? One that costs even more than your car!

Now's your chance to win such a prize in this *Hi-Fi Choice* competition. With the re-launch of the publication we are giving away the totally awesome system pictured opposite. Put together by high-end audio guru Ricardo Franassovici of Absolute Sounds, you know this one's going to be sensational!

The system comprises the following:  
Oracle *Delphi III* turntable  
SME *V* tonearm  
Koetsu *Black K* moving-coil cartridge

Audio Research *SP-9* valve/FET pre-amplifier

Audio Research *D-115* valve power amplifier  
Magneplanar *MG2.5* planar loudspeakers

*Alternatively*, fans of the parallel tracking arms and cone speakers can choose the Air-tangent tonearm and Sonus *Faber Electa* loudspeakers in place of the SME and Magneplanars. To be in the running to win this £10,000+ system, all you have to do is answer the five competition questions in this and the next two issues of *Hi-Fi Choice*, and send the completed forms to us. The first correct set of answers pulled out of the bag will win.

This month's questions are: 2  
1) Who designed Cello's Audio Suite?

2) What is unique about Decca cartridges?

3) Who is the connection between Lloyds of London, the Pompidou Centre and Linn Products?

4) What does Ry Cooder think of Texan women? "Love 'em right or ....."

5) Which esoteric cartridge, available in the UK, does not have a body?

### COMPETITION RULES

- 1) All entries must be on the entry forms provided. Photocopies will not be accepted and only one entry per reader will be considered. Entrants must submit completed entry forms for all three parts, in a single envelope. Incomplete entries will not be considered.
- 2) There is no cash or other alternative to the prize.
- 3) Employees of Dennis Publishing Ltd and associated companies, or their agents, or of the manufacturers and suppliers of the prize system components or their rela-

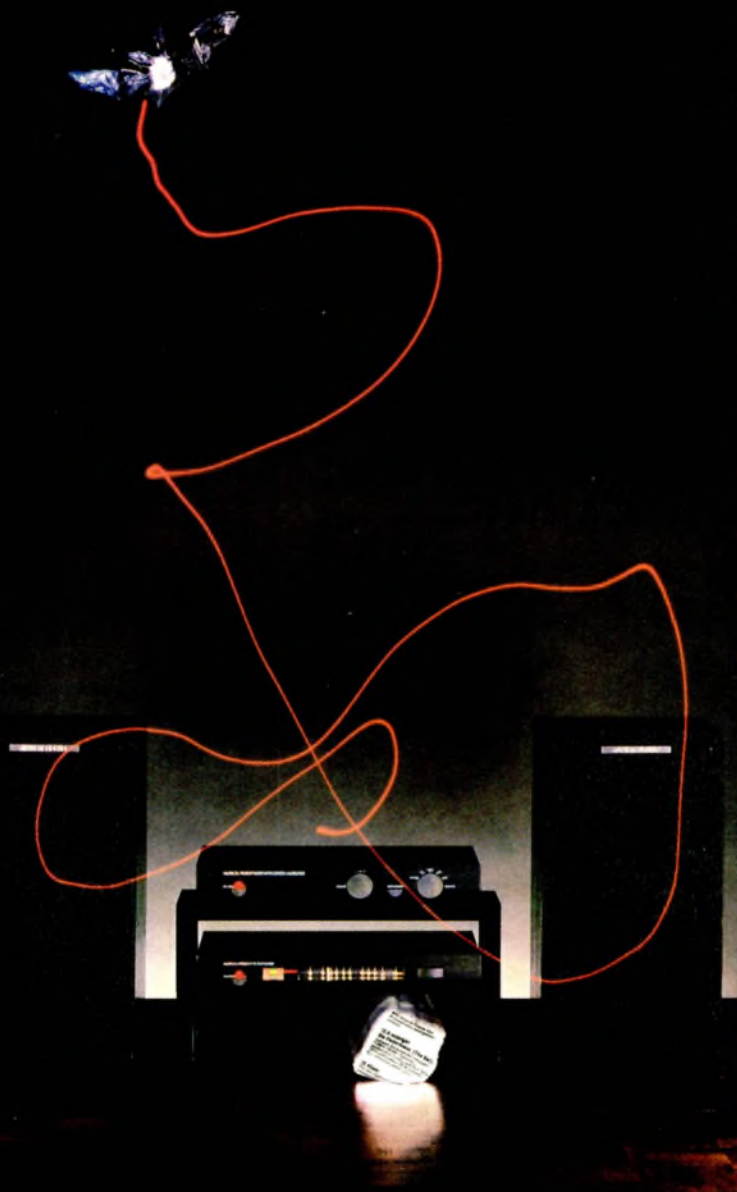
tives are not eligible to enter the competition.

- 4) The competition is not open to readers living outside the United Kingdom.
- 5) The main prize will be awarded for the first set of correct answers opened. The Editor's decision shall be final and binding. No correspondence whatsoever will be entered into regarding the competition.
- 6) All entries must be received by Friday, January 29, 1988. The winner will be notified by post and the results will be announced in the April 1988 issue.

*Please keep this entry form, along with Part One from last month (December) until you have completed Part Two (January issue) and Three (February issue) then send all three completed entry forms to:*

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MUSICAL FIDELITY



# READERS' WRITES CHOICE ANSWERS

## REFERENCE POINTS

The only fair way of evaluating vinyl record playing equipment (ie turntable, arm and cartridge offerings) is to compare the sound produced from a reference record to the sound of the master tape used to produce that record. Competing equipment can then be compared on the basis of which one gets closest to the master tape sound.

In issue 48 of *Choice* on front-end equipment I read with disbelief that comparisons were made to certain reference turntables that are well known to have specific colorations, and are far from accurate.

Test graphs for the Linn Sondek turntable and SME V arm were not even included in this edition and so I felt cheated. These graphs give disc impulse test results, developed by Moncrieff and shown to have a direct relationship to turntable sound accuracy. I read that test measurements were used to help 'weed out the wallies', so were largely ignored.

Readers of *Hi-Fi Choice* expect guidance on choosing equipment that improves the fidelity of sound produced from vinyl. I contend that by not using comparisons to master tape and disregarding test measurements your conclusions and recommendations will mislead the purchaser who wants improved fidelity. If this is the case then this edition will have done disservice to the Hi-Fi community, and may promote buying patterns which are unfair to some manufacturers and an advantage to others.

I can only hope equipment reviewers in future take a more responsible attitude towards readers and manufacturers. Surely record companies could provide quality records and master tapes to make valid judgements possible?

A C SEAFORD,  
FAREHAM, HANTS

*While I appreciate much of the validity of the points you raised, I assure you that we are aware of many of the factors which you*

*mention. For example, where you stress the importance of reference to live sound recordings, I can point to the unknown factor imposed by the microphone - a transducer which any recording engineer will affirm is quite as 'personal' as a loudspeaker.*

*Attempting to refer to copy masters can be just as fraught. The cutting engineer may have a cutting master to work from, but in practice he uses his knowledge, skill and experience to gain-ride, compress and limit to achieve the best vinyl 'fit' (in his opinion). Attempts to treat CD transfers as yardsticks have proved even less satisfactory. Reliable 'references' have a habit of showing their cracks the closer they are examined.*

*We have always rated neutrality as an important performance parameter in any hi-fi component, and I am convinced that our test programme is successful in revealing inadequacies in this respect even without formal mastertape comparisons. But this is not the only constituent that mars our attempts to strip away the veils which obscure recorded music.*

*We also regard our measured lab tests as crucial elements in the overall evaluation. In fact the performance of turntables, arms and cartridges is more susceptible to meaningful lab analysis than most other components, but experience has confirmed time and again the danger of relying only on lab results for evaluation. The 'weeding out of wallies' I referred to consists largely of identifying faulty review samples, so that products were not misjudged on the basis of inferior samples.*

*I regret some of the older measurements were withheld from edition 48. The ultimate restriction on space left the choice between leaving out complete individual reviews or the older test measurements, and on the basis that the tests had evolved particularly in*

*presentation since earlier editions, the reviews won.*

*Your reference to the Moncrieff test is interesting. In fact I have grave doubts as editor of the wisdom of including these graphs, because they are so difficult and misleading to interpret. They provide an interesting 'snapshot' of the disc/platter termination with some qualitative and quantitative information for the trained eye. But in fact the 'sonic signature' as such is only really revealed when the impulse is subjected to a Hilbert Transform to extract and reveal the frequency/amplitude content.*

*Ultimately, Hi-Fi Choice is something of a shoehorn job, trying to squeeze at least a litre into a pint pot with varying degrees of success. But I hope this is enough to show that we are at least aware of the points you raise.*

## BASS CULTURE

Having only a limited amount of money to spend at the time, and acting on your recommendation about two years ago, I bought a Toshiba 20 Rack System.

Considering I got it for £60 below list price, I have been very pleased with it. It is well-made and everything functions perfectly. But I am becoming increasingly aware of its shortcomings as outlined by you when you said: "records were reproduced with a bass-light rather shallow sound," and referring to the speakers: "they had a wooden bass feel and were unable to generate stereo-depth images".

Do you think a change of speakers such as the Toshiba 33, which I believe had a very good write up for a budget speaker, would bring about a noticeable improvement in the sound, or does the problem lie in another part of the system?

MR P KENDRY,  
SWINDON

*I am pleased that you have had good service from the Toshiba 20 Rack System, but suggest that*

*perhaps your ears have now outgrown its general standard of performance. To some extent it would make sense to start from scratch with a specialist system, but if you are keen to build on the Toshiba base I would suggest you do so in the following order.*

*First change the turntable. A Dual 505 would be a big help but better still is a Rega Planar 2. The latter works well with a cheap Audio Technica cartridge but works a lot better still if used on a proper wall-mounted shelf.*

*Having spent £150 on the turntable, you should find the speakers sound rather better than they did, but if you have any more money to spare try to find a simple high quality 2-way design at around the £100 mark - the Toshiba 33s will do, but there are many worthwhile alternatives besides.*

*(After that you should look to the amplifier.)*

## THE ZEBEDEE SYNDROME

As a regular reader of *Hi-Fi Choice* I would like some advice. I use a Michell *Focus* turntable which judders every time I close the lid. The turntable is supported by three rubber feet on springs and it leaps about every time I shut the lid after putting the stylus on the record, so the first few bars of the music are often ruined by the stylus jumping about.

The cover is not especially stiff and I do not have the palsy, but having the first musical moments perfect requires an exhaustive two-handed measured process when I am impatient to get into my seat (and often holding a cup of coffee).

Can you suggest anything?

NAME AND ADDRESS SUPPLIED

*If you cannot listen to music with the lid open perhaps you could try putting a drop of oil onto the hinges of your turntable lid to make lowering it smoother. Failing that you can take off the springs that make your turntable so sensitive and replace them either with*

something like squash balls or even with something more solid such as wooden or metal cones. You can buy the latter – called *TipToes* – from Chris Brooks Audio in Warrington, Cheshire, and perhaps other dealers.

## STYLISH HI-FI

Having checked out your first issue I figured that here was a magazine with taste. However, as Yuppie blasters aren't exactly my cup of tea I would appreciate some advice on a system.

I have recently moved into a small but stylish flat and am looking for some matching sonic hardware. I don't really want to spend more than £500 and would like to be able to play CDs and tapes. Something not too gross and reasonably well built would fit the bill. My musical tastes range from hard rock to new age with a bit of Piaf thrown in. The room is a hard furnished 8 ft. x 12 ft.

L CYPHER,  
LONDON N1

*A glance through the pages of this issue should answer most of your queries and Alvin Gold's CD-based midi system reviews would be a good area to start. This breed of hi-fi system is custom-made for situations where space is at a premium and, as long as you're not power-crazed, one of these should prove satisfactory. If your tastes place musical values ahead of packaging and convenience then the separates systems feature has combinations to suit your pocket. Usually this approach gives better sound for your money but is not so hot on features, gadgets, flashing lights and what-have-you, though many of the budget CD players in the December issue feature remote control of some sort.*

*Whichever path you choose it is worthwhile considering the merits of good speaker stands and cables, which give an excellent sonic return for the outlay involved. With careful selection of stand and cable types one can optimise the sound of a system to suit taste and environment.*

## MACHINES WITH SOUL

I have been an audio enthusiast for around eight years now and presently run a Xerox based system which is almost satisfactory. For fiscal reasons

most of my upgrading is of the tweak variety, most recently rewiring my RB300 with van den Hul silver and solid core, which made the deck far more revealing.

However, as the standard of my system has improved I am not sure whether my enjoyment of recorded music has gone up commensurately. Of course, I'd rather listen to records than watch TV (who wouldn't given the crud that is presented 90 per cent of the time) but rarely do I find myself feeling an emotive response to what I'm hearing.

A while back, my father, then in his hi-fi anachrophile phase, came up with a circa '65 Garrard 301 deck, fitted with the most ingenious wooden arm made by James Worden, the headshell of which pivoted as it traversed the disc, in theory optimising lateral tracking angle. The cartridge was a bakelite-bodied Decca Mk III and the whole lot was housed in a home made plinth, what's more it seemed to work, I had to give it a spin. I stuck on a Stevie Nicks track and heard the most heart rendering version of *Wild Heart* ever – it practically tore me apart. Admittedly the beast rumbled away and the worn out cartridge made a very high pitched ringing sound but the spirit of the music shone through.

Unfortunately the drawbacks of the deck made it hard to live with and I ended up getting the cartridge re-tipped and using it on the Rega I had at the time, on which it looked enormous but performed well, but never had the same magic.

I have yet to come across another turntable with the same ability to put across the soul of the music, but now that I know that it's somewhere in those grooves I won't give up till I find it. I have serious doubts as to whether CD is capable of capturing let alone divulging such an ethereal quality.

P J HUTTON,  
BRIGHTON

## SLAVIC WATTS

I have decided to buy a pair of Spondor SPI loudspeakers, but am in a great dilemma about matching these with amplifier power. I want to buy a pre- and power combination and can spend £900 ex. VAT. Please could you suggest suitable amplification for the Spondors. My listening room is 5.5 x 4 x 2.7 metres and I prefer jazz and rock music. (What do you think about Hafler DH 110 and

220 units?)

D JANKOVIC,  
YUGOSLAVIA

*In our last amplifiers and tuners edition, No. 50, which came out last April we recommended the following pre- and power combinations which come within your budget; Musical Fidelity The Preamp 3b & P170 £300 & £500; Audiolab 8000C & 8000P £300 & £465; Exposure VII & VIII £316 & £309; Croft Super Micro & Series IVS £250 & £730; Naim NAC 32 & NAP 140 £425 & £414.*

*All of these combinations will prove able partners for the Spondors, but which you choose should be based on audition using your preferred source.*

*Some of these pre-amps are not suited to moving-coil cartridges, and one, the Croft is a valve amp.*

*If you are making the purchase by mail order, I could recommend the Exposure combination as a pretty safe bet, but you would have to specify the inputs you require.*

*The Hafler combination you mentioned was reviewed back in '85, when it failed to achieve our recommendation, but was considered "capable of high levels with good power and authority", though less revealing of subtleties than some.*

## MORE GAIN PLEASE

I would be grateful for some advice, please.

I recently purchased an Ortofon MC10 Super Cartridge following the advice in your publication and this was married-up to a JVC Turntable and a Yamaha CR-840 Receiver. My query is that I have to use a three-quarter volume setting to achieve proper quality. This is considerably more than my previous Cartridge and also, of course, much more than the volume-setting required for my CD and Cassette deck (about a quarter setting for each).

I am wondering whether something is mis-matching or whether I will just have to live with such a high volume setting.

A WILLIAMS,  
SOUTHEND-ON-SEA

*I'm afraid there is a genuine compatibility problem between the Ortofon MC10 Super and Yamaha CR-840, inasmuch as the former is a low-output moving-coil cartridge, while the latter has only the input circuitry to accommodate standard high output cartridges.*

*Strictly speaking you should only use a high output moving-coil or a moving magnet cartridge with this receiver.*

*That said, the practical effects of your mismatch do vary somewhat. If your worry is simply that you need to set the volume control higher than you would expect, then this in fact matters little. However, it is quite likely that this cartridge/receiver combination could result in either high background noise and/or severely rolled-off treble, in which case there is little alternative but a fairly major change – either to the cartridge type or the receiver itself, or the acquisition of a step-up device to combine the two. This step-up could be either a head-amp or transformer but both tend to be quite expensive – I believe Sony do some neat little in-line transformers that are reasonably priced.*

## KEF BUSTING

Unfortunately my ageing KEF Concord III's are rapidly approaching the end of their useful lives. The screws which hold the bass and midrange units in place keep loosening and I foresee a time when the threads will ring in the cabinets. But it gets worse – last week I broke a wire attached to the voice coil in one of the treble units, but was able to do a temporary solder job. (I expect the other one to go soon.) So I'm looking for a good 'digital ready' speaker system that can take a lot of pounding and abuse – I like the music loud.

J MOORE,  
NORTHERN IRELAND

*I am sorry to hear of the demise of your KEFs and should imagine that a local dealer could get them overhauled for you, but maybe you fancy some new ones anyway. As far as being 'digital ready' is concerned, this is marketing speak. Although your ability to destroy the well-specified and built KEFs suggests you have special requirements.*

*Our last issue discussed the reliability of current loudspeakers and, from the dealers' standpoint Linn, Monitor Audio, Rogers and Mordaunt Short were considered to be particularly good. However, studio-oriented designs such as those from Bose, JBL and Tannoy may be a better choice for withstanding long term abuse.*

SOUND SYSTEMS AND



## RA820A INTEGRATED STEREO AMPLIFIER

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## RL850/II LOUDSPEAKERS

These modestly sized loudspeakers offer an unusually high musical performance for their cost. In its latest form, the RL850/II benefits from an improved tweeter and crossover which have further refined its performance. With black ash finish and complete with black cloth grills (shown here without grills) they blend into any room environment. Possibly the most acclaimed loudspeaker in the UK today. (Recipient of Hi-Fi Choice's Best Buy Award for the last four years, as part of Rotel's Best system Award from What Hi-Fi? for the past four years, and now winner of What Hi-Fi?'s prestigious award for Best Loudspeaker of the Year for 1988.)



These fine components are but a small selection from Rotel's award winning range of real Hi-Fi products which offer very high standards of technical performance and musical enjoyment. All are based upon Rotel's UK balanced design concept which ensures that within the resources available, each aspect of the products design has been optimised. To find out why Rotel has now received What Hi-Fi?'s prestigious awards for 1988 for Best Turntable, Best Radio Tuner, Best Loudspeaker and Best Hi-Fi System (amplifier - Tuner - C.D. Player - Loudspeakers) call Rotel for details of your nearest dealer.

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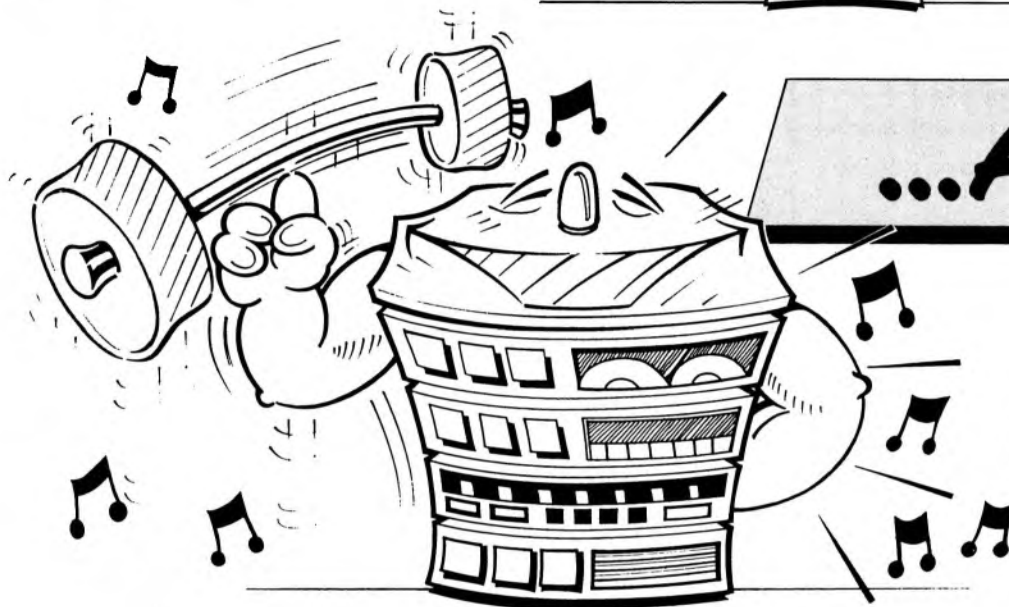
# ...BEFORE

No  
POWER  
Poor  
SOUND



# ...AFTER

More  
POWER  
HiFi  
SOUND

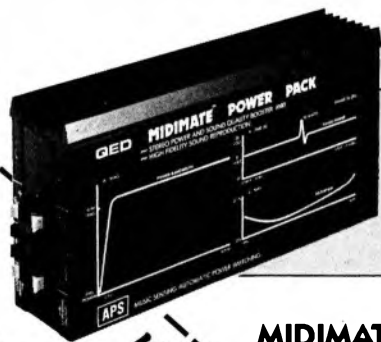


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# MARKET RESPONSE

*Dealer Feedback – our innovatory market survey polls dealers' opinions and experiences on the current state of the CD Midi System market, and examines such factors as consistency and reliability.*

**E**stimates of the size of the hi-fi and audio marketplace vary dramatically from one source to another, but there is no disputing that packaged systems are responsible for a substantial percentage of total hi-fi turnover – more than 50 per cent, though depending on where you draw the hi-fi/audio line.

This was very much the case before CD was introduced but the last few years' healthy sales of high value, standalone CD players has perked up the separates share of the market significantly. As expected, the accelerating growth of standalone sales has started to settle back now, as an increasingly large number of complete system sales automatically include a CD player as part of the package.

One of the major difficulties is that the market doesn't like staying within the neat categories that make analysis easy. The one sure fact is that 80+ per cent of systems will be 'midi' sized. Broad brushstrokes separate portable systems from 'one-piece' 'stackers' and from separates packages. But the latter still include systems that combine one-piece cassette/tuner/amplifier units with add-on CD and record players – in practice usually no more 'separate' than a music centre or its modern day 'stacker' equivalent.

The CD stacker 'one-piece' was one of the success stories of 1986 – particularly as far as Philips were concerned as they had the lion's share (and managed to put one over Amstrad for a change). Volumes stay high, but values are comparatively low, average prices being £300/£150 with/without CD respectively.

The 1987 one-piece market is again quite healthy, assisted in value by the continuing penetration of CD if not to the extent of the more optimistic predictions. However, one undeniably positive trend is that the share held by own-brand packages (the Saishos and Matsuis of this world) is starting to slip back from its 30 per cent high. Could this be evidence at last that the GBP (Great British Public) is at last prepared to use criteria other than price when making a purchase? Hope springs eternal, but there are clear signs that the CD system purchaser on the whole prefers to look a little further upmarket towards the separate midi systems.

This is where Sony took the original initiatives three or so years ago, and have success-

fully hung on to market leadership ever since. However, the competition has been much tougher here, so Sony's 20 per cent or so is followed by JVC, Hitachi, Pioneer, Technics, Aiwa and others, all with substantial enough shares.

Our reviews tend to confirm that Sony know what they're doing all right. And they also have a cunning marketing strategy of getting in early in the Season and clearing their stocks out to the dealers by early Spring. Consequently there is no danger of next year's strategems tripping over what may be left from this year. Such is marketing.

The CD midi system is now vitally important to all brown goods manufacturers, so the fierceness of competition should keep prices keen, despite the escalating value of the Yen, though perhaps at the expense of quality. And the recent decision to launch a separates range next Spring means that Philips are unlikely to sit on the separates sidelines for much longer (see Update).

## THE DEALER SURVEY

This survey is based on 50 dealers' comments and answers to a questionnaire which we sent to around 150 specialist and multiple retailers. Though too small a sample to provide accurate market share data, this does provide some information on reliability and highlights some of the best selling systems. We also include comments from dealers on why the CD Midi System concept is attractive, and how much money you have to spend to get a system which is reliable and pleasant to listen to.

While our laboratory and listening tests can accurately describe a given piece of equipment, they do not take account of factors such as reliability which are important in the buying process. The market is particularly thriving at the moment with the popularisation of CD, though manufacturers have found substantial demand over at least the past four or five years for a product which lies between the music centre concept and the more specialist separates market.

There is, of course, quite a big price spread, some manufacturers turning out systems for under £300 while the top of the range cost over £1,300. With this in mind we asked dealers for their personal views on

what one needs to spend for a 'reasonable' system – one that will not make your ears bleed (metaphorically speaking) with use. The answers, as individual as the dealers themselves, ranged from 'over £300' to £800, with a mean of £541.33p! It was interesting to note that none of our dealers recommended buying one of the sub-£300 systems. They pointed out that the CD player was substantially the most expensive ingredient in such systems, costing around £150/180, while the rest – tuner, cassette deck, amplifier, graphic equaliser and speakers – tot up to £120-150. "This speaks for itself", we were told.

In fact several dealers commented that in driving prices down the better to corner the mass end of the market, manufacturers risked ruining the reputation of the CD Midi System by cutting quality with cost. The whole concept and market would suffer as a result, they warned.

The most important midi system selling point appears to be style. Again and again dealers replied that size, looks and ease of use were the main attractions for purchasers. Where dealers also sold separates, they confirmed that the System option was chosen because of the difficulties in matching separates for both performance and looks. Spaghetti wiring and complex installation with the often sprawling style of separates is a great deterrent to many buyers (and/or their wives) who are conscious of the space and scheme of their living rooms. Furthermore, buying separates can often be a time consuming business if mixing the ingredients to taste; with the midi system it's all there and if you like it, you buy it, *comme ça*.

Many dealers said that the sound quality of many midi systems was not their selling point, particularly below the £600-700 mark. Some who had tried to entice buyers to listen to separates to demonstrate 'better' sound quality reported brusque answers like "I'm not interested in what it sounds like". Other factors favouring the CD Midi System's market prominence included 'trendiness', a second system purchase (for the country cottage or study), gadget appeal – and sheer ignorance of the present day sound reproduction capabilities of hi-fi separates.

Another question to dealers concerned what is known in the business as the 'wife factor'. The unhealthy male dominance of the industry leads to style being considered

as something for Italians, or 'er indoors with most separates manufacturers showing a strong engineering bias. It was therefore not entirely surprising to learn from just under 60 per cent of the dealers that female spouses and women in general preferred the midi concept, with some dealers claiming that a decision to buy a midi was made by women in 80 per cent of their sales.

Dealers recognised that women often had better hearing abilities than men, but explained that the style and convenience of the midi was more important even when a 'better sounding' separates system of the same price was found. With hope for less-well-endowed lovers everywhere, the phrase "she will prefer something small and neat" was oft repeated.

It was impossible to detect regional variations in this trend, except perhaps in Manchester where it was reversed – "girls in Manchester know their stuff" – and young men were greedy for midis. We stress again that this is purely subjective on the part of dealers, and many told us there was no influence from either sex to buy a midi.

If there is a point to be made here it concerns midi-systems where price is not the prime factor influencing a purchase. Most retailers who also dealt in separates agreed that a midi-system did not give comparable sound quality to a 'tailor-made' system costing the same. Yet there are very few systems which offer midi-size and style with separates' performance, according to dealers. One system that received particular acclaim was Yamaha's AV99 which costs £1,080 without the graphic equaliser. Some dealers felt that this kind of design was the best of both worlds, but of course it is at the top end of the price range.

It is very difficult to 'tweak' a midi system or add anything to improve sound quality, but several dealers replied that they would sell separate loudspeakers with a system which could greatly improve performance. Consistent criticism was made of the loudspeakers supplied with many of the cheaper systems. Most dealers and multiples said they could not sell the system without its speakers, but it may be worth looking around or haggling for a decent pair of British speakers. This may put £50 on the cost of the system but could deliver substantial rewards. Failing that you could buy a proper pair of loudspeakers straight out and use the originals in the bathroom or kitchen.

Another problem lies in the ephemeral nature of the Midi System. We heard of a customer who bought a system last year and returned eight months later to get the CD component to go with it. The manufacturers had since introduced this year's model, but alas the plugs were incompatible with last year's, and no-one could find him last year's CD player. Most manufacturers will stick with a plug type, but of course they may change the colour or style of a system, and if our survey is correct this could ruin the whole purpose of buying the thing in the first place.

## RELIABILITY

Twelve of our dealers replied that all their stocked brands were equal in terms of reliability; indeed most said there was little difference between the brands on the UK market at the moment. But some systems seem to be a little more equal than others, and we shall point out the market leaders in this respect, with a note on manufacturers who received adverse comments.

The most reliable manufacturers from our survey were, in order:

- |                 |    |
|-----------------|----|
| 1) Trio Kenwood | 38 |
| 2) Technics     | 32 |
| 3) Pioneer      | 29 |
| 4) Sony         | 26 |

Brands which received adverse comments were Aiwa (with nine) and Sony (with four). These are among the top selling brands and also stocked by most of our dealers, so there was more chance of attracting criticism.

If and when your midi system does go wrong we found that you can expect it back within seven days (on average) if the dealer can fix it. Some dealers quoted 24 hour servicing, but most preferred a week especially if they had to get parts. When the CD player breaks down it is usually a job for the manufacturer, and on average you will lose it for three weeks. The better firms, according to our poll, are Trio Kenwood, who tend to get stuff back in less than two weeks, Yamaha, Ferguson, Technics and Goodmans. The slow coaches – taking over four weeks on average – were cited as Philips, Alba and Amstrad.

There was the odd horror story of dealers having to wait for parts from abroad and one mentioned a 24-week wait, but these were the exceptions to the rule.

## TOP SELLERS

The top selling brands with points scored were, in order:

- |                 |    |
|-----------------|----|
| 1) Trio Kenwood | 54 |
| 2) Technics     | 38 |
| 3) Sony         | 36 |
| 4) Pioneer      | 30 |
| 5) Aiwa         | 30 |

Our five top selling systems and points scored were:

- |                               |    |
|-------------------------------|----|
| 1) Kenwood M30/31 CDS (\$500) | 33 |
| 2) Technics X800 CD (\$400)   | 25 |
| 3) Aiwa V770 DX (\$479)       | 19 |
| 4) Pioneer S8000 + CD (\$560) | 17 |
| 5) JVC Midi-W2 CD (\$533)     | 16 |

We found that Aiwa was the most stocked brand, Sony and Technics, JVC and then Trio following.

## THE LAST SIX MONTHS

The summer is not the best time for hi-fi sales and dealers universally claimed that sales would quadruple over the Christmas run up period and well into February. Nevertheless we found that trade was certainly healthy and the wolf is a long way from the door where CD midi systems are concerned. The average number of complete systems sold from May to October was just

over 92 per dealer (just over 15 a month). The multiple outlets such as Debenhams and Laskys did help to push up that figure, but even so some Independents were selling nearly twice the average for that period. Where dealers also sold separates, two thirds of them said they sold less midi systems, but some envisaged selling more in the pre-Christmas period.

## PARTICIPATING DEALERS

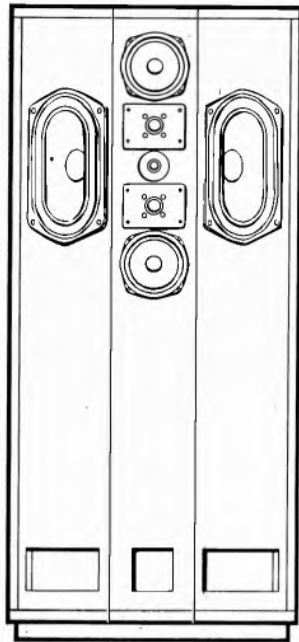
We would like to thank the following for helping us compile this survey:

- Active Audio Hi-Fidelity Products, Derby.
- Aerco Ltd, Woking, Surrey.
- Avon Hi-Fi, Shrewsbury, Shropshire.
- Azat, Charlotte St, London W1.
- Bartletts Hi-Fi, Holloway Rd, London N7.
- Bridge Hi-Fi, Walsall, West Midlands.
- Cambridge Hi-Fi, Cambridge.
- Clearstone Hi-Fi, Manchester.
- Deans Hi-Fi, Edgware Rd, London W2.
- Debenhams (Electric Supreme) Oxford St, London.
- Dixons, Victoria St, London SW1.
- Eastwoods, Leicester.
- Erricks of Bradford, Yorkshire.
- A. Panthorpe Ltd, Hull, Humberside.
- Norman H. Fields, Hurst St, Birmingham.
- WM & D Forrest, Gallowgate, Glasgow.
- Framptons, Cornwall St, Plymouth.
- Fraser Hi-Fi, Windsor.
- Gaveds, Hertford.
- Harrods, Knightsbridge, London.
- Hi-Fi Centre, Wilmslow, Cheshire.
- Hi-Fi Corner, Rose St, Edinburgh.
- Hi-Way Hi-Fi, Edgware Rd, London W1.
- Holborn Hi-Fi, Aberdeen.
- Bill Hutchinson Ltd, Hope St, Glasgow.
- In Hi-Fi, George St, Edinburgh.
- John Lewis PLC, Oxford St, London W1.
- Kensington H-Fi, High St, London W14.
- Laskys, Tottenham Court Rd, London W1.
- Le Set, Fulham, London.
- Listen Inn, Northampton.
- Marrow Sound, Guildford, Surrey.
- Norman Audio, Preston, Lancashire.
- Nottingham Hi-Fi Centre, Nottinghamshire.
- O'Brien Hi-Fi, Wimbledon, London.
- Radford Hi-Fi, Exeter, Devon.
- Richer Sounds, London Bridge.
- Rogers Hi-Fi, Guildford, Surrey.
- Royal Arsenal Cooperative Society, Woolwich, London.
- Rumbelows, Edgware Rd, London W2.
- Salisbury Hi-Fi, Wiltshire.
- CJ Smith, Chertsey.
- Sound Sense, Edgware Rd, London W2.
- South London Hi-Fi, Streatham.
- Standens Tonbridge Ltd, Kent.
- St George's Audio, Croydon.
- Swift of Wilmslow, Cheshire.
- The Audio Centre, Portadown, N. Ireland.
- Tru-Fi Sound and Vision, Aldershot, Hampshire.
- University Audio, Cambridge.
- Watts Radio – The Engineers, Somerton, Somerset.

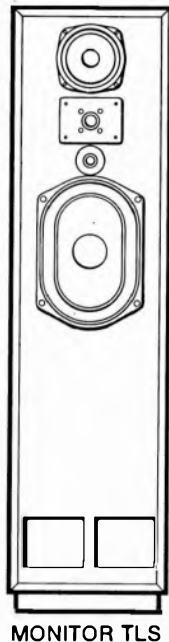
**NB Any hi-fi dealer who feels aggrieved he is not on this list, and who would like to be consulted in the future, either regularly or intermittently, please write to us at 39 Goodge Street, London W1P 1FD, or telephone 01-631 1433. We didn't leave you out deliberately, and would welcome your future participation.**



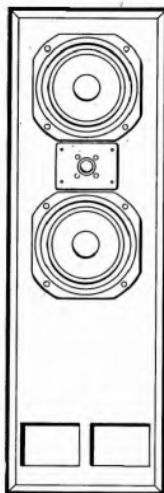




REFERENCE STANDARD TLS



MONITOR TLS



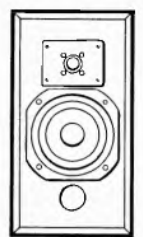
STUDIO 3 TLS



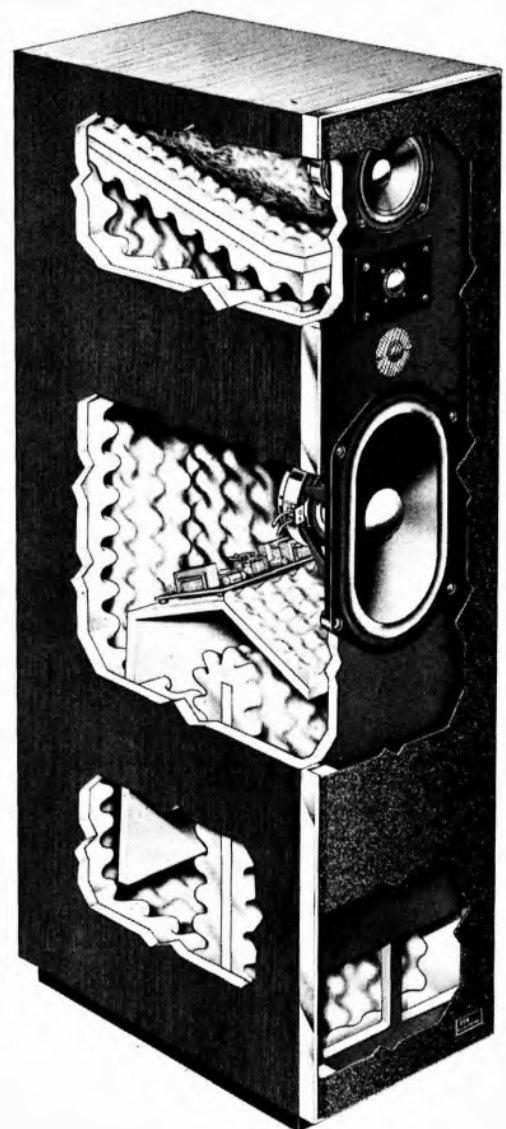
STUDIO 2 TLS



SUPER-COMPACT



COMPACT



The TDL Monitor loudspeakers are derived from our much acclaimed Reference Standard transmission-line speakers; precisely the same driver and crossover technology, yet in an enclosure more suited to the domestic environment.

Resemblance to the sound of the Reference Standard's is uncanny, with the same sense of openness. Yet the bass pressure-loads the listening room, so that low frequencies are felt as much as heard.

TDL transmission-line speakers do not rely upon corner positioning to perform at optimum, nor do they require electronic equalization. A freer, more musical bass is achieved by moving a lot of air just a little, rather than just a little air a lot . . . .



# transmission line speakers

MTLS



# CHOOSING AND USING . . . CD BASED MIDI SYSTEMS

*Complete stereo systems offer the promise of a genuinely hi-fi standard of sound reproduction, in a convenient and domestically acceptable package. While the shape, size and performance varies widely, the basics are similar. Here we look at the 'building blocks' of hi-fi.*

Music is easily recorded and reproduced using our century's technology, yet is also easily corrupted in the reproduction. Our memories for sounds are good in many ways, yet extremely feeble in others, and in the absence of the 'real thing' we may be quite able to accept a poorly-contrived fake.

By itself this hardly seems important. If we're that easily fooled by the faking process – if we can 'hear through' failings in the reproduction process to the music beneath – why do we need to worry about the quality of the reproduction?

First although we may not find it easy to pick out the specific faults with reproduced sound, the fact remains that poor sound soon becomes tiring and unrewarding to listen to. Secondly, poor sound usually means *incomplete* sound. If musical information is missing, we're simply not hearing all the music, and again the act of listening becomes tiring and unrewarding.

It is for these reasons and these reasons alone, that pursuing audio excellence is a worthwhile exercise. For countless thousands of people, a 'hi-fi' midi or rack system has become merely an ornamental centrepiece of the house rather than a tool for playing music, because after the initial excitement had passed, there was little joy left in listening to music. This is the effect of poor sound-reproducing equipment. But there are hi-fi systems which *will* give you musical enjoyment and enduring pleasure.

For many people interested in listening to music in the home, a packaged audio system of the type usually referred to as a midi system is the obvious choice. There is no doubt that choosing your own separates to make a working system has its satisfactions, and under ideal conditions will provide the most worthwhile and musical results. But it is also liable to end up with a rather Meccano-like appearance and wired up with 'a plateful of spaghetti', to use Sony's memorable description.

The integrated system avoids these problems, with components of matching appearance, sometimes with a piece of furniture to subdue the 'hi-tech' look of bright chrome, control knobs and displays. Choosing a one-make system might appear to guarantee optimum electrical and mechanical matching. But appearances can be deceptive and many apparently well-matched systems (in the technical sense) are anything but.

Increasingly, integrated systems are physically smaller than in the past. Typical component widths have reduced from 43-44cms to 33-35cm now, and this review concentrates on the latter – hence the midi in the title.

## COMPACT DISC PLAYER

The digital compact disc is a recent development in audio – a means of storing information in digital form on a small (12cm) disc, recorded on one side only and giving continuous playing times equivalent to both sides of a long playing record strung together. The information is stored in a spiral arrangement of 'pits' which are read by a laser which follows, but does not touch the surface of the record. Very low background noise and great linearity of frequency response (up to the cut-off point near 20kHz) are the hallmarks of the system, together with a degree of robustness not associated with conventional records. Small scratches, dust and fingerprints should not affect sound reproduction. CD reproduction is free of the 'pops and clicks' which mar LP sound.

In the few short years compact disc has been on sale, it has grown in strength to the point where it is beginning to rival the more traditional sources in popularity. Many systems (including all those reviewed) are now available with compact disc, and there are cases (eg Marantz) where CD is pushing the traditional record player off

the scene altogether.

Compact disc is the easiest source of all to operate. All a CD player needs is a mains feed and one of the inputs on the system's amplifier. If no dedicated CD input is fitted an auxiliary or even a spare tape input will suffice. So owners of old systems wishing to add 'stand alone' compact disc players to their existing equipment will be able to do so if such an input is available – and if not, 'input expander' accessories are available, from QED and others.

## TURNTABLE

The usual type of system turntable is a simple design which includes auto-return at the end of side, and a magnetic cartridge. Recent design trends look worrying; there is an almost universal use of flimsy plastic mouldings in areas of structural importance (eg headshells) whilst the weight and build quality of the turntable chassis has tended to become lighter and stay static, respectively.

Quite a number of turntables are fitted with so-called parallel tracking arms, where the whole arm slides along a runner parallel to the line the stylus describes as it plays the record. Parallel tracking arms are invariably associated with fully automatic operation and in some cases, programmable track-search facilities.

As in previous years, the majority of cartridges are readily interchangeable if required. A significant number incorporate the new T4P or 'P'-mount cartridge fitting, where the cartridge plugs into the end of the arm using the terminal pins. These cartridges all have a common specification which means no alteration to any of the arm settings is required no matter what cartridge is fitted. With some turntables, cartridges are not interchangeable at all, and where this is the case, it's indicated within the reviews. The ability to change cartridges provides an easy, if limited route to improving

system performance at a later date.

There is a remarkable uniformity in the types of cartridges fitted. Nearly all are standard magnetic designs, bearing the rack maker's name in most cases, but often recognisable as coming from Audio-Technica.

## CASSETTE DECK

There have been changes in the cassette decks supplied with systems too, especially in peripheral areas like transport control and record level meter designs.

Ignoring the sub £450 systems for a moment, the archetypal cassette deck looks something like this. It will have two transport mechanisms, one for recording and playing back in the usual way, the other for playback purposes only. Using the two in combination allows tapes to be dubbed, or played back from one deck and recorded onto the other, and played back one after the other (often known as sequential play or – perhaps confusingly – as continuous play). The dubbing can be done in real time, that is at normal playback speed, but the majority of designs tested also allow double speed dubbing. However, there are severe tradeoffs when using this high speed alternative, and sound quality always suffers severely.

Cassette decks may also have a range of buttons to operate the transport, a number of controls to set the tape type, the recording levels (with the aid of record level meters), and the noise reduction system.

Better sound quality is the aim of Dolby C noise reduction system which works very much like the familiar Dolby B but with twice the noise reducing effect. Dolby C is fitted to the more expensive decks, whilst Dolby B is almost universal as it is needed to replay pre-recorded cassettes which are invariably recorded to the B format.

Instead of manually instructing the deck what kind of tape you've inserted, cassette decks are

learning to recognise tape types for themselves using the notches on the rear of the cassette housings for the purpose. Another much less welcome trend is automatic record level control, or ALC. This means no record level adjustments and is an undoubted boon from the convenience point of view. But the trade-off can be severe, taking the form of a loss of dynamics and increased background noise; this is because the ALC shunts the record levels up and down continuously in an attempt at making everything sound the same volume!

Elsewhere cassette deck design has become relatively static. The most popular feature is one or other variety of programme search where the deck 'listens' for gaps between tracks when in fast wind/rewind mode, switching through stop to play when it finds the gap. This is of obvious use with popular rock music (or when tapes are used to store a number of computer programs!), but the system tends to break down when presented with material with built-in gaps or long quiet passages. Speech and much classical music are examples of such programme-search-busting material, and for this reason we were disappointed to see the eclipse of normal memory search features linked to the tape counter.

Tape acceptance in most cases is standardised for the three major types: ferric (or standard bias, Type I), chrome (or high bias, Type II) and metal (Type IV), though some are unable to make recordings on the latter.

## TUNER

The tuner provides the means of listening to radio broadcasts, and is commonly capable of reception over the three main broadcast bands of interest to UK listeners – FM, MW and LW.

Only FM broadcasts on VHF are inherently capable of high-quality results in stereo. FM can give a smooth, even frequency response to about 15kHz, which is close to the limit of most people's hearing. FM is also the only band where stereo broadcasting takes place.

The snag with FM, apart from the relatively complex circuitry necessary to make it work effectively, is the fact that it is a short distance medium with a typical range of only 30 miles or so from the transmitter. Although indoor strip (wire) aerials are usually provided for FM reception, the use of such devices tends to be unreliable if good, hiss-free reception is required. This comment holds especially in the case of stereo reception which requires typically ten times the signal needed for good mono reception. So where a portable (mono) radio may work perfectly adequately with a rod aerial, a stereo tuner will normally benefit from a multi-element (typically four or more elements) aerial mounted on the roof – or something similar. It's worth taking some time and trouble over the aerial, and employing a specialist local aerial erector who knows the neighbourhood reception problems. Aerial fitting is not usually expensive; note that even a high-quality, expensive tuner will not give of its best from an inadequate aerial.

A good aerial will provide more than just quiet, hiss-free reception. It will also provide a generally more reliable result, free from impulsive 'crackling' interference and other reception problems.

The two AM bands, medium and long wave, offer longer distance reception and provide the only way of listening to BBC *Radio 4*, for example, when the VHF band is given over to educational broadcasting; *Radio 1* is also only sporadically represented on FM at present. However, AM sound quality has very limited treble, and a generally uneven, closed-in kind of sound. The aerials supplied with the tuners – usually a ferrite loop or rod – are about optimum. They may need to be swivelled for the best reception, but attempts to increase the signal level by adding an external long wire aerial are often met with increased interference too. Although reception and sound quality on AM are 'iffy' at the best of times, there turned out to be quite

remarkable differences between the best and worst of the tuners tested.

The tuners tested divide conveniently into two categories – the traditional analogue or scale-and-pointer tuner; and the digital or quartz synthesiser tuner. The very useful feature of preset timing is usually associated with the digital tuners which lend themselves naturally to this kind of facility. Digital tuning can also mean more accurate tuning, though there was evidence from the tests that this was not always the case.

Many synthesiser tuners also had other problems, in particular background whistles and buzzes in the less well engineered examples. The better synthesiser tuners were free of this defect, however, and were particularly easy to use in preset mode.

## AMPLIFIER

Aptly thought of as the heart of any system, the amplifier accepts the low-voltage outputs from the turntable, CD player, cassette deck and tuner, and boosts them to a level suitable for driving loudspeakers. It also performs a variety of subsidiary functions such as tone controls, filtering and so on.

Although the amplifiers built into the systems came in a wide range of power outputs, this was usually related to price, the more expensive ones generally going louder – though not necessarily sounding better! Where loudspeakers were supplied with lower price systems, their high sensitivity generally made up for the limited power of the amplifier, so that the maximum available volume was still quite adequate.

A pair of conventional high-fidelity Heybrook *HBI* loudspeakers (see Technical Section) was also used during the listening tests, and in most cases the systems were fully able to drive these to high enough volumes to satisfy most requirements. The moral of this is obvious enough – it usually makes little sense to choose a system simply on the basis of its power output unless you've an unusually

large room to fill with sound, or you throw a lot of parties!

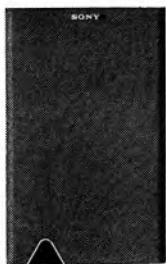
Sound quality and power output apart, the more up-market amplifiers tended to accumulate additional input facilities and more complex tone controls, often described as graphic equalisers. But many of the features on offer are less than they seem. Leaving all theoretical considerations aside, a system that works well in the first place will not benefit greatly from using tone controls. Graphic equalisers, which are effectively a number of such controls, each responsible for a narrow band of frequencies, are merely gilding the lily.

## LOUDSPEAKERS

The loudspeaker is not, as is often thought, *the* determining factor for sound quality – the system as a whole is as good as its weakest link, no more. But the loudspeaker does have the crucial role of translating the electrical signal from the amplifier into the vibrations in the air we call sound. The simplest loudspeaker consists of a box housing a single drive unit, but most of them divide the sound into two bands, and channel the low bass frequencies to a large coned unit capable of moving large quantities of air, and the high frequencies to a smaller unit capable of responding quickly. A third midrange unit of intermediate size is sometimes used as well, but it's worth making the point that it's extremely difficult to make a three-way loudspeaker work as well as an equivalently-priced two-way one.

There is one crucial factor that determines how well a loudspeaker auditions – and this is how it's used. It is important to support loudspeakers properly, preferably on tall, open stands of the type stocked by most specialist hi-fi dealers. It's equally important to place them correctly, which often means well away from walls and other obstructions. Occasionally shelf (or wall bracket) mounting gives good results – let your ears be the guide – but placing loudspeakers on the floor and/or behind furniture is a virtual guarantee of unsatisfactory sound.

**ONLY ONE PART OF THE ES RANGE  
DOESN'T SOUND LIKE THE BEST BRITISH HI-FI.**



**APM 66 ES.**  
Award winning flat diaphragm design.  
Hi-Fi Choice: 'Worth Considering.'



**APM 66 ES.**  
Award winning flat diaphragm design.  
Hi-Fi Choice: 'Worth Considering.'



**CDP 555 ES.**  
CD player with Gibraltar Chassis, 4 times  
over sampling, and twin transformers.  
Hi-Fi Choice: 'Recommended.'



**TCK 700 ES.**  
3 head quartz lock, direct drive,  
cassette deck.  
Hi-Fi Choice: 'Recommended.'



**STS 700 ES.**  
FM stereo/MW/LW synthesiser tuner.  
Hi-Fi Choice: 'Best Buy.'



**TAF 700 ES.**  
110W stereo integrated amplifier  
with Gibraltar Chassis.  
Hi-Fi Choice: 'Worth Considering.'

No one appreciates good hi-fi as much as the British. That's why we consulted them when we wanted to improve our ES range.

As each new product was developed we sent a hand-built sample to a team of British hi-fi experts.

After the strictest examination, they suggested improvements which we took on board.

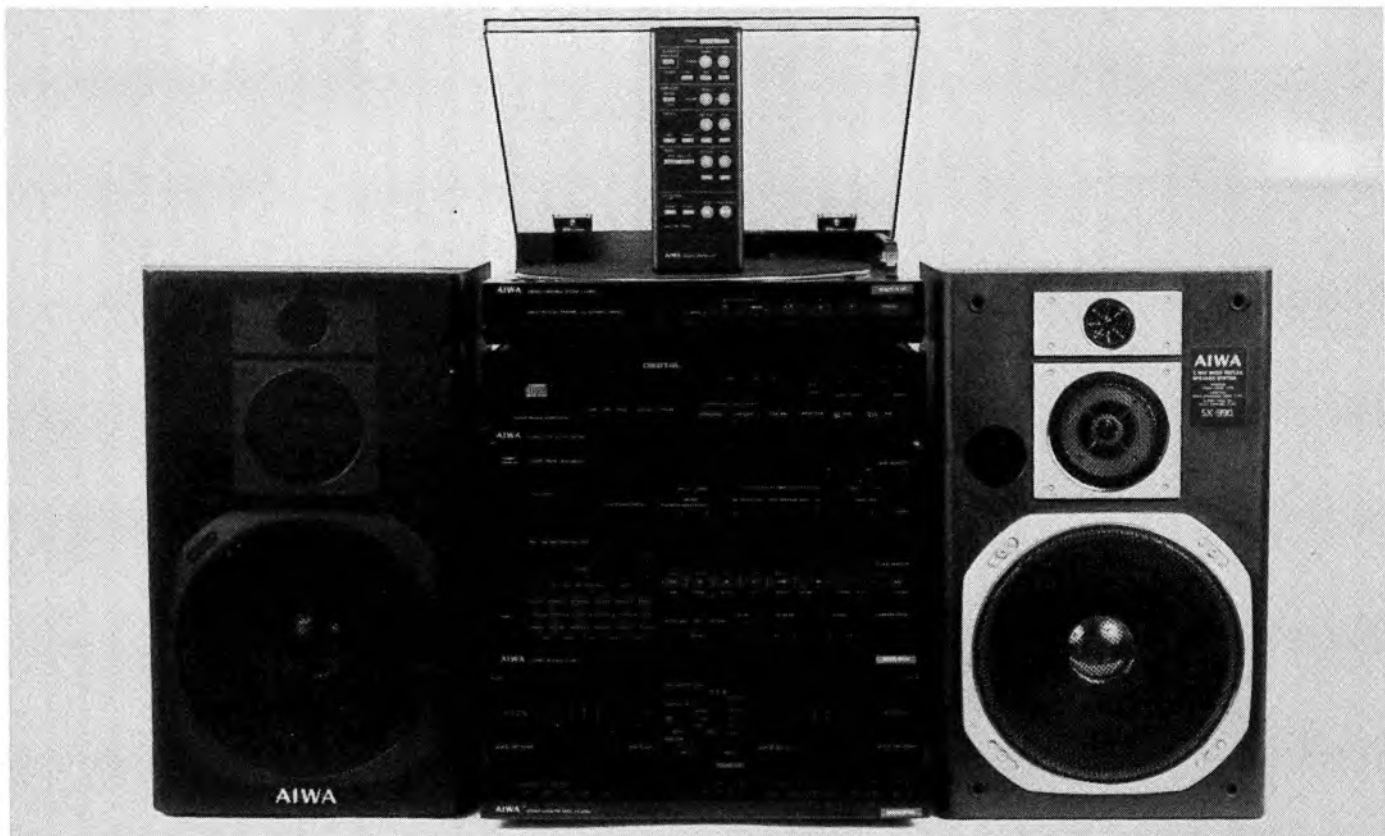
But even the toughest critics approved our Gibraltar Chassis. The CDP 555 ES as well as each amplifier is built on a solid base of marble and fibreglass. So vibration and magnetic interference are kept to an absolute minimum.

Judging by their response, hi-fi magazines are impressed too. Though if you think our separates sound good on paper, wait until you hear them in your living room.

**SONY ES**

## AIWA V-990DX

AIWA (UK) LTD., UNIT 2, DUKES ESTATE, WESTERN AVENUE, LONDON W3 0SY. TEL: (01) 993 1672.



On the face of it, the V-990 looks thoroughly in tune with the late '80s, and indeed looks excellent value for money. First impressions are of restrained good looks, and of solid, common-sense engineering. The low key presentation will probably endear itself to the relatively conservative customer at whom £750 systems are aimed. A look down the options list also shows the CD player is optional.

Then there's the equipment itself. The components are linked by a wealth of on-board electronics which allow for automatic source selection, synchronised recordings and a built-in clock timer for making absentee recordings. It has a very ergonomically designed remote control and even boasts a surround sound option (albeit a very basic one).

### LX-E990 TURNTABLE

The LX-E990 turntable is typical of the system as a whole – well turned out, understated and user-friendly. Drive is by belt, the platter is aluminium, the arm a simple parallel tracker, and the cartridge a non-replaceable magnetic (debit about three points for this unnecessary piece of penny pinching).

Operation is fully automatic, as it almost always is with turntables as inherently difficult

to handle manually as parallel trackers. Front panel controls provide arm drive and cueing. Record size and speed determination is automatic, with overrides for both.

The cartridge has a smoothly rolled away treble response, whilst the turntable has very low wow and flutter, a tribute to the under the skin engineering. Because the unit is fitted with non-standard connectors like the rest of the system, it wasn't possible to measure the other normal parameters. What was obvious, however, was that susceptibility to low frequency disturbance, due to feedback or mechanical shock, was surprisingly low in level.

### RX-990 RECEIVER

Very much the heart of this system, the RX-990 is a combined tuner and amplifier with styling intended to imply that the two components are completely separate. The tuner section is also home to the system clock and timer.

Measured power output is 30 watts a side, which is roughly in line with the claimed power if you read the fine print. On the tuner side, quartz synthesiser circuitry enables eight FM, and eight MW or LW stations to be programmed. A mono switch is included, as is a rather old fashioned fluorescent frequency readout.

On the test bench the tuner coped poorly off air, adding a lot of spurious noise to the music, even where the signal was only moderately weak.

The tuner display also doubles as the clock and timer readout, defaulting to show the time when the system is switched to 'standby'. The timer works on a 24 hour cycle, and can be programmed on once only or every day basis.

The amplifier section has the inputs required by the other system components, plus one other set, arbitrarily labelled DAT/Aux, with input and output connections. On the front panel are a number of mainly cosmetic facilities including a 5-band equaliser, a spectrum analyser display (annoying because it can't be switched off), microphone mixing and others.

One additional feature is a 'surround sound' circuit which works in conjunction with an extra pair of loudspeakers. The system is probably meant to resemble Dolby Stereo (the surround system used in the audio coding of many video cassettes), but isn't; it's just a matrix derived from the difference between left and right hand channels.

### FX-W990 CASSETTE DECK

The FX-W990 lacks for only two things. Only

one of the decks records, and record levels are set automatically. The rest is all there. Both transports have quick acting auto-reverse mechanisms (triggered by the tape leader) with normal and high speed dubbing, Dolby B and C, track search, and less usual features like cue and review and optional blank skip. There is even a device mysteriously called CBRS which returns to the start of a current CD track when dubbing onto tape if the tape changes direction from Side A to Side B. Synchronised recording from CD and records means no more cueing a disc as the tape starts or forgetting to switch back to pause at the end of side. Measured performance is excellent so far as the tests were able to show.

## DX-990 CD PLAYER

This optional player is a relatively high spec unit with 20-track programme memory and an auto-space function that inserts short gaps between selections when dubbing onto tape. The player has its own random access keypad for track selection. Disc handling is smooth if very deliberate, whilst the ability to track marked discs was poor.

## SX-990 LOUSPEAKERS

Leave the covers on, and what you have is a smart black 'woodgrain' enclosure with smoothly rounded sides, plus a hint of the underlying technology as the three vertically in-line drive units glint through the black front cover. Remove the frame that secures the cover and the speakers are transformed. Now they're nasty ol' bug-eye'd monsters, with three brash looking drivers and acres of black mesh - all aggression and power. The truth in all this? They're cheaply built, lightweight, shoddy and fitted with poor quality drivers. The enclosure and other constructional details are equally inadequate.

This was partly confirmed by the in-room frequency response test, which had an even overall energy trend, but which was locally very bumpy (eg around 650Hz). Positioning was uncritical.

## HOW IT SOUNDS

The tuner isn't the finest on earth. Auditioned on FM, it sounded thin, even a little brittle and sterile, and clearly suffered from RF problems. A variety of synthesiser derived and other whistles and noises were audible under conditions of very strong or very weak signal reception. However, AM sound quality was much cleaner than expected.

The tape deck was mostly good. Subjective speed accuracy was excellent, and resolution

was good on the whole, especially with metal tapes and when not using Dolby noise reduction. On the other hand I can't see many people wanting to spend as much money as metal tape demands to turn out recordings as noisy as the lack of Dolby entails.

I was quite impressed by the ALC circuit too, which was less than usually intrusive on perceived dynamic range. However, there was some evidence of less than ideal tape to head contact: the HF output was variable, though the same tape didn't suffer on some other decks.

If anything, the turntable was a little better than expected. Without suggesting that it in any way transcended the *genre*, it was acceptably clean and open sounding, whilst the bass was under better than usual control. On the other hand surface noise was high, there were some distinctive 'ringing' colorations in the upper bass, and the cartridge displayed a rather coarse character. Fortunately Aiwa do allow you to place the deck alongside the system rather than on top, making at least a 150% improvement.

The real surprise of the show came from a quite unexpected quarter - the loudspeakers. There have been speakers that looked no worse than these and which sounded positively evil. But in practice these Aiwas were relatively painless. The treble in particular was relatively tame and innocuous, whilst the bass was in good character if not very deep. They probably concealed more than they let through, and dynamics were quite badly mauled, but for anything less than super critical listening they sounded quite reasonable.

Finally, the CD player worked unobtrusively well, easily the most consistent of the sources and the cleanest by some distance. By CD standards the Aiwa ranks as only of medium quality - imagery is unimpressive and the top end rather strident - but in a system context there are few complaints.

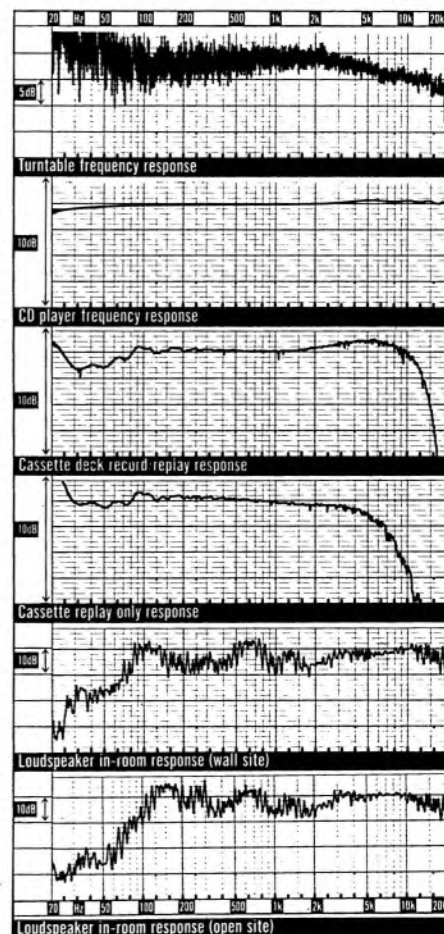
## VERDICT

This system rates as Recommended with the Aiwa loudspeakers, and would have been Best Buy material had it been available without, partly because the system has good all round abilities, but also because it is so well made and in tune with the needs of the system buyer. Ease of use is good, the remote control is superior to the usual system remote, and the linked automatic facilities work a treat.

## GENERAL DATA

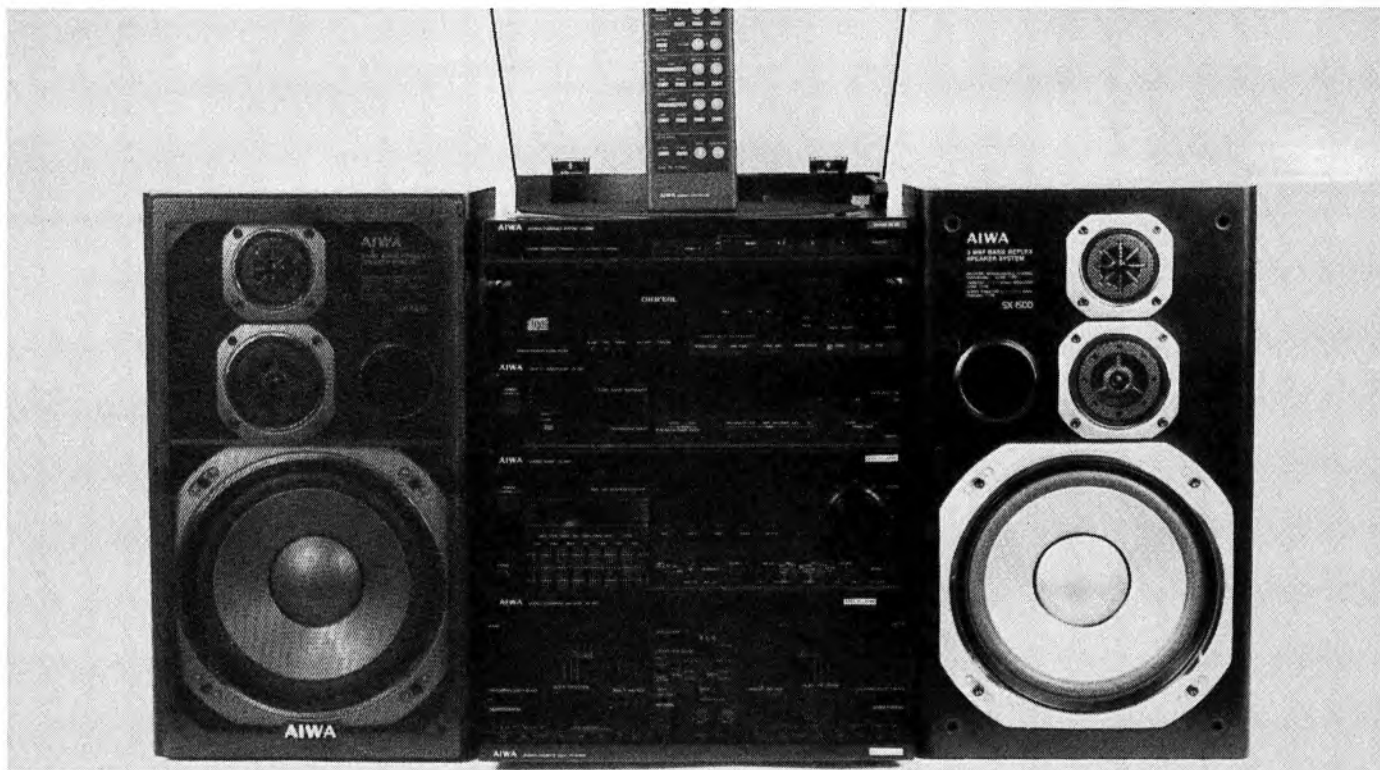
Cost with speakers £749.95  
Options? sold without CD player as V990 at £499.95  
Size - main unit 74 x 33 x 33.5cm (h x w x d)

Size loudspeakers	42 x 25 x 18.8cm (h x w x d)
<b>Turntable</b>	
Wow & flutter wtd	0.065%
Drift	good
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
( <10Hz too low, >14Hz too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*
<b>Tuner</b>	
Sensitivity	poor
Signal/noise	very poor
<b>Cassette Deck</b>	
Wow & Flutter (wtd)	0.075%
Signal/noise ref 0dB Type II	n/a**
Distortion 0dB Type II	n/a**
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	>103dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	30 watts
(1kHz, both channels driven)	
<b>Loudspeakers</b>	
Efficiency	above average
*could not connect to test equipment	
**auto level record	



# AIWA V1500DX

AIWA (UK) LTD, UNIT 2, DUKES ESTATE, WESTERN AVENUE, LONDON W3 0SY. TEL: (01) 993 1672.



Aiwa systems are usually distinguished by two qualities. One is their cassette decks – would you expect any less from a company that came to prominence through their cassette technology? The other can be summed up in one word: flexibility.

One obvious way in which flexibility has been engineered is the fitting of a clock/timer to facilitate unattended recording off-air – which also enables the system to be used as a glorified clock/radio. It has two record output selectors which separately control which source is fed to the two tape transports, so each deck can be used quite independently. The system will lull you to the land of nod with a sleep timer, and wake you up the following morning with *Radio 1*. Which will no doubt put you straight back to sleep again. That's science . . .

The high level of on-board intelligence is used (amongst other things) to assist synchronised recordings from records and CDs but recording integral tracks on the flip side of a cassette if a side change is forced during the course of a track (from CD only). It has genuinely helpful features like automatic source selection (when listening, not when recording) which obviates the need to get to grips with the amplifier input selectors. Simply press 'play' or one of the preset or manual tuning keys in the case of the tuner, and the amplifier automatically switches inputs to suit.

The Aiwa is supplied with a remote control with which you can do everything important (almost) from the comfort of your favourite companion's lap. Just for once, Aiwa have given some thought to the design of the handset: the result is intelligent control disposition and graphics to make the thing as near intuitively obvious to use as practical.

For all the multiplicity of twiddly bits, the system is a surprisingly discreet dresser, almost as though it doesn't wish to proclaim its virtues too loudly. Potential buyers should also be taken with the solid, expensive feel of the system.

## LX-E990 TURNTABLE

The *LX-E990* turntable, shared with the *V990* system, is a fully automatic belt driven deck with a parallel tracking arm and a magnetic cartridge; regrettably only the stylus is replaceable. The cartridge has a reduced output at high frequencies, and some loss of output at low frequencies too. All departures from linearity appear to take place smoothly, however, which is also how it sounds. The turntable has good speed stability, measured and perceived.

## TX-1500 TUNER

Similar in design to the *V990 System* tuner, this separately housed design has eight FM and eight randomly mixed MW and LW presets. One extra it boasts is a five LED signal strength

indicator. Unfortunately it ran out of LEDs early, below the  $100\mu\text{V}$  level; two LEDs and the stereo decoder were still on at  $10\mu\text{V}$ , where noise levels were, not unnaturally, extremely high! Lab tests indicated that FM reception performance was a little better than the cheaper Aiwa, and broadly on a par with other system tuners. The two AM bands worked well enough in all key respects.

## FX-W1500 CASSETTE DECK

This must be getting close to the ultimate in system cassette decks. Both transports are auto-reverse and both are record capable, which means you can make three continuous hours of recordings using C90s (or two identical recordings at once). Better still, the two decks can be used independently. You can dub a CD onto one, and a radio programme onto the other whilst listening to the record player. You can even programme the two decks separately to record different radio programmes, on different frequencies at different times of day. Each deck is equipped with auto tape type sensing (including Type IV metal), track search, cue and review, blank skip and Dolby B and C noise reduction. Plus high and normal speed tape-to-tape dubbing and sequential play. Record levels are manually adjustable.

In addition to these basic(!) features, the deck also features Dolby *HX Professional*.



This is not a noise reduction process, but one designed to linearise the recording of music with large high frequency content which might otherwise compress and smear. In principle, and to a large extent in practice, it helps extend at least some of the crispness and vitality of metal tape recordings to lower cost chrome (Type II) and even ferric (Type I) tapes.

The deck measures well all round, except that the Type II record/replay response is a little bright. Use of a tape with an inherently falling response is recommended.

## DX-990 CD PLAYER

The display area shows the current track number and time, and a thermometer style display – misaligned on the review sample – reads out all available track numbers. A 20-track memory, repeat and track skip add to the features tally. But track search is slow, and disc tracking erratic except on unblemished discs.

## MX-1500 AMPLIFIER

The amplifier offers 40 watts per channel (not 75 as the manufacturer suggests), and is similar to the V990's amplifier, including a slightly more elaborate version of the graphic equaliser and spectrum display. There is also the same facility for an add-on DAT or other external signal source or recorder, and the same very simple surround sound facility (near useless in practice).

One of the most visible differences is that the electronic volume control is replaced by a potentially better sounding motorised conventional type. The remaining controls (and there are a number of them) are dedicated to operation of the complex tone control circuits, microphone mixing, and the two already mentioned record out selectors.

## SX-1500 LOUDSPEAKERS

The SX-1500s are nothing if not well finished, generously proportioned and built. Using no less than three flash looking drive units, they contain the usual minimum of under the skin hardware and engineering. The enclosure, however, has smoothly rounded contours and with the baffle cover in place they look the part. Well adapted for use well away from walls and other obstacles (they boom when used otherwise), they offer a surprisingly good measured response shape.

## HOW IT SOUNDS

I was expecting a lot from the system as a whole, but little from the loudspeakers, for

reasons that should be clear. In the event, however, they conspired along with the amplifier (which sounds more articulate and in command than the 990 System amp) to sound well on the way to being vivid, colourful and alive. They gave a real taste of stereo imagery, with a relatively mild dose of splashiness and 'glare' in the traditionally weak upper treble area. They were also capable of going quite loud, and more important still, preserved dynamics and didn't sound strained. They are broadly comparable in practice with some of the low end specialist designs – but not the best of them.

Objectively the tuner isn't in the best category of modern digital tuners, which as a breed are often worse than previous generations of analogue (scale and pointer) tuners, but it was clearly better than the one in the cheaper Aiwa V990 System. It still had a rather aggressive, 'edgy' quality, but reception problems which at times led to whistles and other spurious with the V-990 tuner were dealt with in style here, and background hiss was suppressed.

The other sources were open to some criticism, but nothing excessive. The turntable is not of high fidelity standard, but despite some susceptibility to microphony and simple knocks and bumps it did perform a little tidier than most system turntables, especially in the extreme bass.

The CD player was also far from being the best of its type, suffering from a degree of artificiality that would be untenable in a truly high class high fidelity system. It removed the almost tactile cues that CD is capable of, and again the top end sounded openly 'splashy' and aggressive. Even so, its deflections from the path of true wonderfulness were mild in the context of the system as a whole. It was OK.

The cassette deck wasn't far behind. And as cassette decks go this one is almost as elegant sonically as it is egglike in its versatility. It is an excellent recorder which makes clean sounding and stable recordings, with good control and definition.

## VERDICT

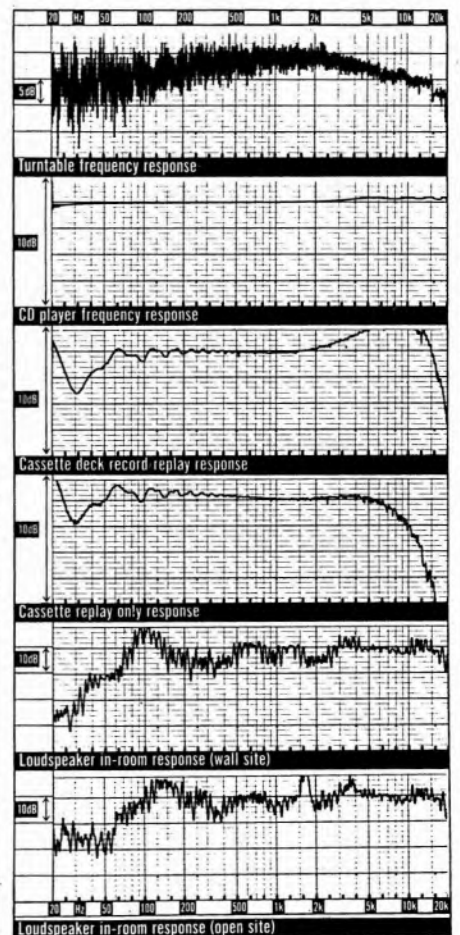
On the whole this is a more than satisfactory sounding system which can be recommended even with the loudspeakers, but which is predictably better without. The extensive user features are mostly there to make life easier and more enjoyable, though inevitably they detract from the easy to grasp control system that characterises the V990.

## GENERAL DATA

Cost with speakers £999.95 (without £849.95)  
Options? Sold w/o CD player as V1500 £799.95  
Size – main unit 75.5 x 33 x 33.5cm (h x w x d)

Size loudspeakers	45 x 26 x 19.2cm (h x w x d)
<b>Turntable</b>	
Wow & flutter wtd	0.085%
Drift	average
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
(<10Hz too low, >14Hz too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*
<b>Tuner</b>	
Sensitivity	fair
Signal/noise	good
<b>Cassette Deck</b>	
Wow & Flutter (wtd)	0.085%
Signal/noise ref 0dB Type II	51.5dB
Distortion 0dB Type II	1.4%
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	98.5dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	40 watts
(1kHz, both channels driven)	
<b>Loudspeakers</b>	
Efficiency	above average

\*unable to connect to test equipment



# FIDELITY MS202

FIDELITY PLC, VICTORIA ROAD, LONDON NW10 6ND. TEL: (01) 965 8771.



The *MS202* is a full midi system that conspires to include a twin cassette mechanism, a tuner, a turntable and loudspeakers. Add a CD player in the shape of the *CD202* covered here, and you have a complete system that sells for £339.98. This breaks down to £169.99 for the basic system with loudspeakers, and £179.99 for the CD player.

The system is a badged import, from Taiwan in the case of the main system unit, and Japan in the case of the CD player. Build quality is as simple as you'd expect from the price tag, and styling is uninspired. Despite a half-hearted attempt to make the system look crowded and full of features (which it isn't), there is enough commonsense grouping of controls and differentiation by function to ease the task of learning to drive it considerably.

## MAIN UNIT

The *MS202* facilities count is pretty standard. The turntable, for example, is based on cheap unsprung plastic mouldings, the arm being particularly shoddy. It is equipped with a rudimentary magnetic cartridge which tracks at an amazingly high and non-adjustable downforce, and which is fitted with a plastic can-

tilever. Yes folks, they haven't even tried to disguise the fact – the cantilever is made of bright red plastic. Next they'll be casting car engine crankshafts in solid high density balsa wood...

Very pretty it is too, but quite unsuitable for playing records to judge from the excessive distortion (and presumed groove damage) at high modulation due to severe mistracking. It wasn't possible to measure the deck properly since interfacing the system to my test equipment wasn't practical. But I can tell you that the frequency response shape matches too closely for coincidence a picture I have of the Himalayas. Note the truly gargantuan response peak between 3-4kHz, and the severe discontinuity at 125Hz. To say that it is all over the place is rather like saying that not all motorway service areas offer *Cordon Bleu* cuisine. Too true they don't.

On to the tuner section. As usual it covers all three wavebands of importance in this country – FM (stereo), MW and LW. It does so using a purely mechanical scale and pointer tuning system based on an inordinately stiff and low geared vertical tuning wheel. There are no presets of course. On test, the Fidelity was severely noise-bound, and selectivity was poor. The AM side was a complete shambles from all

points of view, hamstrung partly perhaps by its inability to accept an external aerial.

The cassette deck has a record/playback and a playback only transport, plus manual switching for Type I, II and IV tapes (standard or ferric, chrome and metal or equivalent). The deck will accept a pair of microphones, and there's a mechanical tape counter too. Dubbing (sensibly it's limited to normal speed only) and sequential play are included in the unit's specification. Auto stop doesn't work following fast wind, and record levels are regrettably set automatically.

What's missing is Dolby noise reduction. Apart from the Fidelity's extreme noisiness, the lack of Dolby signals the inability of the system to reproduce pre-recorded tapes adequately. It's not just that playback will be hissier it's that the sound becomes mangled, instruments vary unpredictably in relation to others, and stereo images shift alarmingly.

The auto level control has one of the most audible actions I have ever heard, allowing music to completely swamp the tape for a couple of seconds, and then overreacting by attacking the input so strongly the music all but disappears. Amazing. Wow and flutter is high, but this isn't a determining factor in this case.

The amplifier offers 10 watts/channel, which in practice is more than sufficient given the efficiency of the loudspeakers, not to mention the listenability of the system at high volumes. The only operating facilities are a so-called graphic equaliser, and the necessary volume, balance and source controls. The equaliser is pure window dressing. There are only three controls – bass, midrange and treble – but they are doubled up, and positioned alongside the balance slider to give the impression of a legitimate equaliser. Don't be taken in. There are no spare inputs apart from the one used by the CD player.

## CD202 CD PLAYER

The CD player is separately packaged, which enables Fidelity to sell the main unit on its own. Made in Japan, it is rather better engineered than the rest of the system. The control centre of the player takes the form of a stylised diamond within a square on the front panel, different corners of which provide such functions as track skip, audible scan, play, pause and stop. It's a clever arrangement that is at once attractive and which very quickly becomes intuitive (other manufacturers please note). 15 tracks can be programmed into memory, and a repeat option is available.

The loading drawer is surprisingly fast acting, but track search commands are followed at a snail's pace, and in any case can't be programmed in until the play command has been given and is well on its way to being obeyed. The player boasts a 14-bit converter, and does not have an oversampling filter, which in effect means that there is no attempt to meet the full compact disc specifications. Signal/noise is very poor as checked *via* the system headphone socket, but the response shape is about optimum.

## LOUDSPEAKERS

The sealed loudspeakers inhabit shallow, lightweight enclosures, and contain two very cheap 'n' cheerful cone drivers, mounted from behind the baffle (which usually adds a layer of coloration to the music). They boast very little energy below 200Hz or above 7.8kHz, but the trace looks satisfactory in between.

## HOW IT SOUNDS

Like the wisdom of a donkey, there's a certain clarity about the sound of this system. The trouble is that this is achieved by default – it is simply the sole beneficial side effect of a circuit simple enough to be produced at this price level. Because the other immediately obvious observation is that the presentation of sound is

positively unpleasant.

Even on headphones, bypassing the worst excesses committed by the loudspeakers, the Fidelity has a raw, 'shouting' quality, and a 'thinness' that robs the sound of any solidity. It doesn't make the kind of noises you can sit down and enjoy – or even endure with equanimity. You just kind of sit down, and the system kind of pins you to your seat until it's all over.

The loudspeakers merely serve to caricature this effect, simultaneously adding a layer of artificiality all their own. Stereo presentation is totally flat in (lack of) depth, whilst there is no sense of lateral spread – merely two discrete wedges of sound that were never destined to knit together.

The CD player was the best component, but listeners unaware of what they were listening to would be unlikely to recognise its origins as the 'perfect sounding' source of the future. They might even be forgiven for thinking they were listening to a rather poor turntable, with an undernourished, noise-bound sound, whose pitch stability and rhythmic integrity were rather at odds with the metronome-like certainty that is the public image of the medium.

Given a reasonable signal strength, and this presupposes a decent aerial installation, the FM tuner also sounded OK when monitored on headphones (note the *caveat*). But the front end tended to produce 'spitchy' effects, with sibilance exaggeration and distortion arising from 's' and other HF-rich signals. With weak signals, the Fidelity merely sounded soft and whistly.

Cassettes on the other hand came over sounding smeared, compressed and uneven in level (due to dropout as well as the ALC circuit), and lacking in pitch integrity. The tape deck was simply a mess.

## VERDICT

On the whole, and although the CD player and FM tuner are inherently capable of making acceptable music, the rest of the system simply sounded coarse and ugly. It's very cheap of course, but for musical enjoyment a decent portable radio will easily outperform the Fidelity system. I feared for the continued playability of my test records too. On balance, the message of this system, which is certainly as good as can be expected at the price, is that worthwhile full feature systems cannot be had without paying more.

## GENERAL DATA

Cost with speakers	£339.98
Options?	£159.99 without CD player
Size – main unit	68.5 x 34.6 x 39.5cm (h x w x d)

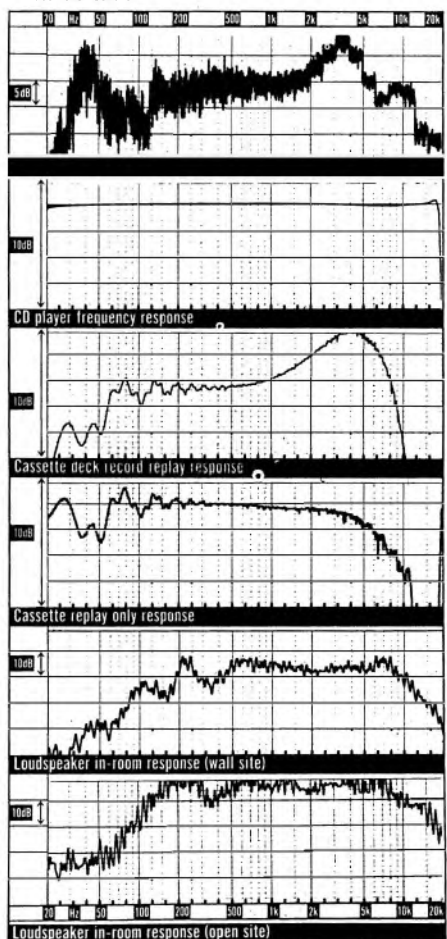
Size loudspeakers 34 x 22 x 14.1cm (h x w x d)

<b>Turntable</b>	
Wow & flutter wtd	0.13%
Drift	poor
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
(<10Hz too low, >14Hz too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*
<b>Tuner</b>	
Sensitivity	very poor
Signal/noise	very poor
<b>Cassette Deck</b>	
Wow & Flutter (wtd)	0.25%
Signal/noise ref 0dB Type II	n/a**
Distortion 0dB Type II	n/a**
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	71dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	10 watts
(1kHz, both channels driven)	

**Loudspeakers**  
Efficiency above average

\*unable to connect to test equipment

\*\*auto level control



# GOODMANS 5100

GOODMANS LTD, 2 MARPLES WAY, KINGSCROFT CENTRE, HAVANT, HANTS PO9 1JS. TEL: (0705) 486344



From their base as manufacturers and suppliers of loudspeakers for home and car use, Goodmans have gone from strength to strength through product diversification, achieved partly as a result of acquisition and partly by acting as distributors. They now list radios (including a quite nifty low cost 4-band model with preset tuning) and other portable products, microwave ovens, TVs, telephones and personal stereos. They have taken over specialist loudspeaker manufacturer Mordaunt-Short, and merged with Tannoy, in the process becoming one of the most powerful, and certainly the largest force in the British hi-fi industry. Increasingly Goodmans are also getting into systems, of which this is merely the most recent.

The sample 5100 system supplied for this review is said by Goodmans to be functionally as per normal production, but apparently the aesthetics aren't yet finalised. Speaking personally, I find it hard to imagine a more nondescript fascia design; it would take an earthquake in the styling department for changes drastic enough to be material to take place. But this is very much par for the course at this end of the market. Konformity rules KO.

The system is made on Goodmans behalf in Taiwan. The electronics are supplied as a single unit, and this includes the turntable and CD player. Only the loudspeakers are separate, as

they must be, and there are no options of any kind. The system is available only as reviewed here.

## MAIN UNIT

Construction of the main unit is very much of a kind with other cheap systems. Tacky and plastic are the words that spring immediately to mind. The impression of cheapness is everywhere, and handling the system only reinforces that impression.

Contained in the main system unit is a CD player, a cassette deck, a tuner and also an amplifier. Interfaces to the outside world are notable by their total absence. On the front panel there is a headphone socket, and on the back a terminal strip for the loudspeakers. And that's it, folks. There are no spare inputs of any kind, no way of even attaching a microphone.

The turntable is in character. Belt driven, it is equipped with auto return at the end of side. Set down, however, is manual, assisted by a well engineered cueing platform whose control lever is located near the arm base. There is no suspension and absolutely no mass damping of the crude platter (crude rather overstates its sophistication). The arm has a pretend moulded adjustable counterweight, and cartridge alignment is way off beam.

The magnetic cartridge has an essentially flat energy trend through the midband, but

roughens up considerably at higher frequencies. Turntable speed stability is in line with build quality.

The press release says that the amplifier is rated at 35 watts/channel. My instruments say otherwise, but the Goodmans still manages a creditable 26 watts/channel, which isn't bad for this class of system. It has a 5-band graphic equaliser (so-called), plus volume and balance controls. There are no other facilities of any kind.

The tuner by contrast is quite well equipped. It is a full quartz synthesiser implementation of the usual type, with a neat back-lit LCD read-out of tuned frequency. Five tiny little preset buttons each provide one frequency on each of the three wavebands - FM, MW and LW - which are selected using three waveband keys. It's a perfectly satisfactory arrangement, even though the pattern has been largely superseded by designs with random presets, which obviates waveband switching.

There were serious problems with the tuner under adverse reception conditions, however. Very strong signals completely swamped the front end, and the audio output changed from music to a loud buzz. Under average signal strength conditions the tuner behaved more normally, but noise levels were always high; and the noise was always beset with whistles and other spurious, which increased in strength

and annoyance value as the signal strength was reduced. AM performance on the other hand was satisfactory on all counts – noise, interference levels and intrinsic sound quality.

The cassette section has twin unidirectional transports, with just one of the two equipped to make recordings. Noise reduction is by Dolby B. Dubbing is available at high speed or in real time, and sequential play is also possible. The makers have provided a link between the cassette deck and the CD player mechanism which synchronises recordings made from CDs – handy for making up tapes for in-car or personal players. Auto stop doesn't function from fast wind by the way.

The frequency responses sharply favour the treble, and although this may be partly a function of the frequency selective effect of the auto-level control circuit, sonic results gave much credence to the measurements. Wow and flutter was something else. 0.4% was about average for a portable about a quarter of a century ago, so the Goodmans represents a very special kind of progress.

Finally, the CD player, an integral part of the main unit as already noted, is very basically equipped, though it will programme an impressive 36 tracks maximum. The display omits time indications and there is no audible cueing feature, which is practically universal elsewhere.

One irritating feature of this system (though I concede that it is common to a number of others) is the way power is removed from the compact disc player as soon as another input is selected. Although this may not seem to be particularly relevant – after all, if you're in the middle of a tape, why would you wish to change to the record deck? – it's not unreasonable to want to make a quick check on the radio whilst the CD player is held on 'pause'.

This was not the only feature of the compact disc that made me want to tear my hair out. Unaccountably the deck reserves its largest and most prominent operating control for the 'track skip' function, hiding 'play' below and alongside an identically styled 'stop' button. The 'skip' feature idiotically fails to auto-repeat and won't even make amends by finding the last track on the disc when using the backwards skip control from the stop position. I merely hope the guy who wrote the control software doesn't go on to work at my local tax office.

## LOUDSPEAKERS

This is where the Goodmans comes good. The loudspeakers, benefitting from Goodmans' proven loudspeaker expertise, are made in this country to standards broadly in line with low end hi-fi design. They're medium/small, and

incorporate a paper cone bass unit of some quality, along with an Audax tweeter – again a legitimate high fidelity component. The enclosure is unprepossessing but satisfactory, and the in-room energy trend is much smoother than usual, especially at the frequency extremes.

## HOW IT SOUNDS

I've heard worse sounding record decks than the one fitted here, though the pitch of sustained notes was all over the place. But I wouldn't trust any valuable discs to its embraces, so abysmal is tracking performance.

Cassettes sounded rough, and had a sharp 'edge' which undoubtedly corresponds to the measured frequency response shape. Output levels appeared to vary almost randomly within a relatively narrow envelope, and dynamics were squashed quite severely, though the auto level control wasn't as fierce acting as some. Speed stability was audibly erratic, and noise levels were always high. Noise was high on FM radio too, though this was the major shortcoming here; otherwise FM sounded perfectly reasonable as long as the music was loud enough to swamp the background.

This leaves the CD player as the prime source of decent sound quality (though background hiss was intermittently audible here too). As already noted, the loudspeakers are a step up the quality ladder from the run of the mill. However, it's also true that the system amplifier did them no favours; in the end this factor proved decisive, and the loudspeakers could do no more than show clearly what problems lay elsewhere.

The amplifier was clearly quite unable to track recorded dynamics; it constantly sounded strained and 'on edge'. The wealth of richness and variety of information that is captured on practically every musical recording was allowed no free reign. The system sounded messy and confused, and much detail was masked.

## VERDICT

Regrettably, good loudspeakers can't rescue the abysmal electronics. Seen in this light, the price looks like less of a bargain than first impressions suggest. And the turntable should carry a health warning: 'this product may damage your record collection'.

## GENERAL DATA

Cost with speakers	£379.90
Options?	none
Size – main unit	63 x 38.4 x 41.3cm (h x w x d)
Size loudspeakers	34.9 x 22 x 18.6cm (h x w x d)

### Turntable

Wow & flutter wtd	0.19%
Drift	poor
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
(<10Hz too low, >14Hz too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*

### Tuner

Sensitivity	poor
Signal/noise	very poor

### Cassette Deck

Wow & Flutter (wtd)	0.40%
Signal/noise ref 0dB Type II	n/a**
Distortion 0dB Type II	n/a**

### Compact Disc Player

Signal/noise (measured at Tape Out)	73.5dB
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### Amplifier

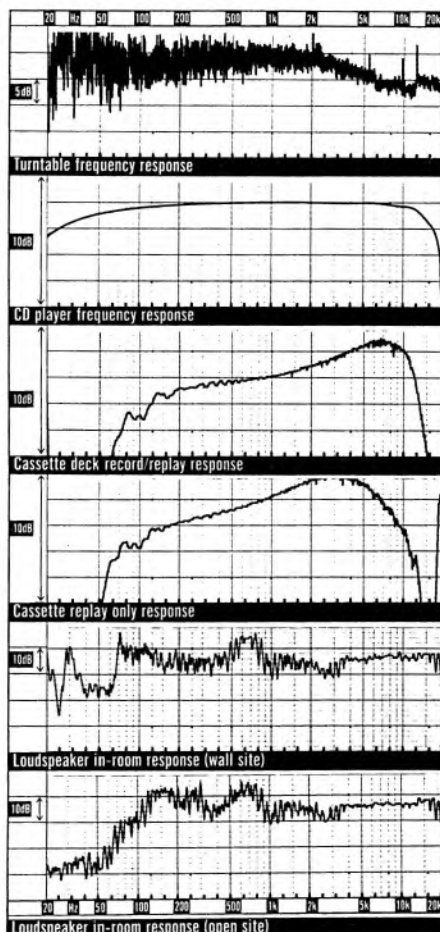
Power output/channel (8 ohms)	26 watts
(1kHz, both channels driven)	

### Loudspeakers

Efficiency	average
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\*unable to connect to test equipment

\*\*auto level control



# GOODMANS MAXIM MIDI SYSTEM

GOODMANS LTD, 2 MARPLES WAY, KINGSCROFT CENTRE, HAVANT, HANTS PO9 1JS. TEL: (0705) 486344.



To a first approximation, the *Maxim-Midi* System is a de-luxe version of the *5200* system reviewed last year and which continues to be available at a reduced price. Both systems are based on separates – no cassette/tuner/amps here – and can therefore be readily upgraded with alternative components should the bug take root. Consequently the Goodman's is *not* a dead end purchase, unlike most of the systems in this issue. It is very fully equipped and flexible, though the latter doesn't extend to remote control or synchronised record starts.

## MRP2001 TURNTABLE

Unlike the Japanese electronics, the turntable comes from Korea. Semi-automatic operation involves manual setdown assisted by a damped cueing platform (the lever is near the arm base) with automatic return at the side end. The platter is an alloy casting, belt driven from a DC motor. Construction is very light and resonant.

Wow and flutter is very well controlled, and speed accuracy reasonable. However, the cartridge had an intriguing measured performance. Tracking ability was excellent and separation at 1kHz was well above spec – better in fact than the test instruments were capable of resolving even though the cartridge was canted alarmingly to one side. Channel balance, however, was way off beam, and the response run suggested strong high frequency losses. Asses-

sed on music rather than test tones, the HF region sounded very dirty and distorted in the presence of treble-rich material, which implies that tracking isn't so hot after all.

## MDT2001 TUNER

This is a gimmick free 3-band tuner, with 7 FM presets and 7 which can be shared randomly between MW and LW. Powered manual tuning is available *via* a simple rocker switch which stops when released. The display is fluorescent, and not as attractive as more modern back lit ones, but serviceable nonetheless. A stereo indicator is fitted, and the only real surprise was the absence of a mono switch – but there is one on the amplifier.

The tuner performed strongly on the test bench. Sensitivity was high and noise levels were low, though there were some problems with capture effect, unwanted stations tending to break through onto wanted ones at a very low level. The two AM bands were not an outstanding success. My notes describe the sound as 'anaemic', with limited bass and treble and no dynamics to speak of.

## MRW2001 CASSETTE DECK

This deck looks rather button bound. Manual tape type switching (including metal) accounts for three of them, and others control the Dolby B noise reduction, high speed dub-

bing, and so-called continuous play (actually sequential play). Microphone and headphone sockets are both fitted, but best of all record levels are set manually, a pair of vertical bargraph meters providing the necessary assistance.

The Type II record/playback response shape is a little 'dished', in favour of the bass and treble, though the top end can be tamed by judicious choice of tape types. The playback only frequency response was quite well optimised. Wow and flutter kind of splits the difference between prevailing system and component audio standards. Noise and distortion at 0VU checked out well. Sum up? Not bad.

## GCD-500S CD PLAYER

The *GCD-500S* is totally at odds with the rest of the system, both in style and execution, the heavy membrane switching being a case in point. Without wishing to put too fine a point on it, this is a crude player operationally, with tedious disc handling, no preselection of tracks before loading and so on. But you do have a 16-track memory, repeat play, cueing, Uncle Tom Cobby and all.

The display simply reads out track numbers, or at the press of a switch elapsed times. At the end of the disc it tries to get clever and say 'End', but as only two alphabetic characters are available, it actually says Ed (right, Ed?) (*OK-Ed.*). Tracking ability was surprisingly good

even on badly marked discs, proving it *can* be done.

## MPA-2001 AMPLIFIER & MEG 2001 EQUALISER

With the front panel flap closed, this 40 watt/channel amplifier is the model of purposefulness, with only the volume control, headphone socket, source switching and various tell-tales on show. Open the flap and you find the tone and balance controls, a loudness switch, a low pass filter (avoid) and a microphone mixing facility. The graphic equaliser section (avoid, avoid) is housed separately and divides the audio frequency band into 12 sub-bands, each with its own 'tone' control red LED illuminated when active. The set equalisation can be bypassed (for best sound) or fed to the tape deck if required as well.

## MAXIM 2 LOUSPEAKERS

Already a Best Buy in *Choice: Loudspeakers*, the *Maxim 2s* are unusually small, being considerably shorter than a long playing record, less than a normal handspan wide, though quite deep which brings the cubic capacity back a bit. All this makes the *Maxim*, quite literally, an unusually handy proposition. But being small and neat is not *carte blanche* for placing them in any hole on a shelf (for example) that presents itself. The *Maxim* must be used on tall stands for anything like best results, preferably about a foot from the wall behind.

The hardware complement includes a very rigid enclosure (small means rigid without need for exotic build techniques), a small Audax tweeter and a beefy pulp cone bass driver – all driven from a well specified and laid out crossover. Finish is black vinyl 'woodgrain', and the loudspeaker terminals are 4mm socket/binding posts. The response extends down to below 100Hz in the bass (some of the larger speakers in other systems did nothing below 200Hz), and upper mid and treble output was very smooth.

## HOW IT SOUNDS

One of the loudspeaker bass units decided to give up the ghost during testing; luckily a replacement of the original Maxim model was found and pressed into service. I have a good deal of respect for the inherent qualities of this particular design. But these speakers really do need treating properly from every angle, and I fear they weren't in the best of voice with the Goodmans system, where the often rather

coarse, 'flattened' sound of the electronics tended to come through all too clearly.

The turntable worked a little better than expected in some areas. The bass, though not very powerful, was at least decently controlled and light, even agile in feel. The midband was surprisingly crisp in definition and the overall effect nas natural and enjoyable, if slightly 'pushy' in balance. The bottom line, however, is that the record player mistracks; worse, it mistracks so heavily and often that it becomes a trial to listen to almost any percussion recordings, which fizzle away like a Guy Fawkes sparkler. This is a crucial limitation, since mistracking does about as much good to records as a Challenger tank does to the local high street tarmac – and for much the same reasons.

On the other hand, I admit to not liking the CD player much from a user's angle – I found it clumsy and obstructive – but it's also only £150, it does play music in a reasonably articulate way, with a decisive, detailed presentation and a reasonable (not excessive by any means) amount of detail. There's nothing nasty about it at all, even though it is cheap.

Likewise the cassette deck, which was not that wonderful but did at least work. All the traditional failings of cassette decks are on display: vagueness, defocused stereo, poor resolution at the frequency extremes, loss of dynamic range – sounds like an R rated disaster movie, doesn't it? The fact is, however, that none of the bad points was taken to excess, and the deck really was perfectly serviceable. In routine, non-critical use it was often possible to forget you were listening to cassette at all. The tuner was also likeable off air (on FM anyway), and an effective alternative to the CD player from the qualitative point of view. It sounded gutsy, dynamic and together, while amply transcending its price point.

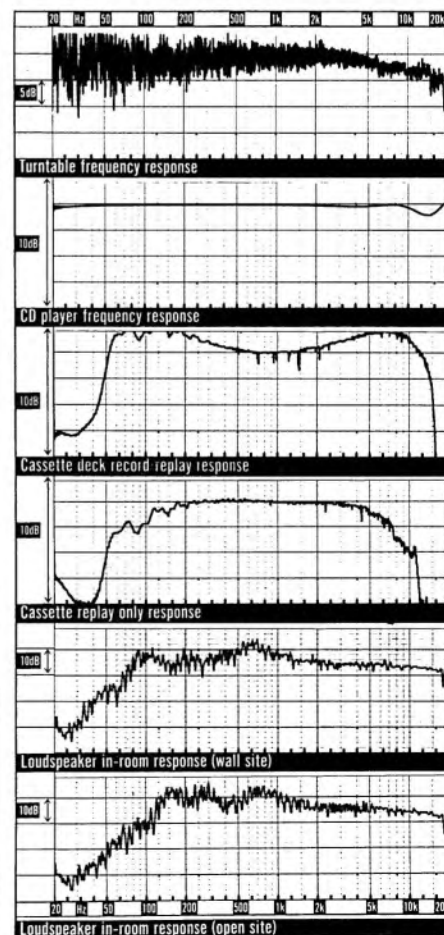
## VERDICT

I was happy with this system, less for its excellence in the gentle art of music reproduction than for its sheer, unadulterated value for money. Like the original Ford Cortina, it's an awful lot of sheet metal for your money, and does seem better in many specific areas than the *Midi 5200* system.

## GENERAL DATA

Cost with speakers	£550
Options? CD player –	£150 (system w/o costs £400)
Size – main unit	73.5 x 34.5 x 36.5cm (h x w x d)
Size loudspeakers	26 x 17 x 20.6cm (h x w x d)
Turntable	
Wow & flutter wtd	0.08%

Drift	average
Speed accuracy	+0.3%
Arm/cartridge resonance	OK
( <10Hz too low, >14Hz too high)	
Cartridge channel balance	2.4dB
Cartridge channel separation	-30dB
Cartridge tracking ability	69µM
<b>Tuner</b>	
Sensitivity	very good
Signal/noise	very good
<b>Cassette Deck</b>	
Wow & Flutter (wtd)	0.13%
Signal/noise ref 0dB Type II	54.5dB
Distortion 0dB Type II	1.4%
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	R = 101dB/L = 94dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	40 watts
(1kHz, both channels driven)	
<b>Loudspeakers</b>	
Efficiency	average



# HITACHI MD280

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The MD280 is at the top of a range of three systems, all available either with or without a CD player and rejoicing under the *Scorpion* badge. The system sells for £279 without CD, and in that form is known as the MD28. The other models offer less power and facilities, and start at £199.99 without CD player, or £329.99 with. They are therefore aimed firmly at the bottom end of the market.

The MD280 must be every marketing man's dream. The fascia design looks so crammed full it seems impossible that anything could have been omitted. Yet in reality equipment levels are quite basic. It isn't what would normally be regarded as well built, but given the price it's as good as can be expected.

## HT-MD28 TURNTABLE

Although belt-driven, all similarity between the Hitachi and, let's say, a Linn *Sondek* finishes there. The platter is made of plastic, the mat is thin. Flexibility is the arm's middle name and the construction of the whole deck is thin and wobbly. The edge float (the amount by which the platter edge goes up and down as it rotates) is enormous. Operation is manual on the way in, assisted by front panel cueing and a motor that switches on as the arm approaches the disc. Outbound is automatic as usual. The

cartridge is a simple magnetic, sourced from Audio Technica.

Measured *via* the amplifier headphone outlet (the only sensible access point), the turntable response shape shows a heavy emphasis at the bottom end (mostly below the passband of the loudspeakers), and considerable roughness at HF. Wow and flutter levels are high, and in practice the pitch of the music was so unpredictable I found it hard to listen for any protracted period. I admit to giving up after the obligatory minimum!

## HRD-MD28 TUNER/CASSETTE/AMPLIFIER

The majority of the electronics are contained in this single box, which is styled to look like separates.

The FM, MW & LW tuner has digital tuning, and is accompanied by a digital readout of tuned frequency and preset number, on a far too dim red fluorescent display. There are ten random presets using five main preset buttons plus a 'shift' key. In a minor subterfuge, each preset key has two numbers corresponding to the two presets available, but Hitachi have chosen to omit numbers 6-10 inclusive, so that at a first glance the unit appears to have 15 presets. The auto tuning mode proved unusually

obstructive, but that's relevant only until initial setting up is completed. Sensitivity is low, unfortunately, and low signal levels are accompanied by a cacophony of whistles and other spurious.

The cassette deck has two mechanisms, one for recording and replay, the other for playback only. Record levels are set manually, using a simple meter (one only for both channels). This at least ensures that some semblance of dynamics pass through unimpeded, and is clearly preferable to auto level control on musical grounds.

Everything else is manual too, including a very badly designed tape type switching arrangement. High speed dubbing is possible, the unit will accept a single microphone, and noise reduction is by Dolby B. The unit can be made to play one side from each of two tapes in succession – sequential play.

Transport controls are manual and poorly anchored, but they're easy to understand and gave no problems in practice. Users are unlikely to wear their fingers out for lack of power assistance.

The measured performance of the deck is a bit of a mess, but there are limitations built into the test procedure, in that the only way into the machine's innards was *via* the headphone socket. But nothing excuses the severe lack of



head alignment that led to the playback response shape shown, or the horrendous levels of wow and flutter, which are poor even by portable standards.

The amplifier section is very poorly equipped, unless you think you have a use for the 5-band graphic equaliser beyond impressing your friends. For example, there are no inputs whatever beyond the ones required by the system CD player and turntable. Headphones and one pair of loudspeakers can be connected, and remaining facilities are limited to a balance control and loudness switch (surely redundant in the presence of a graphic equaliser, so I assume it was specified by the marketing department).

I wasn't happy with the volume control. It had become very stiff and crude in action because of the (mechanically coupled) bar graph display that supplements more than adequate edge markings. No other complaints though, and power output is healthy enough at 30 watts/channel.

## DA-7000 COMPACT DISC

The DA-7000 CD player is easily the best built item in the system. The instruction manual lists several 'Luxurious Features', every one of which is absolutely standard even on the most basic players. They include track skip and audible scan, plus memory programming for up to 24 tracks. The display shows track numbers only, along with a simple illuminated arrow which translates as 'play'. The response shape gives evidence of filter ringing, and tracking ability on marked discs was very poor. On the plus side, disc handling generally, and the drawer action in particular is smooth and rapid.

## SS28X LOUDSPEAKERS

Not wanting to risk damage to the enclosures, I wasn't able to find out what kind of bass unit is employed, but the tweeter at least can be examined through the baffle. It's a large cone unit, as is often used in cheap and cheerful loudspeakers – and this is by any standards a cheap, cheerful (and not very good) loudspeaker.

The enclosure is light and well finished, if ugly. Its resonant structure can be determined by the dramatic 'bloom' that, at its most objectionable, accompanies all male speech off radio. The response shape of the loudspeakers is ragged at the top and clearly resonant at the bottom. Most of the sharp 200Hz resonant peak is real, not a room effect, and in practice determines the low frequency cutoff. In other words, the SS28X doesn't have any bass. Not the slightest bit.

## HOW IT SOUNDS

The difficulty here is that only moderate results can be expected given the price constraints, and making the assessment is a subjective matter, fraught with difficulty.

On due reflection, however, I have to conclude that the system doesn't make it. If the lower cost systems in the *Scorpion* range just lack power, but don't suffer too much elsewhere, they will represent a strong weapon with which to beat the legion of no-hopers at this end of the market. But this model is a kind of 'luxury budget' model, and at £429 is really out of its class.

Accuracy is too much to expect at the price. Had the system sounded reasonably entertaining that would have been enough. But the loudspeakers are unpleasant even by portable radio standards: bass is utterly absent whilst their thin, resonant construction is reflected in a coarse, uneven sound that lacks detail and is a total stranger to dynamics. On the face of it the amplifier is quite potent, yet the flattened perspectives and dynamics afforded by the loudspeakers belie the fact. In any case, listening at high volume is quite out of the question. The sound is really too crude.

So poor were the amplifier and loudspeakers, it's almost academic to try and distinguish too closely between the source components. But AM radio sounded shabbier than usual, FM was OK if a little rough and noisy, and the turntable sounded de-focused and incapable of holding the pitch of a sustained note. On the other hand the cassette deck sounded a little fairer than the numbers – and the rest of the system – might imply, though there's no sense in thinking of using metal tapes, and piano sounded especially insecure. The best source was the compact disc player, but even here the sound could not be described as other than lacking colour and texture.

## VERDICT

The shortfall in resolution and bass extension is such that it's really not possible to hear what's going on. The price is low, but not low enough, and on balance this system gets a thumbs down.

## GENERAL DATA

Cost with speakers	£429.99
Options?	w/o CD player £279.99
Size – main unit	70 x 37 x 34.5cm (h x w x d)
Size loudspeakers	31.5 x 19 x 21cm (h x w x d)

### Turntable

Wow & flutter wtd	0.18%
Drift	poor
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
(<10Hz too low, >14Hz too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*

### Tuner

Sensitivity	poor
Signal/noise	very poor

### Cassette Deck

Wow & Flutter (wtd)	0.23%
Signal/noise ref 0dB Type II	40dB**
Distortion 0dB Type II	3.3%**

### Compact Disc Player

Signal/noise (measured at Hdph Out)	70dB
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### Amplifier

Power output/channel (8 ohms)	30 watts
(1kHz, both channels driven)	

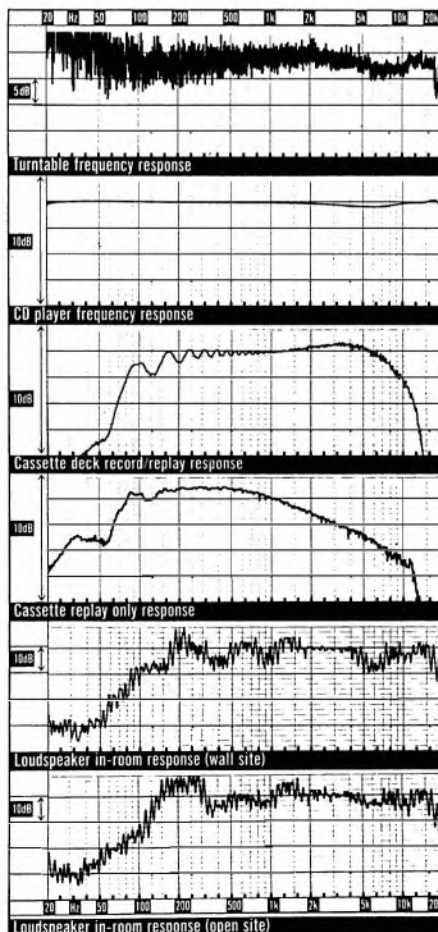
### Loudspeakers

Efficiency	above average
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\*not possible to interface with test equipment

\*\*via amp head phone output

\*\*via amp head phone output



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## MARANTZ STUDIO SYSTEM

MARANTZ AUDIO (UK) LTD, 15-16 SAXON WAY IND. EST., MOOR LANE, HARMONDSWORTH, MIDDX UB7 0LW. Tel: (01) 897 6633.



In addition to an extensive range of standard midi systems, the hi-fi specialist Marantz outpost of the Philips empire also sell systems aimed at the budget end of the audiophile market. The *Studio System* tested here is an example.

The conception of this system isn't what you might expect. Some of the components are perfectly ordinary devices of no special pretensions – for example, the CD player – while others are based on standard components which have been tweaked to inject some audiophile appeal. The amplifier is a case in point, as we shall see. Finally there are items which were designed from the ground up to fulfil an audiophile brief; the loudspeakers qualify here.

You'll notice straight away that there is no turntable, no cassette deck and no tuner. But there are what the company described to me as 'informal options' – to wit a tuner and two cassette decks (a single or double decker) which are listed separately in the Data section. For record playing, however, Marantz make no

recommendations – not because they are unhappy with the sound of records, but because they are honest enough not to rate their own players highly enough for use in systems like this one. For such admirable candidness (even though they may not have counted on my repeating it) the Nobel Prize is clearly in order.

### CD-56 CD PLAYER

The CD player chosen for the *Studio System* is one of the earliest to incorporate the current Philips 16-bit 4x oversampling technology. Although the chip set is ultra-modern, the rest of the player is beginning to look a little dated, and this is especially the case with the old-style drawer mechanism. This is as slow as it is crude, and may be seen to make a little sideways leap just before retracting (I kid you not). This *CD2* drawer mechanism has also been known to be less than perfectly reliable in some applications, though I concede that what I have been told is probably true, which is that the

problems have been largely ironed out – exempting only the ones that persist in breaking down, presumably.

Facilities are not extensive, but the essentials are there – barring a remote control, if you consider that an essential. The main display area reads out track numbers and elapsed track timings, with the alternative of time-to-go a button push away.

Track skip, audible cueing (which goes silent on full speed), a 20 non-repeating track memory and a repeat mode complete the package. Build quality is fine internally, but shows clear evidence of cost cutting externally.

Disc handling is not as fast as some, and the machine can sound slightly asthmatic, but tracking ability – a much more realistic reflection of engineering and design integrity – is first class.

### PM-26 AMPLIFIER

Confirming the lack of formal system building in the *Studio System*, the amplifier doesn't

even match! It's built into a smaller case than the CD player, and is both narrower (by just 4mm) and less high (by 2cm), as well as having a quite differently designed control layout. However, at least the panel graphics, based on an attractive gold lettering, are in house style.

The *PM-26* is based on the older low cost *PM-151* amplifier, from which it has been quite extensively re-engineered. Off came the switching and socketry for a second pair of loudspeakers, and in went the capability to bypass the tone control circuits – a far more worthwhile feature sonically. Out came some critical capacitors to be replaced by different types which audition better; the power supply was beefed up; copper screws replaced steel ones to promote better earth continuity and reduce ferrous metal content in critical areas; the output stage was improved and more.

The *PM-26* has a very simple specification. Power output on test was above spec at 40 watts/channel, but there are few gizmos, no flashing lights and only the bare minimum of inputs – phono, tuner, CD/aux and tape. Naturally and as a direct result the amplifier is very easy to use.

## LD-20 LOUDSPEAKERS

Marantz equipment is taking on an increasingly cosmopolitan slant these days. The CD players come from Belgium (Philips production lines in fact), and the amplifiers and other electronics components come from Japan. The loudspeakers are designed and made in the UK, though the designer is a Japanese engineer based in Europe.

In style and engineering the *LD-20* conforms to British design priorities. The small tweeter has a Mylar dome, and is a relatively sophisticated hi-fi-oriented design. The bass unit is well specified and fitted with a polypropylene cone. The enclosure, vented at the front, is strong and quite heavily built, with a full complement of crossover and damping inside. One unique point is that the speaker can be wired back to the amplifier using two or three core cables. The latter separates the earth returns from the tweeter and bass driver.

The *LD-20s* are so designed that they give their best when used on stands well away from walls. The in-room frequency response indicates a consistent loss of energy in the treble, but a very well tailored response shape and good extension below that. Efficiency is below average, and with the amplifier tested here, this is not a system for bawling out the neighbours.

## HOW IT SOUNDS

The system gave good results at low and mod-

erate volume levels, successfully straddling the gulf that divides packaged systems from out-and-out hi-fi components.

The sample of the *CD-56* used for this test was the second the author has tested in a fairly short period, and by a long distance the better of the two. When inserted into the best system to hand, it impressed in a number of ways. One of the most striking was the sheer transparency of the player – the way it allowed the qualities of the music to shine through. Stereo soundstage information was especially well handled: there was a great sense of depth, of precision in image placement and of scale. Tonal colours seemed to cover a wider than usual range, and dynamics happened less forcibly but with more integrity and stature than I had expected from recent experience of an earlier sample. All these things are what you'd expect of a player that actually achieves that rare but sought after quality: truly high resolution.

These qualities are only partly preserved in the subsequent audio processing. The amplifier does a pretty reasonable job, but doesn't like being driven too hard, even though the raw power output figure is a quite high 40 watts a side. At high levels it loses control and sounds ragged. In ordinary size rooms at less than headbanging levels, however, the system is unlikely to seriously overstep the mark, and under these conditions the amplifier has all the right qualities – speed, good bass and treble definition, and good stereo.

If the amplifier is compromised towards the edge of its operating envelope, the loudspeakers are more clearly compromised. Like the other components of this system they sound clean and detailed. And in stark contrast to the bulk of system loudspeakers, the *LD-20s* are particularly strong at the frequency extremes. The bass end was deep, tuneful and well controlled, assuming use on appropriate tall stands away from walls and other obstacles. However, the most important area of any loudspeaker is the midband, which determines the basic shape and character of the sound, and here the speakers displayed a trace of unevenness. At one moment an instrument would project well; the next it would sound dull and recessive. The integration between the two drive units was less than perfect, and the subjective tonal balance favoured bass over treble.

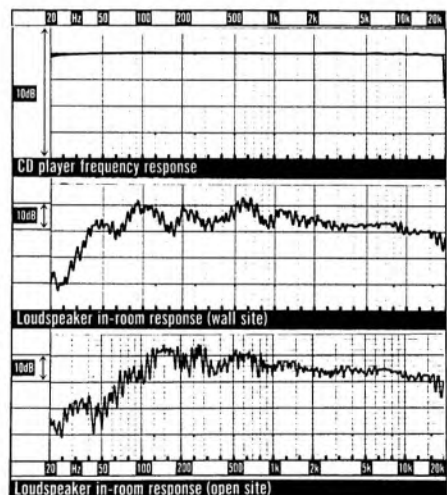
## VERDICT

This is an excellent system of its type. If it has certain limitations by full blown high fidelity standards, it remains an object lesson in packaged systems. Note that the amplifier and CD player are in non-matching boxes, and that the system doesn't include tape or radio facilities

as standard, though these can be obtained as extras and at reasonable prices. Flexibility is therefore definitely a positive feature. Recommended, lacking only a little inspiration to project it into Best Buy status.

## GENERAL DATA

Cost with speakers	£449; without £310
Options?	ST-26L tuner £109 SD-35 cassette deck £159 SD-275 twin cassette deck £149
Size – CD-56 CD player	10 x 42 x 30.4cm (h x w x d)
Size – PM-26 Amplifier	8 x 41.6 x 20cm (h x w x d)
Size – LD-20 loudspeakers	36.5 x 23 x 26cm (h x w x d)
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	>107dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	40 watts (1kHz, both channels driven)
<b>Loudspeakers</b>	
Efficiency	below average



# MARANTZ CONCERT SYSTEM

MARANTZ AUDIO (UK) LTD, 15-16 SAXON WAY IND. EST., MOOR LANE, HARMONDSWORTH, MIDDX UB7 0LW. TEL: (01) 897 6633.

BEST BUY



Marantz was the first major company to formalise the idea of a compact disc based system made from the minimum number of separate components. The *Concert System* is simply the latest in the line, and fully in keeping with the ideas underlying the *Studio System*, reviewed separately. The most obvious difference between the two is price.

The basic system consists of the minimum hardware needed to play CDs – a compact disc player, an amplifier and a pair of loudspeakers. Options available include a matching *ST-35* tuner and a *SD-35* cassette deck. Marantz supplied only the three basic units for test, but we still had a sample of the cassette deck left over from the last *Hi-Fi Choice: Cassette Decks & Tapes*, so were able to include this deck in this test.

Leaving the loudspeakers to one side for a moment, the cheaper *Studio System* was based on components which, whatever their other qualities, were relatively insubstantially built. This doesn't apply here. The higher prices for the equipment have been put to good

use making the components solid to the point of chunkiness. By midi system standards the Marantz *Concert System* is as impressively constructed as any, and almost as well finished. The aesthetics are based on black panels with gold lettering in the familiar current Marantz house style.

## ST-35 CASSETTE DECK

The facilities on this cassette deck follow typical modern hi-fi practice. Both Dolby B and C noise reduction are fitted, together with separate MPX filtering. This filter is built into all Dolby equipped recorders, and enables the Dolby circuits to work correctly with music derived from stereo FM tuners with 'dirty' outputs, rich in 19kHz pilot tone. MPX filtering is completely unnecessary otherwise, and indeed imposes a slight loss of sound quality, so the switching is appreciated.

Tape type switching is fully automatic, and capable of dealing with all three main tape types. In addition there is a variable bias con-

trol, which enables fine adjustments to be made to help match the characteristics of the machine to most brands of tape. The transport controls are touch sensitive. The deck is completed by a tape counter (but no memory or track search features) and record level meters with a 26dB dynamic range. Record levels are set manually.

The record/playback sweep indicates excellent linearity, the mild lift above 2kHz being within the scope of the variable bias control. Wow and flutter measured low, and the noise and distortion figures were equally encouraging. Furthermore, the playback response shape is perfectly satisfactory.

## CD-75 COMPACT DISC PLAYER

Another 16-bit player with 4x oversampling, the long established *CD-75* uses Philips' dual chip which has separate converters for each channel housed in a single package. It's attractively laid out with all the usual features including 20-track programmability, a numeric keypad, cueing, track skip and repeat. In addi-

tion the Marantz includes a headphone socket, fed *via* a volume pot. Only two features give the *CD-75* away as old style Philips technology – the simple time/track number display, and the slow, bronchial old loading drawer mechanism.

If the *CD-75* was not as fast as some when loading discs and locating tracks, it has few peers when playing scratched or dirty ones, and doesn't complain or feed back when knocked or subjected to high levels.

## PM-45 AMPLIFIER

Power to the tune of 55 watts per channel (worst case) is provided by this elegant amplifier. It is dominated by four large rotary controls – bass and treble on the left, the selector switch and volume on the right. Ranged in a discreet row along the bottom are a headphone socket, loudspeaker on/off switching and tone defeat, alongside tape switches used when dubbing or monitoring whilst recording. There is even a phono gain switch to suit MM and MC cartridges. The extensive range of inputs includes two tape circuits, four high level inputs (including CD) and phono. The remaining important feature is a so-called CD/Phono Direct switch, which bypasses the entire pre-amplifier stage ahead of the volume control in the interests of greater signal purity.

The internal design of this amplifier reflects the designer's priorities by including high grade components in critical circuit areas, a well specified power supply, and an output stage designed to cope with difficult loads.

## LD-50 LOUDSPEAKERS

The final link in this chain is the *LD-50* loudspeakers. A natural big brother to the *LD-20* that comes with the *Studio system*, the *LD-50* uses the same small Mylar dome tweeter but a larger polypropylene coned bass driver in a scaled-up ported enclosure. One interesting idea that Marantz have adopted is to layer the front panel so that the frame of the baffle cover sits flush, theoretically reducing the likelihood that this component will affect the sound. Practice proved otherwise...

The speakers are well built to a high specification both inside and out, and in common with other Marantz models can be wired up in conventional (2 wire) or special (3 wire) form. The latter separates the earth returns for the two drive units back to the amplifier, a technique designed to improve sound quality. The cheapest suitable cable is 3 or 5 amp twin and earth mains cable, but certain specialist cables give better results with this model. (Notably DNM solid core, which is available from specialist outlets only, and doesn't cost an arm and a leg; only a leg.)

The in-room response is superbly engineered with just a trace of consistent treble loss.

## HOW IT SOUNDS

To some extent the inherent compromises in the other Marantz *Studio System* were obvious on audition; they are much less so here. The cassette deck sounded excellent, both with pre-recorded tapes and its own recordings. It tended to emphasise transients and generally sounded bright, though not aggressively so. Bass was light but agile and well extended into the lowest octave. Headphone listening did suggest some loss of absolute stability, and dropout wasn't entirely absent, but the negatives are mild, and easily outweighed by the positive points.

The *CD-75* sounds like what it is – an improved version of the *CD-56*. As such it has notably good stereo soundstaging, both in the precision of width and depth image placement, and also more generally in the sense of scale and weight in the soundstage as a whole. The differences between the two are subtle, and sometimes not at all obvious. I generally favoured the *CD-75* which sounded slightly sharper and more detailed. Conversely it could sound more clinical and less 'rounded', but these are no more than fleeting impressions.

The real strengths of this system reside in the amplifier and the loudspeakers. Again we have in the *LD-50* a loudspeaker that is not as efficient as some, and which therefore demands a little more of the amplifier than usual. But the *PM-45* is easily up to the task of driving them. It is, in this combination, powerful, refined and extremely musical. It is one of the very best full facilities amplifiers around, though at its best only with the tone controls bypassed and the CD/Phono Direct switch pressed. The best qualities of the amp are its 'speed' – rhythms are driven solidly and don't drag or blurr – and its consistency throughout the dynamic range.

These are the things the system bequeaths to the loudspeakers, which have enough clarity and consistency, over a wide enough frequency range, to make them really tell. At its best, the *Concert System* was capable of excellent explicit stereo, with extremely fine analysis and control. The treble was less obvious than with some, and the system could sound a little on the 'cold' side, but what there was showed excellent quality. There are other criticisms that can be made, for example a residual brashness from the loudspeakers, but nothing seriously detracts from the gloriously wide ranging musical panoramas this system opens up.

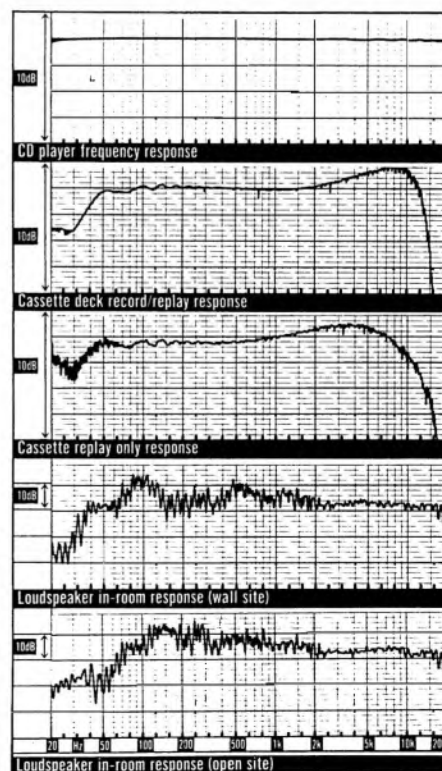
## VERDICT

This is what it's all about. A week with this system will spoil you for anything less. Remember that the cassette and tuner are extras, so the system total runs close to £1,000 without adding a turntable; recommended regardless.

## GENERAL DATA

Cost with speakers £649; without £499, no turntable  
Options? ST-35 Tuner £159, SD-35 Cassette Deck £159  
Size *CD-75* CD player 10 x 42 x 30.4cm (h x w x d)  
Size *PM-45* Amplifier 11.8 x 41.6 x 33.4cm (h x w x d)  
Size *SD-35* Cass Deck 26 x 42 x 10.6cm (h x w x d)  
Size *LD-50* loudspeakers 41.4 x 27.2 x 28cm (h x w x d)

<b>Cassette Deck</b>	
Wow & Flutter (wtd)	0.095%
Signal/noise ref 0dB Type II	56dB
Distortion 0dB Type II	1.7%
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	>108dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	L = 55 watts/R = 60 watts
(1kHz, both channels driven)	
<b>Loudspeakers</b>	
Efficiency	below average



## MARANTZ MX673CD

MARANTZ AUDIO (UK) LTD, 15-16 SAXON WAY IND. EST., MOOR LANE, HARMONDSWORTH, MIDDX UB7 0LW. TEL: (01) 897 6633.



This system is a little different. In addition to offering what you'd expect of any £1,000 package, *ie* a powerful system of considerable flexibility, the Marantz also incorporates a fully functioning Dolby Surround Sound decoder, for which a third full channel of amplification is provided. There are also circuits capable of handling both the audio and vision signals from two video recorders and a video disc player (or other video hardware), routing the video signals to a television monitor or any TV with a video input.

Those not interested in video can switch off at this point, this system is probably not for you. For the rest, the scenario goes something like this. When used with a simple VCR + CTV video system, the system is installed in the general vicinity of the VCR, which must be a hi-fi stereo machine. Its video and audio outputs are connected to the Marantz, and the TV is also connected in the same manner.

The equipment will all continue to operate in the usual fashion of course, but a whole new range of possibilities become practical. They include the ability to record simulcasts, routing the stereo tuner signal through to the VCR – even perhaps whilst listening to a CD or cassette. But you can also feed the stereo soundtrack of a video tape, or mono, or TV sound for that matter, through the Marantz system loudspeakers.

This possibility can be extended to full Dolby Stereo decoding of appropriate video tapes. In this case the system will be used with an extra pair of loudspeakers – rear left and rear right. If and when the BBC gets its act together and starts broadcasting stereo TV sound, (*an ongoing manana situation – Ed.*), you will have Dolby Stereo films pumped into your house every day. And it is easy to see how the video and audio integration can be extended with additional video equipment – CDV to give

just one example.

Many systems with so-called video inputs only handle the audio signals, ignoring the video altogether, and this means they aren't really video-capable at all. You should also beware of systems which claim to have a surround sound or A/V surround capability. Unless it is specifically Dolby Stereo equipped, it won't reproduce Dolby Stereo recordings.

From the general to the particular. This Marantz system is fundamentally different from the other Marantz systems covered in this publication in that the hardware doesn't have audiophile pretensions. Rather it is a high tech system. A simple rotary control is never used if it can be replaced by half a dozen little buttons and an acre of glowing LEDs. As a result the user interface is, er, unusual, and certainly not ergonomic. Build quality varies between reasonable and flakey, and fit and finish are not that wonderful either. The system is supplied as standard without loudspeakers.

### TT873 TURNTABLE

There are few surprises here. This is a simple lightweight belt driven deck with a parallel tracking arm, a non-replaceable magnetic cartridge, and fully automatic operation. Technical performance is good on the whole, apart from evidence of random speed drift which was at a high enough level to be subjectively terminally annoying.

### ST673L TUNER

This component too is straightforward enough. Quartz synthesiser tuned, it offers a healthy 16 FM and a random mix of up to 8 MW and LW stations. Holding a preset button down for more than an instant calls up a second frequency, giving the 16 presets from eight buttons; accessing the AM presets requires that either MW or LW is selected first.

Bench tested in the usual fashion, the FM band was subject to one of the highest levels of spurious background tones of any tuner known to the author. They could often still be heard even behind quite loud musical signals, and were present irrespective of signal strength, though matters were worse under poor reception conditions. The AM bands sounded a little hazy at high frequencies, but the mid and bass sounded full and open. Not bad.

### SD873 CASSETTE DECK

It's easier to describe what you can't do with this deck. You can't record on the one on the left, and you can't set the recording levels manually. However, both transports offer full auto-reverse operation. Using a bank of controls hidden beneath a full-width flap (this is something



of a system feature) you can control the other facilities, which include Dolby B and C noise reduction, microphone mixing, record synchronisation, dubbing speed, the memory stop, blank skip, intro-scan and track locate functions – and more.

The main control bank and associated tell-tales are about as clumsy as it is possible to get. Measured performance appears reasonably sound, allowing for the fact that the ALC circuits scuppered most of the measurements, and may be partly responsible for the treble boost in the record/playback plot. Having said this, most tape types did tend to sound bright with this deck.

## CD873 COMPACT DISC

One of Marantz's new generation players, technology is 16-bit 4x oversampling, and the loading drawer is a newly designed, smooth running item which is clearly much better built than its forebears. Like all Philips based players, it tracks marked discs like a dream. The display, however, is much more Japanese-like, being clear, explicit and informative. Facilities are very standard, but they do include intro-scan.

The extensive rear panel socketry includes Euroconnectors (*aka* Scart sockets) which are familiar from the video world. On the subject of socketry, although there are front and rear 3.5mm Walkman-type headphone sockets, there's no normal headphone jack of the 6.3mm variety.

## PM673 AMPLIFIER

Very much the centrepiece of the system, to try and describe all its features and attributes would be impossible, so this is simply the abbreviated version. The amplifier is home to the electronics which facilitate synchronised recordings from radio and tape, and timed recordings using an on-board 7-day/event timer.

You can have hours of (probably) harmless fun with this amp. The 7-band equaliser/analyser is a good start, and the fun continues with the various surround sound options, which can be programmed into memory along with a lot of other routine setting up data. The various memories do at least allow quite rapid setting up to your chosen configuration, though what Marantz have done is only a half-way house to a full 'snapshot' memory of the type that would automatically retrieve all settings every time a new input is selected. On the other hand, Marantz will have to work hard to better the enormous (24cm x 4cm) status displays.

## HOW IT SOUNDS

The predominant characteristic that remained constant from source to source, no matter which loudspeakers were chosen for the task, was of blandness. Blandness in the way it dealt with instrumental and vocal tonal values, and blandness of expression and inflection. Overriding this there was also some aggressiveness. Despite the ambitious amplifier specification, the system was not very tolerable when played loud because the sound hardened up rapidly as levels rose. Instead of allowing the music to swell and grow organically, it acquired a 'shouting', 'pushy' feel.

These qualities turned out to be largely attributable to the amplifier. The CD player worked exceptionally well played through other amplifiers and loudspeakers, and the player certainly provides the best of what the Marantz system has on offer. Vinyl discs were 'woolly' in the bass and coarse up top – the midi system plague – whilst the tuner was simply synthetic, replete with whistles, hums and other unwanted background madrigals. Pre-recorded tapes reproduced quite well, and recordings did sound incisive, but also flat both spatially and dynamically.

Of course the saving grace of the system isn't the CD player – it's the Dolby Surround sound system. Notwithstanding the criticisms already made, the system did a satisfactory job of decoding some hastily hired Dolby Stereo recordings (mostly of Stephen Spielberg movies, which make better use of the system than most). The other saving grace of this system is the absence of loudspeakers. It's ironic I suppose that Marantz take more care over loudspeaker performance than almost any other system manufacturer, but the freedom of choice is always welcome.

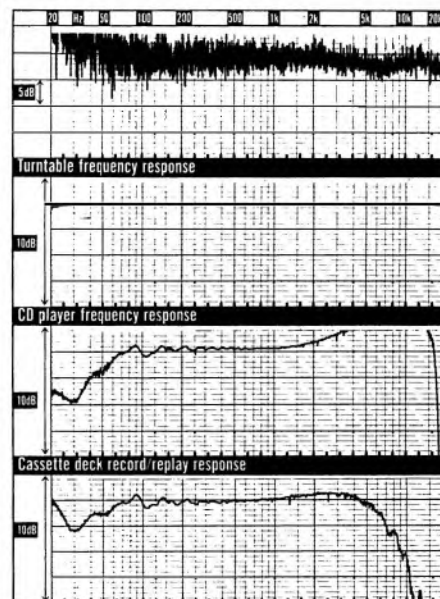
## VERDICT

The high price is certainly justified by the sophistication and flexibility of the system. But build quality is generally slightly disappointing, and the music making – CD player excepted – is lacklustre or worse. Against all this, however, the currently unrivalled A/V capabilities (to the author's knowledge) place this system in a class of its own. If you like movies at home, but with something of the flavour of theatre sound (for better or worse), this could be the system for you.

## GENERAL DATA

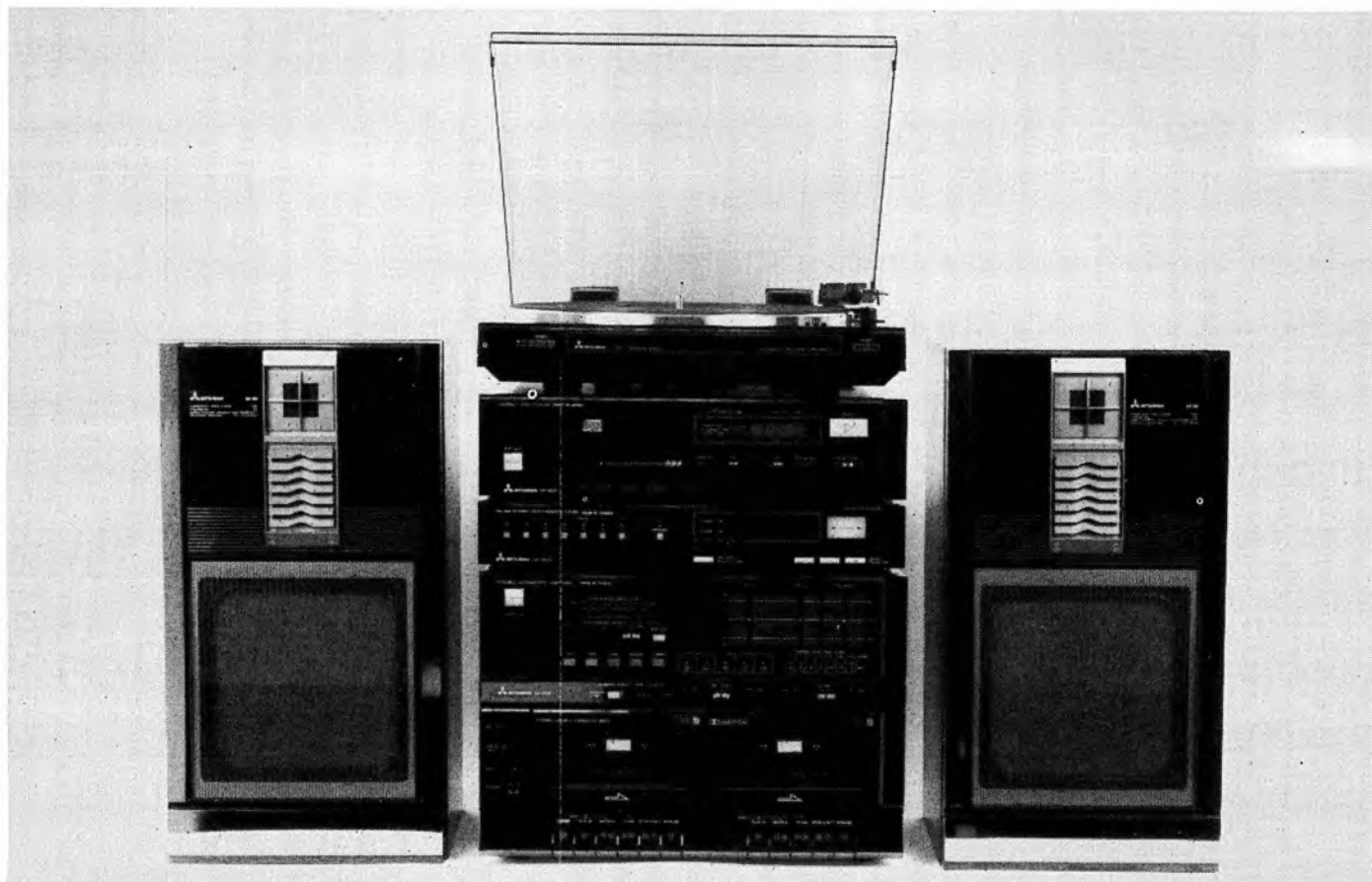
Cost without speakers	£999.90
Options?	loudspeakers
Size – main unit	76 x 36 x 38.2cm (h x w x d)
<b>Turntable</b>	
Wow & flutter wtd	0.085%
Drift	poor
Speed accuracy	no error
Arm/cartridge resonance	18Hz
(<10Hz too low, >14Hz too high)	
Cartridge channel balance	0.1dB
Cartridge channel separation	-27.4dB
Cartridge tracking ability	80µM
<b>Tuner</b>	
Sensitivity	fair
Signal/noise	very poor
<b>Cassette Deck</b>	
Wow & Flutter (wtd)	0.12%
Signal/noise ref 0dB Type II	n/a*
Distortion 0dB Type II	n/a*
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	96dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	50 watts
(1kHz, both channels driven)	

\*auto level control



# MITSUBISHI E602CD

MITSUBISHI ELECTRIC (UK) LTD., HERTFORD PLACE, MAPLE CROSS, RICKMANSWORTH, HERTS WD3 2BJ. TEL: (0923) 770000.



Undeniably, this system looks different. In place of the matt black that adorns just about every other system on the market, the Mitsubishi is finished in a combination of highly reflective black perspex and metallised silver. As far as the main unit is concerned, the effect is only slightly OTT. The loudspeakers, however, suffer badly, and end up looking like something from a market stall rather than a hi-fi shop.

The electronics are at least made as though they'll last and the quality of external finish is perfectly satisfactory. The loudspeakers will stay the course too – in a way that's the problem – but they're certainly not well enough built to do the job properly. A split rating for build quality then.

## LT-603 TURNTABLE

The lightly built, belt drive *LT-603* stands on four absorbent feet, which invest it with a little more imperturbability than usual. The arm, which makes extensive use of plastic mouldings, is pivoted and fitted with a magnetic cartridge. Operation is semi-automatic: a damped cueing device (situated near the arm pillar) is

used to set the stylus down, whilst arm return is automatic.

On measurement the cartridge has a substantial balance disparity between channels, while the phono system response shape was severely rolled away at high frequencies. A resonant effect can be seen in the bass which corresponds to an obvious 'boom' region and consequent loss of mechanical control. Turntable drift was a little excessive, but wow & flutter levels were moderate.

## DA-F603 TUNER

The *DA-F603* is simple but adequate in design. A large, clear display on the right reads out the currently tuned frequency, whilst a bank of seven presets and three waveband keys allows the user to preset seven each FM, LW and MW transmissions. Mono switching is also fitted.

FM sensitivity and noise levels were satisfactory, but the nature of the noise residual, including substantial whistle and buzz contributions, is audibly more annoying than straight hiss. Unfortunately the AM section proved dreadful: wanted stations were often swamped by noise and interference, whilst

such sound that could be heard was often simply appalling.

## DA-602 AMPLIFIER/CASSETTE DECK

In contrast to the tuner and record deck, this combination unit is awkwardly styled and laid out. The most prominent feature with its own associated LED display turns out to be something called 'synthesised bass', not the volume control as you'd expect. This monitors the sound level between 80Hz and 160Hz and then mixes in some extra very deep bass by 'synthesising' (*ie* inventing) bass in the octave below, *viz*: 40Hz – 80Hz. There are other slide controls disposed willy-nilly, and also displays which are positioned inappropriately.

Amplifier facilities are simple, but include a pair of phono sockets carrying a record output, so an external tape deck could be attached if required; there's a spare input too. Power output from the amplifier measures 22 watts/channel.

Apart from the bass synthesiser circuit, on which more later, the amplifier/cassette deck is sensibly equipped. The cassette deck (one

record/playback transport, one playback only) has what appear to be mechanical transport controls. In fact they're power assisted latching controls, giving proper visual feedback of the mode selected just like in the good old days. The deck has manual record level setting, Dolby B noise reduction, and a track search facility on each transport. High speed dubbing is available (of course), but microphones cannot be connected.

Test bench behaviour was dominated by poor measured wow and flutter – at 0.24% roughly three times as high as a standard low cost high fidelity deck. And also by the very high (off the scale) measured 0VU distortion, which implies that record levels should not even be allowed to peak at 0VU on the meters. The frequency response shape has nothing in common with high fidelity practice, and is roughly akin to what you'd expect of a child's portable. There's little bass below 100Hz – it's on a terminal decline below 200Hz – there's little bandwidth to speak of in the treble either. We're talking AM radio quality here.

## DP-603 COMPACT DISC

A simple alphanumeric display spells out such words like 'open' and 'play' when it isn't busy giving time or track information. There's a nine-track memory and track skip, and that's it. This is one of the few decks without a cueing feature, audible or otherwise, and in the absence of index search there's no way to access anything other than the beginnings of tracks. Disc handling is slow, blemished discs simply don't track, and the muting function works only very slowly or not at all, so that impulsive noises due to tracking or other problems pass straight through the system.

## SS-50 LOUSPEAKERS

The picture tells one story: that of a bass unit, a slatted cover over a second, and a third driver on top. In fact there are just two very poor quality drivers in a flimsy, resonant enclosure. The rest is just window dressing. The response shape demonstrates a narrow operating bandwidth and a lumpy response within that bandwidth. Wall proximity positioning was preferred.

## HOW IT SOUNDS

The synthesised bass is the biggest joke I have heard for a long time. It works on a threshold effect. Nothing much seems to happen until a specified signal level is reached, and then along it comes. At medium signal levels, you get this peculiar stuttering effect as the bass comes and goes.

Further than this, the synthesised bass itself is about the most singularly unpleasant noise I have heard from an item of audio equipment for some time. Playing an orchestral recording was as though someone was standing between the orchestra and the microphone with an enormous cardboard box which was being periodically beaten with clenched fists.

With the bass circuit switched off, listening proceeded – first with the supplied loudspeakers, and when my ears started burning with headphones and the reference Heybrook HB1s. The loudspeakers are in almost as bad taste as the aforementioned synthesiser circuitry. Their bass is shallow and boomy, their treble non-existent. The bit in between sounds coloured and aggressive, and terminally lacks detail. Stereo imagery is noticeable only by its absence.

With the loudspeakers discounted, the system still sounded very poor. At the best of times the sound picture was soft in resolution, and indeterminable at both ends of the frequency spectrum. The result was fat, soggy and lacking in presence or focus. It was rather like listening to a big ghetto blaster.

Of the four sources, the record deck has the most obviously articulate quality. As long as it was protected from bumps or feedback it made some quite enjoyable noises, despite the dull balance and loss of control in the extreme bass that led certain recordings to 'drone' monotonously. The CD player exhibited better control and a tidier sound in the bass and treble, but sounded less articulate and spatially 'flatter' for much of the time.

The tuner was of limited use on AM. At the test site it proved impossible to receive *Radio 4* on Long Wave with sufficient clarity to hear what was being said, which is not normally a problem. FM was OK in a slightly wooden way, but again subject to the usual softening process that seemed endemic with this system. The cassette deck was also poor, if just about usable in the manner of a reasonable quality portable unit, though rapid pitch variations were audible with some program material, notably piano. Hiss levels were on the high side, and tapes tended to sound gritty and compressed; pre-recorded material sounded very dull.

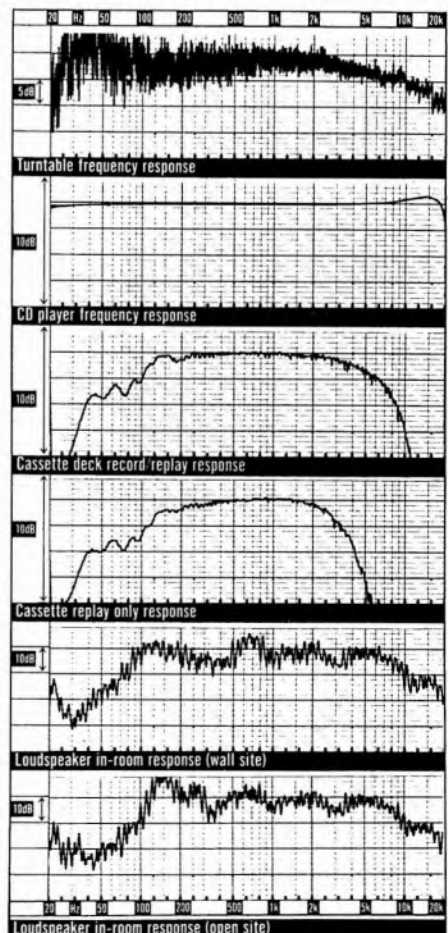
## VERDICT

Even at its moderate price, this system is far from setting an acceptable standard. Not recommended.

## GENERAL DATA

Cost with speakers £499.90  
Options? sold as E602 w/o CD player – £299.95

<b>Size – main unit</b>	73 x 33.5 x 36.6cm (h x w x d)
<b>Size loudspeakers</b>	42 x 22 x 18.4cm (h x w x d)
<b>Turntable</b>	
<b>Wow &amp; flutter wtd</b>	0.08%
<b>Drift</b>	p60r
<b>Speed accuracy</b>	correct
<b>Arm/cartridge resonance</b>	not measurable
(<10Hz too low, >14Hz too high)	
<b>Cartridge channel balance</b>	1.1dB
<b>Cartridge channel separation</b>	–24dB
<b>Cartridge tracking ability</b>	80µM
<b>Tuner</b>	
<b>Sensitivity</b>	fair
<b>Signal/noise</b>	fair
<b>Cassette Deck</b>	
<b>Wow &amp; Flutter (wtd)</b>	0.26%
<b>Signal/noise ref 0dB Type II</b>	58dB
<b>Distortion 0dB Type II</b>	>3.3%
<b>Compact Disc Player</b>	
<b>Signal/noise (measured at Tape Out)</b>	96dB
<b>Amplifier</b>	
<b>Power output/channel (8 ohms)</b>	22 watts
(1kHz, both channels driven)	
<b>Loudspeakers</b>	
<b>Efficiency</b>	above average



# PIONEER SYSTEM 10

PIONEER HIGH FIDELITY GB LTD., FIELD WAY, GREENFORD, MIDDLESEX UB6 8UZ. TEL: (01) 575 5757.



As well as having an easy model number to remember, Pioneer's *System 10* is also the starter model in a range of three systems based on separate components with strong hi-fi overtones. That, at least, is the claim. Even this lowly system will set you back £678 in the form tested. However, you can take it without a compact disc player if you so desire, or alternatively buy it with one of the other Pioneer CD players, including the multi-disc player tested as part of *System 30* (see separate test).

Most of the components are made to a quality level commensurate with the system's station in life. The exception – isn't it always? – is the turntable. Sadly I must conclude that major system manufacturers just don't see much mileage in records anymore, which at the least can be interpreted as a disservice to existing record owners. The good news is that Pioneer have gone to town on the loudspeakers, supplying something that demands to be taken seriously in its own right, not merely as a throwaway part of the package.

Available as options are a floor-standing rack housing and a graphic equaliser/spectrum analyser. Neither are especially bright ideas if you put sound quality first. Rack housings are inferior to stiff, lightweight shelves or tables as supports, whilst equalisers merely insert masses of additional circuitry into the audio signal path without any compensating musical gain.

## PL-X230 TURNTABLE

The *PL-X230* is belt driven and provides automatic return, but arm setdown is manual, assisted by a front panel cueing lever. The arm is pivoted and comes with a T4P magnetic cartridge, which is readily interchangeable for any other suitable unit without requiring any re-setting up. Sounds familiar? You may have noticed that the description tallies point for point with the *PL-X77Z* player in the *S-7000* system. They are indeed very similar, and in the case of the cartridge identical.

On the test bench, wow and flutter measured well, drift was OK whilst speed (at 33 $\frac{1}{3}$ rpm) was spot on. The cartridge has a smooth response within the audio band, and measured separation, channel balance and tracking ability were all satisfactory, though none was good.

## F-X430 TUNER

This well designed tuner, described more fully in the *System 30* review, offers 24 random presets over the usual three bands, and a signal optimising 'stereo blend' circuit that can help cope with less than perfect reception conditions. FM reception quality was indeed immaculate, and AM sound quality was also excellent, though subject to moderate interference and background 'mush'.

## CT-X430W CASSETTE DECK

Some good points, some bad ones... This is one of the decks that allows you to set record levels manually, using narrow range (16dB) meters. Annoyingly, tape selection on the record/playback transport is manual, using two buttons to select from the three main tape groups, which is sure to cause confusion. More of the same will come from the playback transport which does have auto tape type recognition, and also offers full audible cue and review facilities, unlike the record transport. With me so far?

All the normal twin deck facilities are included of course – normal and high speed dubbing, sequential play, a headphone socket (also found on the CD player and the amplifier), plus Dolby B and C noise reduction, the latter not common on system cassette decks even now. There are no microphone inputs, here or elsewhere in the system.

The playback only response tails off early, but the full record/playback response shape is indicative of good design and setup. Speed stability, however, is only borderline.

## PD-X530 CD PLAYER

Plainly some thought has gone into this player.

A number of steps, including a novel 'honeycomb' chassis base, an unusual design of disc clamp, and a ballasted transport to lower the centre of gravity, help the player perform and improve tracking margins under conditions where feedback could be a problem. Their efforts have been only partly successful. Resistance to microphony is extremely fine by any standards, but the laser servo system is not the best, and marked discs are not tracked well. Track access times are about average.

## A-X330 AMPLIFIER

Refreshingly, *System 10* comes with a perfectly straightforward amplifier. No graphic equalisers, no silly flashing displays, just inputs for the other system components. Plus one additional tape circuit, outputs for two pairs of loudspeakers, a CD direct facility bypassing the tone controls (but not, inexplicably, the loudness circuit), and mains sockets on the back for the other components. This leaves just one trailing mains lead to connect. Power output is a useful 43 watts/channel.

## S-X330 LOUDSPEAKERS

The speakers, made in Portugal, employ a 200mm pulp cone bass unit and a 25mm dome tweeter, in a solid, heavy vinyl 'wood effect' sealed enclosure. Neat styling (and functional) details include smoothly rounded cabinet edges, but construction is less clever inside. Although this is one of the small number of system loudspeakers that boasts a proper crossover (ironically, at the top end of the hi-fi business, designers are using sophisticated drive unit techniques to reduce or eliminate crossovers!), internal acoustic control is plainly inadequate, leading to a rather 'live' sounding enclosure. Note the engineered-in bass 'hump', and the subsequent gentle rise into the treble.

No placement advice is given; I found it best to use the usual tall, open stands (eg Heybrook *HBS-1* or Foundation *Atlas*), and to place them about a hand's span in front of the wall, tuning finally by ear.

## HOW IT SOUNDS

Starting with the loudspeakers, which despite some shortcomings hold out considerable promise, expectations were not fully fulfilled. Although they sound better than average in this area of the market, are both explicit (as in forthcoming) and reasonably refined, there was also a degree of aural clutter. With simple music, chamber material for example, this was manifest as a slightly hard, 'wooden' character,

with an aural picture lacking tonal variety. As the music became more complex, confusion between individual instruments grew apace and the final result was messy. Not terminally so in most cases, but messy anyway. Speech often sounded 'chesty'.

Control at the frequency extremes, however, was good, and better perhaps than the measurements suggest. This quality carried through from the amplifier, which offered control in abundance, at the expense it must be said of a certain amount of 'life' and vitality. But that's judging by hi-fi standards, which may be a bit too exacting under the circumstances.

Given a good, live broadcast, the tuner was capable of at least as good results as any of the other sources. Compared to compact disc, it was capable of roughly equal fine detail resolution, but with superior stereo definition and that indefinable quality called 'naturalness'.

Cassettes came off badly. Recordings sounded thin and messy, the high wow and flutter rates being more than merely audible, but audibly destructive. There were many other more subtle failings, such as excessive distortion at high levels, 'woolly' bass and more, but they pale into insignificance next to this fundamental inability to reproduce a single note except as a rapid series of discontinuous notes, all of slightly different pitch value. I can see this deck being useful for making recordings of plays from *Radio 4*, but of no real worth as a source of music – certainly not as a primary source.

Finally, the record deck was a moderate success (by system standards), with reasonable clarity in the midrange. But again high frequency content was strident in tone, the bass slow and overblown, and the whole excessively microphonic.

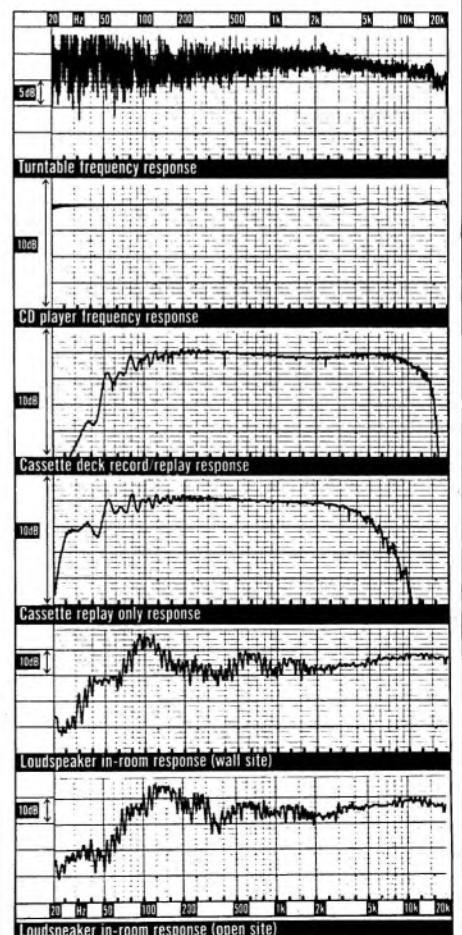
## VERDICT

I was slightly disappointed by this system. Plainly a lot of effort had gone into it, but the results were at best uneven. The loudspeakers didn't sound as serious as they looked, the cassette deck was no better than those with systems at half the price, and the record deck sounded crude. Conversely, the CD player, amplifier and above all the tuner worked a treat. Ultimately, a midi system at this price must offer a synthesis of virtues – not merely a virtuous synthesiser tuner.

## GENERAL DATA

Cost with speakers £678  
Options? without CD player, system costs £479  
PD-X930M multi-disc CD player – £279  
CB-X929 floor standing rack housing – n/a  
GR-X530 graphic equaliser/spectrum analyser – £140

Size – main unit	73 x 36 x 40.5cm (h x w x d)
Size loudspeakers	40.2 x 25.6 x 24.3cm (h x w x d)
<b>Turntable</b>	
Wow & flutter wtd	0.07%
Drift	average
Speed accuracy	correct
Arm/cartridge resonance	10Hz
	(<10Hz too low, >14Hz too high)
Cartridge channel balance	0.8dB
Cartridge channel separation	–24.4dB
Cartridge tracking ability	72µM
<b>Tuner</b>	
Sensitivity	very good
Signal/noise	very good
<b>Cassette Deck</b>	
Wow & Flutter (wtd)	0.20%
Signal/noise ref 0dB Type II	51.5dB
Distortion 0dB Type II	1.8%
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	>108dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	43 watts
	(1kHz, both channels driven)
<b>Loudspeakers</b>	
Efficiency	below average



## PIONEER SYSTEM 30

PIONEER HIGH FIDELITY GB LTD., FIELD WAY, GREENFORD, MIDDLESEX UB6 8UZ. TEL: (01) 575 5757.



*System 30* is the flagship in Pioneer's range of three component midi systems, and has much the same configuration as *System 10*, also reviewed in this issue. This means that although the record deck is fearfully inadequate (no more inadequate than anyone else's, I admit, but inadequate nevertheless), the other components are all extremely well turned out – certainly comparable with standard hi-fi components that cost about the same (say, £175 per item or so). Best of all, the loudspeakers bear no real similarity to the kind of transducers that usually get packaged with midi systems – even ones that cost as much as this one.

The amplifier doubles as a remote control receiver in its own right. It distributes commands around the system using mini-jack connectors, except (mysteriously) to the *PD-X930M* CD player, which would not obey commands issued by the system remote control. However, the handset did switch the amplifier input over, and as the CD player comes with its own independent remote control, you won't actually have to raise your backside from your seat. It works if you don't mind juggling remote control handsets, but the whole arrangement is a bit Heath Robinson. Note that the alternative *PD-X530* CD player is capable of exploiting the system remote control (see *System 10* review).

### PK-X430 TURNTABLE

Once again we find the cartridge used in the

*System 10*, not to mention the cheapie *S-7000* system. It's a budget magnetic, a little out of its depth in this application, which plugs into the arm using the *T4P* specification.

The turntable is built into very much the same plinth as the other Pioneer system decks, and the lightweight platter is much the same too. It's belt driven as well, but the arm is a parallel tracker and therefore quite different. Operationally the *430* is also different because it's fully automatic. A repeat facility is included, and all controls are available on the front with the lid open or closed. Automatic record size sensing is *not* included.

The high frequency response tails off a little more sharply here than in the other installations, probably due to sample variations. What is more ominous is that the extreme bass appears to go out of control; the response shape was better controlled with the pivoted arm decks. This illustrates one of the major problems with parallel tracking arms where bearing design is a nightmare on wheels. Note also the 33.9rpm running speed – a full 1.8 per cent fast.

### F-X430 TUNER

A digitally tuned FM, MW and LW design (also used in *System 10*), the *F-X430* will remember 24 frequencies without any restrictions concerning wavebands. Twelve preset buttons are used, the second stored frequency being

retrievable in each case by pressing the appropriate button twice.

The tuner includes a microprocessor which is designed to optimise tuning. Pioneer don't specify how, but it probably works by re-tuning incrementally until the optimum (lowest distortion) tuning point is reached. Byproducts include a readout of received signal strength on an arbitrary 0-9 scale, and a perceptible delay when selecting stations whilst the circuit does some nifty thinking. Included in the electronics is a halfway house 'stereo blend' facility to reduce noise at some expense to separation when signal conditions are marginal, a useful feature that used to be commonplace. Off air performance on FM is exemplary.

The AM bands had reasonable sensitivity and tolerable levels of background noise. Rather good basic audio quality replaced the usual dull, rolled away tonal balance by something with a bit of incisiveness and p'zzaz.

### CT-X530WR CASSETTE DECK

It's the 'biz'. One of the transports is for playback only, but both offer auto-reverse, both flavours of Dolby noise reduction, full manual record levels, automatic tape type recognition, a sweet logic controlled set of transport controls (assignable to either transport), and all the usual twin deck facilities. Special features include a track search feature, blank skip and a headphone socket. There is no microphone input. Measured responses, noise

and distortion levels are all satisfactory, but wow and flutter is higher than it should be on this ambitious deck.

## PD-X930M CD PLAYER

One feature sets this player apart – the ability to take six-disc cartridges as an alternative to a (push to close) single disc drawer, which also comes with the player. A 32-track memory supports this facility. The Pioneer implementation allows tracks to be added midstream, and pauses to be included for tape editing purposes. Discs can be addressed individually both on the player and *via* the remote control handset (the latter also has a random access track keypad), but not the system remote control. Remote programming is also possible. The feature count is rounded off with random play and an excellent, explicit display.

The PD-X930 is a better tracker than the alternative PD-X530, and not far behind the best. Disc search operations, however, are slow.

## A-X530 AMPLIFIER

To facilitate remote control, this powerful (90 watts/channel) design keeps gadgets at bay – almost. A motorised volume pot allows remote control without the sound quality losses usually associated with electronic volume controls. Other special gadgets include a CD direct switch (which bypasses the tone controls) and a bass equaliser (a deep bass tone control). One spare set of in-and-outputs are fitted at signal level, and two pairs of loudspeakers can be driven.

## S-X430 LOUDSPEAKERS

The loudspeakers are three-way versions of the ones fitted to *System 10*. They have an asymmetric layout of three drive units (not handed by the way) comprising a pulp cone bass, a plasticised midrange cone and a small dome tweeter. The enclosure has smoothly rounded edges and a smart wood effect vinyl finish.

Although they are solidly constructed, a *post mortem* reveals that this is a pretty rudimentary design under the skin. On the other hand the frequency response shows considerable integrity, except for a built-in 'loudness' effect – an excess of output at the two frequency extremes, especially the bass.

## HOW IT SOUNDS

The loudspeakers are clearly better than those that come with *System 10*, with a sweeter, fuller and altogether more spacious feel, and a more complete range of reasonably vivid tonal colours. Transient attack is good and the bass

has acceptable power and tunefulness, plus a slight lack of control by the best standards. Stereo soundstaging, however, lacked focus: it was all there, but never very tightly defined.

The record deck was less excitable than the one in the cheaper Pioneer systems in the extreme bass, but another form of excitability led to a hollow, coloured effect. The rest wasn't too bad, but even more than with the cheaper model, the deck failed to respond with feeling as the music became louder.

The cassette deck was also a disappointment, demonstrating pitch problems in the form of a fast (and extremely disconcerting) warbling effect (like a very fast Leslie – for those with memories long enough!). There was also some 'thinning' of textures, and the Dolby circuits had a strongly soporific effect, badly smothering fine detail. Rarely have I heard the phenomenon as clearly as in this case. Dolby B sounded better, and non-Dolby recordings better still, but the deck really wasn't quiet enough to make non-Dolby recording viable.

I have no complaints about the rest of the system. The CD player sounded excellent. It is a proper hi-fi deck which bears comparison to the majority of hi-fi component players, combining better than expected detail and a cooler, more civilised underlying sound quality than CD commonly achieves even now.

The amplifier also sounded excellent. I detected some inconsistency when played very loud, the music tending to become rather bland. But within normal volume ceilings and with a range of loudspeakers the Pioneer more than held its own, again combining good resolution with a clean, neutral performance. Perhaps surprisingly it was the tuner that stole the show. With razor sharp clarity (maybe just a mite over the top), a clean powerful bass and excellent and explicit stereo. This is an unusually fine example of a system tuner, and better than many component high fidelity ones. Sound quality barely deteriorated with weak incoming signals.

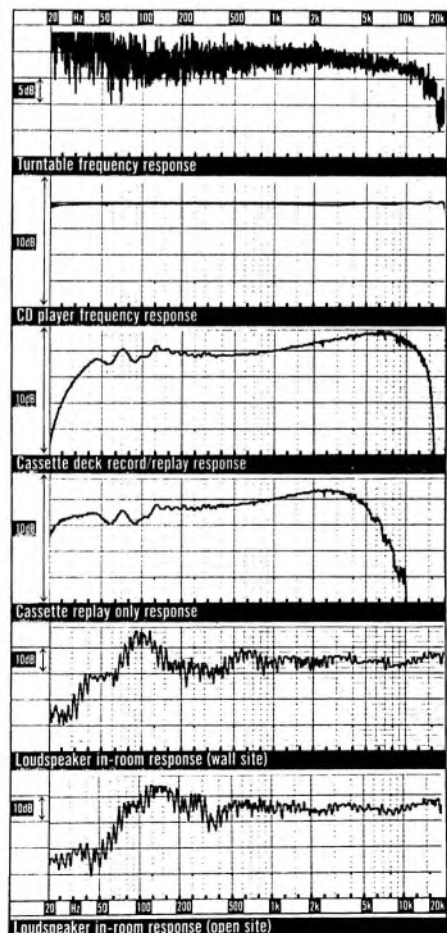
## VERDICT

Recommended, but with caution and only to users whose prime interests centre on CD (especially Wagner lovers, who will flip at the idea of being able to play all of any of the operas without touching the deck) and FM radio. Quite simply, the record and cassette decks aren't good enough.

## GENERAL DATA

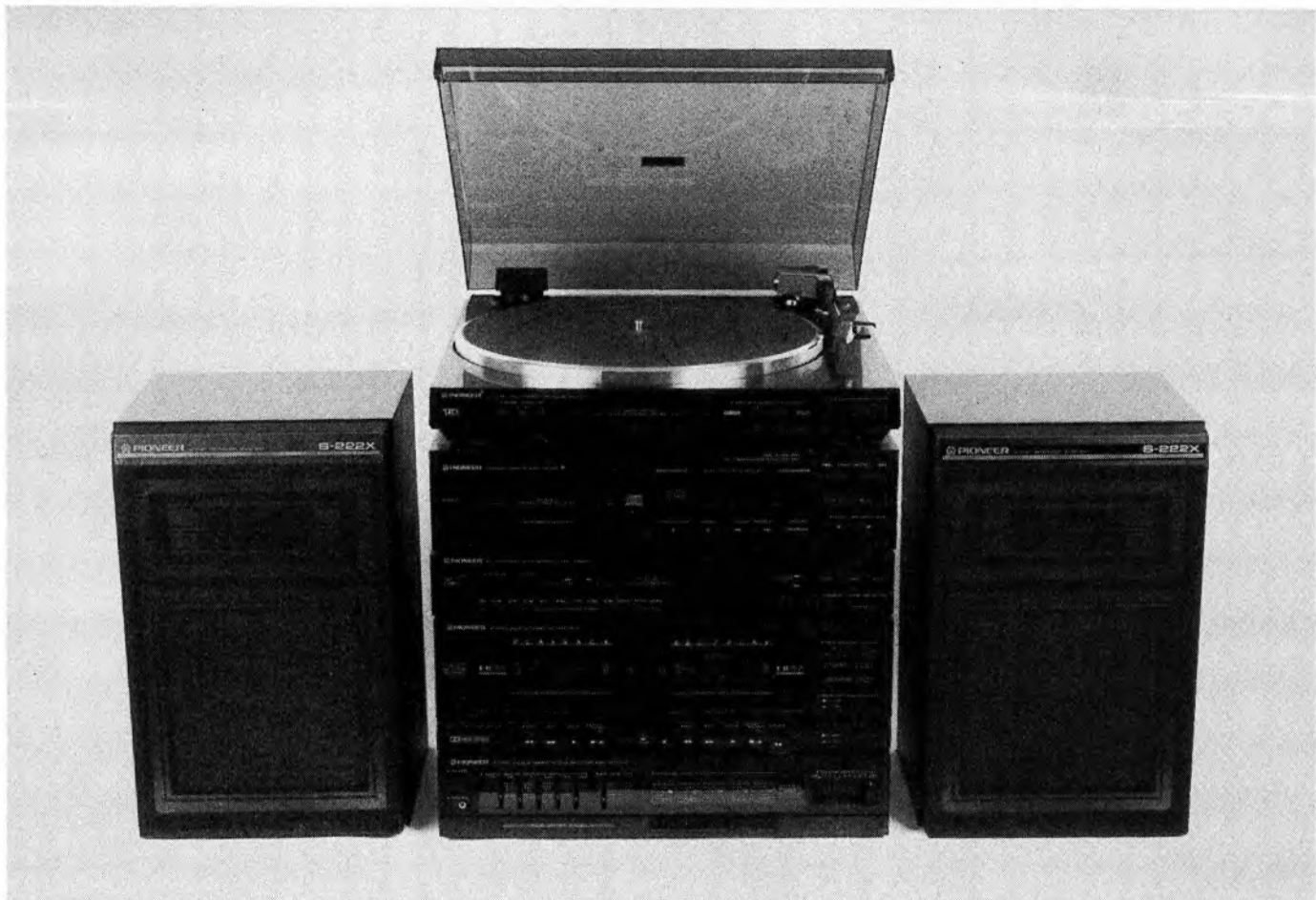
Cost with speakers £978  
Options? without CD player, system costs £699  
PD-X530 single disc CD player – £199  
CB-X929 floor standing rack housing – n/a  
GR-X530 graphic equaliser/spectrum analyser – £140

Size – main unit	67 x 36 x 35.5cm (h x w x d)
Size loudspeakers	45.3 x 25.5 x 25cm (h x w x d)
<b>Turntable</b>	
Wow & flutter wtd	0.08%
Drift	average
Speed accuracy	+1.8%
Arm/cartridge resonance	OK
	(<10Hz too low, >14Hz too high)
Cartridge channel balance	0.8dB
Cartridge channel separation	-28.4dB
Cartridge tracking ability	80µM
<b>Tuner</b>	
Sensitivity	very good
Signal/noise	very good
<b>Cassette Deck</b>	
Wow & Flutter (wtd)	0.23%
Signal/noise ref 0dB Type II	51dB
Distortion 0dB Type II	2.0%
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	>107dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	90 watts
	(1kHz, both channels driven)
<b>Loudspeakers</b>	
Efficiency	below average



## PIONEER S-7000

PIONEER HIGH FIDELITY GB LTD., FIELD WAY, GREENFORD, MIDDLESEX UB6 8UZ. TEL: (01) 575 5757.



To all appearances the Pioneer S-7000 has a set of attractively finished front panels, each beautifully brushed and painted to a standard well beyond its price class. A closer look, however, reveals more. All fascias are no more (nor less) than high quality plastic mouldings, albeit with a clever finish. Which does nothing to diminish the fact that you get a surprisingly good looking package for your money, and one that has a particularly pleasing set of controls and displays. Watch out for some quite sharp corners though.

The system is built around a combined cassette deck and amplifier. The CD player, digital tuner and turntable are all separate self-powered items. The system is available as described for £478, or for £299 without the CD player

### PL-X77Z TURNTABLE

Unlike a number of its peers, the PL-X77Z is equipped with a T4P type cartridge, which is readily interchangeable with other T4Ps without any adjustment. The engineering quality of deck and arm is a little better than usual – the

arm structure is slightly more solid, the bearings a little less slack. The deck itself is slightly heavier, the mat likewise and hence more suitable for damping a lightweight and resonant platter. Operationally it's 100 per cent standard semi-automatic, with arm cueing using a front panel slide switch (which makes it quite easy to jog the arm) and automatic arm return at end of side.

There are no sharp cartridge response discontinuities anywhere in the audio band, whilst other measured parameters were generally fine, only tracking ability being slightly below par. Turntable wow and flutter was exceptionally low, drift was low too, but the deck ran about 0.6 per cent slow.

### F-X88ZL TUNER

Pioneer have always shown particular expertise with tuners, which is reflected in this highly capable unit. Synthesiser driven, there are 12 preset buttons and 24 presets (any mix of wavebands allowed) with shift key and mono switching completing the facilities count. The

display is neat but bare, consisting simply of a waveband and frequency display with separate 'tuned' and 'stereo' LEDs.

The high level of capability unfortunately doesn't extend to MW or LW, both of which suffer from very low sensitivity and a surfeit of whistles and other interesting but useless background noises. In contrast, FM reception quality was simply exceptional: sensitivity was very high; background noises were well controlled; spurious whistles and noises were almost completely absent.

### DC-X77Z AMPLIFIER/ CASSETTE

The unidirectional double cassette deck section is quite simple too. It is not designed to cope with Type IV metal tape (except when playing back of course, where IV shares Type II equalisation), but the tapes that are used are recognised automatically when inserted. The playback and record transports both employ well designed mechanical transport keys, angled for ease of use, while the remaining controls



switch the Dolby B circuit and high speed dubbing, and count the travel. Sequential play is available, whilst record levels are regrettably set automatically.

The playback response curve rolls off early, probably as a result of head azimuth misalignment. However, the record/playback response looks fairer allowing for the response of the auto-record level circuits. The clearest indication of the poor breeding of the unit is the 0.35 per cent measured wow and flutter, which is well out of order.

Pioneer claim 33 watts/channels for the amplifier using a strange DIN method of misrepresenting power output, but the 30 watt measured RMS really isn't at all bad. Amplifier facilities are limited to a 5-band graphic equaliser and a spare auxiliary input, nominally designated to the video input, but in practice only suitable for audio circuitry of a video recorder. One oddity is that only 3.5mm headphone plugs can be connected, the size normally used for personal stereos, instead of the usual 6.3mm (1/4 inch) types.

## PD-X66 CD PLAYER

Amongst Japanese producers, Pioneer are almost as well regarded for their CD players as for their tuners, and this one doesn't disappoint. It is well equipped, highlights including an attractive display that shows track numbers, time and status information, plus 24-track programmability and repeat. The memory can include 'pause' instructions to facilitate editing selections onto tape, and a special inaudible high speed cueing feature can be selected from 'pause'. The deck functions well, and tracking ability was particularly good on less than perfectly preserved discs.

## S-222X LOUDSPEAKERS

The S-222X is an oddity. Appearances suggest that it is a standard, rather grotty system loudspeaker. It certainly *looks* suitably tacky, with tasteless styling of the kind that says 'cheap cheap', but not like a bird. Bass extension is severely limited, but the response smooths out nicely below 1kHz when used away from walls, which is the optimum positioning in practice. So there is at least a suggestion that a little more care than usual has been taken with the design.

## HOW IT SOUNDS

The system loudspeakers proved to be nothing like the anticipated handicap. They sounded a little brash, stereo imagery was quite badly mauled, and there was a lack of real transparency and definition. On the other hand the

bass end sounded surprisingly together, not lacking in as much weight as the measurements suggest, whilst at the opposite end of the spectrum percussion was more forceful and less compressed than usual. The rest of the frequency band was reproduced quite well, and I felt much less need than usual to replace them with the reference Heybrooks – or dig out the earplugs.

Records reproduced in good voice with a nice, articulate touch – combined, it must be said, with a trace of fluffiness in the bass and midrange. The bass was less 'overhung' than usual (usual for a midi system turntable that is, not for turntables as a whole). Microphony was generally held under reasonable check, but the deck sounded very coloured and hollow if not well supported during play.

The excessively high levels of measured wow and flutter set a practical ceiling on the integrity of sound from tape, especially with pitch sensitive instruments like pianos, which sounded unsteady, or on timpani which tended towards graininess. Then there's the auto level control which did its usual job of murdering dynamics: the moment anything vaguely loud came along, the sound was instantly sat upon so that the stereo image appeared to shrink. Pre-recorded stuff came over dim and constrained, as predicted.

The best showings of all were put up by the FM section of the tuner and the compact disc player. Both acted as sources of good, crisp and alive sounding music-making (excusing *Radios 1/2* of course which start out sounding dead). Combined with a decent enough amplifier which doesn't get in the way, even if miracles are beyond its capabilities, they simply worked – and worked well.

## VERDICT

The only real limitation of this system, and the only reason for withholding Best Buy status, is the largely unusable cassette deck. Why a little more engineering integrity couldn't have gone into it is a mystery. On the other hand the CD player and tuner were excellent, and even the turntable worked better than expected. The amplifier was unobtrusively satisfying, and the loudspeakers (which looked as 'yucky' as any) surpassed expectations by quite a distance. The whole system apart from the cassette deck sounded airy and spacious, and is warmly recommended anyway.

## GENERAL DATA

<b>Cost with speakers</b>	£478
<b>Options?</b>	without CD player £299
<b>Size – main unit</b>	70.5 x 35.8 x 40.5cm (h x w x d)
<b>Size loudspeakers</b>	34.4 x 21.7 x 20.2cm (h x w x d)

### Turntable

<b>Wow &amp; flutter wtd</b>	0.055%
<b>Drift</b>	good
<b>Speed accuracy</b>	-0.6%
<b>Arm/cartridge resonance</b>	11Hz
(<10Hz too low, >14Hz too high)	
<b>Cartridge channel balance</b>	1.0dB
<b>Cartridge channel separation</b>	-24.6dB
<b>Cartridge tracking ability</b>	68µM

### Tuner

<b>Sensitivity</b>	very good
<b>Signal/noise</b>	very good

### Cassette Deck

<b>Wow &amp; Flutter (wtd)</b>	0.35%
<b>Signal/noise ref 0dB Type II</b>	n/a*
<b>Distortion 0dB Type II</b>	n/a*

### Compact Disc Player

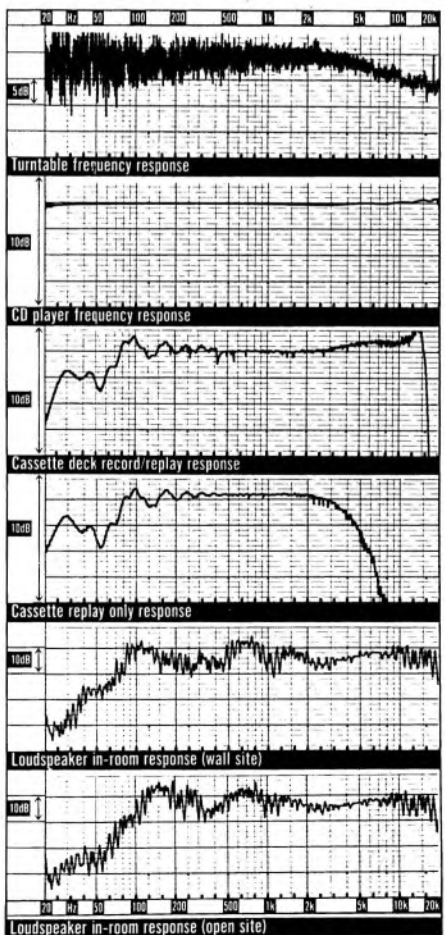
<b>Signal/noise (measured at Tape Out)</b>	85.5dB
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### Amplifier

<b>Power output/channel (8 ohms)</b>	30 watts
(1kHz, both channels driven)	

### Loudspeakers

<b>Efficiency</b>	average
*auto level record	



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## SANYO W40CD

SANYO MARUBENI (UK) LTD., SANYO HOUSE, OTTERSPOOL WAY, WATFORD, HERTS. TEL: (0923) 246363.



Given Sanyo's immense strength in the systems market and the lower price reaches especially, it seems at least mildly surprising that the relatively new *W40CD* (announced in July '87) is their first ever dedicated compact disc system.

Sanyo have chosen to enter at the deep end, pricing the *W40CD* at 1p under £380, where it will sit alongside a number of similar systems from other manufacturers on the crowded shelves of some of the larger high street multiples. The question then is, what if anything does the Sanyo offer that its peers don't have?

### TP W40 TURNTABLE

Unusually for a sub-£400 system, the turntable is a separate item that plugs in at the back of the system unit, and perches on top, or (better) sits alongside. This doesn't mean that it can be readily upgraded, however, since Sanyo eschew the usual phono socketry in favour of a cheaper, dedicated plug/socket arrangement that also carries the power.

The *TP W40* has few of the attributes of a quality turntable. The platter main bearing is

loose, and the platter itself is a lightweight plastic moulding covered by a thin rubber mat. Operation is semi-automatic: the deck starts as usual when the arm is pulled towards the record, but cueing is manual, using a damped cueing platform operated from the front panel. Arm return is automatic.

As with other very low cost systems, interfacing with the test equipment proved impractical, so a number of the usual tests could not be run. Of those that were, wow and flutter, though poor in absolute terms, was better than with most similarly priced systems. Similarly, the measured frequency response showed a relatively even energy trend, bar a fairly severe rise at very high frequencies. Luckily this wasn't too audible directly, though it does have indirect consequences on the way lower frequencies are reproduced.

### DXD W40CD MAIN UNIT

The main unit contains all the electronics apart from the turntable. On test the system amplifier gave 17 watts/channel power output. Only the most basic operating facilities are pro-

vided, apart from the obligatory 5-band graphic equaliser. Note that there are no spare inputs of any kind on this system – not even a microphone socket – and that the only outlets are for loudspeakers and headphones.

In most respects, the tuner and the CD player are both highly acceptable items. The CD player has the usual baseline level of facilities expected in a separate component player, including track skip, audible track search, a 16-track programmable memory, and an optional repeat mode. The *pièce de résistance*, however, is the display, an extremely presentable, green backlit LCD device that shows track and index numbers, and elapsed time into the current track – all with appropriate labelling to avoid ambiguity.

Frequency response linearity was not good by CD standards, though it could be argued that this is academic considering the limitations of other source components. What was decidedly *not* academic, however, was the incredibly poor tracking on anything less than the most optically perfect discs.

The tuner is blessed with a similarly attractive and practical display, this time configured to show tuned frequency, preset numbers and

a number of other tuning status related items, all with full signposting to show what's what. It is a quartz synthesiser model of course, and equipped with the usual FM, MW and LW bands. The FM band is split into FM1 and FM2 sub-bands to double the number of available presets, so there are 12 for FM and 6 each for MW and LW.

Tuning is automatic or manual when not using the presets, and the stereo decoder can be switched off to help cope with weak, noisy signals. Tuner RF performance is reasonable, allowing for the usual buildup of noise and whistles with very weak signals, and inevitably higher levels of noise at normal signal levels than with more expensive tuners. The two AM bands, however, worked well, interference and noise alike being well suppressed.

The weak part of the system, as with so many of the competition, is the cassette deck. It has two unidirectional mechanisms, only one of which is designed for recording. Features include Dolby B noise reduction, high speed dubbing, sequential play, automatic level recording, and manual tape type selection (metal Type IV tapes are not accepted for recording purposes).

Experienced readers will recognise in this description items like the auto level control which renders the deck unsuitable for serious applications like enjoying music. The crucial point, however, is the cheap portable-class engineering that characterises the deck. It measures and sounds unstable, and is simply not in the same league as the other components.

The Sanyo is more attractively presented than most of its peers, and on the whole the control system is well thought through. A couple of annoying points did make themselves apparent, however.

First, Sanyo have chosen to give no special prominence to the volume control, burying it instead in a long line along with the equaliser and balance sliders. Consequently I kept finding myself reaching for it and failing to find it.

Secondly, power to the CD player is cut as soon as another input is selected, losing the current play position, and, if the deck is programmed, the memory contents too.

Good points include automatic starts and stops on recordings made from compact disc – nice one, especially for those into taping silver discs for the car or their personal stereos.

## SXW40 LOUDSPEAKERS

On the face of it, the loudspeakers are the usual rather crummy lightweight two-ways, with the two cone drivers mounted from behind the front panel. (This is usually bad audio practice as it puts a short tube in front of them, produc-

ing an objectionable form of coloration as a result.) On the other hand, they are just a little more solidly built than usual.

The frequency response curve shows little evidence of sharp resonant effects, and a quite well behaved treble. The bass end is light in balance according to the response plot, but at least it rolls smoothly away, which is a sign that back in the designer's studio, someone cared.

## HOW IT SOUNDS

The cassette deck is a complete write-off, as implied above. Cassettes sounded messy and 'congealed', lacking in resolution, stability and stereo soundstaging. It made no practical difference whether it was prerecorded or own-made recordings that were being played. They all sounded utterly useless.

The rest of the system, however, gave quite a satisfying account of itself. The tuner, the CD player – even the cheap and nasty record deck – were capable of the kind of noises that make listening rewarding. Whilst the amplifier and loudspeakers are far from offering any real refinement, they did have a cheerful, quite detailed sound.

My observation is that if sufficient resolution can be achieved so that the user has some chance of hearing what's going on, then the brain is capable of largely ignoring the more cosmetic limitations of the reproduced sound. In this case the system has a rather hard, aggressive edge, which was apparent most when playing records, and least on FM radio. Bass was universally lightweight, but far from unpleasant.

## VERDICT

Answering the question posed in the introduction, the Sanyo offers a little more under the skin quality than most of its direct competitors, and it does so in rather greater style.

The best advice for those with a limited budget remains to buy a simpler, one source system based on fewer but higher quality components. For those not interested in this method of getting into audio, however, the Sanyo represents quite a good buy, with an incisive, detailed if occasionally rather uncouth musical presentation. The only real problem is the cassette deck, which is fine for everything except recording and listening to recorded music. Recommended regardless.

## GENERAL DATA

<b>Cost with speakers</b>	£379.99
<b>Options?</b>	none
<b>Size – main unit</b>	67 x 33.4 x 35.5cm (h x w x d)
<b>Size loudspeakers</b>	37 x 20 x 16cm (h x w x d)

### Turntable

<b>Wow &amp; flutter wtd</b>	0.19%
<b>Drift</b>	poor
<b>Speed accuracy</b>	n/a*
<b>Arm/cartridge resonance</b>	n/a*
( <10Hz too low, >14Hz too high )	
<b>Cartridge channel balance</b>	n/a*
<b>Cartridge channel separation</b>	n/a*
<b>Cartridge tracking ability</b>	n/a*

### Tuner

<b>Sensitivity</b>	poor
<b>Signal/noise</b>	fair

### Cassette Deck

<b>Wow &amp; Flutter (wtd)</b>	0.19%
<b>Signal/noise ref 0dB Type II</b>	n/a**
<b>Distortion 0dB Type II</b>	n/a**

### Compact Disc Player

<b>Signal/noise (measured at amp Tape Out)</b>	78dB
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### Amplifier

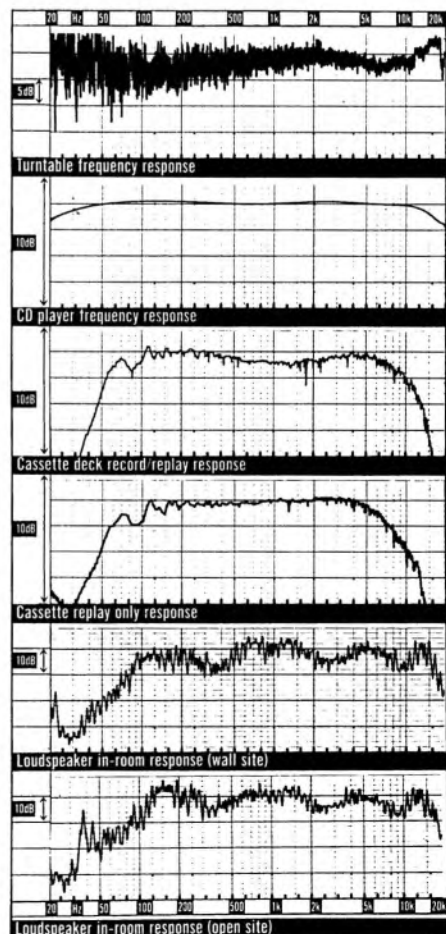
<b>Power output/channel (8 ohms)</b>	17 watts
(1kHz, both channels driven)	

### Loudspeakers

<b>Efficiency</b>	above average
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\*unable to connect to test equipment

\*\*auto level control



# SHARP SA-CD800H

SHARP ELECTRONICS (UK) LTD., SHARP HOUSE, THORP ROAD, MANCHESTER. TEL: (061) 205 2333.



This is an unusual combination, one that Sharp call a 'CDVer'. Get yer tongue around that one if you can! The unit consists of a tuner, an amplifier and a CD player, all built into a single box using a common power supply section, fascia and so on. It's a fairly logical integration of the three major components. Add a pair of loudspeakers and many people's requirements will be met without further expenditure, and in a relatively compact package.

Sharp is normally associated in the UK with budget audio. Combination units of this kind are novel, and superficially it's difficult to see where the SA-CD800H will find its *niche*. Perhaps Sharp think they can establish a new product category. Or maybe they view the 800 as a flagship project, and hope that the rest of the range will bask in reflected glory.

The key features of the SA-CD800H (doesn't the name just roll off the tongue?) are as follows. The CD player has a single drawer loading mechanism, much like any other. But in addition it has magazine loading for up to six discs at once.

The amplifier is also not run of the mill. For one thing, power output is a very high 100 watts/channel. It is also very well kitted out with spare inputs, which includes video handling facilities, and with signal conditioning circuits, notably a graphic equaliser. The package also incorporates a more or less straightforward FM/AM tuner.

The box of electronics is housed in a massive, heavyweight box. It sits on four large circular feet which appear to be sprung but in the event turn out to be fixed and solid. Build quality is good and the machine felt pleasant to operate, with clear, informative displays.

The control system, however, is an uneasy mixture. There's a lot to recommend the overall design, which springs primarily from functional considerations. But aesthetics get short shrift.

One particularly annoying feature is that the CD player works on an either/or basis only. That is, when the tuner (or any other source) is selected, all power to the CD player is cut, and the laser position is lost. As a result it's impossible to put a disc on 'pause', switch over to the tuner to check a broadcast, and pick up the disc where you left off. This limitation often applies with very low-cost systems where the power supply isn't adequately rated for the task, but this can hardly be the case here. It is an example of how integration has been used to *reduce* flexibility of working.

## CD SECTION

A great attraction for many people will be the multi-disc CD player. There are several such mutually incompatible systems around (including a Sony which eschews a cartridge for a rotating loading platform which is loaded up exactly like any single disc player). The Sharp system has one advantage over the other cartridge loaders. Whilst it can be loaded up with six discs when used exclusively as a disc magazine (as Sharp call it), one of the disc loading positions takes the form of a loading drawer. If you want to use the player as a single disc player, it behaves exactly like any other except that the drawer has to be pushed home manually (it still ejects automatically). If you want to load up more than one disc, you simply eject the complete magazine, drawer as well.

Reasons for doing so? Well there's seven to eight hours uninterrupted music making potential here, the main non-professional application being to provide the musical wallpaper for parties. For myself I find the idea of being able to listen to long works without interruption far more exciting. One obvious example from my own experience is a recording of Brahms' *Ein Deutsches Requiem* on Teldec, which for reasons best known to the recording company was issued (admittedly at a special price) on two CDs, even though the running time is only about 75 minutes. With the Sharp I can listen to the work without interruption, exactly as though it was recorded on one disc.

The player has a predictable range of facilities otherwise, except that audible cueing is only available from pause, and the memory records disc as well as track numbers and has a 32-track capacity. The player has the usual repeat modes, and a random play mode. Finally, a so-called 'reserve' function enables a disc or track to be inserted into a programmed sequence. All these things are par for the course with multi-disc players.

## TUNER SECTION

The tuner needs relatively little comment. Electrically it is a quite ambitious design, but from the user's viewpoint it's simply another digital tuner. However, there is one difference. Although the tuner handles FM and MW reception with a useful 12 presets per band, Long Wave has been omitted, suggesting that the model was primarily designed for markets where LW isn't an issue - the USA perhaps? For the UK user this means that *Radio 4* will be

unobtainable at certain times and places (though most of *Radio 4* is available on FM, with better sound quality and some stereo to boot).

I'd like to tell you what the AM side sounds like – I'd like to but I can't, because the tuner refused to tune. Although the display would register different parts of the RF spectrum, the tuner stayed obstinately stuck on one station. This was the second sample, the first having been returned to whence it came when the CD player failed. The FM circuits, however, worked satisfactorily, and although noise isn't particularly low, the nature of the noise is primarily innocuous 'white' hiss, and its build-up as signal levels weakened was very low, indicating good sensitivity.

## AMPLIFIER SECTION

The amplifier will drive two pairs of loudspeakers in an either/or arrangement, though it will not drive two pairs of loudspeakers together (*ie* in parallel), which indicates either over caution or limitations in the current delivery of the output stages, which is a little surprising with this class of equipment.

The graphic equaliser has seven operating bands stretching from 63Hz – 16kHz. There is a matching display, optimistically described as a spectrum analyser, and this is augmented by various extras, including a volume level read-out (very rough and ready), a switch to increase the meter sensitivity, mono, muting and the other expected controls.

## HOW IT SOUNDS

This system – if that's the word – has certain inherent plus points. The major one of course is that the choice of loudspeakers is left to the user, and the same applies of course with cassette and record decks. It won't have escaped the observant reader's attention that these three items are invariably the weakest parts of any packaged system.

Seen in this light, the Sharp is a kind of half-way house between packaged audio systems and component high fidelity. The high power of the amplifier effectively means that any decent loudspeakers can be used without fear of incompatibility, and as a rule of thumb you're unlikely to burn them out through excess power if you avoid obviously gross audible distortion.

Which only leaves the issue of sound quality, which is a bit of a mixed bag. There was very little spread of performance. The tuner sound was pretty much interchangeable with that of the CD player, and even that from a known external source (a Sony *CDP-552ESDII* CD player for this test). At all times the Sharp

sounded precisely defined and in control, with a seamlessness under all conditions of use – different volume levels, different types of sound – that helped make the system sound believable.

The CD player had a gentler, more articulate mid and top than many CD players, whilst the bass was firm and positive. However, the tuner was the more impressive of the two source components, since music conveyed a certain 'tangibility' that the CD player lacked. Stereo soundstaging was more explicit, especially in depth, whereas the CD player sounded a little 'flat', which took the edge off perceived dynamics. The tuner held its own with stations of widely different signal strength at the test site.

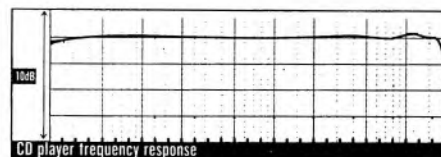
But there were other, less likeable qualities too, in particular a coldness amounting almost to a 'steeliness' in musical presentation which marked the music out as mechanical. A little more warmth and 'give' in the sound would have helped. Trying to add these qualities *via* the equaliser section was doomed from the start, and was less successful the better the loudspeakers used (Monitor Audio *R352MD*, Heybrook *Point Five* and *HBI* for this test).

## VERDICT

The *SA-CD800H* is very expensive, and must be judged against strict standards. Good as it is in overall engineering terms, its competence is compromised by synthetic sounding electronics, and its utility compromised by follies like the cutting of power to the CD player when the tuner is selected. It's distinctive and has unusual (though not unique) capabilities, and as such is worth investigating, to use that immortal phrase. Beyond that I cannot go.

## GENERAL DATA

Cost without speakers	£800
Options?	none
Size	15.2 x 43 x 39.8cm (h x w x d)
<b>Tuner</b>	
Sensitivity	very good
Signal/noise	good
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	> 100dB
<b>Amplifier</b>	
Power output/channel (8 ohms) (1kHz, both channels driven)	100 watts



## SONY COMPACT 310

SONY UK LTD, SONY HOUSE, SOUTH STREET, STAINES, MIDDLESEX TW18 4PF. TEL: (0784) 67000.



This is just one of a number of models, which are available only in the configuration tested. However, Sony do market a similar (not identical) system without the remote control facility. Your dealer will give you details.

The *Compact 310* is designed to sell into the heavily populated bottom end of the market. Build quality is well above average for this class of product, and in a welcome departure, the stylists haven't gone in for the usual excesses. The result is a system that looks almost understated by today's standards, but Sony's restraint will be the user's gain. In other respects too the *Compact 310* is, as we shall see, a particularly strong competitor.

### PS-LX45P TURNTABLE

Whereas many systems at this price use cheap plastic platters and incredibly flexible tonearms, the *PS-LX45P* has a proper metal platter and an arm that is just that little bit better than might have been expected. The deck is

equipped with a Sony magnetic cartridge which adheres to traditional 1/2" mounting centre fixing – absolutely universal with high end turntables of all kinds. There's a damped cueing platform operated by a control near the arm pivot, but the deck is fully automatic in day to day use, with the major controls accessible on the front.

Long term speed stability was poor and the deck ran an (audibly detectable) 0.9% fast, though measured wow and flutter was reasonable. However, the frequency response trend was uneven, indicative of a very poor cartridge design. There is evidence of a lack of structural integrity in the way the deck behaved in the presence of low frequency information.

### XO-D3 CASSETTE/TUNER/ AMPLIFIER

As is increasingly becoming the pattern, the amplifier, cassette deck (twin) and tuner are

packed together as a 'cassette receiver', or whatever you care to call it. The radio tuner has a neat telephone-style keypad, perhaps rather closely jammed together, which allows up to 20 transmission frequencies to be programmed in random order, with selection by pressing one or two number keys followed by 'enter'. This may sound rather long winded, but it should be familiar enough to those weaned on computer keyboards. The display shows frequency and preset number data, plus other status information.

The tuner works well enough off air too: RF sensitivity was reasonable and noise was benign in nature – though slightly high in level.

The cassette deck makes one sensible concession to its modest price by omitting metal tape compatibility. (It will still play back metal tapes, it just won't make them.) Tape switching (Type I and II) is manual, separately selectable for both the playback only and the record/playback deck. High speed dubbing is possible and a single microphone can be connected, but



recording levels are set by an auto-level control (ALC). Measured wow and flutter was poor, though not as audible as the numbers suggest, but the playback only frequency response (the important one when playing pre-recorded material) was truncated very early on this sample (presumably due to azimuth misalignment).

The amplifier section gave about 20 RMS watts/channel on test. The only user controls apart from volume and balance are five graphic equaliser sliders. Fortunately the latter can be bypassed entirely. No spare inputs are provided for ancillary items.

## CDP-M20 COMPACT DISC

The CDP-M20 is the star of this particular show. Well built and well finished – without showing up the rest of the system too badly – the Sony quickly loads discs and locates tracks, and has a better than average ability to track marked or damaged discs. The display is unusually attractive, and like the tuner readout restful on the eye. It shows time, track number and transport status information (play, pause etc.) simultaneously.

Facilities include audible scan and track skip, a 16-track programme memory, and 'shuffle', which re-organises the running order of tracks. By the way, the high measured noise figure comes from the amplifier rather than the CD player.

## SS-A3 LOUSPEAKERS

Garish as the baffle is, the loudspeakers are elsewhere finished in a quite attractive black vinyl wood effect. They appear to be slightly more solidly built than usual in this stratum of the market. I said *slightly*.

## HOW IT SOUNDS

Whatever limitations this system may have, and it has many, it sounds exceptionally good in relation to its price, and to others in this area of the market.

Initial impressions were of a sound that seemed rather dim and muffled. It did, but a little treble boost on the graphic equaliser helped sharpen up the top end wonderfully, and as long as the boost wasn't excessive the results remained good. However, with excessive boost the underlying qualities of the treble showed through, and the sound became raw and coloured.

We're talking about small loudspeakers here, so for this and other reasons the amount of bass is severely limited. Yet the merest whiff of it remains, and the sound isn't totally emasculated. However, the main reason why they work is found in the midband, which is solid yet quite detailed and articulate. It also does something very unusual for a rack system loudspeaker – it goes loud when the music goes loud. Most others either squash dynamics out of existence or change in sound as the volume alters. The Sony doesn't, which is a tribute to both the loudspeakers and the amplifier that drives them.

Furthermore, the CDP-M20 is a thoroughly competitive compact disc player that justifies its place alongside other budget high fidelity separates, not merely other system players. In many ways it is an extremely polished player.

The sheer exuberance and *panache* with which it delivered Previn's Walton *Symphony No 1* (Telarc), for example, was quite something. Once on, I simply couldn't remove the disc until it had played through, which is rare indeed with a work so bold and ambitious on a system so modest. But it must also be said that there were times when the speakers sounded 'phasey' and 'hard'. They don't totally transcend the restriction placed on them by their price.

The other sources lagged behind, but not necessarily by a substantial margin. The record deck suffered obviously enough from its lack of absolute speed integrity, and the sound itself was rather coarse and undernourished through the bottom octave or two. Stereo integrity was poor – the spread was there, but not the precision. The tuner was very effective, and for all practical purposes was a match for the compact disc player. The AM bands weren't bad either. Cassette performance, however, was weak; auto level control robbed the sound of the grosser dynamic swings, but even leaving this aside, cassettes invariably sounded dull and woolly.

## VERDICT

If this isn't Best Buy material, then the moon isn't made of green cheese after all. Sony's *Compact 310* is unpretentious and purposeful, and it sounds as good or better than any other £450 system known to the author.

## GENERAL DATA

Cost with speakers	£449.95
Options?	none
Size – main unit	70 x 35.3 x 36.5cm (h x w x d)
Size loudspeakers	34 x 21 x 19.5cm (h x w x d)

### Turntable

Wow & flutter wtd	0.09%
Drift	poor
Speed accuracy	+0.9%
Arm/cartridge resonance	too high
(<10Hz too low, >14Hz too high)	
Cartridge channel balance	-0.3dB
Cartridge channel separation	-24.1dB
Cartridge tracking ability	80µM

### Tuner

Sensitivity	good
Signal/noise	fair

### Cassette Deck

Wow & Flutter (wtd)	0.23%
Signal/noise ref 0dB Type II	n/a*
Distortion 0dB Type II	n/a*

### Compact Disc Player

Signal/noise (measured at Tape Out)	-59.5dB**
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### Amplifier

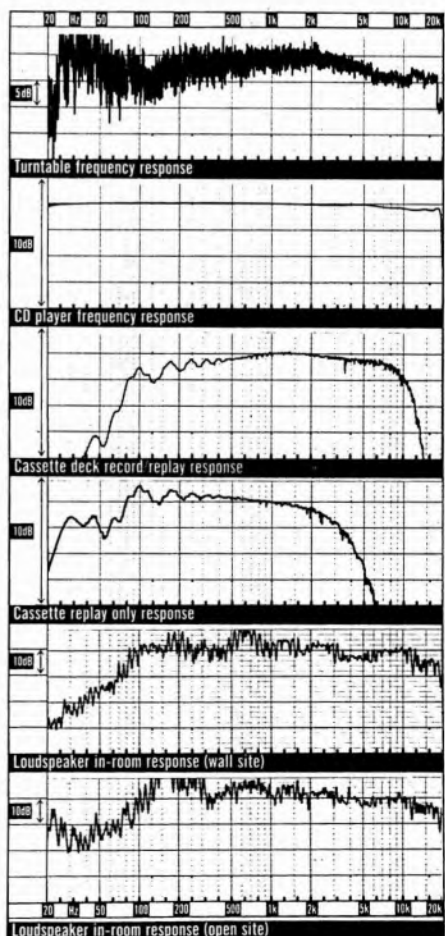
Power output/channel (8 ohms)	20 watts
(1kHz, both channels driven)	

### Loudspeakers

Efficiency	below average
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\*auto level control

\*\*at headphone outlet



## SONY COMPACT 510

SONY (UK) LTD., SONY HOUSE, SOUTH STREET, STAINES, MIDDLESEX TW18 4PF. TEL: (0784) 67000.



Sony offers a bewildering array of integrated packages, in many cases sharing components across several systems. The main system unit here, a cassette/tuner/amplifier combination, is used in more than one other Sony system, and the *CDP-M20* CD player follows in the shoes of last year's market leading *CDP35* by being Sony's main system model, as well as available for separate sale at around £200. The *PS-LX45* turntable is also employed elsewhere.

Like other Sony systems, the *510* has class-leading aesthetics and ergonomics. Although detailed criticisms can be levelled, the clarity and layout of controls on the operating surface is amongst the very best.

### PS-LX45P TURNTABLE

Operation is fully automatic, but a damped cue lever is placed near the arm pivot, and disc size is selected manually. The standard operating controls are fitted on the front panel to maintain uniformity with the rest of the system.

The *PS-LX45* has a thin, resonant carcass, and the arm bearings are no better than reasonable. To cap it all, the platter main bearing on the test sample was tilted, so that the platter wasn't level when the rest of the player was. The cartridge showed similar measured

behaviour to that fitted to the *Compact 310* system: especially ragged in the treble, the upper bass region was also erratic, which may be partly due to structural problems. Wow and flutter was considerably better than average, but absolute speed was unfortunately 0.9% fast. The cartridge has just acceptable channel balance and separation, and tracking performance was good.

### HST-D5 MAIN UNIT

In separate places on the front of this unit, the model number is given variously as *HST-D5* and *XO-D5*, the latter with the qualifier 'Compact Disc Stereo System' – which contradicts other information that this is in fact the *Compact 510* system. Well there you go: if Sony don't know, who does? (Their separates sail under different designations around the world too, so who's fooling who?)

The *HST-D5* (or *XO-D5*) is divided up cosmetically into four horizontal sections, the cassette deck at the bottom, the tuner above it, the main amplifier controls on top, and a section devoted to the 'frills': a 'spectrum analyser' display, a graphic equaliser, and a control labelled Dynamic Optimum Loudness (really?) just below the top.

It strikes the author that these last features

perform no useful function at all. All they do is to add to the visual clutter and manufacturing cost, spoiling the quality of sound by their mere presence. If Sony could omit that section entirely, you'd have a very interesting system which would be more compact, more purposeful, easier to use, cheaper and better sounding to boot. That it would sell as well is rather more doubtful...

Never mind. Most of the remaining features are perfectly stimulating in their own right. Amplifier power output, for example, is a respectably muscular 33 watts/channel. The cassette deck has the obligatory twin transports, one for record and play and the other for playback only. Practical features include sequential play (which carries more conviction with auto reverse units like these – who wants to hear one side of one tape followed by one side of another anyway?), and tape to tape dubbing.

Dubbing operations can be performed at normal speed, or if you don't care what the recording is going to sound like, at double speed. Auto reverse operation is triggered mechanically rather than optically, so there will be a substantial (*circa* 10 second) wait at end of side whilst the deck goes temporarily deaf.

The cassette section is the only part of the system where the controls are jumbled. The direction and mode switching in particular look like oversights. However, on the plus side the transport controls are power assisted, and tape type sensing is automatic. Dolby B provides noise reduction, but record levels are set automatically, so bye-bye dynamics. Wow and flutter levels were very fair. Poor replay response (azimuth misaligned?) led to a considerable treble loss with pre-recorded tapes, but the full record/replay response is better (so far as can be told, given that the ALC may be frequency selective and therefore affect measurement integrity).

The tuner is an even neater piece of kit. It's a digital design with five presets per band (FM, MW and LW), and is blessed with large, well separated keys and a very readable illuminated frequency and preset number readout. Lab tested in the usual fashion, the tuner worked quite happily with good signal inputs, but sensitivity and freedom from synthesiser whistles and other hash were poor under weak signal conditions. On AM, interference suppression was good, but at the expense of a sound quality which was limited at both frequency extremes.

## CDP-M20 CD PLAYER

Possessing a very attractive white-on-black display, which shows time, track numbers and status info, the *CDP-M20* is conventionally equipped with a 16-instruction memory, repeat, skip and audible cueing. The set meal includes very slick and competent disc handling, which is most impressive with marked and damaged discs. This player has its own headphone socket by the way, so at a pinch could lead an independent existence.

## SS-A5 LOUSPEAKERS

Quite why manufacturers make such a point of concealing their loudspeakers beneath layers of tacky trim, in the process making them look cheaper and nastier than they ever could naked, I cannot imagine, but that is the case here. The bass unit is a standard but rather nasty circular unit, but concealed behind foam, and surrounded by a false trim to make it look square (= 'high tech', see?). The tweeter is a little cone unit, again dressed to make it look like something it plainly isn't. On test, however, the frequency response looks well engineered, with the bass end extended flat down to about 100Hz when placed against a wall.

## HOW IT SOUNDS

The loudspeakers were weak in this system – not disastrous, just weak. They had a quite

detailed but slightly 'thin' quality, and although not without bass, what there was lacked power and control: it was all a bit 'cardboardy'. Chamber music generally fared better than denser works. Brahms' *German Requiem* is an excellent example of a full scale choral work of a type that proved difficult for the system to cope with: it sounded coarse and coloured, but most of all 'congested'. Radio speech had a heavy, 'chesty' quality too, but for much of the rest of the time the system sounded fine, with reasonable clarity and articulation.

The turntable compared well with other system turntables, but that isn't saying very much. Especially when sat atop the stack, it was very excitable, and knocks or footfall noise caused a distinctly audible resonant effect in the upper bass. In fact the bass was coloured and overhung all the time, treble was on the coarse side too, and there were other limitations, for example in the way stereo staging didn't really quite happen. To its credit, however, the sound was quite detailed.

The rest of the system worked well – even the cassette deck performed creditably. Output stability was good, and the pitch of 'difficult' instruments like piano was secure. The sound had firmness and reasonable tonal accuracy, though pre-recorded tapes lacked life and 'air'.

Similarly, the tuner worked very well on FM, though it always sounded a touch 'synthetic', as in 'transistory'.

The compact disc player was better still. The sonic signature with FM radio and CD alike was of solidity and crispness – an impression the loudspeakers reinforced. The stereo soundstage was convincingly disposed around the listening area (provided the loudspeakers were securely mounted on solid open stands), and dynamics were convincingly reproduced, though it's fair to point out that the sound became a touch frantic at high volumes.

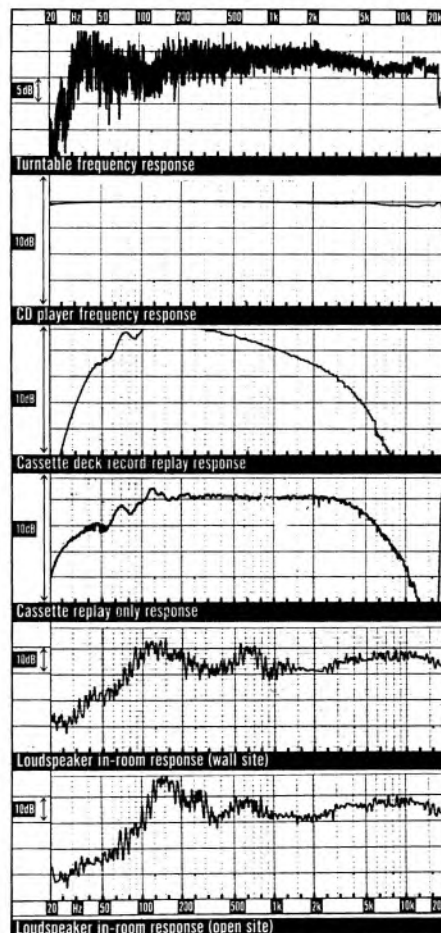
## VERDICT

This is a good one. The turntable could have been better, and the loudspeakers sounded a little raw, but the system as a whole had an honest, punchy delivery that made up in clarity and (mostly) consistency for what it lacked in refinement. Recommended.

## GENERAL DATA

Cost with speakers	£599.95
Options?	none
Size – main unit	69.5 x 35.2 x 36.3cm (h x w x d)
Size loudspeakers	34 x 21 x 19.4cm (h x w x d)
Turntable	
Wow & flutter wtd	0.006%

Drift	average
Speed accuracy	+0.9%
Arm/cartridge resonance	not measurable
(<10Hz too low, >14Hz too high)	
Cartridge channel balance	0.3dB
Cartridge channel separation	-25.7dB
Cartridge tracking ability	80µM
Tuner	
Sensitivity	fair
Signal/noise	fair
Cassette Deck	
Wow & Flutter (wtd)	0.15%
Signal/noise ref 0dB Type II	n/a*
Distortion 0dB Type II	n/a*
Compact Disc Player	
Signal/noise (measured at Tape Out)	65.5dB
Amplifier	
Power output/channel (8 ohms)	33 watts
(1kHz, both channels driven)	
Loudspeakers	
Efficiency	above average
**auto level control	



# SONY COMPACT 610

SONY (UK) LTD., SONY HOUSE, SOUTH STREET, STAINES, MIDDLESEX TW18 4PF. TEL: (0784) 67000.



Although distinctive in many ways, the Sony *Compact 610* system continues to employ the same turntable as is used, for example, in the £250 cheaper *Compact 310*. In that case it was clearly appropriate; here it looks well out of its depth. The *CDP-M20* player is also shared, but in this case it is perfectly appropriate for its more elevated role. So the *Compact 610* continues to illustrate the creeping paralysis of record playing technology amongst systems producers – a paralysis that is far from the situation amongst specialist high fidelity brands.

Aside from the turntable, the *610* system is notably well built and well finished. Apart from the pathetically ugly power level display (the illuminated area grows from the middle in both directions equally, regardless of programme balance, as the power level increases), the aesthetics are mostly well conceived. The system comes with an infra red remote control handset. This includes a full 20-key random access keypad which can be switched for use with the CD player or the tuner, but which omits such commonplace functions as audible cueing on the CD player and 'record' for the cassette deck.

## PS-LX45P TURNTABLE

As suggested, this item is a little out of its

depth. The features count includes fully automatic operation, and the main functional controls are accessible on the front panel. But build quality is not commensurate with the evident ambitions of the system as a whole. The cartridge response and other test findings indicate a limited high frequency bandwidth and quite severely compromised low frequency performance (coloration, lack of dynamics and smear) due to microphony. Speed stability is good, but note the whacking 1.4dB difference in output between channels.

## ST-D7L TUNER

Where lowlier Sony systems employ a 15-preset tuner with five presets/band, this digital synthesiser tuner offers 20 random presets – any number up to 20 on any band. The tuner also acts as receiver for the remote control, whilst a tagliatelle of ribbon cables around the back distributes the control signals as needed.

An interesting disparity arises between the way the presets are accessed on the tuner itself and *via* the remote control. On the machine ten small, closely packed keys are used in combination (if necessary) followed by the 'enter' key. Using the remote control, however, the preset number simply needs to be selected. Test bench performance is excellent on the

whole, though the ultimate signal/noise figure is below expectations.

## DXA-D7 CASSETTE/AMPLIFIER

The cassette section has twin unidirectional transports, one record/playback, one for playback only. Noise reduction is by Dolby B, tape type selection is manual (Type I and II only, not metal Type IV), and record levels are regrettably set automatically. Other facilities include a tape counter, high and normal speed dubbing, and sequential play (Sony call it relay play, which makes sense). Finally, the deck has a microphone input, for which an input level control is fitted.

The amplifier section has a 5-band equaliser, a loudness switch (which has a diabolical effect on the sound) and the usual volume, balance and source switching. The Sony also has connections labelled for a video processor (say a Dolby Stereo decoder, or simply a VCR), but these can be treated as a spare audio input or tape loop. Finally, the volume control is an analogue type, but motor driven when under remote control. Power output measures 30 watts/channel, which is not totally consistent with Sony's 50 watt/channel claims, though our test figure is measured on a much stricter basis.

## CDP-M20 CD PLAYER

This is the same, familiar unit covered elsewhere. Main features are audible cueing, repeat, a 'shuffle' (random play order) mode, and a clear, attractive white track number/time readout, with alternative displays a button push away. Disc handling is very fast and polished.

## APM-A7E LOUDSPEAKERS

Cheaper Sony system loudspeakers make a pretence of being what they most certainly are not, by covering up the round drive units and fitting square trims to make them look technologically sophisticated. The *DXA-D7* goes one step further by continuing to use a false square surround, but this time to exaggerate a real flat square diaphragm bass unit! (The tweeter is a large cone, and so continues to need disguising.) I ask myself why they bother, and I cannot imagine what the answer is.

More important than the drivers is the enclosure, which plays a large part in defining how well they operate. This vented Sony is quite heavy and solid, and by system standards remarkably non-resonant. The *APM-A7E* is capable of impressive and worthwhile results, but this potential will not be realised unless they are sited on solid, open stands of the kind that are sold by specialist hi-fi stores – but probably not from many of the outlets that sell packaged systems like this.

The frequency response plot shows a minor presence band boost (the plateau between 500Hz-1.5kHz) which is likely to be dominant on audition. The bass alignment suggests that away from wall use will be best (it is) to achieve the best uniformity and freedom from coloration. The treble is remarkable flat, which is a good start. Obviously this isn't a typical system loudspeaker.

## HOW IT SOUNDS

I was impressed by the music making abilities of this system, though background hiss levels were higher than expected with all inputs. One particularly striking example of its capabilities was with Walton's *Belshazzar's Feast* (Previn/RPO) on CD. For those who don't know it, the work is a large scale choral piece with enormous dynamics, some very quiet reflective passages and some of real ferocity from orchestra and chorus alike. It's the kind of work that defeats most systems because they compress the dynamics and smear the detail, the quiet passages often losing out on presence and clarity more than the loud ones. In this case, although the bass quality was a little dry and

thin, the sheer exuberance and clarity of the sound was most striking, and the way it held the attention during quieter moments was even more so. On the scale of goodness, however, the treble was the least couth performance area due to the tweeter – headphone sound quality was much better.

The cassette deck couldn't match the performance of the CD player: speed stability was occasionally suspect; it was also a little dropout prone and the centre of the soundstage tended to drift. Poor tape path design and/or inadequate back-tension is the probable reason. Furthermore, the auto record level led to the predicted loss of impact on loud passages, and inconsistencies with quiet ones which would creep up in volume slightly as time progressed.

The turntable wasn't too hot. In the context of this system especially, it simply wasn't good enough. The coloured and inarticulate bass was a classic of the genre, though when things were going its way – for example by playing music that didn't stretch the frequency extremes – records took on a stature denied CD. The sound seemed to start and stop more readily; tonal colours were more explicit and varied. The effect was simply more natural, and this is *not* an uncommon finding.

In some ways the system was at its best with the tuner. I wasn't that keen on the AM side, which sounded band-limited and overtly mechanical, but the FM sound had considerable subtlety and articulation. Stereo was good, dynamics were free to happen; the sound had warmth and class, not to mention a little hiss. Smasssshing.

## VERDICT

Good in parts, but the inconsistency of this system makes final judgement necessarily equivocal. With a better turntable and a more sensibly designed cassette deck, things would have been different.

## GENERAL DATA

<b>Cost with speakers</b>	£699.95
<b>Options?</b>	none
<b>Size – main unit</b>	69 x 35.2 x 36.3cm (h x w x d)
<b>Size loudspeakers</b>	39.6 x 23.1 x 21.6cm (h x w x d)
<b>Turntable</b>	
<b>Wow &amp; flutter wtd</b>	0.075%
<b>Drift</b>	average
<b>Speed accuracy</b>	+0.6%
<b>Arm/cartridge resonance</b>	not measurable
(<10Hz too low, >14Hz too high)	
<b>Cartridge channel balance</b>	1.4dB
<b>Cartridge channel separation</b>	-26.8dB
<b>Cartridge tracking ability</b>	80µM

## Tuner

**Sensitivity** very good  
**Signal/noise** poor

## Cassette Deck

**Wow & Flutter (wtd)** 0.38%  
**Signal/noise ref 0dB Type II** n/a\*  
**Distortion 0dB Type II** n/a\*

## Compact Disc Player

**Signal/noise (measured at Tape Out)** >107dB

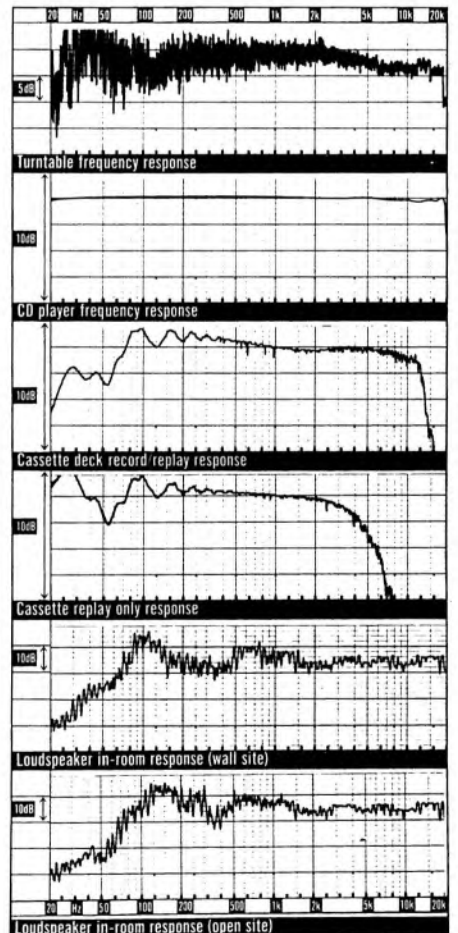
## Amplifier

**Power output/channel (8 ohms)** 30 watts  
(1kHz, both channels driven)

## Loudspeakers

**Efficiency** below average

\*auto level record



## SONY COMPACT 710

SONY UK LTD, SONY HOUSE, SOUTH STREET, STAINES, MIDDLESEX TW18 4PF. TEL: (0784) 67000.



Sony's *Compact 710* is visually and operationally in keeping with the cheaper systems in the range – but with bells on. One of its most attractive features is a full function remote control which allows you to make recordings, select CD tracks or radio programmes using a numeric keypad, and more. This is the high tech, go faster system. It does more and does it better – mostly.

Not completely though: I was disappointed to discover that the turntable used here is the same as that which appears throughout the range, including a system that costs less than half the price of this one. The CD player is also common (almost) throughout the Sony lineup, though unlike the turntable it is quite comfortably at home in this more exalted system. Well at least you won't have cause to complain about build quality. It's put together like a Swiss clock. Except the turntable...

### PS-LX45P TURNTABLE

The *PS-LX45P* is no different here than in the other Sony systems. Belt driven, it is equipped with a magnetic cartridge, but this is only interchangeable for another of the same type because the tracking weight is fixed. Operation is automatic, mostly using the controls on the front panel. The cartridge response is a bit of a mess at both ends of the audio frequency band – the bass end suggesting all but total loss of

control. On a typical stiff, rigid surface instead of the top of the equipment stack, sound quality is perceptibly improved.

### ST-D9L TUNER

The *ST-D9L* is functionally identical to the *ST-D7L* tuner found in the £200 cheaper *Compact 610*. The 20 station presets are accessed in exactly the same way, the one or two digit preset number followed by 'enter' – a cumbersome procedure made no easier by the cramped design of the keypad. Alternatively, the station can be selected directly from the remote control's 20 button keypad. The tuner also has a handy 'memory scan' feature which plays a few seconds from each usable preset frequency.

Not only are the features identical to the *ST-7DL*, the behaviour of the tuner on test is equally indistinguishable. Very good sensitivity is combined with below average ultimate signal/noise. However, AM reception and sound quality were both below par.

### DXA-D9 CASSETTE/AMPLIFIER & SEQ-V70S SPECTRUM ANALYSER

For once, the twin cassette deck is exactly that:

two separate decks, both capable of recording, both with full auto-reverse capabilities, and both controlled by a set of light-touch logic-controlled transport keys. Sequential recording allows up to 3 hours continuous recording or playback using C90s, while other features include high speed dubbing, Dolby B and C noise reduction, track search and simultaneous recording on two tapes. Minor facilities insert blank spaces between tracks (for the track search feature), edit whilst dubbing, preselect certain transport modes and more. A microphone can be mixed in if required. But I was truly startled to discover that even at the elevated price of almost £1,000, the packaged cassette deck is stuck with automatic record level setting, with all the sonic compromises that entails.

The Sony is a polished performer, the transport leaping to the commands that your fingertips tap out on the keys. Lab test performance was satisfactory on the whole, the slightly dished record/replay response seemingly attributable to the action of the ALC. But the wow and flutter figure is poor for a deck at this price level.

With a measured 40 watts/channel power output (Sony claim a 2x60 watts based on less stringent criteria), the amplifier is a quite potent device, with an electronic volume control using large + and – keys. A central display

area reads out the selected input, volume level setting and instantaneous power output levels. One extra (non-system) component can be patched in at the rear. Labelled 'video', the connections are identical to any audio tape circuit, with input (play) and output (record) connections.

The equaliser/spectrum analyser acts as an adjunct to the amplifier's tone control section, and can be bypassed if desired. The analyser reads out programme power in seven narrow frequency bands, with an additional reading of integrated power output. The equaliser works over the same seven bands, with separate controls for each channel.

## CDP-M20 COMPACT DISC

The *CDP-M20* is a relatively simple unit which features memory, repeat and 'shuffle' (random non-repeating) play, which makes quite a mess of most classical works. Audible cueing, a fixed level head phone socket, and an attractive track number and time display to match the one on the system tuner and amplifier completes the trappings. Disc handling is very assured, even with optically blemished discs.

## APM-10ES LOUSPEAKERS

At last – the first and cheapest Sony system with a proper pair of loudspeakers! The *APM-10ES* has a flat diaphragm bass unit and a small soft dome tweeter, both of real quality. They are mounted in a strongly constructed cabinet, mated *via* a multi-element crossover, and filled with sound absorbent material. The grille is detachable to improve the sound. A mild critical note: the crossover components are bunched together, and some mutual interference is inevitable. However, the in-room response shape is very clean and well extended at both frequency extremes.

## HOW IT SOUNDS

In a phrase, consistently excellent, at least by packaged system standards.

The annoyance value of cassette wow and flutter depends on the way the artefacts are distributed, and this is one of those cases where the distribution has resulted in reduced audibility. In practice, it takes very wow-critical program (say piano) for any speed instability to become audible. Even then it didn't do badly. The potential for dynamic damage due to the the ALC has been limited by making its action quite subtle. Even so loud peaks were ducked just perceptibly, spoiling soundstage integrity as perspectives altered, and reducing the dif-

ference between the quietest and loudest passages.

The cassette deck also sounded a little ragged – lacking the rock steady stability of the CD player, or the midband openness of the record player. But the system remained quite convincing from tape. Ditto for the CD player, which is also a lot tidier sounding, if verging on sterility (a common complaint with CD). And ditto too for the FM radio, which again sounded clean and potent, with unsquashed dynamics and a 'squeaky clean' sonic presentation. As for the record deck, for all that it excelled in the mid-band (as turntables usually do), it performed poorly in other areas, the bass in particular sounding unintegrated and coloured. Pitch and timing were simply not as they should have been.

So far then the *Compact 710* scores about 70-75% which ain't bad. What pulls it up to about 80% is the combination of amplifier and loudspeakers which work well together, the former investing the latter with considerable stature and authority, though only below well defined volume ceilings.

This is not a system which sounds comfortable being driven very hard, but if that trap is avoided, it sounds light and airy, with a very spacious soundstage and plenty of resolving power. There is also a certain coldness – almost a 'steeliness' – which sometimes seems to underline transients and treble information generally. This tendency isn't too objectionable, however, and by system standards these components are nothing less than a revelation.

But the effect of the equaliser, even with controls set flat, was like adding a few fine layers of gauze over the ears. Boosting treble didn't bring the sound back to life, merely making it sound aggressive and coarse. The loudspeakers are sufficiently good that equaliser 'tweaking' isn't necessary, as it doesn't address the speakers' hardly severe shortcomings anyway.

## VERDICT

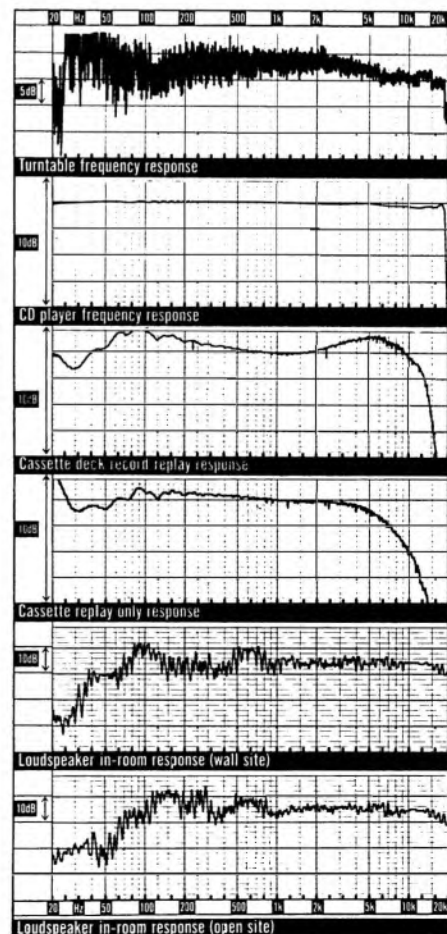
Good, and Recommended. Removing the equaliser would reduce bulk and cost, and benefit sound quality, while operationally I missed automatic source selection and generally found the ergonomics a bit cumbersome, save for the remote control. Sound quality, however, varied between good and excellent almost all round. However, as it stands this is *not* a system for record enthusiasts.

## GENERAL DATA

Cost with speakers	£999.95
Options?	none
Size – main unit	75 x 35.2 x 36.5cm (h x w x d)

Size loudspeakers 39.5 x 25 x 21.5cm (h x w x d)

<b>Turntable</b>	
Wow & flutter wtd	0.12%
Drift	poor
Speed accuracy	+0.9%
Arm/cartridge resonance	too high
(<10Hz too low, >14Hz too high)	
Cartridge channel balance	0.8dB
Cartridge channel separation	-24.9dB
Cartridge tracking ability	80µM
<b>Tuner</b>	
Sensitivity	very good
Signal/noise	poor
<b>Cassette Deck</b>	
Wow & Flutter (wtd)	0.19%
Signal/noise ref 0dB Type II	n/a*
Distortion 0dB Type II	n/a*
Compact Disc player	
Signal/noise (measured at Tape Out)	92dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	40 watts
(1kHz, both channels driven)	
<b>Loudspeakers</b>	
Efficiency	average
*auto level control	



## SONY FH1215CD

SONY (UK) LTD., SONY HOUSE, SOUTH STREET, STAINES, MIDDLESEX TW18 4PF. TEL: (0784) 67000.



Welcome to this review of something else: the astonishing *FH1215CD*, the grown up micro system that thinks it's a ghetto blaster. As supplied for this road test, the system boasts a single cassette deck, an amplifier, a tuner, a pair of loudspeakers and full feature remote control. But this isn't Sony's only miniature system: there are no less than three others of varying degrees of sophistication and price, which are also available with a twin cassette deck, claimed to be the world's smallest.

The *FH1215CD* is a transportable component system. Without the CD player, the electronics perch on top of each other, the loudspeakers clamp on each side; a handle is clipped on top; hey presto – it's transportable! But there's no provision for battery power – this one's strictly AC.

With the exception of the loudspeakers the components are engineered to a much higher standard than the street audio norm, which reinforces the point that this is a serious sys-

tem designed for the home, office, or perhaps student digs. However, potential buyers may like to think about the possibility of ditching the supplied speakers which really don't measure up to the potential of the rest of the system. It's a shame this equipment cannot be purchased without them.

It can be bought with a turntable, however, though the one Sony make to match, the *PS Q3B*, is neither wider nor deeper than the other system components. As a result disc support is vestigial, and much of the record overhangs the player itself, so those serious about vinyl disc reproduction are best advised to seek a more conventional solution.

### ST-215 TUNER

This tuner concedes little to its diminutive proportions. Barely 5cm high, it is digitally tuned and fitted with an extremely attractive and clear display of frequency, preset number

and other relevant status information. There are 20 available presets, selected using a slightly clumsy telephone keypad-like arrangement of 10 buttons plus a key marked 'enter'. The preset buttons are also rather closely packed and require some care in use. The remote handset has a simpler-to-use full 20-key selection system.

The tuner works on FM, MW and LW, and there is no restriction on which waveband can be used for any of the presets. One additional feature is memory scan, which plays a few seconds from each active preset until instructed otherwise.

On test, the FM section worked satisfactorily at normal signal levels. At around 10mV input, however, the front end overloaded and hum products became quite audible. At slightly higher levels noise and synthesiser 'hash' set in early and seriously. AM performance was iffy; at best rather dull and constrained sounding, MW and LW alike were rather too susceptible



to interference from other electrical appliances.

## TC-215R CASSETTE DECK

This sweet little machine is about as simple and elegant as mains cassette hardware gets. Despite its size, the deck has full auto-reverse for both recording and playback. Noise reduction is Dolby B, and the gadget count includes a tape counter, a direction mode switch and beautifully laid out, fully logic controlled, powered transport keys, including a record mute key.

Tape type selection and recording levels are both automatic, the latter of course implying a loss of musical dynamics and greater hiss levels during quiet spells. You can connect a microphone, even mix it with other sources, but only *via* the amplifier. Using the normal transport controls, a track search feature can be engaged.

Wow and flutter levels were moderately low on the test bench, but the other measurements were rendered unreliable or meaningless due to the action of the ALC circuit.

## CDP-17F CD PLAYER

If the cassette deck is a peach, this one is a gem. It's no bigger than the tuner, but has a standard drawer loading arrangement. The display matches the tuner one, and shows time and track numbers simultaneously. Facilities are the usual track skip, search, 16-track programmability and repeat. A 'shuffle' facility is also included, plus a miniature headphone socket with level control.

The frequency response rolls slowly away in the extreme treble. Disc handling is slowish and tracking is below par. Moral: be careful with your discs.

## FH-215R AMPLIFIER

Again simplicity rules. Communication from the other source components is by flat ribbon cable in most cases, but the CD and record deck inputs use standard phono sockets, which allows some freedom of choice and flexibility. Unfortunately there are no other spare inputs unless you count the front panel microphone mixing facility. The volume control is electronic (to facilitate remote control) and excessively slow acting, especially at the low end of the volume range.

Most of the rest of the machine is taken up by a large and elaborate spectrum analysis display with alternative fixed step and animated read-outs, and an associated 7-band equaliser which uses logic controls to perform the setting. Three equaliser configurations can be

memorised for instant recall. An additional feature is an elaborately specified bass boost switch, which in practice sounded disastrous with any loudspeakers. Measured power output was 33 watts/8 ohms.

## APM-215 LOUDSPEAKERS

Last – and least – the loudspeakers are relatively lightweight items, compact yet with three drivers shoehorned in where even two is a crowd. Despite the apparent sophistication, this is about as advanced as a Tiger Moth in the age of supersonic air travel. And so it goes. The frequency response shape is ragged, with clear energy peaks around 100Hz (in the optimum wall-loaded position), between 500Hz-3kHz, and again near 8-10kHz.

## HOW IT SOUNDS

Miraculously, the system on the whole sounds very presentable. Perhaps its best feature was expressiveness. Wired to a pair of good loudspeakers (Heybrook *HB1* and also Musical Fidelity *MC-2*, both of which are nominally quite unlikely partners) the Sony was able to play Ravel with a surprising degree of voluptuousness (without which Ravel's orchestration doesn't work), and with impressive grace for a system so small. It also went loud with adequate consistency.

CD sound in particular was airy and spacious, even refined. While it's true that considerable mauling was going on behind the scenes (the system never sounded very sharply focused or excessively authoritative, for example), it did remain essentially true to the spirit of the music, and didn't ride roughshod in the way so many systems undoubtedly do.

The cassette deck did surprisingly little to dent these positive attributes, though significant rapid flutter effects are intermittently audible, apparently because the deck is a bit over-sensitive to the exact nature of the tape inserted. The ALC circuits showed some restraint, so loud passages were not entirely crushed.

Given a strong enough signal, the FM side of the tuner was also a reasonable performer. Good stereo, a good idea of recorded acoustic, and an underlying sense of ease and movement when reproducing music all helped. However, this isn't the tidiest or sharpest tuner alive.

Forget the loudspeakers though. They sound coloured, coarse, aggressive, phasey – especially phasey – and are singlehandedly responsible for wrecking everything Sony's electronics engineers have achieved.

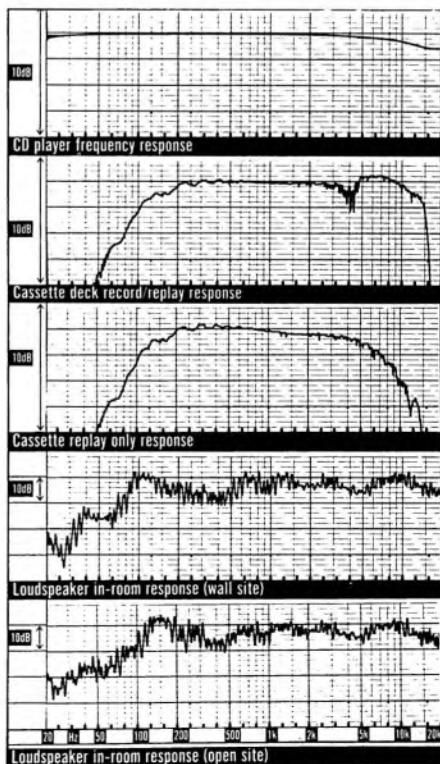
## VERDICT

This system has a superb camera type finish

and feels like a zillion dollars. Most of the criticisms concern the cosmetics of the sound, not its essential worth. Sony were nervous about submitting this miniature for review, declining to do so a year ago, but in the author's opinion this system meets its brief superbly. There would be no justice if it didn't earn Recommendation. The loudspeakers, meanwhile, could almost be donated to Oxfam.

## GENERAL DATA

Cost with speakers	£799.95
Options?	PS Q3B turntable
Size – main unit	33.6 x 21.5 x 27cm (h x w x d)
Size loudspeakers	28.7 x 18 x 22cm (h x w x d)
<b>Tuner</b>	
Sensitivity	poor
Signal/noise	fair
<b>Cassette Deck</b>	
Wow & Flutter (wtd)	0.11%
Signal/noise ref 0dB Type II	n/a*
Distortion 0dB Type II	n/a*
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	80dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	33 watts
(1kHz, both channels driven)	
<b>Loudspeakers</b>	
Efficiency	average
*auto level control	



# TECHNICS S800CD

PANASONIC UK LTD., 300-318 BATH ROAD, SLOUGH, BERKS SL1 6JB. TEL: (0753) 34522.



Technics' entry into the low cost CD system field is the *S800CD*, strategically priced just under £400. It is supplied with a compact disc player and a cassette based receiver, plus loudspeakers. A turntable is not included, which means that the system will be of greatest interest to those who neither own records nor intend to buy any in the future. However, it is available with a turntable (the *SL-J90*, a simple fully automatic belt-driven model) and without the CD player for exactly £100 less.

As the number of low cost CD systems increases, so the design patterns they fall into seem to converge, if not actually fossilise. The key component is a one-piece box of electronics that contains a tuner, a cassette deck and the system amplifier. This method of construction reduces manufacturing costs and eases setting up, since much of the spaghetti that would normally float around at the back is prewired inside. The disadvantage of course is equally compelling. One piece systems are by nature dead-end purchases. You do not get the opportunity to upgrade by stages – though there is some mileage to be had here from changing the loudspeakers.

Attached to the system as satellite units are the CD player and of course the loudspeakers. One of the most obvious strengths of this Technics compared to the majority of its peers is the excellent standard of external build and finish. And also the neat, unfussed aesthetics and panel graphics, though I note Technics couldn't completely avoid the temptation to fill

up open spaces of fascia with spurious legends like "electronic volume control" and "7 segment, 2 way level display". Makes it sound like an electronic grapefruit, doesn't it?

Aesthetics are nice, but some people might be looking for more tangible virtues. For these, the system comes with remote control, and the Technics implementation is reasonably complete. It lacks the power on/standby feature of others, but does have the means of setting all the sources into action, selecting tracks on the CD or presets on the tuner, and altering levels with a volume and mute switch combination.

## SA-X800L CASSETTE RECEIVER

The tuner is a particularly attractive part of this package from more than one point of view. It roams over FM (stereo and mono), MW and LW, and being quartz synthesiser driven also has preset tuning. In this case there are 16 random presets, any of which may be allocated to any waveband, and you don't need to switch bands beforehand.

To avoid a messy layout (and additional manufacturing costs) there are only eight preset keys, so to ease operation Technics use time sensitive switching to replace the usual shift key switching arrangement. Press any preset button momentarily and you retrieve one of the presets. Press it for about half a second and the alternative is pulled up. Clever, huh?

The tuner also offers automatic and manual

presetting, plus a mono switch which defeats the interstation muting for those interested in weak-signal reception. In auto-preset mode, the deck searches for transmissions and stores them automatically, but it's an inflexible arrangement that in practice is certain to need post-editing. Relevant waveband and frequency information, preset number and a stereo beacon are displayed on an extremely well designed and attractive back-lit LCD panel. The tuner behaved quite well on the test bench, with low levels of interference and moderate noise with strong (>1mV) signals.

Typically, the cassette deck takes the lion's share of the glamour, but is under-endowed on the technology and engineering fronts. It incorporates classic compromises like automatic record level, plus some very useful ones like auto tape type sensing (Type IV metal tapes are excluded for recording purposes). Dolby B noise reduction and serial (sequential) play are also part of the package. A mechanical tape counter logs tape travel on the record capable transport, and tape to tape dubbing is available, sensibly in real time only, not at high speed – a minor triumph for sound quality over cynical marketing ideas.

The record/playback response looks rather erratic, but some of this can be laid at the door of the ALC circuit. Not so the playback only response, which is a mess. Wow and flutter levels are in the cheap portable class.

This electronics package is united by an amplifier capable of delivering 18 watts/chan-

nel on test. Technics have sensibly left this relatively simple, so apart from bass and treble controls there are only necessary features for source switching, volume control (electronic, to facilitate remote control) and so on. There are no spare inputs whatever beyond those required by the system (though a phono input for vinyl record playing is fitted, see introduction), and outputs are limited to headphones and one pair of loudspeakers.

## SL-PJ22 CD PLAYER

This same player is used in a number of Technics systems, and is covered elsewhere in this issue. In brief, it is a very well made deck with quick responses and good tracking performance. The controls are well laid out, and allow the usual track skip and audible cueing, plus a memory facility for up to 20 tracks. Bench test behaviour was good, the poor noise figure (measured at the headphone socket) being attributable to the amplifier rather than the CD player.

## SB-F800 LOUDSPEAKERS

The tweeter looks like a refugee from the set of Star Wars, though underneath the gold coloured dust cap and other window dressing it is a simple, low tech unit. On the whole, however, the SB-F800 doesn't look bad: the enclosure is well finished, and with the front cover in place it has a restrained, almost Europeanised appearance. As for construction, it is clearly well above average for a cheap system component, without being in any danger of achieving full high fidelity standards. However, this is one loudspeaker that is quite capable of speaking for itself. The in-room frequency response is remarkably flat from 100Hz to the limit of audibility in the extreme treble; wall positioning suits quite well.

## HOW IT SOUNDS

Cassette section apart, the Technics gave an unexpectedly strong account of itself on audition, though it's no mould breaker – the cassette deck, for example, is no better than any other of its ilk.

Starting with the bad news, the cassette deck was by any standards an embarrassment to the company name. Recordings – all recordings, whether pre-recorded or home made – suffered from a quite rapid 'warble' and considerable instability of level, which is a reflection of poor transport engineering integrity. The top end (such as there was) sounded 'sandpapery', the mid coarse and distorted. There was little resolution or real insight even with Dolby switched off (which generally helps).

The rest of the system was very much better. The tuner sounded slightly 'thick', again lacking in resolution, and noise levels were slightly high. But this isn't a bad tuner, especially given the price of the system as a whole. The two AM bands also behaved perfectly satisfactorily.

The other components in the system are more satisfactory still. The CD player is simply a good low cost CD player, and stands comparison with most other CD players below about £200. The best surprises however were the amplifier and speakers. The amp sounds clear and transparent (though only the CD player is really in a position to take advantage of the fact), and the speakers had a similar quality – light, detailed, tolerably refined (due allowances being made for price etc.), and tonally quite accurate.

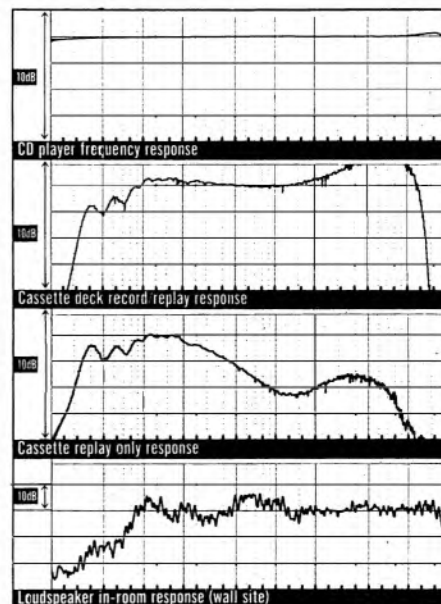
## VERDICT

It's not unusual for low cost systems to have weak cassette decks, but even by prevailing standards this one takes the biscuit. It is tempting to think in terms of sample faults to explain the otherwise inexplicably bad speed stability, but both transports suffered identically. Had it not been for this terrible component the system would have warranted clear Recommendation, perhaps even Best Buy status.

## GENERAL DATA

<b>Cost with speakers</b>	£399.95
<b>Options?</b>	X800 £299.95; similar to X800CD but with turntable instead of CD player
<b>Size – main unit</b>	63.5 x 36 x 27.8cm (h x w x d)
<b>Size loudspeakers</b>	35.5 x 22 x 18.3cm (h x w x d)
<b>Tuner</b>	
<b>Sensitivity</b>	good
<b>Signal/noise</b>	fair
<b>Cassette Deck</b>	
<b>Wow &amp; Flutter (wtd)</b>	0.31%
<b>Signal/noise ref 0dB Type II</b>	n/a*
<b>Distortion 0dB Type II</b>	n/a*
<b>Compact Disc Player</b>	
<b>Signal/noise (measured at Tape Out)</b>	81.5dB
<b>Amplifier</b>	
<b>Power output/channel (8 ohms)</b>	18 watts
:(1kHz, both channels driven)	
<b>Loudspeakers</b>	
<b>Efficiency</b>	below average

\*auto level control



# TECHNICS X820

PANASONIC UK LTD., 300-318 BATH ROAD, SLOUGH, BERKS SL1 6JB. TEL: (0753) 34522.



Available with or without CD player at £580 and £400 respectively, the X820 might be described as a medium price, well equipped system from a company with a good track record with this kind of product. It is styled (if that's the word) to look like separate components, but in reality the central SU-X820 component is a multi-function device which includes the amplifier and a double cassette deck.

The system comes complete with a remote control which includes a random access keypad for the tuner presets, and will make automatically cued tape recordings, releasing 'pause' as a disc or record starts to play, and reimposing it at the end.

## SL-J100R TURNTABLE

Pretty much your standard system component, the SL-J100R predictably employs Technics' favoured T4P type interchangeable cartridge which removes the requirement for any adjustment of tracking force and bias, even if the cartridge is changed for a T4P of another make. A lightweight alloy platter is belt driven, and the arm is pivoted. Operationally it's fully automatic, with auto disc presence and size detection using a couple of feelers poking through the rubber mat.

The cartridge energy trend rises slightly into the 2kHz area and declines mildly thereafter – a reasonable result. Tracking ability and channel balance were both fine. However, although the lateral arm/cartridge resonance fell at a satisfactory 10Hz, the vertical one appeared at

4Hz, which is far too low for adequate stability, especially considering the knocks and bumps the type any turntable must expect from time to time. Speed accuracy was absolute with the test sample, and wow and flutter below 0.1 per cent.

## ST-X830L TUNER

A quartz synthesiser design, the ST-X830L stores up to 24 randomly selected frequencies on the customary 3 wavebands, FM, MW and LW. The display is attractive and clear, showing the waveband, tuned frequency, preset number, stereo beacon and a redundant sign saying 'quartz lock'. In operating feel, facilities and general air of engineering integrity, the ST-X830L does a pretty fair impersonation of a high fidelity component.

Noise buildup on weak FM transmissions was moderate, and the tuner also coped well with input from a good aerial installation delivering a plethora of quite strong signals on different frequencies. The two AM wavebands were surprisingly good too, giving strongly characterised, clear results.

## SU-X820 CASSETTE/AMPLIFIER

The cassette deck has two transports, both unidirectional but only one capable of recording. Sequential playback is available, along with dubbing at normal or double speed. Noise reduction is by Dolby B. The deck knows what kind of tape has been inserted (good), but record level setting is automatic too, which

effectively disqualifies it as a serious music recording tool.

One of my pet hates is an amplifier with loads of meaningless drivel scrawled all over the fascia in a wanton form of vandalism. The Technics is guilty of this. The paean of self-aggrandisement reads: 'New class A' circuitry with synchro bias eliminates switching and crossover distortion enables high power and excellent waveform fidelity.' That's exactly what it says.

Otherwise, the amplifier is a model of restraint and clarity, developing a useful 30 watts/channel. It has an electronic volume control, engineered slightly better than normal; these invariably respond slowly and don't do much for the sound, even when (as here) the number of steps is adequate. The volume control is supplemented by a -20dB panic button (they call it 'mute'), an electronic balance control, the usual bass and treble controls and a 'super bass' switch for the headbangers in our midst.

Source switching is fully manual. There is just one spare auxiliary input, but it is possible to patch in a signal processing device, perhaps a Dolby Surround processor or a graphic equaliser by plumbing into a removable wire link at the rear. One pair of loudspeakers can be connected.

Power output measured about 30 watts/channel. The auto record level control prevented accurate measurement of most cassette deck parameters, but wow and flutter was a little below hi-fi standards, as expected. The Type II record/playback sweep was well

optimised, whilst the playback only plot was a bit lumpy, and favoured the bass.

## SL-PJ22 CD PLAYER

Again, we have what looks and behaves like a legitimate high fidelity component. The *SL-PJ22* has a very slick loading drawer and rapid disc handling that elevates it a rung or two above the run of system players. Facilities include a 20-track programme memory, audio cueing and a track number/time display that can be switched to show a variety of time-based data.

## SB-F820 LOUSPEAKERS

Mostly window dressing here, the enclosures are small and neat, but light in weight and quite resonant structurally. The bass unit has a plastic surround made to look like a diecast one, and the design of the cone/dome tweeter is so messy, it's not surprising it sounds as it does. Nevertheless, and for what it's worth, the frequency response shape is quite accurate, though there's little output below 100Hz.

## HOW IT SOUNDS

Not bad at the price, in the usual fashion the sonics tend to be dominated by the loudspeakers, simply because they suffer the most glaringly objectionable shortcomings. But they are far from being the only determining factor.

The Technics loudspeakers are mercifully reasonably innocuous through the bass and midband, but the treble was obviously raw and 'phasey', and the dynamic range of the system was largely limited by the inability of the loudspeakers to track a loud signal. Tonal balance was pretty fair, though there was a tendency to lighten instrumental colours. The top end's harsh overall quality clearly missed many of the more relaxed and colourful musical nuances completely, but by system standards they really weren't bad at all, though suffering a little from a lack of control and weight in the amplifier.

Semi-favourable comments apply elsewhere too. The system was at its best with CD, though the edge over FM radio was often surprisingly narrow. Both sounded dynamically lively, and the latter especially quite spacious in all planes. CD was positionally accurate and certainly made some enjoyable noises, despite a touch of glare. The cassette deck worked moderately well, with a subjective absence of flutter side effects (harshness, loss of separation and tonal colour) and good speed pitch accuracy. Metal tapes fared best, but the margin was so small that the premium over a good Type II tape probably isn't justified.

Records were hamstrung by the propensity of the deck to 'wobble' alarmingly – but LF 'Boomy' effects were well controlled. The underlying sound quality from records, however, was surprisingly reasonable, even to a confirmed vinyl junkie like yours truly. It was full, articulate and (leaving the Rice Krispies to one side) quite good enough to show CD where to get off. Oh praise be!

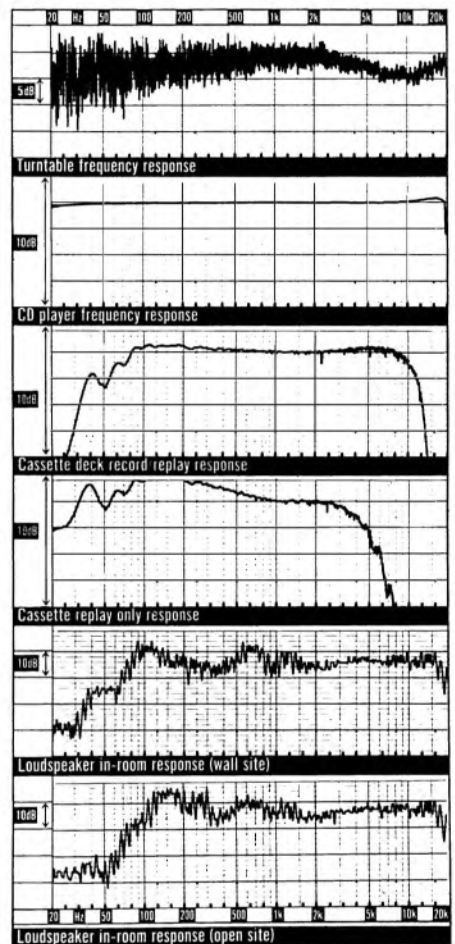
## VERDICT

This is an absolutely typical middle ranking system. Uneven in its attributes – the loudspeakers are particularly weak – it should suit radio and CD freaks well. The Technics parentage invests it with better than average build and finish quality, but it would be truly wonderful if they could give the matter of loudspeakers some long, hard thought.

## GENERAL DATA

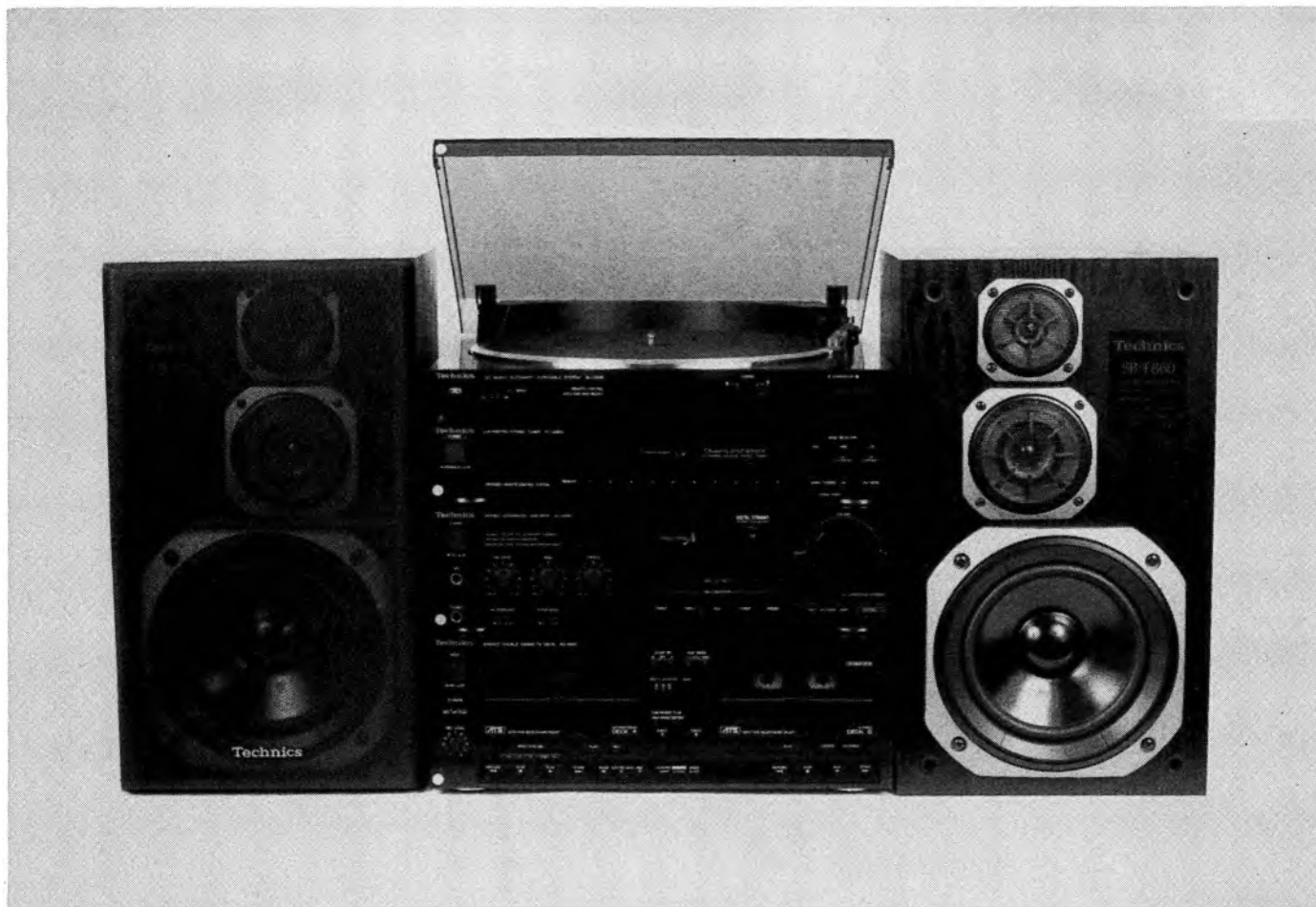
Cost with speakers	£579.95
Options?	SL-PJ22 CD Player £179.95
Size – main unit	71 x 36 x 32cm (h x w x d)
Size loudspeakers	35.5 x 22.6 x 18.5cm (h x w x d)
<b>Turntable</b>	
Wow & flutter wtd	0.095%
Drift	poor
Speed accuracy	good
Arm/cartridge resonance	too low
(<10Hz too low, >14Hz too high)	
Cartridge channel balance	0.2dB
Cartridge channel separation	-27.5dB
Cartridge tracking ability	80µM
<b>Tuner</b>	
Sensitivity	good
Signal/noise	good
<b>Cassette Deck</b>	
Wow & Flutter (wtd)	0.15%
Signal/noise ref 0dB Type II	n/a**
Distortion 0dB Type II	n/a**
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	>105dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	30 watts
(1kHz, both channels driven)	
<b>Loudspeakers</b>	
Efficiency	average

\*\*auto level control



## TECHNICS X840

PANASONIC UK LTD., 300-318 BATH ROAD, SLOUGH, BERKS SL1 6JB. TEL: (0753) 34522.



You could call this a grown-up *X820*. Two of its components are shared with that system: the turntable and CD player. The tuner supplied with this system is called the *ST-X880L*, and the one with the *X820* system is the *ST-X830L*, so the implication is that they're not the same at all. But the facilities are identical, and so are the aesthetics, the technical specs – and even the sound.

Styling is unimaginative, but build quality and operational feel are both good. System *X840* has full remote control, the handset covering all basic functions, including power on/off switching.

### SL-J100R TURNTABLE

I think most of the turntables that come with Japanese rack systems are shelled from the same pod. The *SL-J100* sounds pretty modern, even attractive on paper. It's compact, has a neatly integrated lid, auto record size sensing using a mechanical system based on feelers,

and full automatic on and off. There is a front panel cueing device for manual use. The arm is pivoted and of a very basic design, but the *T4P* cartridge is readily interchangeable. Structural integrity, however, is simply off the menu.

The sample tested is the one described in the *X820* review. The cartridge has a slightly lumpy response, favouring the 2kHz area, but the slopes are gentle on both sides. All other cartridge parameters were satisfactory bar a very high vertical compliance, leading to a 4Hz LF arm/cartridge resonance and a marginal stability when playing records. Long term speed stability (drift) was poor, but wow and flutter etc were fine.

### ST-X880L TUNER

The tuner is a thoroughly modern and attractive device, whose front end roves over FM, MW and LW, and which has 24 random presets – enough for a party. The display reads out preset numbers along with tuned frequency and the usual status information.

RF behaviour on the FM band was good under most signal conditions – weak and strong alike. AM performance was better than average, with well contained interference levels and without excessive loss of treble and 'air'. By prevailing AM standards that is.

### RS-X844 CASSETTE

This is one of those cassette decks that sings and dances. At least I *think* that's how the expression goes. It is a moderately well equipped deck, the prime limitations being that only one of the two transports is record capable, and neither offers auto-reverse operation (a feature I miss on convenience-oriented products like these midi systems).

Equipment includes both Dolby B and C, and manual record level setting, while tape type selection is conveniently automatic. Very rudimentary metering is included. Both transports have a track search feature; both have sequential tape playback and full timer standby

switching is also provided. Other parts of the deal are inadequate visibility of the tape, and messy ergonomics, partly due to poor display and switching design.

The deck measures extremely well on most counts, and is particularly effective in replaying pre-recorded material.

## SL-PJ22 COMPACT DISC

Like other recent generation Technics units, this is very accomplished in the gentle art of disc handling. In short it's fast, quiet and smooth. The display is reasonably comprehensive, and the unit has a predictable enough range of facilities, including a 20 track programme memory and audible cueing. Tracking on marked discs is quite good, and the laser servo more stable than usual.

## SU-X840 AMPLIFIER

The *SU-X840* is one of Technics' so-called 'New Class-A' amplifiers – which actually means a sliding bias Class B system that does everything important that Class A amplifiers do except what is really important. But the *840* is unusually exactly specified by midi system standards. Power output is about 50 watts/channel, and that's the real figure we measured on test.

Apart from those inputs required by the other system components, the Technics has connections for a spare tape deck, auxiliary inputs and microphone mixing. The unit also boasts a less-than-Dolby Surround circuit called AV Surround, which with the aid of an additional pair of speakers can give a surround type effect (on the right day and with a following wind). (If you're really interested in pursuing this aspect further, a proper separate Dolby processor could be patched in using the wired across sockets on the rear.)

The volume control is electronic but rotary in action, with a useful 38x2dB steps, a very solid feel, and a simple bar-graph volume display supplemented by a much more explicit dB numerical readout, sensibly scaled with 0dB corresponding to full gain (not necessarily the same as full output of course).

To maintain signal purity, a CD direct switch is supposed to bypass non-essential circuitry. But the tone, volume and balance controls are all left in circuit, so it's hard to imagine what might have been bypassed (apart, perhaps, from the unsuspecting users' credibility). There's also a 'super bass' switch, which in practice sounds a bit like being hit over the head by a shovel, and generates a comparable level of pain.

## SB-F860 LOUDSPEAKERS

Far from your usual two cheapo radio drivers in a converted orange box, this model wears added value like a badge of credibility. Though fairly small – certainly well within the bookshelf category – it employs no less than three drive units. The tweeter is described as horn-loaded, whilst the normal 5.5cm midrange and still small 16cm bass units have polyester reinforced cones. The units are well finished and installed in what appears to be a fine black wood-effect enclosure. However, picking them up demonstrates that the enclosures are far too thin to meet high fidelity standards. Notwithstanding appearances, the internal construction of these speakers is below par – in other words, the *SB-F860* is mostly front . . .

## HOW IT SOUNDS

On balance the system sounds good. Despite the hard words on the construction of the loudspeakers, the sound is much less like a dog's dinner than I had anticipated. However, some midband and upper mid messiness remains, and any competent 2-way design from a specialist manufacturer (including the reference Heybrooks) has the Technics well beat. Best point is an engaging liveliness – worst is a lack of bass and instrumental separation. On balance they're usable, and the amplifier is the perfect foil, with just enough class all round to make them really sing.

The turntable, CD player and tuner have been covered in the *X820* system. The CD player is quite a good one of its type, and works reliably with good resolution and dynamics, though it can react a little violently with the slightly uncouth system treble performance. The FM section of the tuner is musically or more or less on the same plane. Some live *Radio 3* transmissions, which in engineering terms are a lot less processed than most pre-recorded software, sounded glorious.

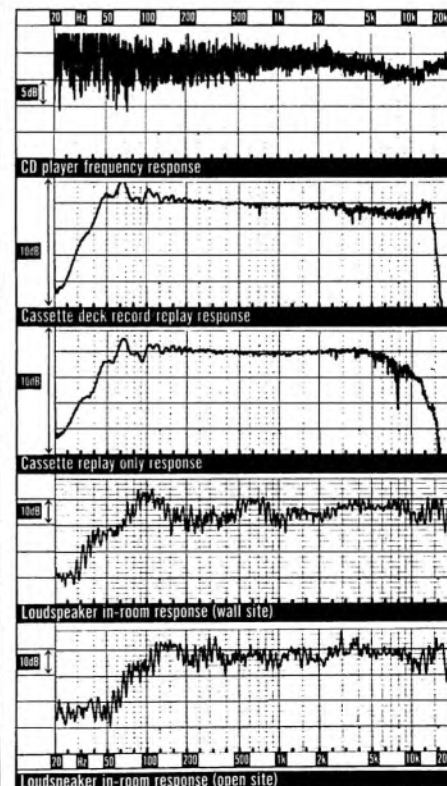
First prize goes to the record deck, despite the obvious speed instability, simply because the system sounded cleaner and more articulate with records than with any other source. But you do have to wade through the garbage, including a quite active HF when playing less than perfect records. The cassette deck was also a qualified success. Normal cassette problems were well controlled on the whole, and I made some fine recordings as well as having some real success with pre-recorded tapes.

## VERDICT

Good – Recommended. This is clearly one of the better mid-to-expensive systems, and is well made into the bargain.

## GENERAL DATA

Cost with speakers	£729.90 (inc CD player)
Options?	SL-PJ22 CD player, £179.95
Size – main unit	71 x 36 x 32cm (h x w x d)
Size loudspeakers	42 x 24 x 21.7cm (h x w x d)
<b>Turntable</b>	
Wow & Flutter wtd	0.095%
Drift	poor
Speed accuracy	none
Arm/cartridge resonance	too low
(<10Hz too low, >14Hz too high)	
Cartridge channel balance	0.2dB
Cartridge channel separation	-27.5dB
Cartridge tracking ability	80µM
<b>Tuner</b>	
Sensitivity	good
Signal/noise	good
<b>Cassette Deck</b>	
Wow & Flutter (wtd)	0.13%
Signal/noise ref 0dB Type II	52dB
Distortion 0dB Type II	1.1%
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	>105dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	50 watts
(1kHz, both channels driven)	
<b>Loudspeakers</b>	
Efficiency	average
NB: Turntable & compact disc player data from Technics X820 system	



# TECHNICS X880

PANASONIC UK LTD., 300-318 BATH ROAD, SLOUGH, BERKS SL1 6JB. TEL: (0753) 34522.



Although Technics have a comprehensive range of separates, the X880 is their flagship packaged system, and by any standards is an impressive beast. The question, as always, is how much of the investment is reflected in what comes out of the loudspeakers at the end, and how much is merely window dressing?

This is probably not the system for granny. It's not difficult to use, it's just that for the most part Technics have used their technology to add new features rather than to reduce complication (the alternative route, pioneered by Bang & Olufsen in particular). But there are two important exceptions that will make everyone's life easier: one is a full function remote control; the other is automatic source selection. Press 'play' on any of the source components and the amplifier switches over to that input.

## SL-J300R TURNTABLE

Arm-in lid parallel tracking turntables have become rarer than hen's teeth recently. The number using direct drive motors is even smaller, but this is one. Compared to the run of system turntables, the SL-J300R is quite solidly built with a heavier platter, a better mat and a stronger main bearing than normal, though it still falls short of separates standards. On the

negative side, some flexibility is inherent in the lid, which doubles as the arm base, so the required tight coupling between arm and record (except for the clearly defined planes of movement that allow the system to work) is not really met.

Watching the deck go about its business is instructive. After the lid is shut, the arm swiftly traverses and scans the still stationary record, lights adjacent to numbered buttons illuminating one by one as the individual tracks are identified. From then on you can pick a particular band to play, or a programmed sequence of up to 8 non-repeating tracks. Other controls provide powered sideways shuttling, this being one deck you can't operate by hand (or even see where you are through the dark smoked lid). Normal automatic operation is the other mode of use, with source selection taking place automatically as play is pressed. (The source selection process is one way only, so selecting 'phono' on the amp doesn't do anything to the record deck.)

The T4P magnetic cartridge has reasonable channel balance and good tracking but deficient separation and a rather high arm/cartridge resonance, mostly because the vestigial arm is so low in mass. The frequency response shape has no obvious discontinuities (normally indicative of resonances), but suffers some output loss above 3kHz. Speed stability is good and wow and flutter low.

## ST-X880L TUNER

The tuner chosen for this system is the very unit used in other much cheaper Technics systems, but it doesn't look or behave out of place. Under the skin it is a conventional but modern synthesiser design, with an attractive display and 24 random presets, using a 12-key access system which uses short delays to determine whether you've selected a one or a two digit preset number.

Both AM and FM bands worked well on the test bench, AM sound quality being clean and open yet with well controlled susceptibility to interference. FM sensitivity, immunity to the kind of hashy junk associated with digital tuners, and ultimate background noise levels all rate as good.

## RS-X888 CASSETTE DECK

This deck is one of the stars of the show: two fully functioning cassette decks, both record capable, both full auto reverse equipped (changeover happens at the tape/leader join, so the delay is minimised), both with Dolby B and C and both with auto tape recognition. Record levels are set manually, and additional features include track search, sequential and parallel recording, and automatically synchronised record starts/stops when dubbing from records or CDs. There is a powerful editing function from CD only which records just as



many integral tracks as can be fitted into one side of a tape before reversing to complete the recording.

Apart from a rather truncated low frequency response, the decks worked superbly, with remarkably low wow and flutter by auto-reverse standards, plus good OVU noise and distortion.

## SL-PJ44 CD PLAYER

The show stopping feature is the editing function, described under the cassette deck head. Otherwise it's a typically slick player with 20-track programmability, a 15-track calendar type display, a random access keypad, repeat mode and more. Disc handling is fast and secure, and tracking on marked discs is also good.

## SU-X880 AMPLIFIER

This amplifier contains something I thought I'd never see on a system amplifier – a thermostatically controlled cooling fan. It isn't often needed, but should ensure the unit survives partly abuse with equanimity. Facilities are pretty standard, but there are some typically fancy proprietary circuit tweaks, which on the whole don't have a great record of success. Otherwise it is most notable for three things. One: prodigious power output, measured at 100 watts/channel. Two: the silly legends on the front panel (sample: 'Digitally encoded volume' means that the volume level in decibels is shown in digitised form. Right, and the sky is light when it isn't dark). Three: lots of lovely spare socketry, including two tape circuits suitable for tape decks, video sound or DAT, and a patch for a sound processor, equaliser etc. Finally the Technics is less than notable for including a 'nearly but not quite...' surround sound processor, a sub-Dolby Stereo device that doesn't really work very well.

## SB-F880 LOUSPEAKERS

Sadly, form also comes before function with the poorly constructed louspeakers. The formula Technics have adopted is to go for a biggish box and shoehorn in no less than three drive units. The naive prospective buyer will certainly be impressed by the amount of hardware on offer, and even more impressed by the expensive looking diecast chassis'. But what you see is simply cosmetic plastic trim; the units underneath are of poor quality and based on thin metal pressings. Construction is inadequate; only a tiny amount of sound absorbent material is used and the crossover is bodged. But at least I was able to get inside without destroying the enclosures, which says something about serviceability.

## HOW IT SOUNDS

This is an expensive system, fundamentally far too good to be written off simply because the loudspeakers properly belong on the end of a Dixon's special. Though not unattractive in many ways, they suffer, and suffer badly, in areas like low frequency control and tunefulness, smoothness at high frequencies, and clarity through the midband.

Changed for something better (I used the Heybrook *HBI*s for this and other tests, and rate them as ideal in this application) the system began to sing. Even so, some bits of it were better than others.

The turntable for example sounded tidier and more 'together' than most system turntables, and record surface noise was well suppressed. Yet for reasons it was hard to put a finger on it was still vaguely disappointing. Records didn't 'sing', somehow, and the effect was rather lacklustre.

There are no other real criticisms. The tuner, CD player and cassette deck all gave good accounts of themselves. The tuner was no surprise, since it performed with integrity in other systems. Honest enough AM performance was complemented by natural, spacious and refined FM. Ditto with compact disc, though the *SL-PJ44* seemed little better than the *SL-FJ22* used in the other Technics systems, except from the user interface angle.

The cassette deck, however, was the most impressive item. Not that it matched the CD player or tuner in absolute sound quality terms, but simply because it ran them so close. This is one case where a good measured performance was amply reflected in the listening results. The deck was impressive in most modes of use, though high speed dubbing should be avoided of course, and Dolby C recordings tended to sound a little sterile. Speed stability was impressive, and the underlying stability that comes from good tape to head contact made it more impressive still.

## VERDICT

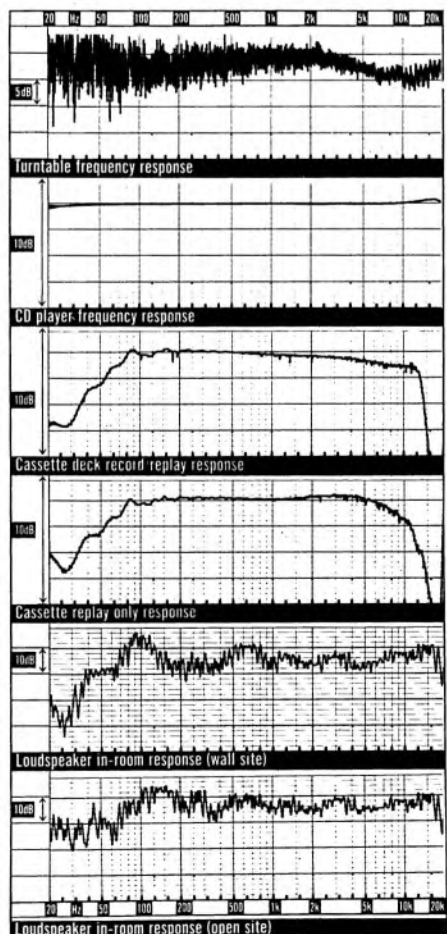
The Technics is extremely well turned out, with the kind of finish that only one or two others seem routinely able to achieve. Despite detailed criticisms of the turntable, the good qualities are sufficiently well distributed for the system to rank well as an all rounder. But the loudspeakers must be ditched first. C'mon, Technics, if you're not going to do the job properly, how about making them optional?

## GENERAL DATA

Cost with speakers £899.95  
Options? SH-E70 Equaliser, SL-PJ44 CD Player

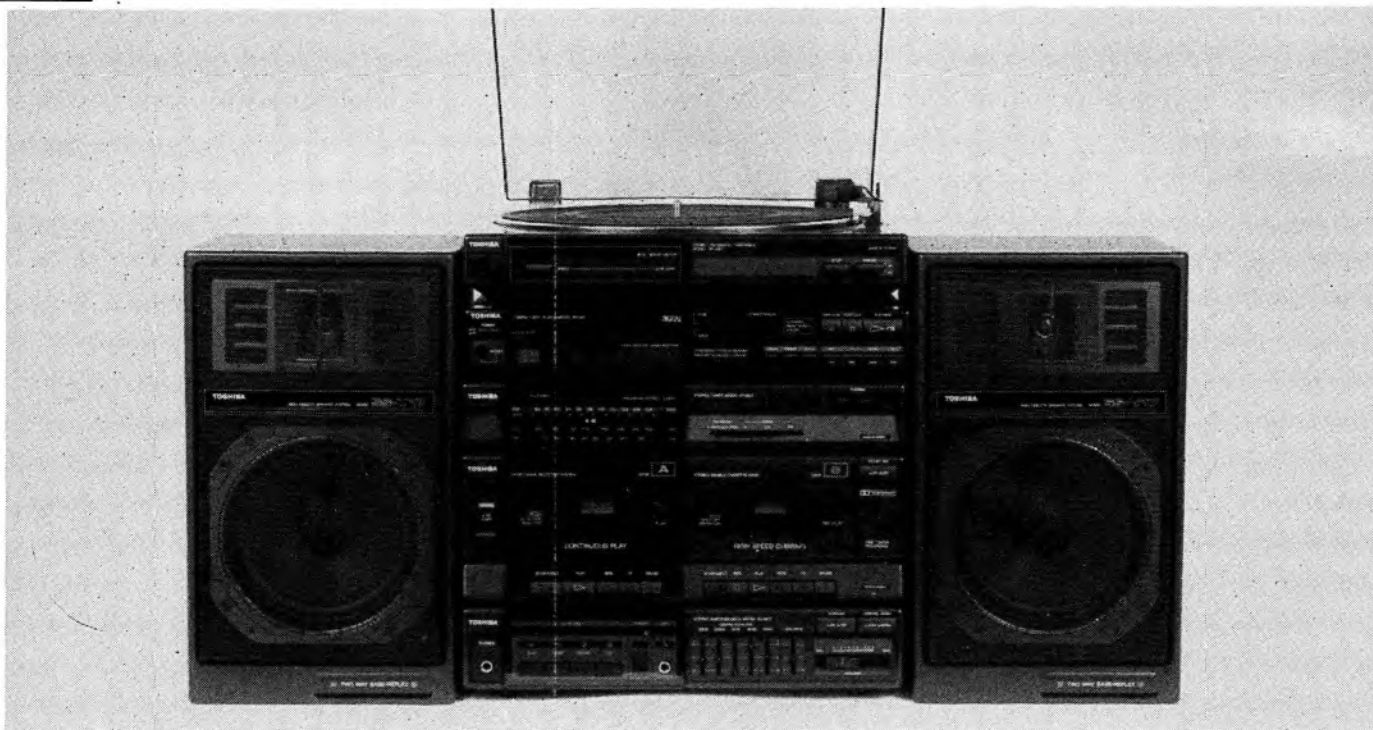
Size – main unit 78.8 x 35.8 x 32.4cm (h x w x d)  
Size loudspeakers 45.4 x 26.6 x 21.6cm (h x w x d)

<b>Turntable</b>	
Wow & flutter wtd	0.06%
Drift	good
Speed accuracy	+0.3%
Arm/cartridge resonance	15Hz
( <10Hz too low, >14Hz too high)	
Cartridge channel balance	0.4dB
Cartridge channel separation	-22.4dB
Cartridge tracking ability	80µM
<b>Tuner</b>	
Sensitivity	good
Signal/noise	good
<b>Cassette Deck</b>	
Wow & Flutter (wtd)	0.09%
Signal/noise ref 0dB Type II	53dB
Distortion 0dB Type II	1.0%
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	>106dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	80 watts
(1kHz, both channels driven)	
<b>Loudspeakers</b>	
Efficiency	average



## TOSHIBA V17CD

TOSHIBA UK LTD., TOSHIBA HOUSE, FRIMLEY ROAD, FRIMLEY, CAMBERLEY, SURREY GU16 5JJ. TEL: (0276) 62222.



Toshiba's low cost V17CD is something of a polyglot. Bits of it come from Taiwan, from Korea, from Japan, and (as a label on the back of the loudspeakers points out) Royaume-Uni, though the UK involvement is nothing to shout about – the influences are strictly Oriental. A simply specified system, the amplifier and cassette deck are integrated into one unit, whilst the tuner, CD player and turntable are all separate components.

Aesthetics have a spark of originality for once. The hardware is designed to have a 'sculpted' appearance, which is achieved most obviously by the softly rounded equipment edges. There has been no attempt to disguise the plasticky nature of the system, but it's been achieved with some taste and the system does look smart, even attractive, though not expensive. It's well finished too.

### SR-3617 TURNTABLE

The turntable describes itself as automatic. Maybe something was lost in the translation, because it's only a semi-auto – manual setdown assisted by front panel cueing device and auto return. Underneath a thinly disguised silvered edge is a turntable platter of purest plastic, topped by a mat of thinnest rubber. The arm is pivoted and fitted with a magnetic cartridge; only the stylus is replaceable.

The cartridge gave wildly asymmetric separation figures in the two directions, which

suggests poor internal generator build quality, and the frequency response was spiky at the top end. The turntable ran a little fast (+0.9%), and pitch stability was suspect. The most obvious shortcoming of the deck, however, was such an excitability that it sounded hollow and boomy even when left undisturbed.

### ST-3517 TUNER

The ST-3517 is one of a shrinking number of analogue (scale and pointer) tuners. The scale is clear but cramped, and although the edgewise tuning control is largely free of backlash, it's also free of flywheel assistance. The usual FM, MW and LW bands are all covered, but there are no presets.

Although it loses out in the technology stakes and the lack of preset provision, there's no rule to say that analogue tuners have to sound or perform worse. This one works better than expected for a model at this end of the market. Sensitivity is reasonably high, and ultimate noise levels are low, with much lower levels of discrete whistles than is usually found with low cost digital tuners. AM sound quality was pretty good, again assisted by quite well contained background nasties.

### SJ-3417 CASSETTE AMPLIFIER

Cassettes are handled by this simple low cost twin transport deck. The record/replay trans-

port is equipped with a track search feature called MQSS, but not the playback only deck. Noise reduction is by Dolby B, and other features include sequential play, normal and high speed dubbing – and that's about it. Tape type recognition is automatic (metal is not accepted for recording purposes though), and regrettably so is the recording level. One curious omission is a tape counter.

The automatic record level prevented some of the measurements being made, and provides a possible excuse for the record/playback shape (which in any case is not all that bad). However, the playback only response can't be excused on these grounds, and the rather peculiar shape defies rational understanding. Wow and flutter was quite poor.

The amplifier section is reasonably powerful for a low cost system. It has a 5-band equaliser and microphone socket, but no other spare inputs. On the output side, the Toshiba is equipped with something they hopefully describe as surround sound. The rear speaker sound appears to be derived from the front stereo difference signal (as in Hafler), with additional processing to give a 'stereo wide' effect. This made the music sound 'phasy', or rather phasier than before, and the sound became edgy and peaky. This circuit cannot be used to reproduce Dolby Stereo (surround) video tapes and actually destroys normal stereo imagery. Presumably it has been included to cash in on the fashion for Dolby

Stereo equipment; in fact it (and others like it) could end up killing this embryo market stone dead.

## XR-9217 CD PLAYER

This is an attractive modern player and quite well equipped. It has dedicated track search keys, audible cueing, plus a 16-track memory, repeat, and a display that can show track times and numbers simultaneously. The player even has its own headphone socket, stopping short of any means of adjusting volume.

One snag with this deck is that it had a great deal of difficulty with marked discs. Not only was tracking ability below par (despite the 'high precision servo system' claim), it quite often simply refused to find tracks at all.

## SS-V17 LOUSPEAKERS

The loudspeakers share the smoothly rounded edges of the main unit, and look a little more domesticated than some. But Toshiba throw it all away with an ugly nameplate and crude tweeter trim. The usual simple construction techniques are employed, the hardware consisting of a simple bass unit and tweeter. The SS-V17s don't do much at the frequency extremes, and are peaky within their passband. Note the prominences around 500Hz-1.5kHz, and again just above 5kHz, which dominate the sound quality.

## HOW IT SOUNDS

The CD player may not be the world's best tracker, but it worked well enough when presented with a reasonably clean disc. (It usually will of course; the relevance of the tracking tests is that a bad result implies high error rates when playing normal discs too, which inevitably reflects in the sound. In this case the system does not have sufficiently high inherent resolution for any shortcomings in this department to become apparent.) Although the sound was a little soft in ultimate focus, it still sounded colourful, dynamic and clean when it went loud. The high frequency end sounded less obtrusive than usual – a good sign.

The tuner worked well too, and on all wavebands. The FM side could be criticised for sounding a little strident and monochromatic – there was a definite loss of warmth which can be expected to have this effect – but it still sounded clean, concise, detailed and capable of good, explicit stereo.

The other two sources were less satisfactory. The record deck came off worst. Dynamic range was poor, and despite a clean, articulate midband, the level of surface noise was so high, and loss of precision in the bass so severe, that

it could not be regarded as a success. The cassette deck was a less spectacular failure. It sounded poor with pre-recorded tapes, though not as poor as the response suggests, whilst recordings sounded reasonably good with non-critical material. Speed stability was borderline.

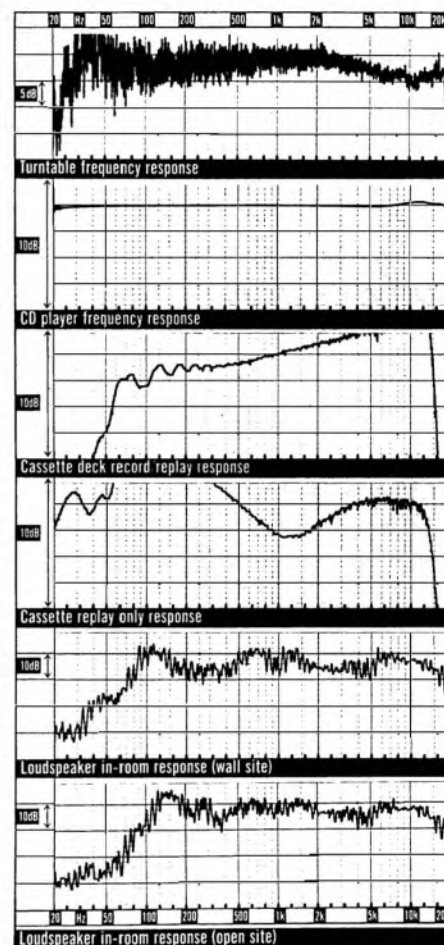
The amplifier did its job quite satisfactorily, but the loudspeakers didn't. They were awful – phasey, ragged, lacking bass – the works. The only excuse is the price, but affordability doesn't preclude listenability.

## VERDICT

If you are prepared to discard and replace the loudspeakers, the system represents good value for money. The record deck wasn't well liked, but it was no worse than expected at the price, and most of the rest of the machine was surprisingly good. Recommended.

## GENERAL DATA

Cost with speakers	£399
Options?	sold as V17 without CD player £249
Size – main unit	68 x 33.7 x 37.5cm (h x w x d)
Size loudspeakers	35.5 x 21 x 18.9cm (h x w x d)
<b>Turntable</b>	
Wow & flutter wtd	0.085%
Drift	poor
Speed accuracy	+0.9%
Arm/cartridge resonance	9Hz
	(<10Hz too low, >14Hz too high)
Cartridge channel balance	0.7dB
Cartridge channel separation	17.3dB L-R/30dB R-L
Cartridge tracking ability	80µM
<b>Tuner</b>	
Sensitivity	good
Signal/noise	good
<b>Cassette Deck</b>	
Wow & Flutter (wtd)	0.18%
Signal/noise ref 0dB Type II	n/a*
Distortion 0dB Type II	n/a*
<b>Compact Disc Player</b>	
Signal/noise (measured at Tape Out)	86dB
<b>Amplifier</b>	
Power output/channel (8 ohms)	20 watts
	(1kHz, both channels driven)
<b>Loudspeakers</b>	
Efficiency	average
	*auto level record





# TECH TALK

Every review includes a table of laboratory test results. This chapter explains how each test was carried out and how to interpret the results.

This section describes the measurements, in the order in which they're listed with each review. Occasionally it proved necessary to alter the procedure, especially where the system concerned lacked the usual inputs and outputs, making it difficult to connect the test gear. In general, these alterations are described within the reviews themselves. Nearly all the measurements were conducted by my colleague, Robert King, the aim in all cases being to help illuminate the practicalities of each system's performance as far as possible under normal domestic operating conditions.

**Dimensions and prices:** We have given dimensions of the stacked system components with the turntable (if fitted) lid up, and of the speakers. Prices quoted are typical retail prices including VAT. While to the best of our knowledge these were correct at the time of going to press, they obviously are subject to fluctuation from time to time, and this should be taken into account when interpreting our 'value for money' judgements.

## AMPLIFIER

**Power Output:** The figures presented are the RMS output in watts with both channels driven together to a point immediately prior to amplifier output waveform clipping at 1kHz. Equipment used: Dual beam oscilloscope, dual 80hm dummy load and Nakamichi T-100 audio analyser, both for generating the sine wave signals and displaying the output on its wattage scale.

## RECORD DECK

**Speed variations (wow and flutter):** The measurement given is peak DIN-weighted, as measured using a 3kHz recorded tone from HFS 75 and the Nakamichi T-100.

**Speed drift:** This is an assessment (not a measurement) of long-term drift (low-rate speed variations) using the same test set up as above.

**Speed Accuracy:** percentage error, derived from tests using the

Ortofon TC 3000 test computer. The more accurate, the better – although of course a slightly incorrect speed is less serious than appreciable speed variations.

**Arm/cartridge resonant frequency:** This is the average vertical/lateral resonance, also derived from the Ortofon TC 3000 test computer. This frequency is related to the mass of the arm and cartridge, and the stiffness (compliance) of the cartridge cantilever (the thin rod that supports the stylus at its visible end, and which is secured loosely at the other end). Very low figures, below about 8Hz, may cause the cartridge to be easily disturbed by problems such as warped records, and (where fitted) turntable spring suspensions. Sound quality may suffer – pitch reproduction can become unstable and low frequencies generally may become muddy and ill-defined. Too high a frequency – above about 16Hz say, may result in a rather fluttery and under-characterised bass. The 'ideal' figure is 10-14Hz.

**Cartridge channel balance:** Again derived from the Ortofon TC 3000 test computer. The smaller the difference between the two channels the better, of course.

**Cartridge channel separation:** The figure indicates the amount of left hand channel signal appearing on the right hand channel output – or *vice versa*, the 'worst case' figure being quoted each time. The higher the figure, the better the result. Test equipment again was the Ortofon TC 3000.

**Cartridge tracking ability:** This figure indicates the highest

recorded velocity the cartridge can track at the quoted tracking force – so the higher the figure the better. The measurement is not a comprehensive test of tracking ability, but it gives a useful general indication. Any perceived shortcomings in tracking ability on music programme have been commented upon separately.

**Cartridge frequency response:** For these systems we used the 1/2-octave pink noise test bands on B&K QR 2011, which is designed for system response checks. The signal measured was from the tape output of the system where possible, or alternatively the headphone output.

Theoretically the test described above should give something approaching a straightline response, but this never happens in practice. For reference, see the charted response of a Koetsu Black cartridge (fitted to a Linn Ittok arm and LP12 turntable) when measured this way (the output in this case being from the tape feed of a Musical Fidelity preamplifier). As you can see, the trace shows a slight loss of output at high frequencies.

Note that all cartridge responses were run with the standard 50dB scaling often used in cartridge tests.

## CASSETTE DECK

**Tape used for tests:** Measurements all refer to Type II (Chrome bias) tape. The brand chosen was either Maxel XLIIIS or TDK SA-X, according to the manufacturer's recommendation (where available). Tapes used were always C90s.

**Frequency response:** The plot was made using the Type II tape selected as described above, and was run at -10dB ref 0VU on the deck's meters. Equipment used was a Neutrik sweep generator and chart recorder. The vertical scale was set to 10dB total, *ie* 2dB per large division.

**Speed variations (wow and flutter):** Record/replay, DIN Peak weighted. Equipment used: Nakamichi T-100 audio analyser. The lower, the better.

**Speed drift:** Exactly as for the equivalent measurement of record decks, this is an assessment rather than a measurement of long term drift (low rate speed variations) using the Nakamichi T-100.

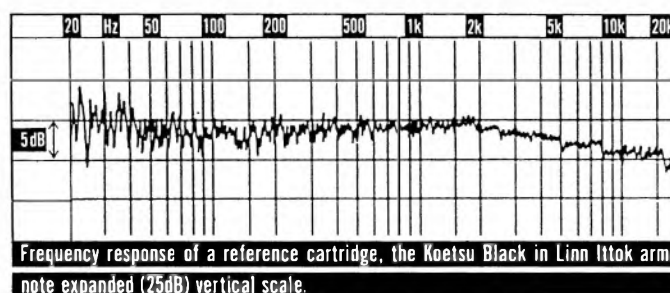
**Signal-to-noise:** CCIR/ARM Weighted signal-to-noise ratio. The figure quoted is for the complete record/playback cycle at 400Hz and is referred to 0VU as indicated by the deck's meters and with any noise reduction switched out. The higher the number the better.

The presence of automatic level record controls, where there is no stable reference point for the record level, frustrated this measurement.

**Distortion:** Measured at 0VU on the deck meters, this should be read in conjunction with the signal-to-noise figure. A poor figure for the latter test may still be satisfactory in the light of a very low distortion figure (say 0.8%), because there will still be several dB of headroom to play with above 0VU. Conversely, an apparently good signal-to-noise result may in reality be no better than average if the distortion level is high (say 2-3%) at 0VU.

## TUNER

**Sensitivity and Signal-to-noise:** These are assessments rather than measurements. A laboratory FM stereo generator, which can be pictured as a small transmitter that can encode any source connected onto FM, was used for these, and for a major part of the listening tests as described



in the general introduction. The generator – a Radiometer SMG1 – has a range of outputs ranging from 10 $\mu$ V, an extremely low level which is barely sufficient for good mono reception even with a sensitive tuner, to 100mV, approximately 100 times the amount necessary for good, low noise stereo. By feeding an unmodulated carrier to the tuner under test (that is, a transmission of silence) it was possible to obtain a reliable and repeatable idea of how sensitive and quiet each tuner was. As part of these tests, the tuner was also driven with a range of signal voltage levels using a very low-level piece of music, which gave an idea of the annoyance value of noise in the presence of a music signal. The music signal was derived from a Sony CDP-552ESDII compact disc player.

## LOUDSPEAKERS

**Frequency response:** One loudspeaker from each pair was measured in the room used for the listening.

The listening room itself clearly has a significant effect on the loudspeaker measured response as reflections from the walls add to and subtract from the loudspeaker's inherent response. To get some sort of feeling for what the room was doing, I measured the in-room frequency response of an inexpensive but good quality high fidelity loudspeaker – the Heybrook *HBI Mk II*. The response runs were taken with its back to a wall, as recommended for this model, and also pulled about 1 meter into the room. In both cases the speakers were stood on Heybrook *HBS-1* stands, which were used extensively throughout the system tests too. The room – the main listening room for the reviews – is irregularly shaped, but is roughly 17 x 15 feet, with a tall ceiling. The in-room response was made with a 1/2 octave warble tone signal, which is a normal sine wave modified so as not to excite room resonant modes unduly. The equipment was a Neutrik generator, a high grade calibrated microphone and chart recorder,

the microphone being essentially flat (*ie* accurate) to 20kHz.

This room is responsible for a suck-out at 200Hz and some boosting of the curve between 400 and 600Hz. The sharpness of these effects is critically dependent on the geometry of the loudspeaker itself. Where the bass unit is equidistant from the base and the two sides of the enclosure the effect is more sharply defined. Small changes in the microphone position also have a dramatic effect here, as they do at the top end of each drive unit's pass band, where drivers tend to become very directional.

Taking all these effects into account suggests that any in-room curves should be treated with a degree of trepidation, but we were able to obtain much useful information from them. First, we looked for an overall shape that was reasonably smooth and lacking in severe peaks and dips. Secondly, some idea of the frequency balance of a loudspeaker could be gleaned by looking at the area under the curve. Thus although the room is responsible for some modification to the response in the range of frequencies from 200Hz to about 1kHz, the energy output of a speaker in this region (represented by the total area under the curve between these two points) should be roughly equivalent to the trend elsewhere. So we looked for a smooth mid-range and extended treble response – the *HBI* rates as good in these respects – and a smooth averaged-out response below 1kHz. Our comments on speaker performance, then, are based on these tests as well as on listening.

**Efficiency:** This should be read in conjunction with the amplifier output figure to get a rough idea of the maximum attainable volume levels with each of the systems. Low loudspeaker efficiency implies that more amplifier power will be needed to shake the neighbours up, and *vice versa*. A combination of low efficiency and low or medium power levels should act as a caution, especially for those with large listening rooms or a penchant for playing

music at realistic volume levels.

## LISTENING TESTS

A great deal of thought went into designing listening test procedures which would be repeatable and give consistently useful results. As far as possible, all test conditions were standardised, and system evaluation was based in the first instance on so-called 'substitution' tests. This involved careful listening to a 'reference' system, chosen as being one of good basic sound quality without being ludicrously expensive compared with the system under test. One at a time the components of the test system were then introduced into the reference system, and notes made on the performance in each case.

After this, the 'reference' system was set aside, and the system under test was assembled and listened to thoroughly as a whole, further detailed notes being made on the performance.

In each case, the cassette decks were evaluated for sound quality by listening to pre-recorded cassettes, and by listening to the results of recordings made both from the standard system, and also the one being reviewed – records and Compact Disc being used for source material. Compact Disc was also used to drive a laboratory FM generator which fed a 'broadcast' signal to each tuner in turn, simple A-B switching between the tuner and a straight feed to each system's own amplifier being used to establish sound quality in a particularly repeatable way. Each tuner was also listened to off-air from a four-element roof-mounted aerial which provided a good quality and strong signal from local transmitters.

All listening was done with only the test pair of loudspeakers in the listening room – that is under 'single loudspeaker' conditions. While I made no attempt to keep to a selected batch of records and CDs, I did maintain consistency from system to system by keeping a number the same from one review to the next – but not always the *same* two or three records.

There were several reasons for this, though it had a lot to do with wanting to keep a fresh ear and brain for each review.

The complete reference or benchmark system was as follows: Revolver/Linn *LV-X* record player; Audio Technica *AT95E* cartridge; Rotel *RA820BXII*; Heybrook *HBI Mk II*; A&R Arcam *Alpha* tuner; Sony *CDP552ESDII* CD player plus headphones and sundries, mostly from Sennheiser and QED.

Apart from the CD player of course, this system is representative of good quality, medium price record playing systems. The loudspeakers, which were used with each system tested, are relatively easy to drive and efficient, as well as fitting the bill on sound quality grounds.

## PROGRAMME MATERIAL

Musical programme used for the listening tests included the following:

### Records

James Taylor/*Sweet Baby James* Warner Bros K46043  
Ry Cooder/*Chicken Skin Music* Reprise Records REP 54083  
Joni Mitchell/*Dog Eat Dog* Geffen Records GEF 26455  
Nils Lofgren/*Cry Tough* A&M AMLH64573  
Battle Imperial/Johnathan Woods, Harpsichord Ace of Diamonds SSD 530  
Britten/*Piano — Violin Concertos* Decca SXL 6512  
Scheherazade/*Beecham* – RPO Concert Classics SXLP 30253

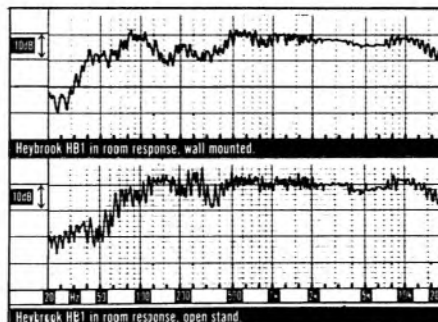
### Compact Discs

Schubert, Schumann & Weber/*Gervase de Peyer* Chandos CHAN 8506  
Mahler Symphony No 3 *etc/ Maazel* – Vienna Phil CBS M2K 42403  
Ravel Piano Works Vol 2/*Perlmuter* Nimbus NIM 5011  
Brahms/*Ein Deutsches Requiem* Teldec 8.48272  
Bernstein/*West Side Story Suite* etc/Philip Jones Brass Ensemble Decca 417 354-2  
Bob Dylan/*Blonde on Blonde* CBS CDCBS66012

## ACKNOWLEDGEMENTS

First, my thanks to Robert King, who sat at the test bench day after day performing most of the test programme. Thanks are also due to QED Audio Products, Heybrook Audio, A&R Cambridge, Sony UK, for loan of equipment.

Last but not least, thanks to my family, and especially my wife Kathy, for perseverance in the face of considerable domestic disruption.



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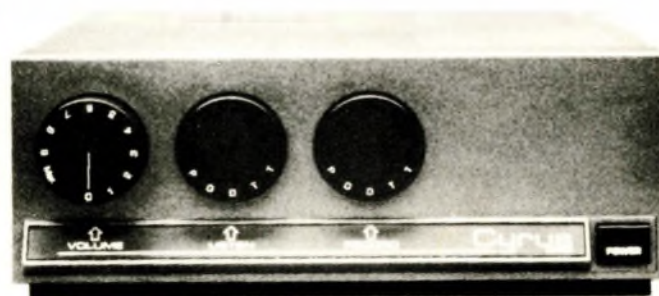
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Sennheiser, Snell, Stanton, Sys-  
temdek, Supex, Wharfedale,  
and others. Active systems on  
demonstration.







# CD MIDI SYSTEMS CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

*A run down of our findings throughout the system tests plus the models which stand out as particularly good value.*

Globally applicable conclusions from the system tests published here are not altogether easy to draw. Each system has its own individual performance attributes and limitations, plus different pricing, distribution and back-up – not all of which are readily dissected even within the context of a searching review format like *Choice*.

Nevertheless, certain patterns stick out. There has been very little obvious technical advance over the last year. CD player, amplifiers, tuners are all essentially static technologies. The movement has been on the cassette side, where more often than not standards have regressed – it's hard to imagine why, while loudspeakers are improving slightly, almost imperceptibly.

No new design input is discernible with any of the record decks tested this time around. Direct drive motors have been effectively ditched in favour of belt drive, and the T4P interchangeable cartridge standard reigns supreme. But one slightly disturbing trend is that a number of low to medium cost decks are equipped with fixed cartridges, which limits options further when the stylus expires (and could in some cases make it difficult to get the deck going again at all). Overall it's hard to avoid the conclusion that system turntables are dead; they just don't know it yet.

The only notable trend with tuners is towards random access preset tuning, eliminating the need to change wavebands preparatory to tuning. But more 'technical' features like signal strength indicators have practically disappeared.

Perhaps the dominating theme this time around is the increasing and systematic weeding out of any features that confront the user directly with the technology built into the equipment. You might think we're talking about B&O

style clean fascias, where the housekeeping functions are automated or disguised to make them relatively painless to operate, but in reality we are dealing with nothing so rational or straightforward.

Instead, record level controls and meters are being replaced by automatic circuits, with the result that music dynamics are chucked out of the window. Automatic tape type sensing replaces manual setting – a good thing in itself, but often metal tapes are omitted from the menu altogether, with no warning given on the machine.

Then there are the straight stupidities, a good example of which are the graphic equalisers which are allowed to alter the record signal fed to the tape deck even though there is very good reason not to. Equalisation should be restricted to playback, if it is to be used.

There has been some positive movement on the loudspeaker side though. It never ceases to amaze me just how shoddily built most of the loudspeakers supplied with the great mass of middle market systems really are, and how readily they shed all vestige of legitimate audio engineering. For all that, there are signs that even if the manufacturers are unwilling to spend money on the hardware, they are at least employing designers who, against all odds are doing their best to build silk purses from sow's ears. And at the top end of the market there does seem to be increased willingness to build more expensively. These points are covered in depth in the individual reviews of course.

Having been closely involved in reviewing these systems, being up to my neck with literally hundreds of all kinds of components over the last couple of months – it's not necessarily easy to detach oneself to the extent of being able to discern long term trends clearly.

Nevertheless there are some that are too obvious to miss.

One of the most significant is that interest is gradually shifting away from the real bottom-end of the market (£300 and below) towards slightly higher priced systems. The realisation that the very lowest cost systems are not in any sense comparable with better ones, even when appearances seem to belie this, is only slowly becoming widespread. For years high street multiples that have traditionally been the main outlets for such cheap and cheerful monuments to gullibility, seem to have laboured under the misapprehension that they were dealing with something approximating to high fidelity; happily matters are improving.

There is no reason to suppose that matters won't continue to improve, and with a bit of luck we may see a gradual atrophy of the true low cost system market, an increasing preponderance of the bigger 'names', mostly Japanese (synonymous with quality in this market), and an expanding interest in higher priced systems. Real high fidelity itself may benefit from such changes of emphasis.

In purely numerical terms, sales of systems have more or less plateaued out, but have done so at an historically high level. The appearance of CD-equipped systems has led to a growth in the size of the market, of which systems probably accounts for something like 70 per cent of the total. Midi-size systems dominate the systems market. Apart from the relatively small percentage of the population who are aware of high fidelity, most people still automatically consider packaged systems when they think of buying equipment to play music in the home.

This report is published at a rapidly approaching watershed for the industry. Though the technical trends reflected in the

reviews are few, there is one development which will come to be seen as highly significant in the fullness of time. I am referring to the marriage of sound and video, which labours under the generic title A/V, or audio visual, depending on how conversant you are with the terminology. But first, DAT...

DAT has long been discussed in the context of the future of packaged audio. Not long ago it looked set to pick up where the compact cassette left off, establishing itself alongside CD as the system of the future. But as events unravel it is becoming increasingly clear that DAT will play little part in the development of mainstream high fidelity, not just in the immediate future, but in the middle term too.

There is every indication that those manufacturers investing heavily in DAT – most of them doing so defensively, to protect their interests should the medium take off – will end up with egg on their faces. If you're worried that your investment in an audio system today will be rendered obsolete by DAT tomorrow, you can rest easy. DAT doesn't look like becoming a viable system component yet, nor for a long time, except at the very top end of the market (stand alone systems will cost £1,000 initially). Best estimates are that the cheapest DAT recorder will still cost double the price of a CD player when the technology is mature, which itself is a long way off. CD players currently add about £170 to the cost of a system, and there is considerable customer resistance to spending even that much. Despite Aiwa's recent launch on the Japanese home market, the arithmetic for DAT systems in the UK doesn't look at all favourable.

The future is coming all right, but probably from a quite different direction. For a number of years now A/V has been talked about,

theorised over and plugged as though it was here already. It isn't, but it may well be on the way at last. Dolby Stereo from hi-fi VCRs is providing one impetus – the Marantz *MX673CD* system being the sole representative in this report. The real push however, may come from a completely different direction – terrestrial TV stereo broadcasting using the NICAM system, which is ready to run, and CD-V (compact disc video) – could be the next revolution audio following CD itself.

Until such time as CDV really takes off (*assuming of course that it's going to – Ed.*), half-way house A/V systems will become more popular. Essentially these are straight audio systems with an extra audio input labelled as though it was a video one, which isn't true video compatibility at all of course. But the next step, which adds video switching to the audio system certainly is. This kind of system will become steadily more popular as the advantages of being able to integrate audio and video equipment in one system become recognised. As such systems become easier to use (they can be quite daunting), market penetration will begin to increase at a rate of knots.

## RECOMMENDED SYSTEMS

### Sanyo W40CD (£380)

One potential snag with Sanyo's first dedicated CD based midi system is its lack of flexibility; for example, there are no spare inputs of any kind. Tracking performance of the otherwise attractive CD player was 'iffy', and the cassette deck had a pitch problem. But all the source components bar cassette worked well and the loudspeakers have been sympathetically designed.

### Toshiba V17CD (£399)

Toshiba's *V17CD* is a viable alternative to other low-cost systems. The cassette deck in particular is better than some (which isn't hard), but the loudspeakers are weak and should ideally be replaced. Build and finish are relatively good, the tuner is analogue (no presets); a sub-surround sound facility of sorts is available but there are no spare inputs.

### Marantz Studio System (£449)

You'd never know this was a system if Marantz hadn't called it one. The only source is CD, whilst cassette and radio facilities are optional, so the real inclusive price is rather higher than its position here indicates. The amplifier doesn't even match physically. Performance is good, however, delivering something much closer to high fidelity reproduction than most integrated systems (not to mention many less than integrated systems like this one).

### Pioneer S-7000 (£478)

Only the cassette deck stood in the way of Best Buy status in this case. The other components varied between adequate (the loudspeakers) and excellent (the tuner and compact disc player, where sound quality was as good as can be had at the price).

### Goodmans Maxim-Midi System (£550)

Essentially a separates system with traditional separates type features, this provides the important benefit of being upgradeable component by component at any time in the future. The CD player is crude, but most of the system components work adequately or better, and the loudspeakers are genuine, legitimate hi-fi despite their small size. Pricing is competitive.

### Sony Compact 510 (£600)

Not the world's smoothest sounding package, Sony's middle of the market *Compact 510* nevertheless worked surprisingly

well, though it would benefit from a loudspeaker transplant. Sony show again that they have little to learn about how to present an audio package.

### Technics X840 (£730)

Technics *X840* concentrates on essentials and eschews fripperies, and the outcome is a predictably workmanlike system that plays music unobtrusively well. The loudspeakers just pass muster, and might benefit from upgrading in the future.

### Aiwa V-990DX (£750)

This middle ranking Aiwa system is well equipped in the traditions of the marque. Conservative aesthetics, impressive under the skin engineering and a more than usually sensible remote control combine to make this a pleasing system all round. Only very poor loudspeakers stand in the way of Best Buy status. Other Aiwa systems have optional loudspeakers; why not this one?

### Sony FH1215CD (£800)

It looks like a ghetto blaster, but isn't, as you'll discover if you unhitch the Sony loudspeakers and plug in some real ones. The hardware is immaculately built, and is an attractive remote control proposition to use, especially with CD and FM radio. Keeping the record deck optional is a commendable act of realism. **Pioneer System 30 (£978)** This is an uneven choice. The major plus point is the CD player, which offers multi-disc play which has obvious applications for party givers and classical music lovers. The record deck, however, is particularly weak, and the cassette deck disappointed too.

### Aiwa V1500DX (£1,000)

This is a good buy despite the high price tag, but is better still without the optional Aiwa loudspeakers. Not surprisingly the cassette deck is a notable strength, and the system is also extremely flexible. A powerful set of features is designed to improve useability

and flexibility, the most notable example being the built-in clock timer.

### Marantz MX673CD (£1,000)

As a straight audio only system, this package would miss recommendation on the grounds of its rather crude overall sound quality and impenetrable control system. However the A/V section has been well implemented and includes Dolby Stereo and proper provision for video hardware. As such it's unusually future-ready and an indicator of the future of packaged audio.

### Sony Compact 710 (£1,000)

This expensive system suffers by employing the same turntable used in much cheaper Sony systems, but the rest is good. Value for money would be improved if the equaliser could be dropped, but remote control is very welcome and build and finish alike are typical Sony – first rate.

## BEST BUYS

### Sony Compact 310 £450

Unusually restrained appearance and high build quality distinguish this low price remote control system. The cassette deck and tuner are particularly good. Lack of spare inputs is a potential handicap, but the overriding impression is of musical competence – almost despite rather than because of the loudspeakers.

### Marantz Concert System (£649)

The second of Marantz's unusual unfinished systems, the optional extra cassette deck turned in excellent results, whilst the rest of the system outperformed allcomers in this project. Extra care taken in setting up, especially with speaker stands, will be rewarded.

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# PERSPECTIVES

Loudspeaker developments from the practical to the metaphysical. Paul Messenger reports.

FROM

## Ground Zero

TO

## Blue Skies

**L**oudspeakers are hi-fi's open question. Far fewer physical constraints than those inherent with other components allows free rein to the imagination of the designer and/or engineer. The result is an extraordinary variety of different approaches – both in providing solutions to the conventional task of stereo reproduction, and in questioning the future possibilities opened up by the digital age. This feature looks at both ends of the spectrum, from the practical development of the integrated stand to the 'blue sky' research into psychoacoustics being carried out under the European Eureka initiative.

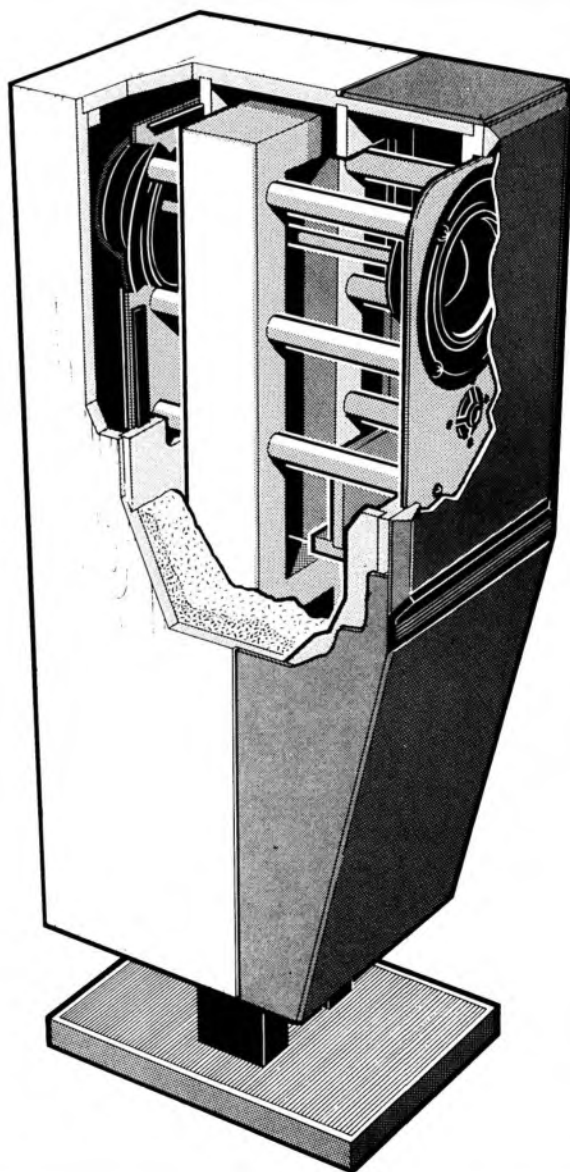
### REFERENCE TERRA FIRMA

For a couple of years now enthusiasts have happily been prepared to spend £50, £100, or even as much as £250 on a special loudspeaker stand – sometimes to partner even quite modest £100 loudspeakers, and usually with a dealer who is willing and able to demonstrate the importance of this component. The difference a decent stand can make to the overall sound is so great that it can easily overshadow the choice of the loudspeaker itself.

There is still some controversy surrounding the mechanisms involved – some speakers like light frame stands, some heavy filled constructions; some favour spikes and others blu-tack at the stand/loudspeaker contact. But the prime purpose is to couple the enclosure mechanically to the room structure, and hence by implication to *terra firma* itself.

In the end of course, it all comes back to Sir Isaac Newton: "For every action there is

*Cutaway shows the complexity of rods and baffles needed to fix the drives to the spine and 'float' the cabinetwork.*



an equal and opposite reaction" means that the movement of the speaker cone does its best to shake the enclosure to and fro. Indeed, the basic theory of loudspeaker operation assumes that the 'stationary' bits like magnets and baffles remain stationary. However, there's no such thing as stationary in a real world vibrational system trying to cover three decades and 50 or so dB. And any movement will undermine the integrity of the signal to some degree.

The truth of this was brought home forcefully to me recently when I heard some massively reinforced Quad *ESL63s*, heavily modified by SME owner, Alistair Robertson-Aikman. Theoretically featherlight electrostatic diaphragms should be far less affected by stator movement than heavily coned dynamic speakers, though air mass loading may upset this simple equation.

Subjectively speaking, I've never found *ESL63s* as satisfactory in the bass as the original electrostatic. Yet ARA's Quad *Quartet* delivered some of the best low frequency performance I have ever heard, anywhere. (Further details will be forthcoming in a future feature, but this is no DIY project I can assure you!)

Rigid and spiked stands at least give the conventional box **loudspeaker** a better chance to do a half-decent job than the unpredictability of castors, carpet, Tredaire and what-have-you. But they also put the ball back into the speaker designer's court – structural and mechanical design limitations become that much more obvious if the whole *shebang* isn't shakin' like a leaf on a tree.

If the stand can assume nearly the same importance as the loudspeaker itself, the obvious next step is to integrate the two. Whether that makes a stand which thinks it is a loudspeaker or a loudspeaker that thinks it is a stand is a matter for debate, but at least three such designs have appeared on the UK market in the past year or two, and more can be confidently expected.

Their arrival was predicatable enough with hindsight: the differences in execution are where the interest and imagination comes in. The details themselves are important, but having tried all three at some length, the contrast and comparison that follows is more interesting still.

## FOUR FOUR TWO

Mordaunt-Short's *442* was reviewed (and

Recommended) in last month's loudspeaker project. It consists of a central pillar stand 'endoskeleton', spiked to the floor and providing direct mechanical support for the three drive units, the ensemble being wrapped and concealed by a suspended, soft-mounted enclosure.

In practice this is essentially a two-unit system with conventional forward-facing bass/mid and tweeter drive units (the latter a single piece titanium dome). An additional refinement is a third driver, another bass/mid unit also facing forward but mounted on the rear of the backbone and operating out of phase and the rear of the enclosure. This acts as a 'mechanical balance' by cancelling reaction vibration from the front-mounted bass/mid driver at low frequencies.

The drive units and metal baffles are assembled onto the integral steel backbone stand/frame *via* tuned aluminium rods, and the actual enclosure is then 'floated' on compliant, energy absorbing but airtight seals, so that vibration within the metalwork is largely prevented from exciting the woodwork. Such a 'floating enclosure' helps to minimise the energy transmission and storage. Other details include a bass unit with natural mechanical high frequency rolloff, allowing some crossover simplification.

Designer Phil Ward described the day a salesman arrived with a laser test set for examining and measuring cabinet vibrations, as used by several UK loudspeaker companies. Having set the apparatus up, a rather puzzled representative wondered why he couldn't get it to work with a *442*, so Phil kindly rescued him by substituting a conventional loudspeaker with normal levels of cabinet vibration!

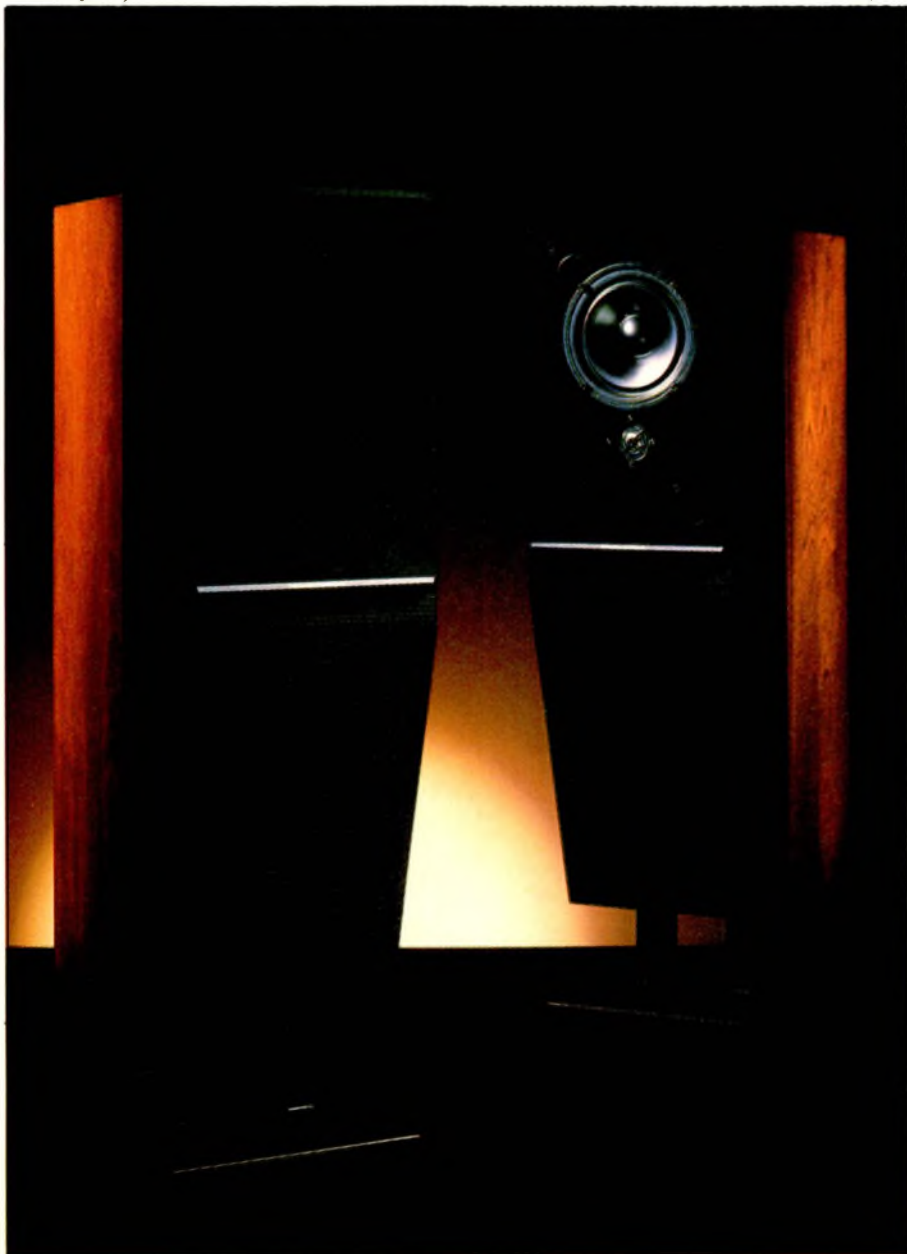
## SBL

Naim Audio's *SBL* made its first appearance at the same time as the *M-S 442*. The reactions of the respective designers from these two (friendly) companies was astonishment at the similarities, as neither knew of the other's plans, though in detail there are many differences.

The *SBL* also features a central, enclosed stand, but a subsidiary 'exoskeleton' frame sneaks up the back to support the tweeter enclosure. Naim use spike coupling rather than compliant decoupling for the main cabinet structure, while the tweeter frame acts as a decoupling leaf spring at subsonic frequencies.

In fact there are three separate enclosures, though only two drive units. The larger, lower enclosure acts purely as a chamber to absorb bass output from the rear of the main bass/mid driver. The bottom of this box is spiked to the stand base, and two of the stand verticals pass up through the carcass (the other two running up at the rear).

Gaskets seal a hole in the top of the box to like holes in the stand top-plate and the bottom of the upper, smaller, bass/mid enclosure. *MS442 sits on its little monopod, well clear of walls.*





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sure, with a carefully specified acoustic resistance controlling airflow between these two cabinets. This upper cabinet acts as the mounting for the bass/mid driver, and is in turn spike-coupled to the stand top-plate.

The tweeter has its own separate small box (the baffle of which provides the appropriate dimensions for acoustic propagation). This is fixed to the main floor-keyed stand *via* a predictable spring compliance that decouples at very low (subsonic) frequencies.

This highly complex arrangement of bass and mid/bass enclosures helps to preserve the control advantages of the small enclosure over the drive unit, while permitting the bass extension of a much larger enclosure. Meanwhile, the tweeter enclosure (using the Scandinavian Highgophon unit) should be immune from vibrations generated in the main cabinetwork.

There are a number of other interesting details besides, which show how carefully this design has been thought through. The elegantly predictable if expensive technique of mass loading is used extensively in place of cruder damping methods on enclosure panels, magnets, driver frames and even the bass/mid cone itself. The passive crossover is an external device, allowing active or passive operation.

## DARIUS

The third skeletal stand/speaker is a committed invertebrate, featuring an 'exoskeleton' rather than a spinal arrangement. When partly undressed, Roksan's Darius looks superficially like a conventional enough two-way box loudspeaker, but it is only supplied with an enormous stand which frames the entire outside of the enclosure, spike-clamping in eight carefully selected places.

This is a similar approach to that adopted in the notorious Cornflake Shop Wharfedale *Diamond* stands in which Roksan's Touraj also had a hand. But the standard of engineering and subtlety of execution are claimed to be much more advanced in this £1,000 model – spiking points are reportedly carefully selected to correspond to specific modes of cabinet vibration, for example.

Although the stand is lightweight tubular material, itself quite susceptible to vibration, it has correspondingly low energy storage in the time domain, and provides a wide 'footprint' for locational stability. Special long front spikes are also preferred, and further exaggerate the slightly menacing robotic appearance.

Close examination of the enclosure itself reveals a number of secrets. Under the grille can be seen a low frequency decoupled tweeter sub-baffle – the same idea as used in the Naim *SBL*, but entirely different in execution, and presumably independently developed. (A point on which the two

respective manufacturers may differ, but I'm saying nothing.)

In this instance the sub-baffle is a small plate, suspended across a shallow enclosure cavity on very compliant springs, creating a 'frequency locked' tweeter installation. An advantage of this arrangement is to allow the tweeter orientation to be adjusted with respect to the enclosure, but the decoupling coil springs look less predictably effective than Naim's 'leaf' arrangement.

The enclosure itself is constructed in such a way as to provide some justification for the high price. It is very heavy for its comparatively small size (470 x 270 x 400mm), being constructed of 25mm Medite. Internal cross-bracing further increases rigidity, and provides a mounting point for loading the back of the bass/mid driver's magnet assembly to a predetermined torque, placing the frame resonance above the passband that the loudspeaker is required to reproduce.

Like the others, the Roksan is designed for optional active, passive or bi-wire operation, using an external crossover which has undergone slight revision since our review samples were sent.

## COMPARE AND CONTRAST

About the only thing the above three have in common are their integral stands and their prices – each weighing in a little over the £1,000 mark, a lot of money for what are basically two-unit designs (the M-S a two-and-a-half). I once overheard the Naim caustically dismissed as an over-priced *MS20* in a fancy box on a fancy stand, and it is easy to understand how such superficial criticism can arise. Yet my reading of the entrails of history suggests these three manufacturers are working on the right lines. Celestion appear to agree, given that the high priced new *SL700* is only supplied with its own special matching stand.

Ever since giant (mono) horns dominated the hi-fi hobby, prestige loudspeakers have tended to be large multi-unit macho devices. Some of them work, given careful enough development, and the genre offers certain benefits in terms of power handling and bass extension. But if the larger box is to match the control and rigidity of smaller enclosures, it costs much more to build – the price probably rising as the cube of the enclosed volume.



*Naim's SBL looks discreet tucked back against a rear wall.*

Furthermore, the two-unit driver arrangement based on a 200mm (8-inch) bass/mid unit with single tweeter is the nearest thing to a natural combination for dynamic loudspeakers. There is therefore logic in the simple two-unit arrangement with elaborate enclosure.

Yet the differences are as obvious as the superficial similarities. The 442 needs to be sited well clear of a rear and side wall. Partly in consequence stereo imaging is exceptional, the levels of coloration very low, but the bass is a little unpredictable and can sound a little on the heavy and ponderous side. One of the strongest aspects of the 442 is that it is relatively foolproof to set up – simply by removing a pair of allen bolts at the base of the enclosure.

Visually the neatest of the three, the Naim is designed to be sited close back against a rear wall, an arrangement which normally favours the bass at the expense of the mid-range. I've heard it sound magnificent – all scale and dynamics (actively Naim driven) – but have also heard it sound small and boxy due to inadequate set-up (done by yrs. truly). If your dealer is good enough it is an attractive prospect that can provide superb bandwidth and integration.

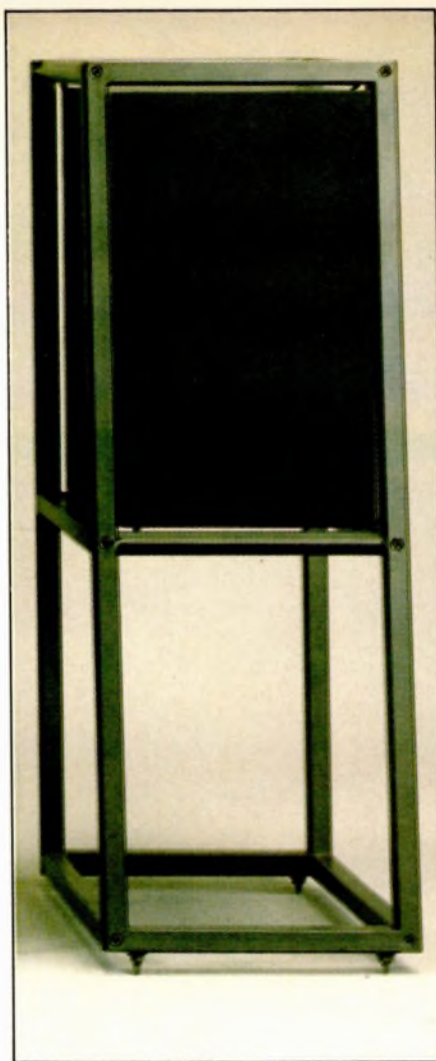
The Roksan is probably the trickiest of all, mainly because it has a bizarrely 'bright' on-axis frequency response and other technical oddities. But again I have heard it sound superb on occasion, which is always the bottom line (though I have also heard it sound appalling). One is tempted to suggest that each pair should come with loan of a Touraj to do the set-up, and certainly the designer seems able to achieve impressive results.

*Darius* needs to be sited about a third of the way down the room, fairly close to the side walls, facing in at 45 per cent and slanted back so that one listens well off the (adjustable) tweeter axis. Under optimum circumstances it is claimed that the source can 'disappear' acoustically, a fascinating trick that I have heard for myself with favourable source material. But the overall balance is a little bass light (a subwoofer is in the pipeline), and *Darius* is as much a 'love it or hate it' design as the *Isobarik*, and needs careful matching to system and room.

## ARCHIMEDES DOES IT WITH MIRRORS

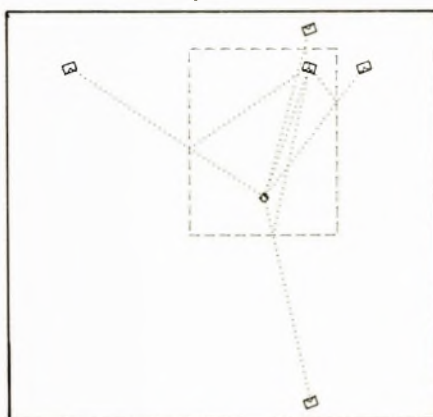
Archimedes is a 'blue sky' psychacoustics research project sailing under the umbrella of the Eureka European high tech initiative. Combining the exceptional engineering resources of KEF Electronics and Bang & Olufsen with the expertise and facility of the Danish Technical University Acoustic Laboratory, this three-year, 30 man-year Anglo-Danish project will use the latest digital techniques to tackle one of the great fundamentals of hi-fi/audio engineering, the effects of room reflections.

The only way you normally hear the sound of a loudspeaker is by listening to it in the



*Roksan's exoskeleton stand lends a rather aggressive, robotic appearance.*

*The walls behave as acoustic mirrors to the sound radiated from a single loudspeaker, so room simulation needs multiple speakers.*



context of a particular room. If you want to hear what the loudspeaker itself sounds like you have to go into an anechoic chamber to remove the reflections of the listening room: the results are pretty wierd, as anechoic conditions produce instant, disorienting sensory deprivation.

So the 'loudspeakers' we gaily listen to, pontificate upon and write about are really no such thing – they're the combination of the loudspeaker and the room where we use

them (not to mention their site within the room and a few other factors besides). The room is the usually unpredictable variable that keeps loudspeaker engineering, metaphorically speaking of course, in the dark ages.

The Archimedes project is not about to come up with a new concept for 'tomorrow's loudspeaker', though doubtless many of those involved already have their own ideas about that. By its very nature a 'blue sky' project has more to do with establishing which questions are appropriate to ask in the first place.

The reflection/absorption mechanisms of loudspeaker/room interaction are well enough known and understood. In effect the boundaries of the room (walls, floor, ceiling) behave as 'acoustic mirrors' to the sound they receive. The listener hears the direct sound from the loudspeaker, plus a series of reflections in which the sound is delayed in time (according to the path length) and modified in frequency balance (according to the directivity of the speaker and nature of the wall covering).

Extensive prior research has shown that the 'early' reflections in the first 1/30th of a second mainly affect the tonal balance and imaging properties, while later reflections are concerned with qualities such as 'spaciousness' and 'ambience'.

Archimedes is using the massive (40 x 33 x 27ft.) anechoic chamber at the Danish Technical University to create an artificially modelled room acoustic under controlled experimental conditions. In the simplest case a single reflection can be modelled by taking two identical loudspeakers, spacing them either side of a notional wall, and feeding the 'reflection/image' via digital delay and frequency shaping.

Given enough loudspeakers (32 are planned), and sophisticated computer controlled digital delay and filtering, it will be possible to model a real room within the chamber. And it will also be possible to check the accuracy of the model by reference to said real room, itself to IEC standards.

Listening tests can then be carried out using a variety of test signals and music program and adjusting the 'room' parameters to ascertain the various perception thresholds of the different (first, second etc.) reflections. Given a successful outcome, the project should establish which room reflection effects are most influential, and this is the first step towards establishing ways of coming to terms with the room.

Ultimately it may be possible to design a loudspeaker which can provide a consistent sound from one room to another. Or a loudspeaker which produces good results even when hung on the wall or stuffed into a corner. Or ultimately perhaps a loudspeaker system with on-board processing that can either be user-tuned or even tune itself to the environment in which it finds itself. But don't expect any of that for the next three years, and keep half an eye on KEF's Meridian subsidiary as well . . .





# MISSION ELECTRONICS

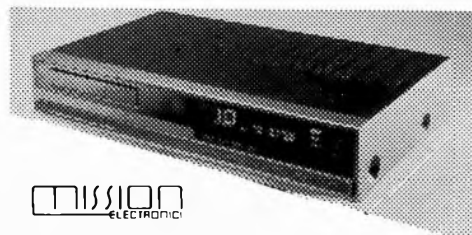
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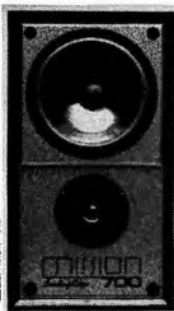
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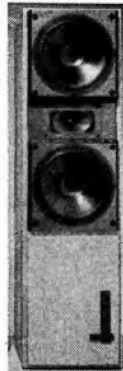


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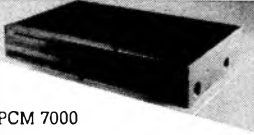
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### MISSION

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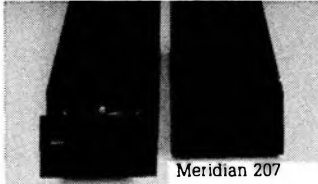
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# CHOOSING AND USING . . .

## CARTRIDGES

*A practical guide to choosing your cartridge plus the background to the test procedures.*

The cartridge is the 'business end' of the record playing system, but is also a slave to the bigger mechanical components. There are two common kinds of cartridge, moving magnet and moving-coil: the former tend to be cheaper but the latter better. All amplifiers cope with moving magnets, but some of the cheaper amps don't handle moving-coils.

One reason moving-coils are generally more expensive is that they are rather more difficult to manufacture. Because the mechanical engineering needed to make them work at all has to be more precise, the mechanical integrity of the generator assembly and its mounting tends to be inherently better too. Most m-c types have fixed styli whereas most m-m's have user-replaceable stylus assemblies, but the inconvenience of the fixed approach is merely another price paid for superior mechanical behaviour.

The mechanics of the generator within the body is only one element; the mechanics of the fit between body and headshell can also play a part. If the cartridge is not fixed really securely, it will of course move or vibrate at some frequency or other, and take the 'fine edge' off the sound. To have a reasonable chance of working well the body should be designed with strong fixing lugs and a flat headshell contact surface, so that the moving stylus/generator works against the whole cartridge/arm mass/stiffness (even the turntable itself), not just a poorly secured lightweight cartridge.

Most of the cost of a cartridge goes into the stylus and cantilever, so a range may share the same body while spanning a price difference of 5X, with differing standards of cantilever, stylus and quality control. These additional degrees of refinement have little if any effect at low and mid frequencies, which have much more to do with the mechanics and engineering of the whole moving element. Improved styli can enhance high frequency performance, but only if the turntable and arm is good enough

not to scramble the potential improvement. However, one additional reason for choosing a good quality cartridge is to give your record collection a better chance of retaining much of its original quality. A further reason for spending a little more for a cartridge is to make sure that the stylus is delicate and shaped accurately enough to preserve the record collection in the best possible condition through repeated plays.

A cartridge is a transducer, changing the mechanical stylus/groove energy into electrical energy. It therefore has a specific tonal balance, which is largely determined by the frequency response and in this respect cartridge selection can be a useful technique for 'fine-tuning' the overall balance of a system. Moving magnet cartridges of ten have a response which is modified by interaction with the characteristics of the amplifier; this is probably undesirable *per se*, but can be similarly useful nonetheless. Frequency response can also give an indication of the inherent mechanical integrity of a cartridge, but another key measurement, the stereo separation response, reveals any shortcomings much more clearly.

A final important factor is the mechanical matching of arm and cartridge, based on a simple mathematical formula so that the combination has its main mechanical resonance in the range of frequencies where it will do least harm.

This resonance is a major cause of record player ills, and cannot be avoided. Damping may be present in arm and/or cartridge, but this is no cure-all. More important is to place the resonance low enough to avoid upsetting the bass sound quality, but high enough to avoid excitation from disc warps. The generally accepted ideal range is 8-12Hz, but carefully chosen systems can operate satisfactorily a little beyond. Lowering the resonance can improve the bass reproduction, but usually at the expense of stability at higher frequencies, and *vice versa*.



# TECH TALK

Cartridges are such remarkable devices it is a wonder that they work at all – let alone extract such complex information with such great clarity. The stylus is subject to vast forces during its passage through a record groove; with maximum amplitudes approaching 90µm, the diamond tip may experience forces up to 1000g at high frequencies. Similarly, the pressure exerted on both groove wall and stylus 'footprint' may vary from 0.8 to 4.5 tonne/cm<sup>2</sup>, depending on the actual stylus profile.

With these forces in mind, my first cartridge review project for *Choice* concentrates heavily on the *distortion* performance. Viewed in the light of the amplifiers, CD players (and even loudspeakers) the distortion of the cartridge may still be an overriding performance factor – especially considering that many of the distortion mechanisms are in practice compounded.

For the laboratory testing, a new Michell *GyroDec* turntable equipped with the latest power supply and SME *V* tonearm was pressed into service, while my Pink Triangle *PT TOO/SME V* was utilised in the subjective assessments. A *PIP* preamp (RIAA 20Hz–20kHz ±0.2dB, mm or m-c) was used with various load options, plus a Deltec *DPA100S* power amplifier and Magneplanar *MGLic* loudspeakers.

## GENERAL PROCEDURE

An Ortofon Test Computer was used for the rudimentary checks on resonant frequency, output and tracking ability. Stereo separation was measured from a swept single-channel tone, quoting the *average* value taken at ±10 per cent of the three spot frequencies. (Averaging removes the chances of spurious results from the irregular crosstalk channel, so the numerical figures may seem a little lower than usual.)

## TOTAL HARMONIC DISTORTION

Measured at 300Hz and 1kHz (5cm/s) without equalisation, this

gives an indication of generator linearity *vs* frequency. Even-order harmonics are produced by inadequate stylus profiles and lateral replay errors, while any odd-order peaks are usually attributed to the electrical circuit. The figures should be below 2 per cent (preferably 1.5 per cent), while more than 4 per cent may affect the timbre of recorded instruments.

## HIGH FREQUENCY DISTORTION

This is a straightforward examination of a 10.8kHz pulse tone (15cm/s) modulated by a 270Hz repetition rate. Both high frequency tracking, transient performance and high frequency distortion are assessed.

## MIDBAND AND SMPTE IMD DISTORTION

Lateral tracing errors inherent with all pivoted pick-up arms will produce large amounts of second harmonic distortion, so the analysis of 3rd-order IMD products is a worthwhile exercise. The SMPTE two-tone test (4000Hz/400Hz) is run at 15cm/s, and all competent cartridges should produce less than 2 per cent 3rd-order distortion. Large distortion components in the second-order spectrum may be due to replay errors, but if this correlates with high THD, and especially the 10.8kHz pulse, the reproduction of front-to-back imaging may be impaired.

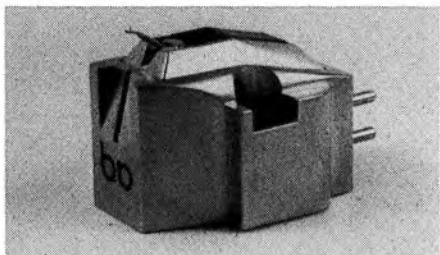
## VERTICAL TRACKING ANGLE (VTA)

Few styli seem set to the IEC recommended VTA of 20 degrees, and certainly many records are themselves cut some 3-5 degrees above this. However, there has to be some point of reference because deviation in VTA can result in a very large vertical distortion component.

Aberrations here can seriously undermine the perception of left and right stereo images – a strong correlation between measured and subjective results is usually apparent.

# AUDIOQUEST MC-5

A&R CAMBRIDGE LTD, DENNY INDUSTRIAL ESTATE, WATERBEACH, CAMBRIDGE GB5 9PB. TEL: (0223) 861550.



Courtesy of A&R Cambridge, the range of Audioquest cartridges should soon be available in this country. Manufactured in Japan for AQ by Dai-Ichi Schogi, this £200 high-output MC-5 moving-coil model has a light but fairly rigid gold plastic body. The long alloy cantilever is a trifle exposed, but the low vertical compliance is ideal for a wide range of medium or high effective mass tonearms. A Namiki nude diamond is honed to a fine line contact profile, but our sample was poorly aligned.

## LAB REPORT

A considerable 2.2mV output was obtained (note high coil resistance) ensuring compatibility with moving magnet inputs loaded by anything from 100-47kohms (and insensitive to capacitance). 7 per cent second-order (SMPTE) distortion indicates excellent lateral

alignment; however, the sensitivity of the line contact profile is reflected in the 7 per cent vertical distortion caused by a 34 degree VTA, which will adversely affect the perception of L/R stereo images. Furthermore, the frequency response was rather 'tailored', falling a substantial 9dB across the audio spectrum.

## SOUND QUALITY

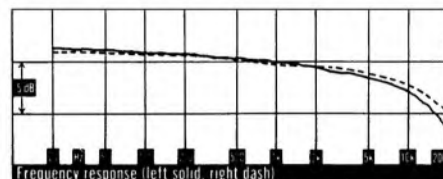
Not surprisingly, one result of the 'warm' tonal balance was a certain lack of HF air and sparkle. Firm central images were created, with good midband articulation and no unpleasant emphasis on sibilants. Underpinning all recordings, the bass was solid and well-controlled, but the absence of any atmospheric 'sparkle' was a trifle disconcerting.

## CONCLUSIONS

The solid and inherently 'safe' sound was accompanied by some technical weaknesses. Consequently, our MC-5 sample (shipped directly over from America) remains too unbalanced for recommendation at its elevated price.

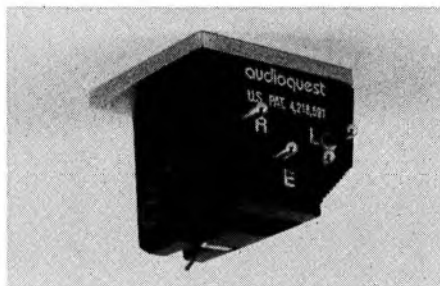
## TEST RESULTS

Type, body mass	High output m-c, 5.5g		
Stylus type	line contact		
Compliance, vert/lat	12.7cu/23.98cu		
Tracking Force Range/test	1.9g - 2.1g/2g		
Tracking ability, L/R	>80µm/>80µm		
LF res., vert/lat (11g arm)	11Hz, 11dB/8Hz, 11dB		
Output (1kHz, 5cm/sec, L/R)	2.15mV/2.20mV		
Separation, L/R	100Hz	3kHz	10kHz
	27.9/28.3	31.2/30.5	28.3/29.7dB
Channel balance	0.2dB		
Coil resistance	114.3 ohms		
Frequency response 20Hz-20kHz	+3dB/-6.7dB		
THD (300Hz, 1kHz)	0.95%, 1.39%		
High frequency distortion (10.8kHz pulsed)	2.45%		
Midband IM dist. (1kHz + 1.5kHz)	1.56%		
IM dist. (SMPTE 2nd, 3rd orders)	6.96%, 1.17%		
Vertical tracking angle	34 degrees		
Loading requirements	47kohms		
Typical retail price	£200		



# AUDIOQUEST 404BL

A&R CAMBRIDGE LTD, DENNY INDUSTRIAL ESTATE, WATERBEACH, CAMBRIDGE GB5 9PB. TEL: (0223) 861550.



This £300 moving-coil cartridge is available in both high and low output versions, the latter distinguished by the L suffix. The robust plastic body and firm alloy top-plate lends a workmanlike feel, while the extra weight is of little concern due to the low, nicely symmetrical compliance. The importance of rigidity is also underlined in the hollow boron cantilever, in this case fitted with a well-polished line-contact Namiki diamond.

## LAB REPORT

Like its stalemates, VTA was well out, adding a substantial 7 per cent to the vertical distortion. Tracking margins were also rather limited, and in consequence the cartridge showed an increase in distortion at both frequency extremes. Although channel balance was poor,

separation was good, being well maintained until the 19kHz resonance. Frequency response was inherently smooth, downtilted gently to reach -3.6/-2.1dB at 20kHz.

## SOUND QUALITY

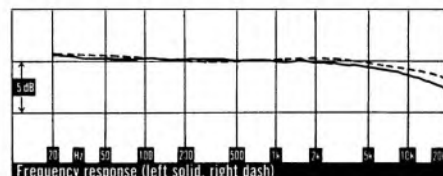
Dynamic material was slightly 'slowed' and muffled in impact, and stereo imagery was slightly vague, (probably due to the VTA error). Reducing the arm-pillar height brought an increase in treble clarity; however, a mild 'wispieness' still pervaded the upper registers, especially during complex passages where mistracking became more obvious. The overall quality was smooth and pleasantly balanced, but failed to create much of the drama and excitement of the best moving-coil types.

## CONCLUSIONS

Marred by its tracking limitations, the AQ-404BL nonetheless managed to produce a very consistent, albeit somewhat 'veiled' sound, and was not considered particularly competitive at its high price.

## TEST RESULTS

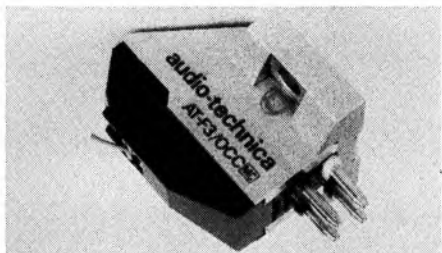
Type, body mass	low output m-c, 8.9g		
Stylus type	line contact with square shank		
Compliance, vert/lat	12.7cu/12.7cu		
Tracking Force Range/test	1.9g - 2.1g/2g		
Tracking ability, L/R	61µm/55µm		
LF res., vert/lat (11g arm)	10Hz, 11dB/10Hz, 11dB		
Output (1kHz, 5cm/sec, L/R)	0.42mV/0.39mV		
Separation, L/R	100Hz	3kHz	10kHz
	25.9/27.0	34.1/35.3	29.7/26.4dB
Channel balance	0.5dB		
Coil resistance	9.29 ohms		
Frequency response 20Hz-20kHz	+1dB/-3.6dB		
THD (300Hz, 1kHz)	2.18%, 1.72%		
High frequency distortion (10.8kHz pulsed)	2.82%		
Midband IM dist. (1kHz + 1.5kHz)	3.9%		
IM dist. (SMPTE 2nd, 3rd orders)	12.58%, 1.19%		
Vertical tracking angle	34 degrees		
Loading requirements	>100 ohms		
Typical retail price	£299		



# AUDIO TECHNICA AT-F3 OCC

AUDIO TECHNICA (UK) LTD, TECHNICA HOUSE, LOCKWOOD CLOSE, LEEDS LS11 5UU. TEL: (0532) 771441.

BEST BUY



A dark blue underbody distinguishes the £70 OCC-wired AT-F3 from its predecessor. Despite a relatively low 5g mass, the mechanical integrity has not been compromised, a milled aluminium mounting plate being fixed to the rigid plastic body that houses the shielded generator. The conventional aluminium pipe cantilever is fitted with a correctly mounted and finely polished bi-radial nude stone. Audio Technica appear to have decreased the compliance somewhat, enhancing compatibility with higher effective mass tonearms.

## LAB REPORT

Distortion was low, especially 2nd order intermodulation, while the 10.8kHz pulse test clearly illustrates the tracking prowess of this cartridge – despite low downforce and 13cu

vertical compliance. More importantly, it appears that AT have successfully ameliorated the 10kHz peak of the older model (possibly due to the defined crystal structure of the OCC wiring). In contrast, the AT-F3 OCC displayed a mildly recessed HF, measuring some -3.1dB at 20kHz.

## SOUND QUALITY

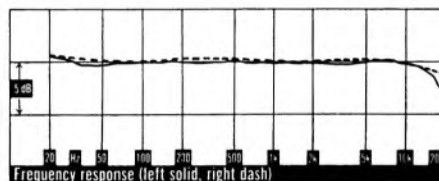
Retaining its predecessor's lively and dynamic character, the 'fierceness' of the older F3 was quite absent, yet the new F3 OCC proved to have considerably more 'pizzaz' than the AT-F5 OCC. A slight accentuation of high frequency sibilants was the only real blemish, while percussion was reproduced with verve and excitement, untainted by graininess.

## CONCLUSIONS

Firm and secure tracking coupled with constrained internal damping ensured that the natural exuberance of the AT-F3 OCC never got out of hand. Fine results were obtained in respect of distortion, VTA and sound quality, comfortably confirming a Best Buy rating.

## TEST RESULTS

Type, body mass	low output m-c, 5g		
Stylus type	biradial nude elliptical, 0.2 x 0.7mm		
Compliance, vert/lat	13.1cu/19.5cu		
Tracking Force Range/test	1.25g - 1.75g/1.6g		
Tracking ability, L/R	>80µm/>80µm		
LF res., vert/lat (11g arm)	11Hz, 11dB/9Hz, 14dB		
Output (1kHz, 5cm/sec, L/R)	0.30mV/0.29mV		
Separation, L/R	100Hz	3kHz	10kHz
	25.2/26.5	22.8/31.2	20.7/23.4dB
Channel balance	0.3dB		
Coil resistance	11.72 ohms		
Frequency response 20Hz-20kHz	+1dB/-3.1dB		
THD (300Hz, 1kHz)	1.12%, 1.93%		
High frequency distortion (10.8kHz pulsed)	1.53%		
Midband IM dist. (1kHz + 1.5kHz)	1.58%		
IM dist. (SMPTE 2nd, 3rd orders)	7.53%, 0.97%		
Vertical tracking angle	23 degrees		
Loading requirements	>20 ohms		
Typical retail price	£70		



# AUDIO TECHNICA AT-F5 OCC

AUDIO TECHNICA (UK) LTD, TECHNICA HOUSE, LOCKWOOD CLOSE, LEEDS LS11 5UU. TEL: (0532) 771441.

BEST BUY



A sister model to the similarly low output moving-coil AT-F3, OCC wiring is again used in the inverted V-shaped coils and lead out wires, and a hardened plastic whisker is attached to the rear of the beryllium cantilever, though the £100 AT-F5 OCC has slightly less damping than the F3, for example. The low vertical compliance is ideal for a wide range of popular tonearms, and the finely-polished extended elliptical diamond was accurately mounted within normal VTA tolerances.

## LAB RESULTS

Powerful samarium/cobalt magnets result in a worthwhile 1.9dB increase in output over the AT-F3, the coil resistance remaining the same. Strangely, tracking margins were slightly reduced, and this was further reflected in the rising distortion trend towards HF. Channel balance was excellent and separation figures

showed good symmetry. Slight VTA error produced an additional 2 per cent vertical distortion.

## SOUND QUALITY

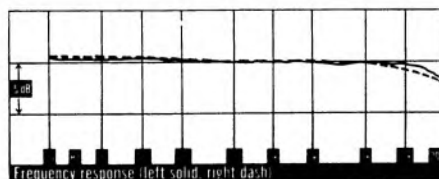
The AT-F5 OCC had an exceptionally smooth treble without compromising the resolution of fine detail. Bass was pleasantly rounded and tuneful – slightly warmer than the original F5 in fact. The cartridge extracted a good deal of spacious, ambient information which was complemented by a seamless and transparent mid-range. A smidgen more 'sparkle' at the extreme top-end would not have gone amiss, though the timbral resolution of metallic percussion or other HF-rich instruments seemed fine.

## CONCLUSIONS

This cartridge delivered a rich, informative and thoroughly consistent sound, with no coarseness to dissuade the user from long-term listening. Subjectively leading the field at £100, a Best Buy rating is mandatory.

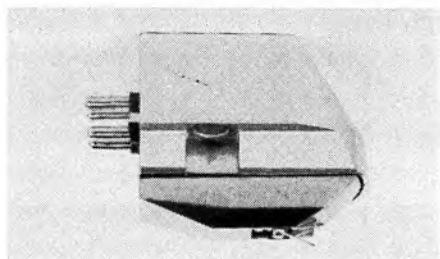
## TEST RESULTS

Type, body mass	low output m-c, 5g		
Stylus type	nude, extended elliptical, 0.07 x 0.14mm		
Compliance, vert/lat	11cu/19.5cu		
Tracking Force Range/test	1.25g - 1.75g/1.6g		
Tracking ability, L/R	78µm/76µm		
LF res., vert/lat (11g arm)	12Hz, 9dB/9Hz, 12dB		
Output (1kHz, 5cm/sec, L/R)	0.36mV/0.36mV		
Separation, L/R	100Hz	3kHz	10kHz
	25/23.8	32/25.7	27/26.9dB
Channel balance	0.1dB		
Coil resistance	11.49 ohms		
Frequency response 20Hz-20kHz	+0.9dB/-2.4dB		
THD (300Hz, 1kHz)	0.85%, 1.27%		
High frequency distortion (10.8kHz pulsed)	2.81%		
Midband IM dist. (1kHz + 1.5kHz)	1.64%		
IM dist. (SMPTE 2nd, 3rd orders)	9.89%, 0.98%		
Vertical tracking angle	24 degrees		
Loading requirements	>100 ohms		
Typical retail price	£100		



# AUDIO TECHNICA AT OC7

AUDIO TECHNICA (UK) LTD, TECHNICA HOUSE, LOCKWOOD CLOSE, LEEDS LS11 5UU. TEL: (0532) 771441.



One of a pair of top-flight low output moving-coils (its OC9 partner being still at the prototype stage), the silver-bodied £250 OC7 has a shielded ceramic generator housing and a surrounding aluminium body to ensure great rigidity. One drawback of the deep body is that unusually long fixing bolts are required (>15mm). The compliance was a little high (and asymmetrical besides) for heavier effective mass arms. A top-quality nude diamond exhibiting a fine polish and extended profile was fitted.

## LAB REPORT

Slightly high coil resistance produces a healthy output. 300Hz distortion showed an unusual predominance of the 3rd harmonic, due to slight generator nonlinearity, but the inter-modulation result indicated superb vertical

and lateral alignment – the best in our test group in fact! The frequency response was quite unperturbed, showing a slight roll-off above 10kHz and picking up again beyond 22kHz.

## SOUND QUALITY

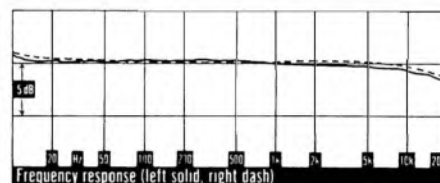
The very low vertical and lateral distortion may have helped the OC7 successfully recreate all the ambience and spaciousness captured on appropriate recordings, without recourse to euphonic colorations. Bass was 'quick' – detailed without being over-weighty – and benefited from seamless integration throughout the entire audible range. This provided a real insight into both recording techniques and the music itself, free from any strain or forcefulness, the end result being a gentle fluidity.

## CONCLUSIONS

Audio Technica have certainly pulled out all the stops in the development of this model. It really is a most outstanding cartridge, worthy of the highest praise, and is clearly recommended at £245.

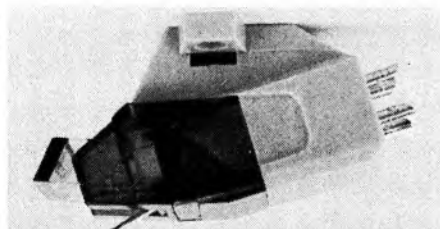
## TEST RESULTS

Type, body mass	low output m-c, 7.8g
Stylus type	nude, extended elliptical
Compliance, vert/lat	16.6cu/21cu
Tracking Force Range/test	1.25g – 1.75g/1.7g
Tracking ability, L/R	>80µm/>80µm
LF res., vert/lat (11g arm)	9Hz, 8dB/8Hz, 13dB
Output (1kHz, 5cm/sec, L/R)	0.30mV/0.31mV
Separation, L/R	100Hz 3kHz 10kHz
	25/24.8 35.5/33.6 28/30.5dB
Channel balance	0.3dB
Coil resistance	18.68 ohms
Frequency response 20Hz-20kHz	+0.8dB/–2.1dB
THD (300Hz, 1kHz)	0.97%, 1.29%
High frequency distortion (10.8kHz pulsed)	1.03%
Midband IM dist. (1kHz + 1.5kHz)	1.25%
IM dist. (SMPTE 2nd, 3rd orders)	3.96%, 0.52%
Vertical tracking angle	23 degrees
Loading requirements	>20 ohms, 100-200pF
Typical retail price	£245



# AZDEN YM10VE

HARMAN (AUDIO) UK LTD, MILL ST., SLOUGH, BERKS SL2 5DD. TEL: (0753) 76911.



Handled by Harman UK, the Azden range covers a broad range of cartridges (including a smattering of P-mounts). The £12.50 grey and purple YM-10VE has conventional half inch fixings and is a fairly ordinary moving magnet based around a normal generator housed in a metal screening can. This is surrounded by a lightweight plastic body that is rather too flexible for firm mounting. As the cartridge appears to be phase inverting, care should be taken when making listening comparisons, while the highish compliance and low body weight render it suitable for medium mass tonearms.

## LAB REPORT

Good tracking margins are ensured by the moderate damping and symmetrical compliance, though distortion did increase rapidly at higher frequencies, due perhaps to the indifferent profile of the dias-shank stylus. VTA

and channel balance were excellent, however. The healthy output was some 0.7dB above the reference level of 5mV, so compatibility problems are only likely to arise over its sensitivity to capacitance loading – a +1.1dB peak at 10.3kHz with a 400pF termination.

## SOUND QUALITY

A 'pinched' character tended to compress the available dynamics and reduce the stature of the soundstage somewhat. Midband detail was certainly more prominent than either of the frequency extremes, but a vestige of clarity aided the articulation of most vocals. High frequency distortion encouraged some vagueness, but there was little of the raw coarseness usually associated with budget designs.

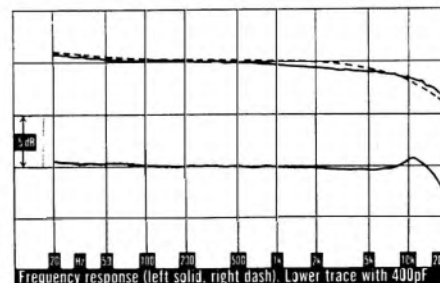
## CONCLUSIONS

Considering the price of this moving-magnet it offered a surprisingly good technical performance, so whatever the subjective shortcomings, at least it will not mistrack over those precious records. Worth considering.

## TEST RESULTS

Type, body mass	moving magnet, 4.5g
Stylus type	diasa-Vital elliptical, 0.3 x 0.7mm

Compliance, vert/lat	20.2cu/20.2cu
Tracking Force Range/test	1.5g – 2.5g/2.1g
Tracking ability, L/R	>80µm/>80µm
LF res., vert/lat (11g arm)	9Hz, 13dB/9Hz, 13dB
Output (1kHz, 5cm/sec, L/R)	5.40mV/5.40mV
Separation, L/R	100Hz 3kHz 10kHz
	14.3/13.2 24.9/22.3 20.5/19.3dB
Channel balance	0.05dB
Coil resistance	606 ohms
Frequency response 20Hz-20kHz	+0.6dB/–4.7dB
THD (300Hz, 1kHz)	1.05%, 2.13%
High frequency distortion (10.8kHz pulsed)	4.32%
Midband IM dist. (1kHz + 1.5kHz)	1.33%
IM dist. (SMPTE 2nd, 3rd orders)	13.39%, 1.17%
Vertical tracking angle	22 degrees
Loading requirements	>47 kohms, 100-300pF
Typical retail price	£12.50



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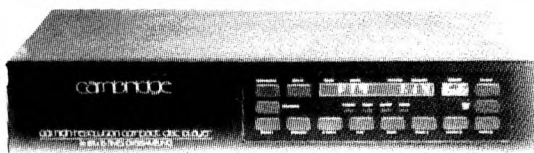
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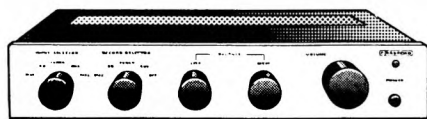


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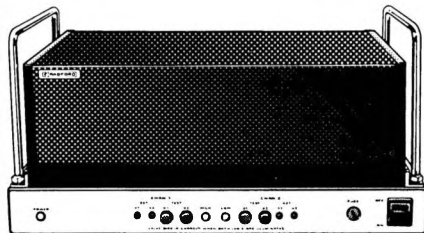


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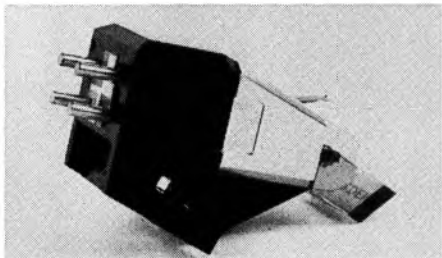
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# AZDEN GM1E

HARMAN (AUDIO) UK LTD, MILL ST., SLOUGH, BERKS SL2 5DD. TEL: (0753) 76911.



In an attempt to reduce the weight of this \$30 high-output moving-coil, Azden have discarded conventional magnet yokes in favour of a 'tri-pole moving-coil' architecture. Three armatures are arranged either side and on the axis of the alloy cantilever to improve both output and separation. Damping is applied by a thick rubber ring, though the compliance is a sensible 18.5cu. Vigorous needle-talk was audible, due perhaps to poor mechanical termination of the black and gold plastic body.

## LAB REPORT

The elliptical-tipped diasa-shank stylus was incorrectly aligned, giving a substantial 5.9 per cent vertical distortion at a VTA of some 32 degrees. As claimed the midband separation was pretty good, though there were obvious compromises at the frequency extremes. The

averaged 1.63mV output was high for a moving-coil design (note coil resistance), but a low noise moving magnet stage will still be required for best results. Tracking margins were inadequate considering that 90µm is the peak groove amplitude on many discs.

## SOUND QUALITY

Rated below average for the price, the *GM-1E* provided a pleasantly open balance even though focus and stability were sadly lacking. Undoubtedly exacerbated by the 'wispy' treble, there was both an increase in vocal sibilance and a muddling of the soundstage compared to other models in this price bracket. Bass was weak and unconvincing.

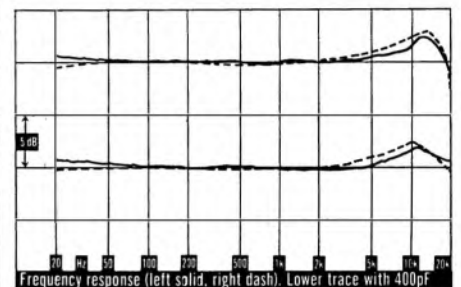
## CONCLUSIONS

A strange cartridge by any standards, the *GM-1E* combines extremely low mass with intermediate output and poor tracking, and in consequence hardly merits serious practical consideration.

## TEST RESULTS

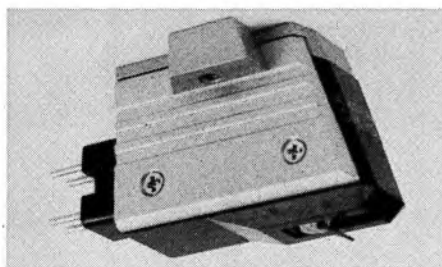
Type, body mass	moving magnet, 2.7g
Stylus type	diasa elliptical
Compliance, vert/lat	18.5cu/22.8cu

Tracking Force Range/test	1.5g - 2.5g/2.1g
Tracking ability, L/R	69µm/67µm
LF res., vert/lat (11g arm)	10Hz, 8dB/9Hz, 9dB
Output (1kHz, 5cm/sec, L/R)	1.68mV/1.58mV
Separation, L/R	100Hz 3kHz 10kHz
	15.7/16.2 31.2/29.6 24.5/26.8dB
Channel balance	0.5dB
Coil resistance	112.55 ohms
Frequency response 20Hz-20kHz	+0.5dB/-2.8dB
THD (300Hz, 1kHz)	1.51%, 2.25%
High frequency distortion (10.8kHz pulsed)	3.16%
Midband IM dist. (1kHz + 1.5kHz)	1.55%
IM dist. (SMPTE 2nd, 3rd orders)	9.17%, 1.55%
Vertical tracking angle	32 degrees
Loading requirements	>47 kohms, 100-300pF
Typical retail price	£30



# AZDEN GMP5L

HARMAN (AUDIO) UK LTD, MILL ST., SLOUGH, BERKS SL2 5DD. TEL: (0753) 76911.



Conceived as the ultimate in moving-coil P-mounts, this \$100 Azden may also be used in conventional tonearms by means of an alloy adaptor which screws firmly into place. This rugged bracket not only reinforces the metal sides of the cartridge, but also increases the bodyweight from 5.9g to 8.8g, despite having non-standard, threaded mounting holes. There is some conflict with the highish compliance, however, which necessitates the use of low/medium mass arms. Technically, the design includes a rigid boron pipe cantilever fitted with a nude line contact stylus. The one-point suspension has a multi-strand stainless-steel tie-wire.

## LAB REPORT

Misalignment of the diamond resulted in some

3.5 per cent vertical distortion. Both frequency response and channel balance were very even, though stereo separation deteriorated quickly above 4kHz; note also the 3.6 per cent HF distortion.

## SOUND QUALITY

Tracking at a low 1.3g (with adaptor) the *GM-P5L* delivered a rhythmic and extended low bass, though slight overhang was apparent in the upper bass region. The reproduction of stereo depth was much better than expected from the intermodulation distortion results, though stage width seemed slightly narrow. However, the Azden's *forté* was its silky-smooth treble, delighting listeners with its laid-back presentation and precise focus of the subtlest details.

## CONCLUSIONS

Used as intended, the Azden *GM-P5L* is probably wasted in its P-mount guise. Yet, donning the adaptor it is transformed into a beguiling moving-coil model of sufficient merit for recommendation.

## TEST RESULTS

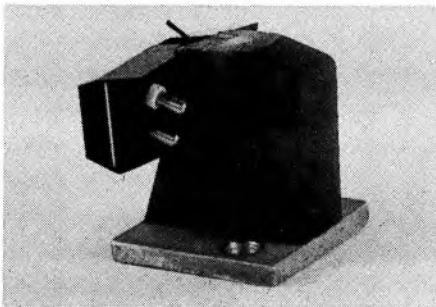
Type, body mass	low output m-c, 8.8g
Stylus type	nude line contact
Compliance, vert/lat	26cu/35.5cu
Tracking Force Range/test	1.0g - 1.5g/1.3g
Tracking ability, L/R	>80µm/78µm
LF res., vert/lat (11g arm)	7Hz, 11dB/6Hz, 10dB
Output (1kHz, 5cm/sec, L/R)	0.34mV/0.35mV
Separation, L/R	100Hz 3kHz 10kHz
	24.3/25.1 31.5/34.2 19.5/20.4dB
Channel balance	0.2dB
Coil resistance	8.07 ohms
Frequency response 20Hz-20kHz	-1dB/+0.6dB
THD (300Hz, 1kHz)	0.87%, 1.95%
High frequency distortion (10.8kHz pulsed)	3.6%
Midband IM dist. (1kHz + 1.5kHz)	1.21%
IM dist. (SMPTE 2nd, 3rd orders)	9.57%, 0.93%
Vertical tracking angle	27 degrees
Loading requirements	>40 ohms, 100-300pF
Typical retail price	£99



RECOMMENDED

# CLEAR AUDIO GAMMA

VITAL SYSTEMS, 38a THE MEADOW WAY, HARROW WEALD, MIDDX HA3 7BW. TEL: (01) 863 8988.



Produced in Germany, the £285 *Gamma* is the cheapest of the unusual 'hammerhead' low output Clear Audio cartridges. Composed of three-sections, the lead-out wires and cartridge pins are located in a wide front section while the generator assembly is effectively clamped in a deep resinous body. An aluminium top-plate provides a firm mate with most headshells, though longer than usual cartridge leads may be required to meet the low-lying tags. This latest sample proved more compliant than previous models – its boron cantilever and (heavily glued) line contact stylus bearing a remarkable resemblance to that of the Audioquest AQ-404B.

## LAB REPORT

Good mechanical and electrical symmetry was

observed, with only a slight deviation at the high frequency 18kHz resonance. The reasonable distortion figures were unfortunately tainted by poor VTA alignment, which was 10 degrees out at the specified 2.2g downforce.

## SOUND QUALITY

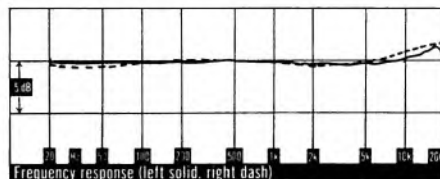
The *Gamma* provided a very lively and dynamic sound, with a highly lucid midband. The balance erred on the light and fast side, however, tending to restrict both low frequency amplitude and the essential weight of a performance. Treble detail was ruthlessly revealed, and although the cartridge could not be described as overtly bright, there was a tinge of 'coarseness'.

## CONCLUSIONS

This is a pacey-sounding cartridge that leaves little to the imagination in terms of speed and excitement. Visually interesting it is not quite refined enough for full recommendation, but is certainly worth auditioning.

## TEST RESULTS

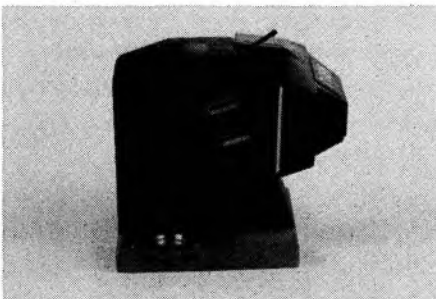
Type, body mass	low output m-c, 5g		
Stylus type	line contact, 5 x 35µm		
Compliance, vert/lat	24cu/24cu		
Tracking Force Range/test	2g – 2.5g/2.2g		
Tracking ability, L/R	>80µm/>80µm		
LF res., vert/lat (11g arm)	8Hz, 10dB/8Hz, 12dB		
Output (1kHz, 5cm/sec, L/R)	0.5mV/0.48mV		
Separation, L/R	100Hz	3kHz	10kHz
	25/24.7	31.2/28.4	24/23.9dB
Channel balance	0.4dB		
Coil resistance	32.43 ohms		
Frequency response 20Hz-20kHz	-0.9dB/+2.1dB		
THD (300Hz, 1kHz)	0.69%, 1.91%		
High frequency distortion (10.8kHz pulsed)	1.97%		
Midband IM dist. (1kHz + 1.5kHz)	1.73%		
IM dist. (SMPTE 2nd, 3rd orders)	10.9%, 0.87%		
Vertical tracking angle	30 degrees		
Loading requirements	>50 ohms		
Typical retail price	£285		



RECOMMENDED

# CLEAR AUDIO DELTA

VITAL SYSTEMS, 38a THE MEADOW WAY, HARROW WEALD, MIDDX HA3 7BW. TEL: (01) 863 8988.



Superficially identical to the cheaper *Gamma*, the £450 *Delta* usually has a different coloured translucent body – greens and blues being the most common. Clear Audio's proprietary geometry involves a staggered array of four rare-earth magnets, each mounted above one of the coils which are themselves situated fore and aft of the cantilever pivot point. One of the magnets is visible, breaking through the underside of the body – ferromagnetic stylus scales should be avoided! Patience should be exercised when mounting this cartridge, as its peculiar shape is not exactly a boon to accurate alignment.

## LAB REPORT

Clear Audio's 'Trigon parabolic' line-contact stylus was neatly mounted, with a lower VTA error than its stablemate resulting in 4 per cent

vertical distortion. Compliance was lower than with the *Gamma*, encouraging the use of heavier arms; some very slight damping might not go amiss. The tracking margins were excellent – aided, no doubt, by the substantial 2.2g downforce – and so was the healthy (albeit low) 0.4mV output.

## SOUND QUALITY

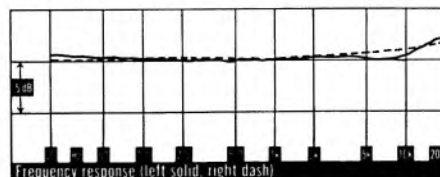
The *Delta* delivered a smooth overall sound, exhibiting little of the *Gamma*'s treble coarseness. Stereo focus was excellent, allied to a worthwhile increase in HF detail resolution. Bass was firm and punchy without being exuberant, maintaining a good sense of rhythm, weight and authority throughout most recordings. Dynamic contrasts were accurately depicted with little overhang or smearing of low-level information.

## CONCLUSIONS

Offering a substantial refinement over the *Gamma*, the Clear Audio *Delta* delivers a smooth and detailed performance with excellent tracking and good moving-coil amplifier matching to boot. Definitely recommended.

## TEST RESULTS

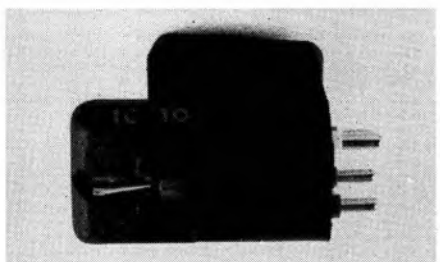
Type, body mass	low output m-c, 5g		
Stylus type	line contact, 5 x 35µm		
Compliance, vert/lat	17.5cu/19.5cu		
Tracking Force Range/test	2.0g – 2.5g/2.2g		
Tracking ability, L/R	>80µm/>80µm		
LF res., vert/lat (11g arm)	9.5Hz, 11dB/9Hz, 13dB		
Output (1kHz, 5cm/sec, L/R)	0.48mV/0.47mV		
Separation, L/R	100Hz	3kHz	10kHz
	30.5/29.7	33.8/35.9	27.2/26.6dB
Channel balance	0.3dB		
Coil resistance	48.63 ohms		
Frequency response 20Hz-20kHz	-0.1dB/+3.1dB		
THD (300Hz, 1kHz)	0.65%, 1.88%		
High frequency distortion (10.8kHz pulsed)	1.9%		
Midband IM dist. (1kHz + 1.5kHz)	1.9%		
IM dist. (SMPTE 2nd, 3rd orders)	9.92%, 0.72%		
Vertical tracking angle	28 degrees		
Loading requirements	>50 ohms		
Typical retail price	£450		



# GOLDRING G1010

GOLDRING LTD, 8 GREYFRIARS ROAD, MORETON HALL IND. EST., BURY ST EDMUNDS IP32 7DX. TEL: (0284) 701101.

BEST BUY



Previously reviewed in *Choice*, this £34 British moving-magnet design appears to have been improved. The black-coloured body is moulded from a glassfibre reinforced polyester called Pocan, so excellent rigidity is assured. A precision-ground Alnico magnet at the rear of the alloy cantilever reduces the moving mass while maintaining a high output. Goldring's specified nude stone was confirmed, being honed to a broad elliptical profile.

## LAB REPORT

Vertical compliance was too low for comfort, but the frequency response, channel balance and separation were excellent for the price of this cartridge, displaying a gentle roll-off above 12kHz, reaching -5dB at 20kHz (170pF). Increasing load capacitance to 400pF introduced a slight rise of +0.9dB at 4kHz, followed by a sharp dip to -7.2dB at 16kHz. Distortion

increased at higher frequencies due to generator nonlinearities, while a significant VTA error inflicted a further 5.5 per cent vertical component.

## SOUND QUALITY

Secure tracking enhanced a bountiful and lively sound. There was some loss of 'air' and see-through transparency, especially in the treble where the loss of sparkle was unfortunate. Nevertheless, the 1010 was highly rated because its thoroughly well-integrated sound cleverly disguised any lack of fine detail resolution. Some coarseness was noted with cymbals and high-level female vocals, but this was not aggressive and did not lead to fatigue.

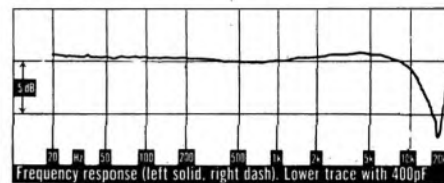
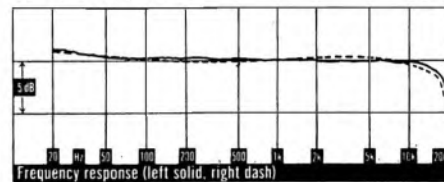
## CONCLUSIONS

A warm and friendly character makes this an ideal choice for the brighter sounding budget system, while careful adjustment of the loading capacitance will effect a tailoring of the balance. Clearly a Best Buy, it is something of a snip at around £30.

## TEST RESULTS

Type, body mass moving magnet, 6g  
 Stylus type nude elliptical, 18µm x 7µm  
 Compliance, vert/lat 8.7/17.9cu

Tracking Force Range/test	1.5g - 2.5g/1.75g
Tracking ability, L/R	>80µm/78µm
LF res., vert/lat (11g arm)	13Hz, 8dB/9Hz, 13dB
Output (1kHz, 5cm/sec, L/R)	3.80mV/3.90mV
Separation, L/R	100Hz 3kHz 10kHz
	28.3/29.7 29.2/31.2 24.5/24.3dB
Channel balance	0.2dB
Coil resistance	811 ohms
Frequency response 20Hz-20kHz	+1.1dB/-5dB
THD (300Hz, 1kHz)	1.41%, 1.51%
High frequency distortion (10.8kHz pulsed)	4.28%
Midband IM dist. (1kHz + 1.5kHz)	1.87%
IM dist. (SMPTE 2nd, 3rd orders)	13.9%, 1.05%
Vertical tracking angle	31 degrees
Loading requirements	47 kohms/150-100pF
Typical retail price	£34



# GOLDRING EROICA L

GOLDRING LTD, 8 GREYFRIARS ROAD, MORETON HALL IND. EST., BURY ST EDMUNDS IP32 7DX. TEL: (0284) 701101.

RECOMMENDED



This diminutive £90 moving-coil is available in both high and low output versions, the latter (tested here) identified by its *L* suffix and electric blue lettering. Pocan body material keeps the weight down to 5.5g. An alloy body would offer greater rigidity but Pocan introduces some controlled decoupling, reflected in the reduced needle-talk.

The compliance was very symmetrical but quite low for the specified tracking force and body mass. Higher mass arms perhaps with slight damping would be most appropriate. A good quality vdH *Type II* stylus has been fitted, and the alloy cantilever is quite conventional.

## LAB REPORT

Midband intermodulation distortion was low, but THD increased at the frequency extremes due to the generator rather than the stylus. Tracking was fine at 1.7g, though the 0.19mV

output will require a low-noise high-gain phono stage for best results - the low coil resistance gives an indication of the few turns employed. There were some channel irregularities above 2kHz, the right channel appearing rather smoother than the left.

## SOUND QUALITY

Relaxing rather than invigorating, the low output *Eroica* presented a stable and thoroughly informative picture of a wide range of material. There was plenty of sparkle at higher frequencies, but also a slight smearing with the most demanding works. The *Eroica* robbed dynamics of their ultimate 'edge', but without making the soundstage appear compressed. Indeed, it was successful in helping the speakers to 'disappear' from the scene, impressing the listener with subtlety rather than aggression.

## CONCLUSIONS

Competitively priced and with a beguiling sound, the *Eroica L* may be confidently recommended.

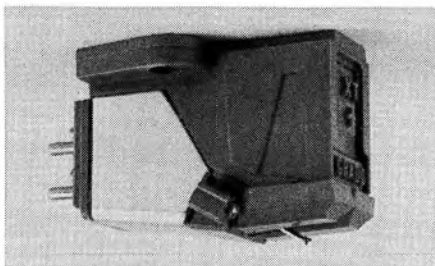
## TEST RESULTS

Type, body mass	low output m-c, 5.5g
Stylus type	van den Hul Type II
Compliance, vert/lat	12.7/12.7cu
Tracking Force Range/test	1.5g - 2.0g/1.7g
Tracking ability, L/R	77µm/>80µm
LF res., vert/lat (11g arm)	11Hz, 13dB/11Hz, 11dB
Output (1kHz, 5cm/sec, L/R)	0.19mV/0.18mV
Separation, L/R	100Hz 3kHz 10kHz
	27.9/26.8 33.4/35.0 29.5/29.0dB
Channel balance	0.3dB
Coil resistance	3.82 ohms
Frequency response 20Hz-20kHz	+1.9dB/-2.5dB
THD (300Hz, 1kHz)	1.1%, 0.65%
High frequency distortion (10.8kHz pulsed)	2.68%
Midband IM dist. (1kHz + 1.5kHz)	1.38%
IM dist. (SMPTE 2nd, 3rd orders)	10.25%, 1.07%
Vertical tracking angle	26 degrees
Loading requirements	>100 ohms/200-1000pF
Typical retail price	£89



# GRADO XTE+1

MOTH MARKETING, 47 ARMSTRONG CLOSE, WILSTEAD, BEDFORD. TEL: (0234) 741152.



Cheapest of Grado's new moving-magnet series, the £20 *XTE+1* hardly looks different from its predecessors – tan bodywork is the only indication. Compliance has now been increased over the older models, making the *XTE+1* more suitable for medium mass (budget) arms; however, the huge LF resonance peak suggests that damping may well be helpful. No internal shielding is employed as Grado relies on the orientation of the four coils to prevent hum breakthrough – decks without metal platters should still be avoided.

## LAB REPORT

A gentle decline in the frequency response was observed, only picking up at 16kHz due to the HF resonance. Distortion increased markedly at high frequencies, the bulk of the 10 per cent pulse distortion being caused by the generator,

not mistracking. Grados are unusual in having a distortion spectrum dominated by odd-order harmonics; the *XTE+1* was no exception, with 3rd-9th order components readily visible. VTA was also way out, adding a further 7 per cent vertical distortion.

## SOUND QUALITY

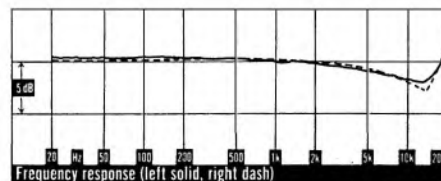
High vertical distortion probably contributed the rather vague aspect to otherwise strong stereo images, and the reproduction of bass lines was improved over earlier Grados. Nevertheless, the frequency extremes were a trifle untidy, the bass ill-defined and the treble lacking a crystalline focus. A particularly lucid midband saves the day, however, resolving complex vocal performances with considerable dexterity. This coupled with the warm low frequency balance gave the *XTE+1* an appealing character, despite its obvious indiscretions.

## CONCLUSIONS

Still displaying those classic Grado traits but with the advantage of increased compliance, the *XTE+1* can be happily recommended for use in good-quality budget systems.

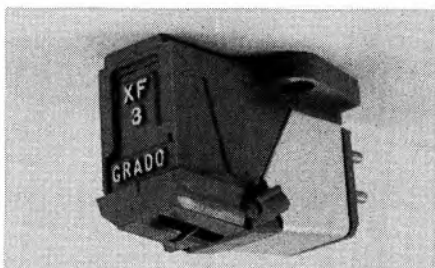
## TEST RESULTS

Type, body mass	moving-magnet, 5.5g		
Stylus type	diala elliptical, 0.6 x 0.3mm		
Compliance, vert/lat	19cu/23.9cu		
Tracking Force Range/test	1.4g – 1.6g/1.5g		
Tracking ability, L/R	>80µm/>80µm		
LF res., vert/lat (11g arm)	9Hz, 20dB/8Hz, 20dB		
Output (1kHz, 5cm/sec, L/R)	3.70mV/3.70mV		
Separation, L/R	100Hz	3kHz	10kHz
	25.1/26.7	22/23	21/25dB
Channel balance	0.1dB		
Coil resistance	460 ohms		
Frequency response 20Hz-20kHz	+0.5dB/-2.5dB		
THD (300Hz, 1kHz)	1.3%, 1.05%		
High frequency distortion (10.8kHz pulsed)	10%		
Midband IM dist. (1kHz + 1.5kHz)	2.37%		
IM dist. (SMPTE 2nd, 3rd orders)	20.6%, 1.25%		
Vertical tracking angle	34 degrees		
Loading requirements	>47 kohms/200pF		
Typical retail price	£20		



# GRADO XF3E+

MOTH MARKETING, 47 ARMSTRONG CLOSE, WILSTEAD, BEDFORD. TEL: (0234) 741152.



Although the £45 *XF3E+* shares the same tan-plastic body with the cheaper models, it benefits from improved production tolerances and better stylus polish. A black mastic compound seals the stylus assembly firmly in place while providing a degree of controlled decoupling. This model had the low-ish compliance of earlier Grado models, along with an undamped resonance characteristic. Low generator inductance renders this (and all other) Grados insensitive to changes in loading capacitance.

## LAB REPORT

A marked loss in high frequency output was noted above 1kHz, though this is part of a gradual down-tilted trend. Output was some 1.1dB up on the *XTE+1* even though the coil resistance remains similar. Improvements were also recorded in both lateral and vertical

distortion, though these were still very high and principally composed of audibly unpleasant odd-order harmonics. The tracking margins were slightly reduced.

## SOUND QUALITY

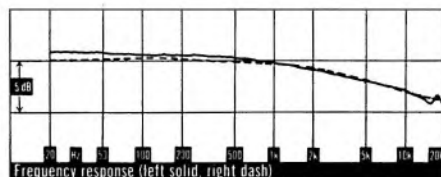
Resolution of stereo depth was quite impressive, though restricted stereo width (probably the VTA error) imparted a tunnel-like effect with many records. Nevertheless, the sound remained open and lively, with the verve and a quick pace to capture the sparkling dynamics of pop recordings. Furthermore, the cartridge sounded significantly brighter than the response might suggest, possibly due to the 3rd harmonic distortion altering the natural timbre of some instruments. In point of fact, the *XF3E+* actually sounded a little bass shy!

## CONCLUSIONS

There was a universal crispness noted with this cartridge, which although probably artificial resulted in a 'packaged' sound that remained pleasant over long periods of listening. At this price greater neutrality would be appreciated, however, so this Grado rates 'worth considering'.

## TEST RESULTS

Type, body mass	moving-magnet, 5.5g		
Stylus type	shank mounted special elliptical, 0.6 x 0.3mm		
Compliance, vert/lat	12.7cu/15.4cu		
Tracking Force Range/test	1.4g – 1.6g/1.5g		
Tracking ability, L/R	74µm/70µm		
LF res., vert/lat (11g arm)	11Hz, 17dB/10Hz, 19dB		
Output (1kHz, 5cm/sec, L/R)	4.20mV/3.70mV		
Separation, L/R	100Hz	3kHz	10kHz
	20.5/21.2	22.7/22.2	25.0/23.6dB
Channel balance	0.6dB		
Coil resistance	462 ohms		
Frequency response 20Hz-20kHz	+1dB/-4.7dB		
THD (300Hz, 1kHz)	1.27%, 1.1%		
High frequency distortion (10.8kHz pulsed)	7.08%		
Midband IM dist. (1kHz + 1.5kHz)	1.94%		
IM dist. (SMPTE 2nd, 3rd orders)	16.86%, 2.45%		
Vertical tracking angle	31 degrees		
Loading requirements	47 kohms/100pF		
Typical retail price	£45		



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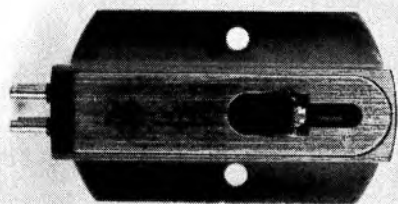
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# Goodmans

# SOUND

# KISEKI BLUE SILVERSPOT

PRESENCE AUDIO, THE OLD POSTHOUSE, PLUMMERS PLAIN, HORSHAM, W. SUSSEX. TEL: (0403) 76777.



Derived from the original Kiseki *Blue* moving coil, the luxurious low output £375 *Silverspot* is an uncommonly deep and heavy cartridge – even by moving-coil standards. Much of the bulk is due to the milled Al/Mg alloy body and large internal Sa/Co magnet, while the high compliance will restrict arm matching; some extra damping may also be worthwhile. Threaded mounting holes ensure a firm mate with alloy headshells – as indicated by the very obvious needletalk! An alloy cantilever with boron overlay is specified, fitted with a heavily glued nude stone ground and polished to an elliptical profile.

## LAB REPORT

Distortion was pleasingly low, except in the vertical plane where the 7 degree VTA misalignment added 3.5 per cent to the total. Channel balance and separation were fine throughout much of the frequency range,

though some deterioration was noted above 10kHz due to resonance. Excellent tracking margins are available, sufficient to cope with the peak 90µm cuts on commercial records.

## SOUND QUALITY

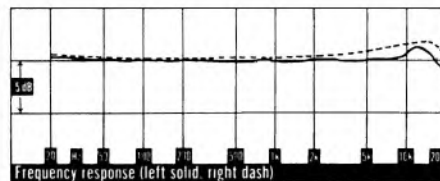
Possessing a firm and extended bass, this cartridge underpinned most recordings with a strong and deliberate sense of rhythm. Unfortunately there was also some accentuation of vocal sibilance and an increase in the 'icyness' of metallic percussion. This coldness did not extend to the critical midband where the cartridge seemed remarkably capable of projecting sharply focused, tactile and convincing stereo images.

## CONCLUSIONS

This cheapest Kiseki is no disgrace to the range, but the strong mechanical energy and weight of the cartridge indicates preference for a robust middle/high mass arm, and this conflicts with the compliance.

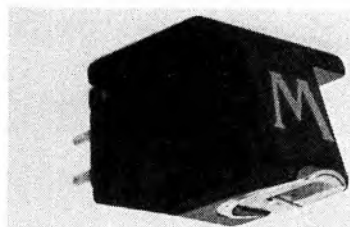
## TEST RESULTS

Type, body mass	low output m-c, 11.4g
Stylus type	nude elliptical, 7.4µm x 18µm
Compliance, vert/lat	17.7cu/17.7cu
Tracking Force Range/test	1.6g – 2.2g/2g
Tracking ability, L/R	> 80µm/>80µm
LF res., vert/lat (11g arm)	8Hz, 13dB/8Hz, 15dB
Output (1kHz, 5cm/sec, L/R)	0.36mV/0.37mV
Separation, L/R	100Hz 3kHz 10kHz
	29.1/30.0 33.5/34.1 22.8/23.4dB
Channel balance	0.2dB
Coil resistance	5.23 ohms
Frequency response 20Hz-20kHz	–1dB/+2dB
THD (300Hz, 1kHz)	0.85%, 1.17%
High frequency distortion (10.8kHz pulsed)	1.92%
Midband IM dist. (1kHz + 1.5kHz)	1.74%
IM dist. (SMPTE 2nd, 3rd orders)	7.25%, 0.85%
Vertical tracking angle	27 degrees
Loading requirements	> 10 ohms
Typical retail price	£375



# MADRIGAL CARNEGIE ONE

ABSOLUTE SOUNDS, 318 WORPLE ROAD, LONDON SW20. TEL: (01) 947 5047.



Manufactured in Switzerland, this unusual £680 low output moving-coil model is built into a highly rigid body machined from a solid alloy billet. A gold-coloured metal inner body extends to the front of the cartridge to form a duck-like bill! Two pairs of threaded mounting holes are provided. Inside, the armature is wound into a figure-eight configuration without a core, in an attempt to improve the cross-talk figures. A compound cantilever made of beryllium, carbon fibre and aluminium combines rigidity with constrained damping.

## LAB REPORT

Despite good symmetry the unit was distinctly over-compliant at 29cu, and separation also reduced sharply above 5kHz. Distortion was extremely low in the lateral plane while the VTA error was acceptable. Of two samples tested, one showed a rise of 1.9dB at 9kHz

(plotted) while the other rose only 1dB at this point. Both exhibited the usual m-c generator losses in the midband.

## SOUND QUALITY

Bass was commendably solid and successfully integrated with the remainder of the frequency range. Fortunately the slight HF lift did not encourage a treble 'sting', but a minor increase in vocal sibilance and slurring was apparent.

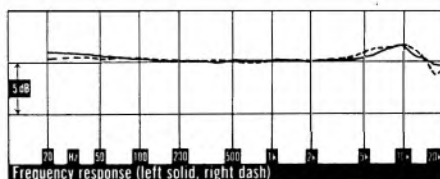
Above all, the sound was highly detailed but quite unforced, the music being allowed to develop in a relaxed and natural manner without the addition of popular euphonic colorations. It was neither incisive or explicit, but capable of fine resolution combined with an inherent smoothness.

## CONCLUSIONS

The *Carnegie One* is beautifully built and possesses some undeniably wonderful qualities. However, it is not quite wonderful enough to ward off the competition at this elevated price level.

## TEST RESULTS

Type, body mass	low output m-c, 6.7g
Stylus type	extended line contact, 5 x 75µm
Compliance, vert/lat	29.2cu/29.2cu
Tracking Force Range/test	1.5g – 1.8g/1.7g
Tracking ability, L/R	> 80µm/72µm
LF res., vert/lat (11g arm)	7Hz, 11dB/7Hz, 10dB
Output (1kHz, 5cm/sec, L/R)	0.29mV/0.27mV
Separation, L/R	100Hz 3kHz 10kHz
	28.1/29.5 29.1/32.1 17.5/18.9dB
Channel balance	0.5dB
Coil resistance	30.65 ohms
Frequency response 20Hz-20kHz	+1.7dB/–0.6dB
THD (300Hz, 1kHz)	0.52%, 1.09%
High frequency distortion (10.8kHz pulsed)	1.28%
Midband IM dist. (1kHz + 1.5kHz)	1.72%
IM dist. (SMPTE 2nd, 3rd orders)	7.45%, 0.73%
Vertical tracking angle	26 degrees
Loading requirements	> 30 ohms
Typical retail price	£685



# ZEUS

Audio



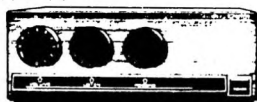
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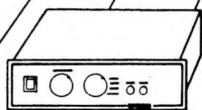
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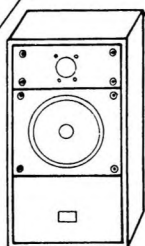
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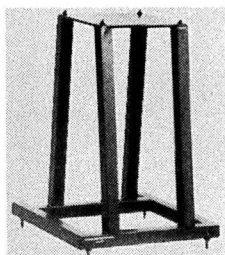
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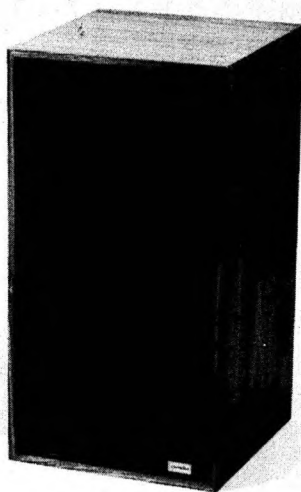
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*HIFi News April 1985*

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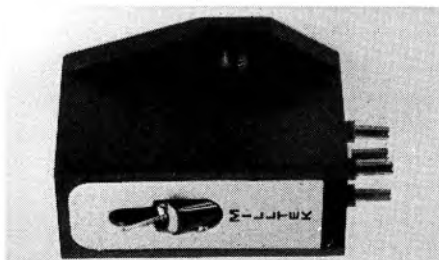
See feature  
on Prelude 2  
in this issue



# MILLTEK OLYMPIA

PRESENCE AUDIO, OLD POSTHOUSE, PLUMMERS PLAIN, HORSHAM, W. SUSSEX. TEL: (0403) 76777.

RECOMMENDED



Produced by Kiseki, the two high-output Milltek cartridges are so named to distinguish them from their more costly low-output siblings. Looking like a smaller version of the Kiseki *Blue*, the solid alloy body of the £300 *Olympia* is actually anodised a rich red colour.

Multiple turns and a powerful internal magnet produce the high output, while the sapphire cantilever should ensure a uniform propagation velocity. The nude stylus was very nicely polished but there was some excess glue present. Compliance was very low and the resonance rise a little uncontrolled – high mass arms with some damping are to be preferred.

## LAB REPORT

An unusual hump was apparent throughout

the upper bass region, while the downward midband trend was rudely interrupted by a premature resonance. Distortion was low in the midband, but rose at high frequencies due to some groove insecurity – in fact tracking margins were far from generous.

## SOUND QUALITY

Essentially neutral if somewhat 'rich', the *Olympia* created a weighty perspective on events, successfully recreating the ambience and sense of space captured on many recordings. Strangely, the inadequate tracking margins were hardly ever exceeded, perhaps disguised by a silky-smooth treble that never seemed to lapse into coarseness.

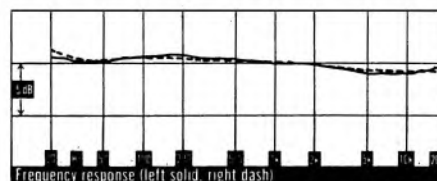
A sense of unforced ease pervaded throughout most tracks, and despite a lack of incisiveness the *Olympia* remained both sharply focused and thoroughly detailed.

## CONCLUSIONS

Combining a usefully high output with all the sonic advantages of a decent moving-coil model, the *Olympia* must warrant Recommendation.

## TEST RESULTS

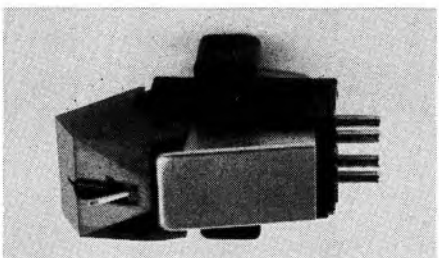
Type, body mass	high-output moving-coil, 7.8g		
Stylus type	nude, line-contact		
Compliance, vert/lat	11.8cu/11.8cu		
Tracking Force Range/test	1.9g – 2.3g/2.1g		
Tracking ability, L/R	65µm/61µm		
LF res., vert/lat (11g arm)	10.8Hz, 18dB/10.8Hz, 12dB		
Output (1kHz, 5cm/sec, L/R)	3.21mV/3.32mV		
Separation, L/R	100Hz	3kHz	10kHz
	29.6/31.2	36.2/35.5	31.0/30.4dB
Channel balance	0.6dB		
Coil resistance	247 ohms		
Frequency response 20Hz-20kHz	+1.4dB/–2.2dB		
THD (300Hz, 1kHz)	1.29%, 1.13%		
High frequency distortion (10.8kHz pulsed)	3.49%		
Midband IM dist. (1kHz + 1.5kHz)	1.28%		
IM dist. (SMPTE 2nd, 3rd orders)	9.48%, 0.78%		
Vertical tracking angle	26 degrees		
Loading requirements	100 ohms – 47 kohms		
Typical retail price	£298		



# NAGAOKA mm4

PATH GROUP PLC, UNIT 2, DESBOROUGH IND. PK., DESBOROUGH PK. RD., H. WYCOMBE, BUCKS HP12 3BG. TEL: (0494) 459981.

RECOMMENDED



In addition to Nagaoka's established *MP* range of moving-magnet cartridges, they are also responsible for a brace of 'super-budget' models. The £8 *mm4* is one of these – a straightforward design but sensible for the price. The generator is housed in a metal body can, and the detachable stylus assembly is formed from a tough purple plastic. A hard plastic top-plate has enclosed mounting lugs, the detachable stylus is equipped with an *A5052* alloy cantilever, and the shank-mounted spherical profile diamond had indifferent finish.

## LAB REPORT

This unit's compliance is ideally suited to a range of budget tonearms, and also showed excellent symmetry. Distortion was high, especially above 5kHz where some generator non-linearities were fairly obvious. Amazingly, the

VTA was pretty much on target, though this cartridge has other rather more fundamental problems. The frequency response peaked +2.4dB at 11kHz, although the position and Q of the resonance was readily altered by changing the load capacitance.

## SOUND QUALITY

Offering a remarkable performance for the price, the *mm4* outclassed many other cartridges up to £20. Although the top-end could get a little over-enthusiastic at times, this was manifest as a gentle smearing rather than a fatiguing brightness. Bass was on the lean side, but the upper bass remained suitably tight and reasonably well-focused. The main strength, however, was an uncanny ability to gloss over any discontinuities while highlighting the more favourable aspects of its performance!

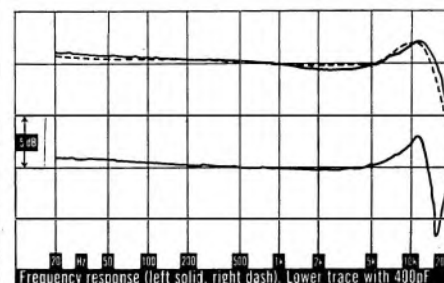
## CONCLUSIONS

Despite an almost giveaway price, the *mm4* should not be overlooked, especially by dealers who might consider this as an alternative practical 'starter' cartridge to current favourites.

## TEST RESULTS

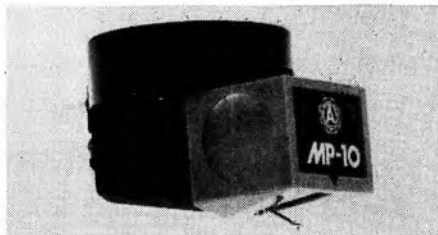
Type, body mass	moving magnet, 4.3g
-----------------	---------------------

Stylus type	diasa spherical, 0.6mm		
Compliance, vert/lat	16.5cu/16.5cu		
Tracking Force Range/test	1.5g – 2.0g/1.8g		
Tracking ability, L/R	79µm/69µm		
LF res., vert/lat (11g arm)	10Hz, 8dB/10Hz, 13dB		
Output (1kHz, 5cm/sec, L/R)	3.40mV/3.40mV		
Separation, L/R	100Hz	3kHz	10kHz
	25/24.4	24.5/29.0	19.1/18.7dB
Channel balance	0.1dB		
Coil resistance	781 ohms		
Frequency response 20Hz-20kHz	+3.1dB/–6.3dB		
THD (300Hz, 1kHz)	1.52%, 2.18%		
High frequency distortion (10.8kHz pulsed)	5.1%		
Midband IM dist. (1kHz + 1.5kHz)	1.99%		
IM dist. (SMPTE 2nd, 3rd orders)	18.13%, 1.9%		
Vertical tracking angle	24 degrees		
Loading requirements	47 kohms/100pF		
Typical retail price	£8		



# NAGAOKA MP-10 SB

PATH GROUP PLC, UNIT 2, DESBOROUGH IND. PK., DESBOROUGH PK. RD., H. WYCOMBE, BUCKS HP12 3BG. TEL: (0494) 459981.



Stilton Audio are responsible for several reinforced versions of the popular Nagaoka moving magnet cartridges, including a £40 variation on the budget *MP-10*. The usual plastic carrier has been removed and replaced with a milled billet of anodised aluminium. This is glued into position, improving the rigidity of the body can at the expense of some 1.3g in extra weight.

However, although the cartridge/headshell interface is improved, the detachable stylus assembly remains the weakest *mechanical* link. In accordance with the weight of the cartridge, the compliance was sensibly low and ensures wide compatibility.

## LAB REPORT

As before, the frequency response of this cartridge shows a roll-off at high frequencies, while the limitations of the conical stylus are revealed in the highish pulse distortion. SMPTE and mid-band IMD were affected, in

addition to the extra 4.5 per cent vertical distortion imposed by the VTA error. The tracking margins were very generous, so indicating that much of the distortion is profile- or generator-based.

## SOUND QUALITY

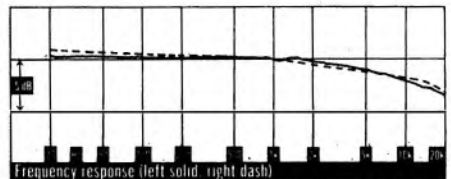
In overall terms this cartridge was slightly hampered by a 'sluggish' bass character which is also perhaps just a bit too strong for its likely application in a budget system. Nevertheless, considering the relatively crude stylus profile, the resolution of fine detail was quite impressive. Vocals were projected with authority, benefitting from the reduced treble output in terms of low noise and reduced sibilance.

## CONCLUSIONS

Bearing in mind that a surcharge of some £24 is being charged for a blob of aluminium, the budget status of this moving magnet model has been somewhat compromised. Nevertheless it retrieves a good deal of information from most records and is certainly worth hunting down.

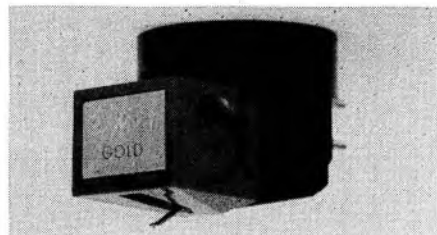
## TEST RESULTS

Type, body mass	Induced (moving) magnet, 8.2g		
Stylus type	spherical, 0.5mm		
Compliance, vert/lat	13.5cu/13.5cu		
Tracking Force Range/test	2g - 2.5g/2.3g		
Tracking ability, L/R	>80µm/>80µm		
LF res., vert/lat (11g arm)	9.9Hz, 7dB/9.9Hz, 12dB		
Output (1kHz, 5cm/sec, L/R)	3.8mV/3.75mV		
Separation, L/R	100Hz	3kHz	10kHz
	24.2/26.5	25.9/28.7	22.1/21.0dB
Channel balance	0.4dB		
Coil resistance	526 ohms		
Frequency response 20Hz-20kHz	+1dB/-4.2dB		
THD (300Hz, 1kHz)	1.25%, 1.20%		
High frequency distortion (10.8kHz pulsed)	7.2%		
Midband IM dist. (1kHz + 1.5kHz)	1.8%		
IM dist. (SMPTE 2nd, 3rd orders)	15.9%, 1.45%		
Vertical tracking angle	29 degrees		
Loading requirements	47 kohms/100pF		
Typical retail price	£40		



# NAGAOKA MP11 GOLD SB

PATH GROUP PLC, UNIT 2, DESBOROUGH IND. PK., DESBOROUGH PK. RD., H. WYCOMBE, BUCKS HP12 3BG. TEL: (0494) 459981.



For a premium of £35 and a total of £70, the standard *MP-11 Gold* has been equipped with Stilton's alloy carrier. Large holes through this thick plate have recesses for the allen-heads - there is no danger of cracking due to over-tightening! Nagaoka use titanium nitride to improve the rigidity of their alloy cantilever, though the comparatively crude diasa-elliptical stylus is a little out of place in this price category. Unfortunately, the compliance is far too high for the sort of rigid medium/high mass tonearms that are likely partners.

## LAB REPORT

Stereo separation was very poor, contrasting strongly with the unmodified *Gold* and throwing up doubts about potential sample (compliance?) variations. Distortion was kept at bay, the VTA was accurate, and the frequency response reasonably linear when subject to low

capacitive loading - 400pF loading produced a +0.9dB rise at 35kHz followed closely by an abrupt drop.

## SOUND QUALITY

This cartridge sounded rather 'thin', as very low bass was conspicuous by its absence. A blandness was cast over most recordings, though the audible spectrum was subjectively smooth and free from discontinuities. This was certainly a point in its favour, but taken as a 'package', the *SB* mods failed to elicit any real enthusiasm.

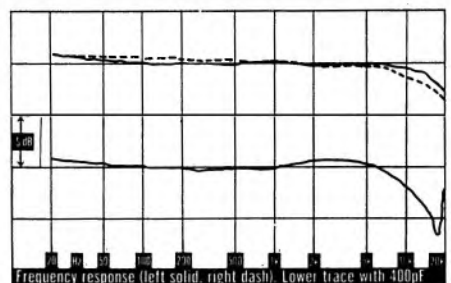
## CONCLUSIONS

Increasing the effective mass of the cartridge in this way does not appear to be a worthwhile exercise when the cartridge has such a high compliance. I remain unconvinced of the benefits of this technique, especially on the more expensive models which carry a large price premium.

## TEST RESULTS

Type, body mass	Induced (moving) magnet, 9.2g		
Stylus type	diasa-elliptical, 0.4mm x 0.7mm		
Compliance, vert/lat	25.6cu/25.6cu		
Tracking Force Range/test	1.7g - 2.3g/2.0g		

Tracking ability, L/R	>80µm/>80µm		
LF res., vert/lat (11g arm)	7Hz, 10dB/7Hz, 11dB		
Output (1kHz, 5cm/sec, L/R)	3.40mV/3.70mV		
Separation, L/R	100Hz	3kHz	10kHz
	15.2/16.7	17.1/19.4	15.5/14.1dB
Channel balance	0.7dB		
Coil resistance	540 ohms		
Frequency response 20Hz-20kHz	+0.4dB/-5.2dB		
THD (300Hz, 1kHz)	0.83%, 1.02%		
High frequency distortion (10.8kHz pulsed)	5.31%		
Midband IM dist. (1kHz + 1.5kHz)	1.92%		
IM dist. (SMPTE 2nd, 3rd orders)	11.96%, 1.2%		
Vertical tracking angle	21 degrees		
Loading requirements	47 kohms/100pF		
Typical retail price	£70		





# CARTRIDGES CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

It is somewhat sad that now, in the protracted twilight of analogue audio, we are really beginning to see some truly advanced cartridges filtering into the mass market. There is nothing like a 'war' to advance the pace of technological progress, and in this case the success of Compact Disc provides the necessary impetus.

The continued growth and market acceptance of the 'high-end' paves the way for even more exotic imported devices, while established names like Audio Technica continue to make great strides in less exotic cartridge development. The trend towards moving-coil operation is broadening too, with more models becoming available in both high and low output configurations – Audioquest and Goldring having particular models in this test update.

Furthermore, an appreciation of the importance of the *materials* used in the construction of cartridges and in the orientation of the generator is also becoming more widespread – as such weird and wonderful designs as the Clear Audios and SB Nagaokas testify. Materials that combine a high Young's Modulus and low density, such as boron, beryllium and corundum are often used for cantilever rods, in progressively lower priced cartridges.

Interesting materials are also being utilised for the cartridge bodies, from lossy but rigid thermoplastics to resins and various magnesium and aluminium alloys. Each presents a very different mechanical impedance at the interface with the headshell, and may go some way in determining the overall character of that cartridge in a specific combination of components.

Stylus quality still appears to be rather varied, covering a myriad versions of the basic elliptical and line contact profiles. However, the biggest cause for concern is the inaccurate mounting/grind of so

many diamonds, very few even approaching the IEC 20 degree standard.

## NEW RECOMMENDATIONS

From the new cartridges tested this issue the following models are recommended.

### UNDER £21

Two Recommendations here, one for the ultra-budget Nagaoka *mm4* (£8) and the other for the new Grado *XTE+1* (£20). Neither approaches the ideals of neutrality, but they nevertheless succeed in capturing the essence of most recordings.

### UNDER £60

The one new Best Buy in this price bracket has to be the Goldring *G1010* (£34). It delivers a remarkably big and bouncy sound that contrasts strongly with the compression and brightness that plagues so many similarly priced budget cartridges.

Stilton Audio's modified version of the Nagaoka *MP-10SB* seems to be the most successful of this series, deserving Recommendation despite the high price.

### UNDER £150

Audio Technica's new *OCC* wiring has slightly mellowed the sound of both their *AT-F3* (£70) and *AT-F5* (£100) moving coils, further reinforcing the Best Buy status of the former and bringing the latter into this category too.

The new range of Azden cartridges have a Recommended model in the smooth-sounding *GM-P5L* (£99).

Similarly, Goldring are to be congratulated on the success of the new *Eroica* moving-coils, the

Low output version (£89) being of particular merit.

### ABOVE £150

Moving up the cartridge hierarchy, the new Audio Technica *AT-OC7* (£245) was highlighted as a truly outstanding moving-coil.

The Clearaudio *Delta* (£450) represents something of a departure, but any deviation from the design norm has certainly benefitted the subjective performance.

Combining a healthy output with a warm and engrossing sound quality, the Milltek *Olympia* (£298) is also Recommended.

Also worth considering is the Swiss-made Madrigal *Carnegie One* which offers a high level of performance, albeit at a high cost.

Whichever high-end cartridge takes your particular fancy, a protracted demonstration in your own system is most advisable.

## CONTINUING RECOMMENDATIONS

Many cartridges tested in earlier editions remain available and continue to merit Recommendation.

### UP TO £25

The Audio Technica derived Best Buys include the *AT110 LC-0FC* (£18), Linn *Basik* (£18), *AT95E* (£15-20), A&R *C77* (£20), and Ortofon *OM10* (£21).

Recommended 'cheapies' include the Goldring *Epic* (£18), Nagaoka *MP10* (£17) and RATA *RP20* (£22).

### UNDER £65

The four Best Buys are the high output m-m Nagaoka *MP11 Boron* (£38) and Linn *K9* (£65), the high output m-c Denon *DL110* (£60), and the low output m-c

Ortofon *MC10 Super* (£65).

Recommended models include the B&O *MMC4* (£33), RATA *RP40* (£44), Audio Technica *AT3200XEH* (£43), Glanz *MFG-110EX* (£24), Shure *M97HE* (£44), Rega *RB100* (£38), Ortofon *OM20* (£45), Dynavector *10X* (£60), and A&R *P77* (£48). Also worth considering is the A&R *E77* (£38).

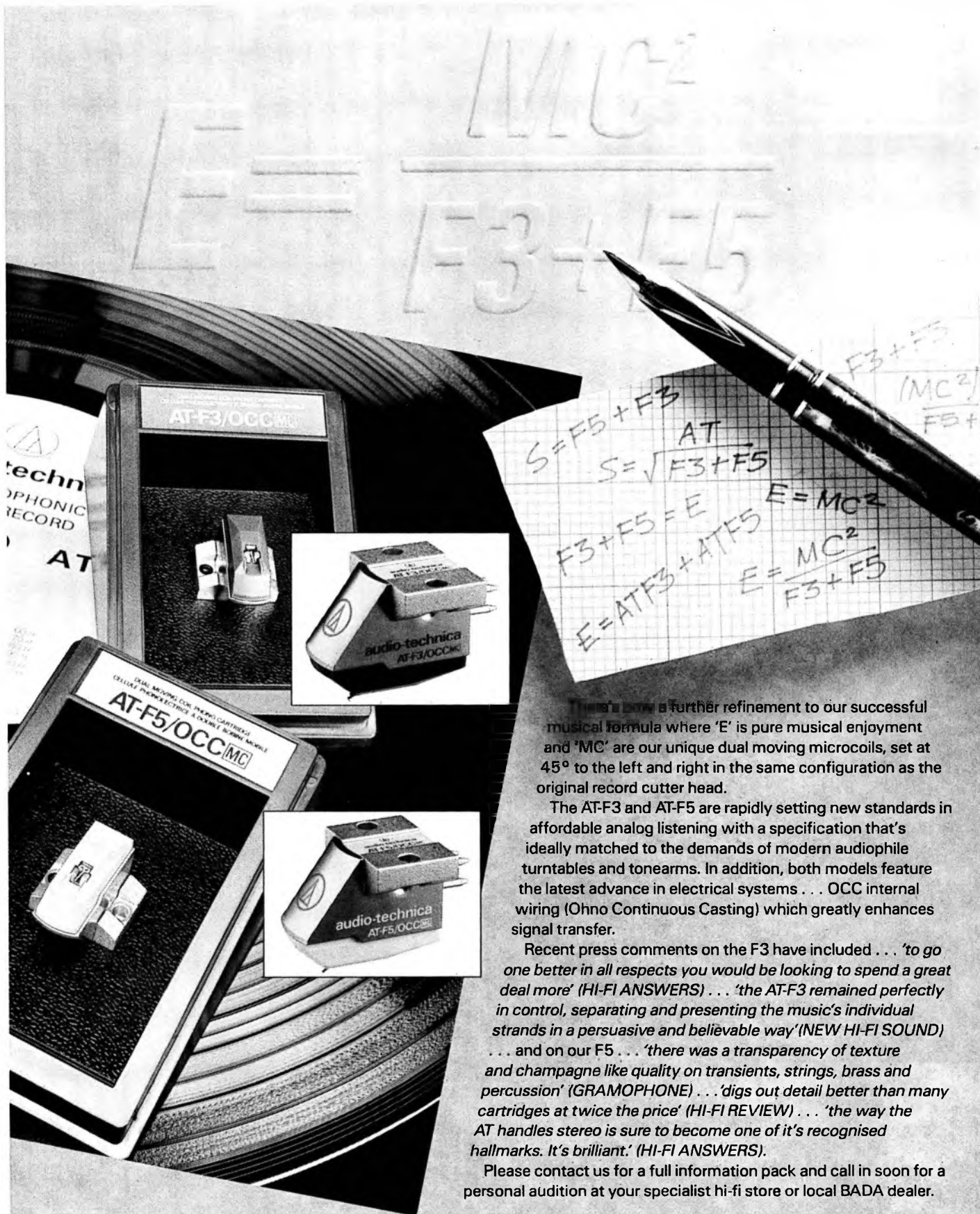
### UNDER £200

Recommendations only here, from the venerable Denon *103* (£90) and modern low output Ortofon *MC20 Super* (£180). Also worth considering are the Decca *Maroon* (£109), B&O *MMC1* (£97), Shure *ML140HE* (£120), Ortofon *X3* (£69) and *OM40* (£75).

### ABOVE £200

These recommended models must be auditioned before purchase, as a mistake could prove costly! They are all different, and will interact in their own way with a high end system. The recent £198 Milltek *Aurora*, joins the long established Supex *901IV* (£375) and the Decca *Super Gold* (£248) as high output models. Low output recommendations include the Linn *Asaka* (£249), *Karma* (£399) and *Troika* (£546), and Koetsu *Black K* (£550). At the very expensive end we have the Cello *Chorale* (£799), van den Hul *MC10* (£699) and *MC One* (£799), and Koetsu *Red* (£835).

High output models worth considering are the Supex *SD2000* (£651), Grace *F9E II* (£240), Shure *Ultra 500* (£452), plus the low output Supex *900IV* (£350), Kiseki *Purpleheart Sapphire* (£645), and Monster *Alpha 2* (£479).



There's now a further refinement to our successful musical formula where 'E' is pure musical enjoyment and 'MC' are our unique dual moving microcoils, set at 45° to the left and right in the same configuration as the original record cutter head.

The AT-F3 and AT-F5 are rapidly setting new standards in affordable analog listening with a specification that's ideally matched to the demands of modern audiophile turntables and tonearms. In addition, both models feature the latest advance in electrical systems . . . OCC internal wiring (Ohno Continuous Casting) which greatly enhances signal transfer.

Recent press comments on the F3 have included . . . 'to go one better in all respects you would be looking to spend a great deal more' (HI-FI ANSWERS) . . . 'the AT-F3 remained perfectly in control, separating and presenting the music's individual strands in a persuasive and believable way' (NEW HI-FI SOUND) . . . and on our F5 . . . 'there was a transparency of texture and champagne like quality on transients, strings, brass and percussion' (GRAMOPHONE) . . . 'digs out detail better than many cartridges at twice the price' (HI-FI REVIEW) . . . 'the way the AT handles stereo is sure to become one of it's recognised hallmarks. It's brilliant.' (HI-FI ANSWERS).

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Output voltage: (1kHz, 5 cm/sec)	0.35 mV	0.30 mV
Channel separation (1 kHz):	27 dB	27 dB
Channel balance:	1.5 dB	1.5 dB
Recommended tracking:	1.5 g	1.4 g
Load resistance:	20 ohms	20 ohms
Load capacitance:	200-300 pF	200-300 pF
Compliance: Med:	35 mm/N	35 mm/N
Stylus geometry:	0.10 x 0.20 mm square-shank elliptical	0.07 x 0.14 mm Nude square Bi-racial
Vertical tracking angle:	23°	23°
Weight:	5.0 g	5.0 g



25 years in Hi-Fi.

Attention to detail is the key to success of Guy Pound's marina architecture, a theme which is reflected in his waterfront apartment and its extraordinary hi-fi system. Words by Paul Messenger, pictures by Ian Dobbie.



## ASPIRATIONS

# Cello

UNDER

# Sail

**T**he architect of an extensive brand new South Coast marina development, Guy Pound hadn't originally planned to live in the middle of things, but was so taken by the cantilevered flat the builders called 'the flying bungalow' that he decided to buy it, moving in just a few weeks before our visit. Aesthetically unusual, jutting out above an access road at first floor level, the flat acts as a stylistic feature to finish of the end of an attractive mixed terrace of flats and town houses, providing panoramic views over the marina and waterways.

Regretting only having designed such a small flat in the first place, Guy's decision was at least made early enough to undertake significant internal alterations – notably, 'opening up' the inside by omitting ceilings throughout and using attractive vaulted wooden beams and weatherboarding instead. This technique is particularly effective in the open plan kitchen/living room, as the living section is semi-octagonal in plan, making for interesting overhead joinery plus six large windows affording a 270 degree view.

No particular pains were taken over the acoustic properties of the room, but the end result combines a number of interesting features and is undeniably effective. It is quite a 'live' room, particularly with the curtains open, but the extensive wood panelling (often found in the best recording studios) helps offset any 'hardness' from the kitchen section. Furthermore, the irregular shape and vaulted roof space ensures unwanted standing waves are avoided. The tiled floor provides a firm foundation, but any reflec-



*Cello's Audio Suite pre-amplifier system inevitably takes pride of place on the equipment shelving, above one of the Burmester A828 MkIIIs and below the Sony CDP 555ES and Nakamichi CR7.*

tions are effectively controlled by the large Persian carpet in the living area.

Guy has been a hi-fi enthusiast all his life, and has always owned 'good' equipment, but doesn't believe in changing it often – the previous Quad-based system having given impeccable services for some fifteen years.

The decision to move up to the 'high end' was only taken after much soul-searching and careful listening comparisons, with the help of Chris Coakes at Suttons Hi-Fi in Bournemouth, and at the Cello Showroom in London. Guy commented on the wide gulf between what one might call normal 'serious' hi-fi, and the really exotic equipment. It is a divide which is difficult to cross, both conceptually and financially, and more's the pity there are no effective bridges at present.

The height and kitchen area together provide a reasonable total room volume, but the limited floor area and a restricted distance from seating to loudspeakers played a significant role in selecting the equipment. Anything too visually intrusive would have been unacceptable, so the elegant and physically near-transparent Martin Logan *CLI* was a natural choice amongst panel speakers. The fine quality hardwood 'picture frame' of this design is an extra bonus that fits in well with

the other woods used extensively throughout the living area and furnishings.

Though undoubtedly a trifle cramped for space, they also sounded very good, the exceptional midrange and presence particularly suiting the jazz sources that Guy favours. As with most panel speakers, the 'beaming' of high frequencies produces wide variations in frequency balance as one moves around, but even when standing or sitting off-axis the sound was remarkably convincing and **impressively solid**.

Cello's *Audio Suite* pre-amplifier system inevitably takes pride of place on the solid pine equipment shelves, sited at chest level for easy use, with its outboard power supply tucked away on a high shelf. A little daunting due to the sheer size and unmistakably 'professional' air, it is inherently simple and easy to use once one has mastered the particular combination.



*Naim's NAT01 two-hor tuner racks on the top shelf, impatiently waiting for its aerial to be installed but promising much when this has been accomplished.*



*Michell's GyroDec is a natural choice for the visually literate, combining aesthetically with SME series IV and Cello cartridge, providing unexcelled standards of external finish.*



*A complete Quad stack of tuner, pre- and power amplifiers with its elegant integrating cabinetwork (plus mouse) presents a remarkable contrast in neatness and compactness to the main equipment array.*





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Having learnt the operation of Martin Collooms' *Suite* a few months ago, I was a little disconcerted to find different switches in different places on this one. An owner will have no problems of course, but apart from the magnificent volume control the labelling and layout is not immediately obvious to the uninitiated.

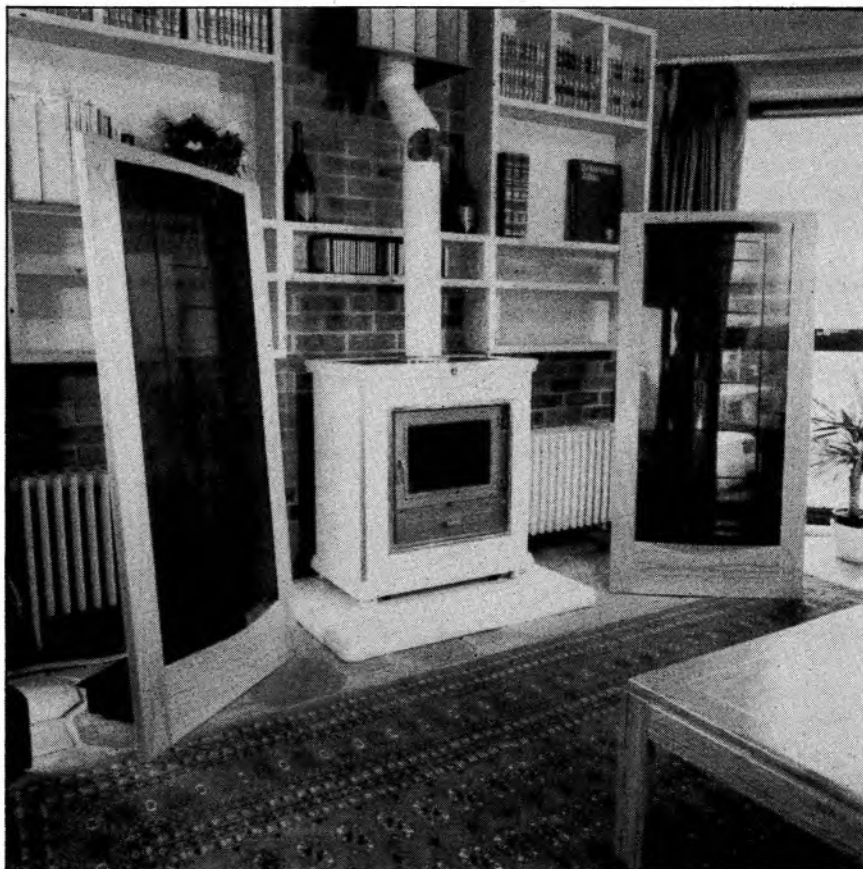
The *Suite* is in fact a miniature modular rack system, allowing selection from a wide (and increasing) range of alternative input and output modules so that each pre-amp is specifically configured for the system it serves – and providing infinite flexibility for any future changes if required. Guy's particular set-up is at the lower end of the price scale, with 'standard' moving-coil and passive line level inputs, plus the *Premium* (balanced) output module – approximately £8,500 worth *in toto* at current prices.

Cello's *Audio Suite* is the sort of product that will bring silver finish back into fashion, now that we're all heartily fed up with everything in matt black (cue for cheer from photographers the world over). The same silver finish was clearly one inspiration behind the choice of the turntable/arm/cartridge that looks fabulous sitting alongside. Michell's *GyroDec* is a natural choice for the visually literate, with unexcelled standards of external finish and a performance that falls only slightly short of the very best.

Much the same is true of the SME *series IV* tonearm and Cello cartridge. The *IV* is a cheaper version of the *V*, with cost savings in bearing and wiring, though in this instance any performance compromise is clearly justified by the superior aesthetic match. The Cello cartridge is a rare but beautiful model hewn from solid aluminium. It follows the US predilection for highish compliance, and is a pig to align geometrically, but seemed very stable in this combination, which after all is the acid test.

Breaking with the silver theme in order to accommodate other sources close to the state of the art, the CD player is the new and beautifully finished Sony *CDP-555ES*, arguably the best sounding single-box model around. The Nakamichi *CR7E* cassette deck is the reference yardstick by which all others are invariably judged. Though intended to be user-friendly after the *Dragon*, our photographer for one found it very intimidating in appearance! Presenting a total contrast to the OTT Nakamichi, Naim's *NAT01* two-box tuner lurked on the top shop, impatiently waiting for its aerial to be installed but promising much when this has been accomplished.

Guy spoke a little wistfully of the Cello power amplifiers, each the size of a substantial coffee table and far too large to be accommodated within the small floor area available. However, he is well pleased with a pair of the remarkably compact and exquisitely crafted Burmester *A828 MkII* – 200W monoblocks that cost rather less than the Cellos, but rather more than virtually anything else on the market. Their design ena-



The elegantly transparent Martin Logan CL1 was a natural choice amongst panel speakers, the hardwood 'picture frame' blending with the other woods used extensively throughout the living area, and contrasting with the ceramic fire.

bles balanced connection to the Audio Suite's *Premium* output stage.

The wiring and the wiring-up are *tour de force* in their own right, and Guy was particularly complimentary about Suttons' and Chris' efforts in concealing all the interconnections. Cello *Strings* are used pre-to power, but elsewhere there are various grades of van den Hul cable (mostly *D102*). The memory of hauling the heavy and perverse loudspeaker cabling through conduits will haunt Chris for many years. However, the interconnection between the various other components was simplified by setting the equipment shelving slightly out from the wall and running the wiring behind its back.

Perched on top of the shelving unit was a pair of Rogers *LS3/5As*. Not in order to provide any sort of surround sound capability, but instead to deliver radio broadcasts to the kitchen area. For sitting alongside the macho equipment array, its elegant integrating cabinetwork presenting a remarkable contrast in neatness and compactness, was a complete Quad stack of tuner, pre- and power amplifiers.

The main system as a whole is an undeniable extravagance when one considers that

the total cost, and I am making no attempt to justify these prices in relation to the common or garden. But the sound as a whole was deliciously warm and inviting. The midrange in particular showed uncanny detail, and the sense of realism on the Pawnshop live Jazz album was exceptional, though choral and rock works were slightly less convincing – the restricted room dimensions and modest size panel speakers acting as some constraint on the sense of 'scale' perhaps.

Though the turntable system sounded a shade 'bright', it clearly and comfortably transcended the capabilities of the CD player by a substantial margin, even though the latter is one of the best of the breed. I was impressed by how well the Martin Logans drove the room, conveying impressive realism and solidity alongside firm, clean and powerful bass, and suspect the first class amplification has much to do with it. Certainly I was again reminded of the exceptional combination of transparency and control which is the *Audio Suite's* trademark. The temptation of watching the water world going by whilst enjoying a wonderful hi-fi may well find me imposing on Guy's hospitality again before too long.

# THE AMPLIFIERS.



# THE AMPLIFICATION.

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# SEPARATE SYSTEMS

*For the first time Choice looks at separates combinations, using the results of a nationwide dealer survey to bring you the most popular compatible systems on the market.*

**S**ometimes described as a minefield for the uninitiated, building a high fidelity system out of separate components is something that every enthusiast has attempted, whether on his or her own initiative or with the help of a dealer.

The specialist hi-fi dealer has possibly the greatest opportunity to try out various combinations of equipment (with the exception perhaps of some overworked reviewers). Although the selections he or she makes are based on personal preference, most seem to realise that not everyone has the same taste. So we have based this section on dealers' recommendations rather than formal testing, which would be a colossal task, warranting an entire edition of the magazine for its publication.

Some 200 questionnaires were sent out asking dealers to recommend single source systems within three price categories, Budget – up to \$500, Mid – up to £1,200, and High End – designated rather vaguely as above £1,200, but intended to cover the sort of high end systems that the particular dealer sold a few times a year.

The written response was disappointing, and most of the information had to be cajoled out of dealers over the phone. But to be fair, they are (for the most part) at least as busy as the rest of us. And those who did respond were extremely helpful, and their approach to customer requirements seemed honest and tailored to long-term listening satisfaction as opposed to a quick sale.

## SYSTEM MATCHING

A good hi-fi system should be more than a sum of its parts. But unfortunately, due to the way that different components interact with one-another, getting a well balanced combination takes experience or experimentation, the latter approach being rather expensive. Perhaps surprisingly, the better the individual parts of a system, the harder it is to realise their full potential, so a poorly thought out or badly set up £5k high end system can sound worse than one costing a quarter of that. Luckily, or otherwise, this sort of dilemma doesn't afflict the major-

ity of us, but most would like to think the system they wish to buy offers the best fidelity for the outlay involved. And this is where a good dealer can be invaluable in helping the keen listener make the most of his hard earned pennies.

One of the biggest problems when buying secondhand equipment is the inability to audition the system as a whole, though established combinations such as the Linn/Naim hierarchy can be put together in this way. Using components from the same manufacturer is a fairly safe way of buying hi-fi but there are very few manufacturers who produce sonically competitive components of all types. Most concentrate on one or two component types such as turntables or loudspeakers, and are thereby able to produce a high quality product.

Of the dealers we spoke to, only one recommended a complete system from a single manufacturer – NAD. Other companies that also offer credible systems include AR, Linn, Mission and A&R, though none fit into our budget category. These systems have the added advantage of matching aesthetically, which could also be an important factor if domestic harmony is at stake.

Our price limitations were intended to cover a source such as compact disc player or turntable, arm and cartridge plus amplifier(s) and loudspeakers, with accessories such as stands and cables where funds allowed. We also requested a list of suitable auxiliary components for the different price brackets, to include a cassette deck, tuner and either CD or turntable according to which type of primary source had previously been selected.

The areas in a system which are most sensitive to good matching are, in a turntable system, the arm and motor unit, which are usually supplied together on budget models; the arm and cartridge, for which there is a basic formula that is based on arm mass and cartridge mass/compliance, and also the match between cartridge output and preamplifier loading/sensitivity.

There are few budget amplifiers that have adequate phono stages for the average moving-coil cartridge. And an important factor

# SEPARATE SYSTEMS

when sorting out the good from the bad budget amplifiers is the standard of the, usually moving magnet, phono stage. Unless of course, you are a CD user.

So much for the front end, which although the most important part of a system is still only the half of it. As far as the budget sector at least is concerned matching amplifier power to loudspeaker sensitivity is pretty important too. Most 'good' budget loudspeakers have an average sensitivity of around 87dB/W which means they can be driven by amps that put out a mere 10 watts, though a minimum of around 25 watts per channel will give you higher SPLs and more control. However, it's more often the sonic characteristics of particular amps and speakers that make them compatible and even if a speaker is rated as being able to take 100 watts it may sound pretty good with a 10W class 'A' amp.

The least expensive, but not necessarily least important parts of a system are the stands and cable. These can have a significant effect on the tonal balance and it's possible to fine tune a system by experimenting with different cables. Whereas two years ago dealers would have thrown in some QED 79 strand as standard with a budget system, now there are a variety of budget cables available to suit different tastes.

## BUDGET RECOMMENDATIONS

We decided to set a limit of £500 for this category to allow for the inclusion of true hi-fi quality equipment, as well as the necessary stands etc. It also gave dealers some scope for variety, perhaps too much, as no two dealers managed to recommend the same system, though the same names cropped up quite frequently. The vast majority of recommendations were for turntable based systems which may be a reflection on the specialist dealer or perhaps the budget market. Or could it be that the thrifty music lover is a very discerning animal?

## REGA BASED SYSTEMS

The best selling turntables in this sector were those made by Rega, which have quite limited distribution but obviously responsive dealers.

The *Planar 2* (£135) was marginally more popular than the *3* (£188) and both these models achieved our Best Buy rating when reviewed – the *2* "offering fine subjective performance" and the *3* making the grade because of the *RB300* tonearm. The cartridges chosen to partner these two decks were the cheaper ones from Audio Technica, A&R and Linn.

*Dinosaur by Charlie Paul. Hi-fi by Roksan, Rega, Nagoaka, Cambridge and JPW.*

The most often recommended amplifier was the *Creek 4040* (£145) which was Recommended when we reviewed it last year. Others included the A&R Arcam *Alpha Plus*, Rotel *RA82CBX2*, and Harman Kardon *PM635*, which all retail for around £150.

Of the Rega based systems, only two shared the same ancillaries, these being the *Creek* amp and Royd *Coniston* speakers, probably because of the market saturation with budget speakers. Other loudspeakers mentioned included budget models from Linn, AR, JPW and Heybrook, pocket reviews of which can be found in the *Directory* at the back of this issue.

The price constraint precluded a lot of the systems from including stands but dealers would suggest that a customer came back if funds were not presently available. A couple of dealers managed to include turntable supports in the budget, such as Rega's own wall bracket (£28.75), but the majority considered speaker stands to be of greater importance, and models from Heybrook, Linn and the Sound Organisation were suggested.

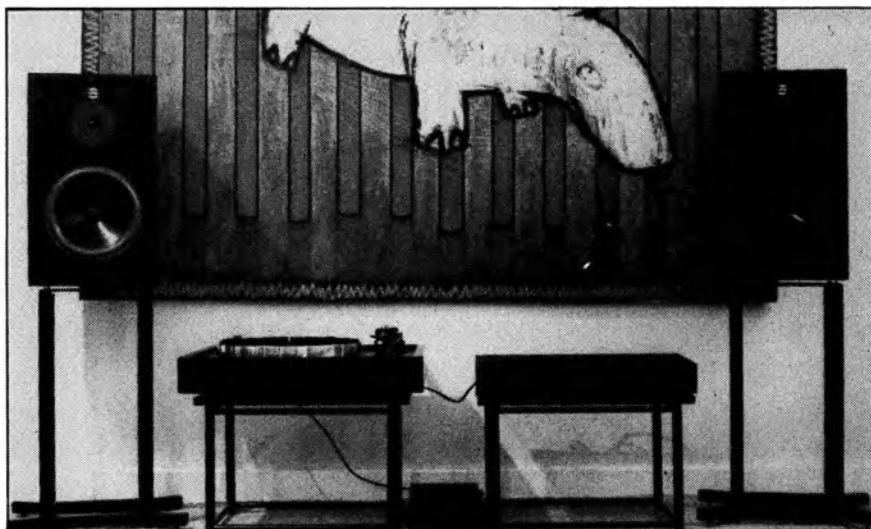
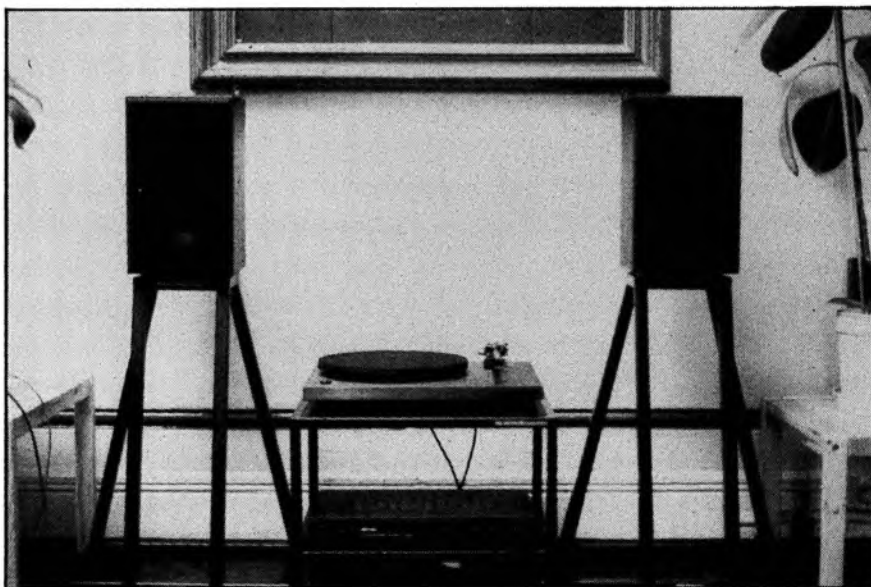
Cables are usually supplied free with complete systems and QED 42 and 79 strand types were the most popular, though some expressed a preference for Naim *NAC A4*, a very low resistance webbed cable.

## REVOLVER AND AR BASED SYSTEMS

The second most popular deck was the SEE *Revolver* (£186 with standard arm). When it was last reviewed by *Choice* it failed to achieve recommendation but is obviously popular with dealers. The majority sold it with the *Revolver* arm but several preferred the dearer Linn *Basik Plus* (£257), although this option may well be superseded by the new *Revolver Super* arm which brings the total cost to £292.

Cartridges selected were the Linn *Basik* and *Revolver's* own model, both derivatives of the Audio Technica *AT93*. By far the most

*A Rega based budget system as found at the Sound Organisation.*



## SEPARATE SYSTEMS

*A typical budget recommendation – Revolver, Denon PMA250 and KEF C30s on Heybrook stands.*

favoured amplifier with this deck was the Arcam *Alpha Plus* (£150), which we reviewed and Recommended in its standard form earlier this year, and which was considered to be “well under control and giving good musical involvement”. Partnering speakers for the *Alpha* included the Heybrook *HB1*, Royd *Coniston* and Castle *Trent*. A couple of other amps were suggested, namely the Denon *PMA 250* and Creek *4040*.

A fairly typical line up was: *Revolver* deck, arm and cartridge, Arcam *Alpha Plus*, Royd *Coniston 2* with Goodmans *Marim* stands (which, due to recent price increases, breaks the budget by £18).

Another well-liked deck was the AR *EB101*, retailing at £220 with its own arm, and which made the Best Buy grade when we last reviewed it. Apart from its own, the cartridges recommended were the Goldring *Epic* and *AT93*, this latter partnered with the NAD *3020E* (£110) amp and Monitor Audio *R252* (£150) speakers.

Another combo was the AR cartridge, Denon *PMA-250V* (£125) amp and Gale *301* (£259) speakers. Stands from Appolo would complement both these set-ups but would stretch the budget.

Other front ends included those from Dual and NAD, but unless your budget is closer to the £350 mark, the decks previously mentioned will give better fidelity.

## CD BASED SYSTEMS

Only a few compact disc systems were suggested in this budget category but there was reasonable consistency amongst them.

The most popular player was the Denon *DCD 300* (£210), with the *DCD 500* (£250) and Marantz *273SE* (£240) also being recommended. Appropriate amplifiers included Denon's *PMA-250* and the Rotel *RA820BX2* (£150). And the Loudspeakers selected were, as usual, quite varied but different to those chosen for analogue front ends. These included the Mordaunt Short *MS15* (£109), Mission *707* (£159) and Good-



mans *Marim* (£80).

A typical system included Denon *DCD300*, *PMA250* and *MS15*'s with Monotrack *M4* stands and QED *79* strand cable, totalling £501.50, assuming the cable was thrown in.

## BUDGET ANCILLARIES

Given that many people also wish to include alternative sources in their systems, we asked dealers to suggest suitable ancillaries

for a £500 basic system. These included a compact disc player, cassette deck and tuner in what is considered a budget price category, the limit for CD players being £250. The Denon *DCD 300* (£209) pretty well swept the board. We rated it Best Buy and said: “The sound was lively and open, with above average dynamics and clarity.”

Two other popular models were the new Yamaha *CD-X5* (£199) and the Marantz *273* (£199).

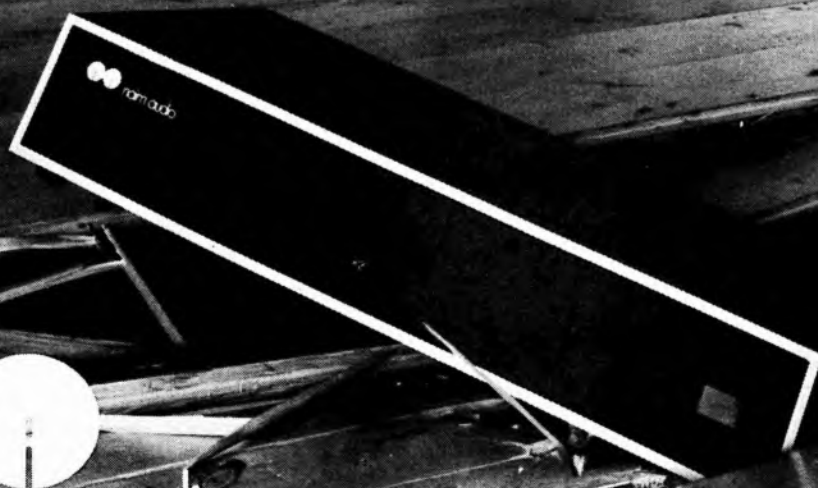
Remarkably Denon also swept the board

## BUDGET SYSTEMS UP TO £500

TURNTABLE	CARTRIDGE	AMPLIFIER	LOUDSPEAKER	ACCESSORIES
Rega Planar 3	Audio Technica AT95E	Rotel RA820BX2	JWS Quintess	Sound Organisation stands, Naim NAC A4 cable
Rega Planar 3	Linn K9	Creek CAS4040	Royd A7 II	
Rega Planar 2	A&R Cambridge E77	Creek CAS4040	Linn Index plus	Index stands, Naim NAC A4 cable
Rega Planar 2	Linn Basik	Cyrus One	Royd Coniston R	QED 42 strand cable
SEE Revolver	Revolver	Arcam Alpha plus	Heybrook HB1	Heybrook HB1S stands, DNM cable
SEE Revolver + Linn LVX	Linn Basik	Arcam Alpha plus	Royd Coniston 2	
SEE Revolver	Revolver	Denon PMA250	KEF C30	Mission cable
AR EB101	Audio Technica AT93	NAD 3020E	Monitor Audio R252	Appolo stands, 42 strand cable



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# SEPARATE SYSTEMS

CD based sub-£1,200 system comprising Arcam Delta 70 player, Musical Fidelity B200 amplifier and A&R's Arcam Two speakers.

with budget cassette decks, their DRM-07 model at £139 proving extremely popular. This gained our Best Buy accolade as did another well recommended model, the Yamaha KX-200 at a pound more. Also mentioned were the Kenwood KX-54B (£100) and Aiwa AD-F360 (£120).

Recommendations for tuners were a bit more even handed, with no particular model standing out. However, the Rotel RT830L at £100 was liked, as was Denon's £129 TU 450L. Several dealers considered Creek's CAS3140 (£149) to be exceptional and only bettered by the expensive Naim models.

## MID PRICED RECOMMENDATIONS

The price ceiling here was set at £1,200, being considered the minimum you could hope to pay for a well balanced system with a first class turntable.

Perhaps, not surprisingly, the most often recommended motor units were those made by Linn products, their LP12 (\$471) with Basik Plus arm (\$129) being marginally more popular than their Axis model (\$313 inc. arm). These were generally fitted with the Linn K9 cartridge (\$64) unless funds were short, when a Basik was used, with the idea that it could be upgraded at an early opportunity.

The amplifier that most dealers considered best match for the price was the Naim Nait (£258) which achieved our Recommendation when last reviewed. Others mentioned were the Inca Tech Claymore (\$345), Ion Obelisk 3 (\$250) and the A&R A60E (\$229). Loudspeakers selected to go with these were of the same breed but did not repeat themselves for the Nait - Linn Kans (\$271), Gale GS220's (£170) and Epos ES14s (£350) were chosen.

A typical Linn LP12 set-up included Basik Plus arm, Nait amp, Kan speakers



and stands with Naim NAC A4 cable. Perhaps not everyone's cup of tea but representative of a significant school of thought in hi-fi retail.

The Linn Axis fronted systems displayed little in the way of consistency but the following are a few of the amp and speaker combinations which were recommended:

Arcam Delta (£329) and Epos ES14 (£350).

Audiolab 8000a (£325) and Monitor Audio R252 (£149).

Musical Fidelity B200 (£299) and Musical Fidelity MC2 (£299).

These combinations allowed for appropriate stands and often turntable supports as well. Cables used included those from Linn, DNM and RS.

Another well respected deck is the Roksan Xerxes which works very well with the Rega RB300 arm. However, the fairly high £685 price of this pair limits the choice of ancillaries in our budget and many dealers chose amps and speakers at just above budget prices. Two recommended combinations were:

MAP MX20 cartridge (\$42), Rotel

RA820BX2 amp (£150) and Gale GS220 speakers (£170) with a Sound Organisation table, Heybrook HBS1 stands and Naim cable.

Alternatively, a Linn dealer suggested the K9 cartridge, Naim Nait amp with Linn Index speakers and stands, a total system cost that takes you a little above the budget.

Another decent suspended subchassis turntable that proved popular was the Manticore Mantra, which comes with its own arm (the M8, a badged Rega RB250) costing £330 in standard form or £398.50 for the electronic version. Sonically the two were very similar, according to the dealers, so if you can live with manual speed change go for the cheaper one.

Partnering equipment was quite varied but recommendations included the following:

Audio Technica AT-F5(OCC) cartridge (\$100), Inca Tech Claymore amp (\$345) and Monitor Audio R852/MD loudspeakers (\$349). This would leave a reasonable amount over for Target speaker stands and, a speciality of this particular dealer, 3-core coaxial speaker cable - not designed for the

## MID PRICED SYSTEMS UP TO £1,200

TURNTABLE & ARM	CARTRIDGE	AMPLIFIER	LOUDSPEAKER	ACCESSORIES
Linn Sondek LP12/Basik plus	Linn Basik	Naim Nait	Linn Kans	Linn Kan stands, Naim NAC A4
Linn Sondek LP12/Basik plus	Linn K9	Ion Obelisk 3	Linn Index plus	Linn Sara stands, Linn K20 cable
Linn Sondek LP12/Basik plus	Linn Basik	Incatech Claymore	Spendor Prelude 2	Sound Organisation table, Chord cable
Linn Axis	Linn K9	Arcam Delta 90	Epos ES14	Target TT2 & 16" stands, Naim NACA4 cable
Linn Axis	Linn K9	Musical Fidelity B200	Musical Fidelity MC2	Sound Organisation table, Heybrook HBS1 stands, Naim NAC A4 cable
Roksan Xerxes/Rega RB300	Map MX20	Rotel RA820BX2	Gale GS220	Heybrook HBS1 stands, Sound Organisation table, Naim NAC A4 cable
Roksan Xerxes/Rega RB300	Nagoaka MP11 Boron	Cambridge P40	JPW AP2	The Cornflake Shop table, Monotrack M4 stands, DNM cable
Townshend Int. Rock, Helios Scorpio	Goldring 1020	Audio Innovations 300	Snell K	Pirate stands, Audioquest Live Wire
Manticore Mantra	Audio Technica AT F5	Incatech Claymore	Monitor Audio R852/MD	Target stands, 3 core coaxial cable

# SEPARATE SYSTEMS



*Hi-Fi Experience's high end recommendation: Linn LP12, Ittok Troika with bestial amps from Musical Fidelity and classic KEF 107s.*

ving very popular with their \$220 DRM12HX featuring Dolby HX Pro noise reduction. The Nakamichi BX-125E was also well recommended but is quite dear at \$395, and is aimed at the serious tape enthusiast on a budget. Others mentioned included models from Sony, Yamaha and NAD.

Perhaps because there are relatively few well-built tuners on the market, some favourites did emerge from the survey. The Quad FM4 (\$289) and Rotel RT850L (\$150) were highly rated but recent models from Musical Fidelity and Onix were also commended.

purpose but possibly quite suitable.

Another system included the Linn K9 cartridge (\$65), Audiolab 8000A (\$325) amp and SD Acoustics SD3 speakers (\$295), with Foundation stands and a combination of 0.6mm and 1mm solid core RS cables for tweeter and woofer respectively.

For a distinctly different, and some would say more accurate, variation on the theme of analogue reproduction there is the Townshend International Rock turntable at \$350 for the basic motor unit. The *Excalibur* arm at the same price is a bit dear for this category, and an arm suggested by dealers was the Helius *Scorpio 3* priced at \$120. A suitable cartridge is the Goldring 1020 (\$50) and the Audio Innovations 300 integrated valve amp (\$300) with Snell *Type K* loudspeakers (\$395) make worthy ancillaries. Stands by Pirate and Rotel Supra cables round off the package.

## CD BASED SYSTEMS

The extra budget in this section gave more scope for CD systems and only one model, the \$300 Marantz CD75, was mentioned several times. On test *Choice* gave it a Best Buy rating saying "it comes close to several highly rated machines costing considerably more". Suitable partnering equipment included:

Harman Kardon FM645 amp (\$225) and Monitor Audio 852MD speakers (\$349).

Quad 34/306 amps (\$505) and Spendor *Prelude 2* speakers (\$320).

Both these combinations leave adequate change for good quality stands and cable, and the first could even include a Sicomun isolation board (\$139) for the player.

Other silver disc systems that dealers recommended were:

Arcam *Delta 70* player (\$499), Musical Fidelity *B200* amp (\$299) and *Arcam 2* speakers (\$250) with Foundation *F.R.E.D.* 17" stands (\$60).

Sony *CDP710* player (\$300), Sondex *Amadeus Gold* amp (\$345) and B&W *DM1800* speakers (\$475).

Philips *CD960* player (\$700), Inca Tech *Claymore* amp (\$345) and *JPW AP3* speakers (\$210), which with stands brings one closer to the \$1,300 mark, but the high quality front end easily justifies the extra.

## ANCILLARY COMPONENTS

For this \$1,200 system we allowed dealers more generous margins for ancillary components, and put the budget for a CD player up to \$500. Out of a wide variety of players recommended the most popular was the Denon *DCD1700MkII* costing \$480. The original version was not recommended by *Choice*, but perhaps the MkII suffix improves matters.

Other CD players felt to be worth a listen are the Harman Kardon *HD300*, Sony *CDP 222ES*, Mission *PCM 4000* and Onkyo *DX530*.

On the cassette deck front there was a little more consistency, with Denon again pro-

## HIGH END SYSTEMS

Here we set no limit on the budget, but tried to find systems that dealers sold a few times a year, so as to avoid too many systems of the second mortgage variety. Most dealers came up with sub \$5k systems which they sold perhaps half a dozen times a year.

Not surprisingly the Linn Sondek LP12 was the most frequently recommended turntable and the all-Linn \$4,000 system of LP12, *Ittok*, *Troika*, *LK1/LK2-75* amps and DMS *Isobariks* with *LK20* cable, *Isobarik* stands and Sound Organisation tables received the greatest amount of votes. (How long one wonders will it be before they make their own turntable table?)

Only marginally less popular were Linn/Naim systems, such as the Naim *NAC62*, *Hi-Cap*, *NAP250* amp combination with Naim *SBL* speakers, *NAC A4* cable and the same tables, costing nearly \$200 more than the previous combination.

Other Naim amplification varieties were also mentioned, and some alternative LP12/*Ittok* systems were:

Linn *Asaka* cartridge (\$249), Linn *Stratos* amps (\$999) and SD Acoustics *SD1* speakers (\$1,050).

Audio Technica *AT-OC7* cartridge (\$245), Quad *34/606* amps (\$728) and Quad *ESL-63* speakers (\$1,459) with Cord cables.

One dealer even spurned the *Ittok* arm in favour of the Zeta 2 arm (\$459), Koetsu *Black 'K'* cartridge (\$550), PS Audio 4.5 pre (\$696) and Counterpoint *SA12* power amp (\$1,250), driving Magneplanar *MG-1c* panel

## HIGH END SYSTEMS OVER £1,200

TURNTABLE & ARM	CARTRIDGE	AMPLIFIERS	LOUDSPEAKERS	ACCESSORIES
Linn Sondek LP12/Linn Ittok	Linn Asaka	Linn Stratos	SD Acoustics SD1	DNM cable
Linn Sondek LP12/Linn Ittok	Linn Troika	Naim NAC 62, Hi Cap, NAP 250	Naim SBL	Naim NAC A4 cable, Sound Organisation table
Roksan Xerxes/SME V	van den Hul MC1	Omtc VA60, CA25, CA60, RDN	Roksan Darius	Roksan table, Isoda cable
Townshend Int. Rock & Excalibur	Decca Super Gold	DNM pre- & power	Townshend Glastonbury	DNM cable
Pink Triangle PT T00/SME IV	Kiseki Purpleheart Sapphire	Musical Fidelity The Pre-amp 3B, P270	SD Acoustics SD1	



# SEPARATE SYSTEMS

was the Roksan *Xerxes* which in standard form costs £595 and works nicely with a number of exotic arms. It has yet to settle into the same sort of system pattern enjoyed by Linn and a good variety of set-ups were suggested, including:

Mission *Mechanic* arm (£599), Ortofon *MC3000* (around £800, but hard to come by), Naim *6 pack - 32.5, Hi-Cap*, 6 x *NAP 135*, 2 x *Naxo 3-6.3* way crossovers (£7,349) into PMS *Isobarilis* (£1,569) with Naim cable and 'Barik' stands.

SME *IV* arm (£675), Audio Technica *AT OC7* cartridge (£245), Orange pre-amp (£895) and Linx *Power 1* amp (£695) driving SD Acoustics *SD1* (£1,050) speakers via Live Wire *Black* and DNM cables.

If you want to get really serious there is perhaps little alternative to a fully blown active system such as the following:

SME *V* arm (£1,138), van den Hul *MC One* cartridge (£800), Omtec *VA602* pre-amp, *CA25* and *CA60* power amps, and RDN electronic crossovers (a mere £11,500) feeding a pair of active Roskan *Darius* loudspeakers (£1,150 including stands). And don't forget the Roksan turntable table and Isoda cables.

There were a variety of other systems that got a single mention and these included:

Townshend International *Rock* (£350) with *Excalibur* arm (£350), Decca *Super Gold* cartridge (£248), DNM *6 PS* pre-amp and *Gem* power amp (£2,490) into Townshend *Model 22* speakers (£1,399) with DNM cable.

Pink Triangle *PT TOO* (£539), SME *IV* arm (£675), Kiseki *Purpleheart Sapphire* cartridge (£645), with Musical Fidelity *The Pre-amp 3B* and *P270* power amp (£1,290) all feeding the rather popular *SD1* speakers (£1,050).

There are too many other options to go into here, but if you've got this sort of money to spend, your best bet would be to consult a dealer who actually stocks high end equipment and let your ears judge for you.

## CD BASED SYSTEMS

The compact disc playing systems suggested seemed to be more down to earth in price, perhaps as a reflection on the market and perhaps also related to the type of dealer that sells CD based systems. None of the players mentioned were as much as £1,000 which, in the context of the front ends outlined in the previous section, makes them almost bargain territory. But it is only digital, after all...

One relatively new player, the £499 Arcam *Delta 70*, received considerable acclaim from dealers and featured in more systems than any other. Some of the equipment chosen to partner it included:

Quad *34/606* amps (£728) with B&W *Matrix 2E* speakers (£795).

Arcam *Delta 90* amp (£329) with Monitor

Audio *R852/MD* speakers (£349), utilising a Target *TT4* table and Mission cable.

Denon's £599 *DCD1700* player was also quite well thought of and featured at the front of the following systems:

Audiolab *8000A* amp (£325) with Rogers *LS7t* speakers (£360) plus a Target *TT5* table and QED *79* strand cable.

Cambridge *C75/A75* pre and power amps (£540) with Rogers *Studio 1a* speakers (£497).

British ancillaries for imported front ends seems to be the pattern with the other systems that were recommended, the following being an example:

Philips *CD960* (£700), Exposure *VI, VII* and *VIII* amps (£949.70) via Exposure cable into Monitor Audio *R952/MD* speakers.

## MATCHING ANCILLARIES

Many dealers found that customers who had bought high end analogue based systems were unlikely to spend much, if anything, on a CD player, and it was usually those customers who were upgrading existing digital systems who bought expensive players. No single unit was unanimously acclaimed, but several got more than one vote so to speak, including the Cambridge Audio *CD1* at £1,500, Marantz *CD94* (£800), Meridian *207* (£950), and Denon *DCD3300* (£1,200). Of these, all but the Denon achieved our Recommended tag when last tested.

On the cassette deck front, things were a little more clear-cut with the £645 Nakamichi *BX300E* being very highly rated, and their excellent *CR-7E* £1,500 machine coming second. It would seem that in the same way that Denon have the budget and mid price sector of the market sewn up, Nakamichi have the high end pretty well covered. The third most popular deck was their £395 *BX-125E* model, with machines from other companies such as Revox and Yamaha only receiving single recommendations.

British companies seem to have a strong hold on the esoteric tuners market with Quad's £289 *FM4* and Naim's *NAT 01* plus *NAPST* power supply, close to £1,100, being the most often suggested. Models from Musical Fidelity, Hitachi and Rotel also got positive comments.

## DEALERS' COMMENTS

One other question we asked dealers was 'What in your opinion is the most important part of the system (ie where should most of the money be spent)?' It would seem that Ivor's First Law has been absorbed by most of the specialist dealers' and almost to a man they replied "the front end", though one said that making a system too top heavy was a mistake - we assume he means a Linn *LP12*, *Ittok*, *Troika*, some string and a couple of

baked bean cans.

We also asked for comments on system building, from which we got a good variety of replies. Many said that a hi-fi system was a fairly personal thing and that the dealer's function was to try to get a feel for the customer's requirements and tastes so as to enable them to suggest a system that will give long term satisfaction. Several dealers found it hard to come up with one particular set-up because of the taste differences that exist between their clients.

An important point made by Mike Lewin of Grahams Hi-Fi was that it is essential to assess whether you are looking for a finite system or one that would be upgraded in future. Certain components lend themselves to upgrading more readily than others which are likely to become redundant when the urge for greater fidelity strikes. On the other hand, another dealer felt there should be no such division and that a good system has an inherent flexibility for upgrading.

Along the same lines, one local (to us) dealer felt that the process of upgrading should be taken in fairly large steps, in order that the customer feels he has really achieved something. For instance, one should go straight from a Rega *3* to a Roksan *Xerxes* and not take the inbetween option of say a *Mantra*.

It was also felt that the decision to purchase should only be made after you've heard a system in your own home, and several dealers were happy for the customer to do this. (Though it may be difficult taking home a budget system without paying first.) Also allow enough cash for stands and cables, the importance of which doesn't seem to have been driven home to the general public yet.

## CONTRIBUTING DEALERS

We are grateful to all the following dealers for the information that they volunteered. If we missed anyone out it was not deliberate and would like to hear from any other dealers wishing to participate in our surveys.

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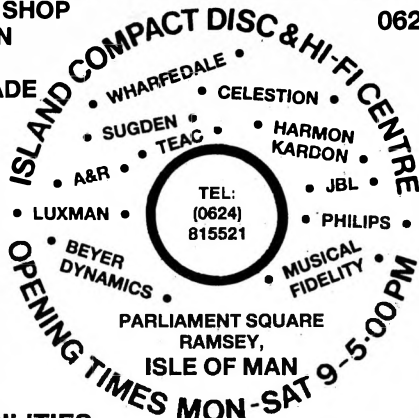
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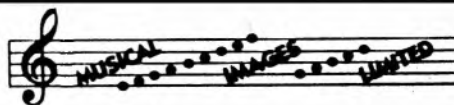
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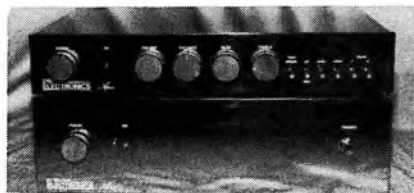
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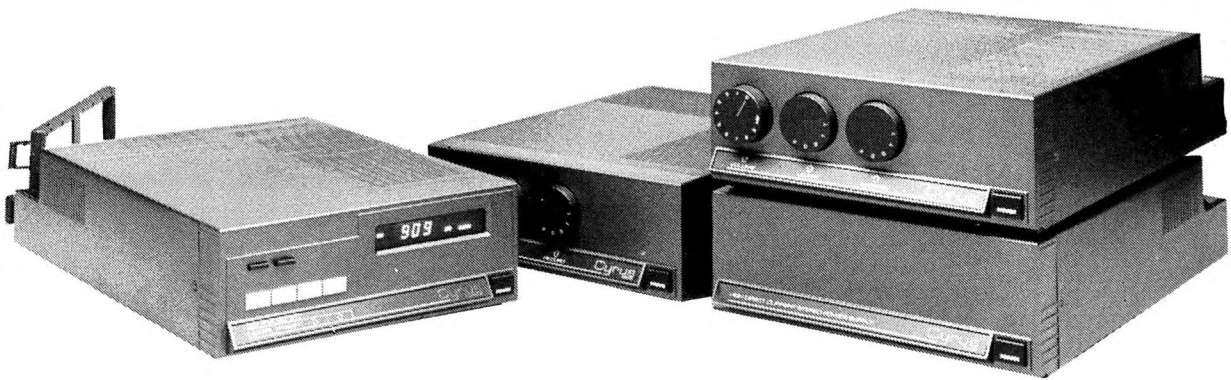
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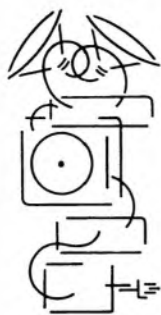
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# SYSTEM BUILDING

Pre-packaged one-make systems have been commercially very successful, with advantages like cosmetic consistency, competitive pricing, and (assumed) technical compatibility. However, despite the mass market clout of the consumer electronic giants, the hi-fi tradition of specialised separate components seems as strong as ever, and certainly represents the route taken by those who place sound quality ahead of other criteria.

Yet those who choose the separates route still have lingering doubts – usually completely unjustified – over the compatibility of components from different manufacturers. Gross incompatibilities are very rare nowadays, only likely to rear their heads amongst the most exotic components such as valve gear or second-hand items, and unusual even here. Meanwhile the subtle 'fine-tuning' of component matching is almost exclusively the preserve of the specialist, and a major reason for the superior sound of the well chosen separates system. Indeed, the delicate art of 'supercompatibility' really takes over the major role at a 'super-fi' level, and might be regarded as the key to 'real' hi-fi.

Superficially the pre-packaged system offers better value, purely in terms of the features available for the price. But the buyer who takes the trouble to analyse his or her needs and preferences will often come to the conclusion that step-by-step building of a separates system will provide greater long-term satisfaction, giving flexibility for future upgrading if so desired.

## A QUESTION OF PRIORITIES

The key advantage of separates is

the opportunity to choose one's own preferences as priorities. Taking the trouble to try and establish these, leads most people to give up, assuming that they don't know enough even to start. But the process needn't be that difficult.

Begin by establishing whether you like to choose your own music, or have it chosen by someone else. This helps sort out what priority should be given to radio, but bear in mind that the best radio music is live radio music, which is very rare and often quite esoteric; when radio is merely an alternative source of pre-recorded material, the results will inevitably be inferior to those obtainable directly from the same source in the home, given a reasonably decent hi-fi.

There are now three different pre-recorded music media competing for the attention of the hi-fi user, and to go for all three will either cost a lot of money or involve substantial compromises in the sound quality of each. For this reason many separates purchasers may start with just one source, adding others or a radio tuner when funds permit.

There will always be controversy over the relative qualities of LP, CD and cassette, with earnest protagonists often trying to advance their prejudices by rubbishing rivals. LP is still the choice for ultimate sound quality – particularly for those prepared to spend a substantial sum on a good quality turntable system. Furthermore the vinyl repertoire is still the cheapest, largest and most varied, especially if one acknowledges a secondhand market extending back 30 years. However, LPs remain tied to the home, are prey to warps and surface noise even when purchased new, and do not survive

rigorous physical abuse at all happily. Though bulky and heavy to store, the 12-inch cover has been turned to good use for artwork and liner notes, creating a pride of ownership somehow un-matched by CD or musicassette.

Cassette has never really challenged vinyl's potentially superior quality, but it is a multiple role format, offering 'go anywhere' flexibility, a uniquely useful recording capability, plus a broad catalogue of pre-recorded musicassette material. Although there are several potential rivals for recording from radio or pirating copyright material, the cassette still wins on convenience and compactness, though the sudden rise in popularity of double mechanism 'dubbing' decks remains mysterious. As a hi-fi medium cassette suffers from pre-recorded material which has been improving but is still patchy in quality, and can usually be bettered by a home recording, while any such home recording is inevitably poorer than the original. There is also the worry that a tape made on a specific machine usually replays best on that machine, which may cause aggravation when upgrading a few years hence. Though such opportunities are rarely possible or practical, a live recording onto cassette using good quality microphones can be the hi-fi equal of any other source.

CD is the new challenger to these two established media, using a digital instead of analogue storage format. The sound quality remains controversial, hailed as near perfect by its fans but derided by vinyl freaks, so it is probably fairest to say that CD is fine for most listeners, but may not suit everyone; certainly the lack of background noise, defects and

deterioration over time are major strengths. Player prices are still on the high side (typically £200), but dropping. However, disc prices are still nearly twice those of LP and cassette, (they're expected to drop in the New Year) which is a significant disincentive for the music lover who is effectively starting from scratch. A major influence over signal source priority will be how many LPs, tapes and CDs a person already owns. To replace even the key items of a large LP collection with CDs will cost a great deal of money.

## A MATTER OF PRECEDENCE

While there will always be arguments about the different music storage and transmission formats available to the hi-fi listener, there is also controversy over the relative importance of the different components which make up the system chain – by which is meant the source, the amplification, and the loudspeakers (and for the pedantic the room itself, though there's often little that can be done).

For many years the 'weakest link' theory proposed that the loudspeakers needed the most attention, that amplifiers merely had to have sufficient power, and that turntables were pretty well perfect. Recently, however, this perspective has become steadily discredited by an alternative 'theory of precedence', which stresses that no subsequent component can make up for the inadequacies of its predecessors – all it can do is supply its own additional degradations. In such a context it is not uncommon to find more than half the system budget allocated to the record player,

with scrimping and saving made on amplifiers and loudspeakers, even though these are used all the time whatever the source. And such an argument applies just as strongly to those who wish to record their LP records on to cassette, for convenience and use elsewhere.

## MAXIMISING POTENTIALS

Choosing the components of a system is only part of the task of getting the system as a whole working as well as possible. Good turntables and loudspeakers both benefit to a surprising degree from proper support – from stands that enable them to give their best performance, whether floor-standing or wall-mounted. Just lining the components up along a shelf or sideboard is a recipe for mediocrity, however much has been spent on the individual components themselves.

Siting of components within a room can play a significant role, as can the room itself. Some people may prefer an acoustically more 'live' room than others, but most will agree that the larger it is the better, because this tends to provide smoother and better extended bass reproduction. All rooms create reflections and standing waves, and the effects of these are more severe if all opposing walls are parallel, similar distances apart, and with hard reflective surfaces. Provided that the loudspeakers can be placed fairly symmetrically, slight asymmetry elsewhere in the room is usually helpful. Though it is not really practical to move the walls around (and stud type walls behave differently from brick ones in any case), the odd strategically placed wall-hanging, say above a fireplace, can work wonders in removing an unpleasant 'flutter

echo' effect, while a decent carpet is almost mandatory. 'Live' rooms are usually those that are sparsely furnished with hard wall coverings, so the overall live/dead acoustic balance can often be modified according to the furniture (or even the number of people) present.

The loudspeakers are most critical of placement, because it is their job to create the stereo image, and it will be impossible to do this if the sound from each is not roughly similar at the listening position. Each loudspeaker should operate in a similar immediate acoustic environment, unencumbered by other furnishings and structure, and a similar distance from listener, nearby walls, and corners. Some loudspeakers will be designed to operate close to a rear wall, others a metre or so out into the room, but all loudspeakers seem to benefit from being closely mechanically coupled *via* proper stands to the floor.

There is some debate about the best form of fixing, and in some instances the floor resonances themselves can become excited, particularly if a single concrete casting, and this may cause undesirable side-effects. However, adjustable spikes through to the floor proper or seated into the tops of cross-head screws are generally regarded as the best solution in most circumstances, and seem to give the best rigidity. Some speakers will work best with another set of spikes operating upwards into the loudspeaker itself, but small pieces of Blu-tack are a popular alternative. There is no need for paranoia about using spikes through normal pile carpets because the holes will be almost impossible to find when the stands are removed, but polished wooden floors do present a problem here,

and hard plastic studs may be the only satisfactory solution.

Most decent quality turntables are fairly immune from feedback from loudspeakers, so it should not matter too much if these items are sited fairly close to each other. Indeed it is debatable whether any advantages gained from keeping the turntable well away are not lost through the need to use longer connecting cables. Turntables are usually susceptible to footfall shock, so one solution may be to use a wall bracket, but these do not sound as good as a floorstanding table as a rule. It may sound unlikely, but amplifiers and CD players (and presumably cassette decks too) can also benefit sonically from carefully stand- or bracket-mounting in a high quality system.

Mixing and matching the components of a record player to get optimum results can be something of a black art, over and beyond the fairly simple business of choosing a cartridge of roughly the right compliance to suit the arm effective mass. Certainly the combining of turntables and tonearms is not a simple matter, and this is where a good specialist dealer will come into his own, both in terms of recommending good combinations from the models he holds in stock, and then in correctly carrying out the sometimes tricky set up procedures which are often required to get the best results.

Getting the best from a cassette deck is usually a question of making sure first of all that your deck does a decent job of replaying a good quality music cassette, and then finding out which tapes in the different price groupings give the best record/replay performance. The most common problem with cassette decks is in their alignment: matters are better than they used

to be a few years ago, but both dealer and customer will need to be on their guard against poorly aligned machines. Tuners can occasionally suffer similar problems, though this is even more unusual; most radio difficulties are likely to come from an inadequate or inappropriate aerial, after skimping on the less glamorous part of the budget. CD players have fewer consistency problems than analogue systems, though it is mildly ironic that they too seem to derive some sonic benefit from spiked stands or tables in a high quality system, and a poorly aligned machine may give poor disc tracking.

## THE FINAL LINK

The key to getting the best results from a separates system lies in finding an experienced and skilled dealer in the first place. One who takes the trouble to find out what you really want and then demonstrate some likely alternatives, without trying to cram his own particular prejudices down your throat. To some extent the customer's task must be to discover for himself whether the dealer in question is competent or not. Membership of trade organisations like BADA can be a worthwhile pointer to a degree of professionalism, but the bottom line is whether the dealer in question can create a good sound in his own shop. If he can't, there is precious little chance of him doing so in your home. The best dealers should lay on demonstrations so you can hear the differences between components for yourself, and hear the sort of improvements which can be had at different price strata. You can then establish the sort of performance you are prepared to accept within whatever budgetary constraints you have set.

# DIRECTORY

## TURNTABLES & TONEARMS

The schizophrenic split between consumer electronics and 'real hi-fi' is most obvious amongst turntables. The former are supplied simply as a means of playing vinyl in a system context. Cheaply manufactured in the Far East, these former are complete players with a variety of automatic facilities, sometimes tied into system remote control. But engineering compromises severely limit sound quality, cartridge choice may be P-mount restricted, and such machines are rarely stocked by specialist hi-fi dealers these days.

Specialist turntables offer big sound quality

improvements, but lack so-called convenience features (that practised users often find irksome). Such turntables at the cheaper end of the market (sub-£350) tend to be supplied with matching tonearm, and often include a 'starter' cartridge. Still better quality is found at higher prices amongst the separate motor units and tonearms. Careful partnering and set-up is essential for these individual components, but 'naturally sympathetic' combinations do exist, and the good dealer can help.

Listed separately as integrated players and as turntable motor units and tonearms, our sound

quality rating is based on results achieved using a high quality system – but in point of fact the turntable is usually the limiting factor soundwise in any system. Lab performance summarises the speed stability, vibration generation and environmental isolation of turntables, along with the friction, alignment and adjustment of tonearms. The tonearm's physical characteristics also define a range of mechanically compatible cartridges (see cartridge listings).

### INTEGRATED TURNTABLES

NAME PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	BACK ISSUE FULL REVIEW
Acoustic Research EB101 £220	Good Good +	This genuine high fidelity product offers an impressive package at a competitive price	Subchassis, manual, 13.5g	BB	48
Acoustic Research Legend £260 with arm	Good Good +	Fine all-round performance and good value though somewhat eclipsed in this respect by the cheaper EB101	Subchassis, manual, 13.5g		35
Akai APA201 £80	Poor Average -	It 'lived down' to our expectations sounding 'dead' and 'smeared', with little depth and poor bass	Solid, auto return, direct drive, 5g P-mount		48
Ariston RD60 £200	Good Good	With the Enigma arm, this balanced and communicative turntable falls only slightly short of the RD90 on sound quality	Manual, belt drive, subchassis, 11.5g	BB	48
Ariston RD40 Q £295	Average + Good	Worth considering for stylish appearance and decent performance, but undermined by RD60 in value for money terms	man/electronic, belt drive, subchassis 11.5g		48
Bang and Olufsen TX2 £288	Average + Average +	Fully automatic, it can interface to B&O's remote control system, is attractively styled and even sounds respectable!	Automatic, belt drive, subchassis, 6g		48 (Summary)
Dual CS5000 £200*	Average Average +	The rare 78 facility may give grandma's collection a new lease of life but the player did not merit recommendation on price vs sound	Electronic, belt drive, subchassis, 10g		48
Linn Axis £313	Good + Good + +	Setting new performance-for-price standards this cleverly engineered and competent deck has many of the qualities of the Sondek LP12	Electronic, belt drive, semi subchassis, 13g	BB	48/Coil
Logic Tempo/Datum II £240	Good Good + +	The general character is lively and exciting, if a little full, with solid, clear open midband, and good stereo staging	Manual/electronic, decoupled plinth, 15g	BB	48
Lux PD290 £167	Average Average +	For the non-critical user who likes Lux styling and who requires a basic turntable	Semi automatic, direct drive, 10g		40
Manticore Mantra £300/£330 (Arm)	Good + Good + +	Fitted with a Rega RB250 arm variant and AT95E cartridge the Mantra fared very well indeed with a fine midrange and good focus	Subchassis, 12g, manual	BB	48/Coil
Michell Synchro £300	Good Good	Fans of X-ray will like the see-through style of the green-tinted clear acrylic base. Respectable sound was delivered with the Rega RB250 arm	Manual, belt drive, subchassis 12g		48
Mission 775LCT £200	Average + Average +	Gives a tidy, coherent and well-integrated sound: a punchy performer if a bit bass light	Solid plinth, manual, 12g		40
NAD 5120 £89	Average Average	Offering near hi-fi quality on a suspended sub-chassis deck fitted with an Ortofon OM10 cartridge can't be bad at this price	Semi-automatic, subchassis, 9g	BB	48
Oak/Moth £175	Average - Average -	Despite the excellent Moth tonearm, motor vibration on the Oak makes for a sonically poor performer	Solid, manual, 12g		48
Rega Planar 2 £135	Average + Good	A remarkable product at the price, surprisingly articulate and confident	Integrated turntable, manual, 11.5g	BB	48
Rega Planar 3 £188	Good Good	A long time leader in its price category, the '3' (with its excellent RB300 arm) sounded nicely "musical" in a balanced and coherent manner	Integrated turntable, manual, 11.5g	BB	48
Systemdek II £199	Good + Good	Rating above average for its price the II sounded open and clear, if a bit soft in the bass	Manual/electronic, belt drive, subchassis, 15g	BB	48
Systemdek IIX £199	Good + Good	The more conventional appearance of the IIX has made it popular, performing competently, but essentially sounding similar to the II	Manual/electronic, subchassis, 15g	BB	48
Technics SLBD-22 £85	Average - Average	Not bad for the price and a great improvement on the L20, it performs reasonably when not stretched	Semi automatic, solid plinth, electronic, 6g, P-mount	R	48
Technics SL-DD33 £110	Average Average +	As with the DD33 though better value	Automatic, direct drive, solid plinth, 7.5g, P-mount	BB	48
Technics SL-L20 £115	Poor Average -	A rather lightweight parallel tracker achieving a poor overall rating, with little to recommend it unless you dig facilities	Electronic, solid plinth, 5g, P-mount		48
Technics SL-DD33 £140	Average Average +	The quartz speed controlled version of the DD is short on sound quality but not features. But it did have fair focus and some depth	Automatic, Quartz, direct drive, solid plinth, 7.5g, P-mount	R	48
Thorens TD280 £155	Average Average +	Not impressive in the context of other Thorens models. The sound was considered lively if somewhat coarse and brash	Electronic, solid plinth, 12.5g		48
Thorens TD166III £174	Good Good	Old turntables never die; this revived 166 yet again takes its place near the top of its class	Auto lift, subchassis, 7g	BB	48
Thorens TD316 £219	Good Good +	A competent, well built if not dynamic sounding machine, ably holding its own in its price category	Electronic, subchassis, 4.5g	R	48
Thorens TD320 £314	Good + Good +	The top of the range and a solid performer providing a stable focused sound, and not critical of siting	Electronic, subchassis 7g (available without arm)	R	48

### MOTOR UNITS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Ariston RD90 £300	Good Good	Giving fairly good depth and focus this is a solid and well-engineered turntable	Manual, belt drive, subchassis		48
Audio Labor Konstant £2560	Good + + Very Good	The space-station-like solid alloy frame needs a substantial shelf, but absolute stability renders a confident, neutral sound	Belt drive, subchassis	R	48/Coil
Goldmund Studio £2350	Very Good Excellent	A reference point for high end audio, only exceeded by the even more extravagant Reference. Currently being reworked into a more competitive (!) package	Electronic, direct drive, solid subchassis	R	Coil
Heybrook IT2 £279	Good + + Good +	This well constructed and finished design has no great sonic failings but sounds rather conservative	Electronic speed (optional), subchassis	R	48

# DIRECTORY

## MOTOR UNITS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Linn Sondek LP12 £471	Very Good Very Good	An established favourite. While not necessarily the most neutral, a very musical communicative nature accounts for its deserved popularity	Subchassis, single speed	R	48/Coil
Logic Gemini £700	Good Good	Innovative twin-motor design but insufficiently developed. Rates good overall but sounds a bit slow and lacking authority	Subchassis, electronic	R	48
Michell Gyrodec £595	Good+ Good+	Heavy engineering, fine finish, well priced	Manual, belt drive, subchassis		48
Oracle Delphi Mk 2 £1500	Very Good Very Good	If the enthusiast is looking for a beautifully made and finished (expensive) subchassis turntable he need look no farther than this	Belt drive, subchassis	R	48
Pink Triangle PT T00 £539	Very Good Very Good	A substantial improvement on its predecessor, the T00's new outboard power supply and motor gave a neutral sound with fine depth and detail	Electronic, subchassis	R	48/Coil
Roksan Xerxes £595	Very Good Very Good	One of the most creative and innovative designs to emerge for some time, the Xerxes also proved itself to be amongst the best	Electronic, solid subchassis	R	48/Coil
SEE Revolver £127	Average Average	Nicely balanced, but unimpressive timing and lightweight bass make this deck rather average for the price	Manual, solid plinth		48
Systemdek IV £448	Good+ Good+	Clarity and definition in the midrange and treble were outstanding. It was better for firm support, less happy on floor tables	Electronic, belt drive		43
The Rock £350	Good+ Good+	Clearly worth considering the Rock has its own unique strengths, decent engineering and good sound quality, the turntable itself offering good value	Electronic, belt drive, solid,		48
The Source £849	Good+ Good+ Good+ Good+	A substantial, extremely well finished turntable with an open bass and easy, relaxed neutrality	Subchassis, belt drive	R	48
Zaruthustra Soliloquy £1995	Very Good Good+ Good+	Attractively designed heavyweight platform, offering very good sound quality but at a hefty price	Electronic, subchassis, belt drive	R	48/Coil

## TONEARMS

NAME PRICE	LAB SOUND	COMMENTS	ARM EFF. MASS	VALUE	BACK ISSUE FULL REVIEW
Airtangent £1698	Very Good Very Good	This linear tracking air-bearing tonearm delivers the goods despite its extravagant price	7.5g (vert)	R	48/Coil
Alphason Opal £110	Average+ Good	The Opal is a well-designed and built tonearm with its own individual interpretation of good sound	10g	BB	48
Alphason Delta £165	Good Good	A highly competent design from Alphason gives good sound quality but with slight blurring and treble fizz	16g	R	48
Alphason Xenon £210	Good+ Good+ Good+	"...sonically solid overall control with firm sense of image-focus. The treble was clear and finely detailed, the bass free from boom"	12.75g	R	48
Alphason HRT00S £359	Good+ Very Good	This S-shaped arm sounds smooth, but nevertheless reproduces transients with fine attack	10g	R	48/Coil
Ariston Enigma £126	Average Average+	Good but not the best in its class: mid-band sounds a little uneven, treble a trifle "brash"	11.5g		48
Audio Technica AT1120 £132	Good Good	This low effective mass (5g) arm suits fairly high compliance MM cartridges, gives pleasant tonal balance with good stereo imagery	5g		35
Decca International £49	Average+ Average+	This uni-pivot design gives a rather rich tonal balance and some bass muddling. Could be good with Decca cartridges, but not well built	12g		48Summary
Eminent Technology £960	Good+ Good+ Good+	One of the best sounding tonearms around, the linear tracking Eminent delivers impressive stereo imagery, focus and transparent sound	9g (vertical)	R	48/Coil
Goldmund T3F arm £3850	Excellent Excellent	This complex parallel tracker created an "ear-opening" experience when tested with a (since updated) Goldmund Studio turntable	16.5g	R	Coil 2
Grace G707 £299	Good Good+	This venerable is still capable, if not competitive with modern alternatives	7g		48
Helius Orion 2 £490	Very Good Very Good	Very expensive but with a performance that merits recommendation	12g	R	48
Kusma £349	Very Good Very Good	A classic performance: solid and dynamic with exceptional bass weight and speed, if a little 'untidy'	14.5g	R	48/Coil
Linn LV Plus £129	Good+ Good	The fitted headshell provides an improvement over the LVX resulting in better clarity detail and punch	13g	BB	48
Linn Ittok LVII £399	Very Good Very Good	Suitable for many turntables this top-quality arm performs best with the LP12, the combination exceeding the sum of both parts	13.5g	R	48/Coil
Logic Datum S £230	Very Good Good+ Good+	Rated sonically very good with fine depth focus and transparency, good air and life, albeit slightly 'untidy'	15g	R	48/Coil
Mission Mechanic £600	Good+ Good	Our "mechanic" tonearm didn't really make it at its high price, though it is clearly a potentially good performer	16.5g		48
Rega RB300 £90	Good+ Good+ Good+	Despite its modest price this sets exceptional performance standards and could be used on a number of high-quality turntables	10-11g	BB	48/Coil
SME 3009 Series IIIS £156	Good Good	A simplified less flexible (as regards adjustment) Series III with a similarly 'soft' sonic character	5g		48
SME 3009 Series III £216	Good Good	Comprehensively adjustable and very well made, suited to MM and high compliance MC cartridges	5g		48
SME 3009R £272	Average+ Average+	A higher mass version of the Series III designed for low compliance MC cartridges	12g		48
SME Series V £1138	Excellent Very Good	Excellent in terms of design engineering and sound quality, this arm arguably sets a new reference standard regardless of price	10.5g	R	48/Coil
Souther Tri-Quartz £850	Average Good	A unique parallel tracking arm that makes up for what it lacks sonically in its unusual appearance	3-4g		48
Well Tempered Arm £545	Good+ Good+ Good+	The overall performance of this arm "grows" on the listener, justifying the possible mounting complications and radical styling	6.8g	R	48/Coil

# THE WORLD'S NO 1 GUIDE TO BUYING HI-FI



# DIRECTORY

## CARTRIDGES

Very much the 'slave' of turntable and tonearm, and to some extent undermined by the supply of free 'starter' cartridges on many turntable systems, the cartridge is still worth taking seriously. The quality of both the stylus itself and the cartridge's tracking performance are important in preserving that most important part of the hi-fi system – the record collection – and the cartridge also plays a significant role in determining the overall balance of a system.

Cartridges fall into two groups: high output models, capable of working directly into any amplifier, and more expensive low output models. Stereotypically, low output cartridges use the moving coil principle of operation, have better mechanical integrity and tighter tolerances, and give better performance but at much higher cost. Most under-£150 amplifiers and many valve designs need either an extra head amp or transformer to cope with the low output. **Cartridge/amplifier** interfacing

can be very subtle, but even basic high output moving magnet designs benefit in overall balance from optimised amplifier capacitance loading. Still more important, the mechanical cartridge characteristic of cantilever compliance ('springiness') needs to be considered in the light of the effective mass of the tonearm which will be used (see Turntable & Tonearm entries).

NAME PRICE	LAB SOUND	COMMENTS	ARM AMP MATCHING	VALUE	BACK ISSUE FULL REVIEW
<b>A&amp;R C77</b> £20	Average+ Average+	A sensible moving magnet package with good bounce at a competitive price	6-16g Normal	BB	48
<b>A&amp;R P77Mg</b> £47.50	Average+ Average+	Cautiously recommended, the P77Mg was preferred to its cheaper partner by virtue of a better tip. Channel balance could have been better	4-9g Normal	R	48
<b>A&amp;R E77Mg</b> £57.50	Average Average	Our sample had a disappointing stylus, but gave a coherent, rich and laid back sound, with good 'scale'	3-8g Normal	R	48
<b>ADC TRX1</b> £49.90	Average Average	Sounding bright and "tinkly" but with a rich bass this model may endear itself to those who like canaries and gongs. Now quite competitively priced	6-15g Normal		38
<b>ADC TRX II</b> £69.60	Average Average+	Comments like "fiercely exciting" treble and "plummy" bass made this cartridge seem overpriced, though price reductions now make it more competitive	6-15g Normal		38 (Summary)
<b>Audionote 102VDH</b> £795	Good Very Good	One of the best, giving "an extraordinarily relaxing midrange clarity". But it picked up a bit of surface noise and dust and needs a transformer	8-18g Very low (transformer)		43
<b>Audioquest MC5</b> £200	Average Average	Offers high-output benefits but the drooping frequency response and severe VTA error preclude recommendation	10-20g Normal		This
<b>Audioquest 404BL</b> £295	Average Average	Lateral stereo imaging is thwarted by huge VTA error and the meagre tracking margins do little to help. Sound quality is not competitive	8-20g Low		This
<b>Audio Technica AT 105</b> £13.95	Average Average	Tight budget people may enjoy this cartridge whose "overall performance was very good for the price"	6-16g Normal		43
<b>Audio Technica AT95E</b> £14.95	Average- Average	Clear, dynamic if richly balanced, the magnetic '95E is a definite Best Buy	8-14g Normal	BB	48
<b>Audio Technica AT 115E</b> £27.95	Average Average	Clear and detailed sound quality although a bit on the "heavy" side. Sonically lagged the cheaper 110E!	5-16g Normal		43
<b>Audio Technica AT320DXE1</b> £42.95	Average+ Average	This high output MC sounds better than it looks, with a decent 'laid back' sound quality	6-18g Normal	R	43
<b>Audio Technica ATF3</b> £70	Average+ Good	Giving a big and generous sound, the ATF3 also has lively pace with good focus and depth, offering a near ideal balance for the price	4-12g Low	BB	48/Coll
<b>Audio Technica ATF30CC</b> £70	Good Good	Slight generator asymmetry but low overall distortion and broad arm matching, plus a lively balanced sound	8-18g Low	BB	This
<b>Audio Technica AT 140WL</b> £99.95	Average Average	Pricy product this. Prefers low-medium mass arms and low capacitance loading, and is sonically unremarkable	6-12g Normal		43
<b>Audio Technica ATF50CC</b> £100	Average+ Good	Decent output, good channel balance and a thoroughly refined sound sets the standard at £100	9-20g Low	BB	This
<b>Audio Technica AT33ML</b> £238.95	Average+ Good	A little expensive but technically competent, and sonically pretty good, low output MC with rather garish gilt finish	6-16g Low		43
<b>Audio Technica ATOC7</b> £245	Good+	Technically and subjectively this cartridge represents a new dawn for AT, in the twilight of analogue audio	6-13g Low	R	This
<b>Azden YM10VE</b> £12.50	Average Average-	A good tracker. Sounds rather bunched-up but not totally incoherent – for very basic systems only	5-15g Normal		This
<b>Azden GWTE</b> £30	Average- Average-	Of academic interest only, this high o/p mc is seriously flawed in sonic terms	8-18g Low/normal		This
<b>Azden GMP5L</b> £99	Average+ Average+	Although no P-mount system will do this cartridge justice, it can still be enjoyed in its universal mode. The subtle balance may prove irresistible to some	4-10g Low	R	This
<b>B&amp;O MMC5</b> £21	Average+ Average	Cheapest in the family – smooth treble and good focus, but the bass was left in the wings	5-15g Normal		38 (Summary)
<b>B&amp;O MMC4</b> £33	Good Average+	Solid and well balanced in the midrange, the '4 lacks bass impact	5-15g Normal		48
<b>B&amp;O MMC3</b> £50	Good Average	Slightly "laid back" sound quality but a good performer for the price. Best suited to B&O equipment	5-15g Normal		48
<b>B&amp;O MMC2</b> £75	Good Average+	Only a modest improvement on its cheaper brothers (and sisters)	5-15g Normal		48
<b>B&amp;O MMC1</b> £97	Very Good Good	Great clarity and detail at high frequencies but a slightly plodding bass. It may appeal more to the classical enthusiast	5-13g Normal		48
<b>Cello Chorale</b> £799	Good Very Good	Looking like a piece of NASA gadgetry the Chorale's transparent treble delicacy was without equal. A serious audiophile choice	4-10g Low o/p	R	48/Coll
<b>Clear Audio Gamma</b> £285	Average Average+	Brimming over with enthusiasm, the unusual-looking Gamma is more than an audio oddity, but it lacks a little subtlety at times	4-11g Low		This
<b>Clear Audio Delta</b> £450	Average+ Good	Midway between the Gamma and exotic Pradikat, the Delta sounds like neither! Nevertheless, it delivers the goods	6-17g Low	R	This
<b>Decca Maroon</b> £109	Poor Average+	Utterly different from other cartridges, the Maroon combines Heaven and Hell with good bass and midband but poor top-end control	8-16g + damping Normal		48
<b>Decca Super Gold</b> £248	Average- Good+	Sometimes a bit fierce in emphasising record surface faults, it is perhaps best at revealing the excitement and tension in music	8-20g + damping Normal	R	48/Coll
<b>Denon DL 110</b> £60	Good Good	Firmly recommended as a fine all-rounder, this high-output moving-coil model is likely to perform well in nearly all circumstances	6-16g Normal	BB	48
<b>Denon DL 160</b> £80	Average+ Good	Although listeners just preferred the 110 its brother here proved a twin in lab tests and is still "thoroughly competent"	6-16g Low		43
<b>Denon DL 103</b> £90	Average Good	This classic spherical stylus model gives lively sound with powerful bass, and is popular in broadcast studios	6-16g Low	R	48
<b>Dynavector DV-50X</b> £60	Good Average	A high-output MC model with impressive lab performance, but whose tip and sound quality both disappointed	6-14g Normal		48
<b>Dynavector DV10X IV</b> £60	Average Average+	Fine sounding and realistically priced, damping is recommended to ensure successful tracking ability	8-18g Normal	R	48

# 84

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# DIRECTORY

## CARTRIDGES

NAME PRICE	LAB SOUND	COMMENTS	ARM AMP MATCHING	VALUE	BACKISSUE FULL REVIEW
Dynavector DV23RS £150	Average+ Good	Sound quality was described as "shut-in", lacking energy and sparkle but with some "edginess" in high frequencies	10-22g Low		28
Glanz MFG 11 OEX £24	Average Average	A little bright but giving detailed bass and clear treble this was competitive at the price	6-16g Normal	R	Systems
Glanz GMC20E £129	Average Average	You could try haggling but we thought the makers of this number were demanding too much lucre for their product	3-6g Low		48
Goldring Epic £18	Average- Average	An unpretentious "punchy" partner to a budget system, giving decent dynamics and focus	6-14g Normal	R	48
Goldring 1010 £33.95	Average+ Average-	Listening results were a disappointment for a design which "looks right" in many respects	8-16g Normal		43
Goldring G1010 £34	Average Average	A bit fiddly to set-up but rewarding once accomplished. The big and bouncy sound belies its price. Sensitive to amp loading	10-20g Normal	BB	This
Goldring 1020 £49.95	Average+ Average-	Like the 1010 this one strutted finely onto stage but couldn't project to the "gods"	8-16g Normal		43
Goldring 1040 £74.95	Average+ Average-	High frequency extension was improved by the van den Hul Tip, nice looking model - no great actress	8-16g Normal		48
Goldring Eroica L £89	Average Average+	Open and relaxed sounding, the L version is just that bit more refined than its high output brother	7-18g Low	R	This
Goldring Electro II £135 complete	Average Average+	A pretty decent allrounder that did not excel sufficiently to warrant recommendation	8-16g Normal		43
Goldring Electro 11LZ Boron £199 complete	Average Average+	Well balanced sound but lacking low frequency authority, midrange focus and "punch"	12-20g Low		38 (Summary)
Grace F9E II £240	Good Good	For lively presentation, excellent separation and general satisfactory sonic delivery - consider this model	5-10g Normal		48
Grado XTE +1 £20	Average- Average	Bass and treble are a trifle coloured but the midband proved highly enjoyable. Ideal for budget systems	6-13g (damping) Normal	R	This
Grado XF3E+ £45	Average- Average	Downtilting balance disguises the brightness of this cartridge; bit of a mixed bag at this price	9-20g (damping) Normal		This
Highphonic MCA3 £320	Very Good Good+	Exquisitely crafted by a group of ex-Denon engineers, this superb tracker had a sweet and seductive (if rather bright) treble	5-12g Low		43
Kiseki Blue Silver Spot £375	Average+ Good	Solid performance from a very solid cartridge but lacks some of the magic of other Kiseki's. Compliance too high	5-12g Low		This
Kiseki Purpleheart Sapphire £645	Good+ Good+	Rare, beautiful to look at and sweet to listen to, our review of this high-flyer conjured up images of Japanese art	5-14g Low		Collection
Koetsu Black K £550	Good+ Good+	Impressive in scale and dynamics but with some criticism of bass muddling and high treble tizz. Listen before deciding	6-18g Low	R	48/Coll
Koetsu Red £835	Good+ Very Good	Named like a rare, and perhaps dangerous, little oriental fish this famous cartridge sounded "almost larger than life"	10-25g Low	R	48/Coll
Linn Basik £18	Average- Average	This goes much further in delivering the goods than its price tag might indicate	6-14g Normal	BB	48/Systems
Linn K9 £64.88	Average Good	Linn threw this model into the leading pack by beefing up the Basik's bodywork, adding a super stylus, and keeping the price fair	6-15g Normal	BB	48/Coll
Linn Asaka £249	Good+ Good+	Disciples of Linn who are trying to realise their true "Karma" may find that saving money is not a short cut to heaven	9-18g Low	R	48/Coll
Linn Karma £399	Very Good Very Good	A specialist which is strongly recommended for Linn-based systems; results may be less predictable in more general application	9-18g Low	R	48/Coll
Linn Troika £546.25	N/A Very Good	Ex-Karma users have been seen with glazed expressions indicating smug self-indulgence the morning after fitting a Troika	8-18g Low		Coll
Madrigal Carnegie One £685	Average+ Good	Looks like a duck but sounds much better, certainly worth auditioning. Compliance too high	5-11g Low		This
Milltek Aurora £198	Good+ Good+	An overall feeling of relaxed ease characterised this clear and atmospheric Kiseki-built cartridge	8-16g Normal	R	48/Coll
Milltek Olympia £298	Average+	Warm and detailed sound - packs the punch of the best m-c's with high output as a bonus	12-20g (damping) Normal	R	This
Mission 773HC £150	Good Good	A sufficiently well-balanced and competitively priced "old-timer" which still warrants recommendation	6-16g Low	R	38
Monster Alpha 2 £479	Good Good+	In the final analysis this fine allrounder is insufficiently exceptional in any specific respect to justify fully its high price	6-14g Low		Collection
NAD 9100 £12	Average- Average	Clearly a Best Buy model for rock music fans, opera and choral music lovers might do better to avoid its tracking (in)abilities	10-20g Normal	BB	38
NAD 9200 £26	Average- Average-	Although competent in many respects, overall the 9200 must be considered an undistinguished contender	6-19g Normal		28
Nagaoka mm4 £8	Average- Average-	Clear punchy sound that delivers the rudiments of a good performance	6-16g Normal	R	This
Nagaoka MP10 £17	Average Average	High frequencies sounded "shut-in" with this spherical-stylus model, but mid and bass were energetic, bouncy and punchy	5-13g Normal	R	48
Nagaoka MP11 Boron £38	Average Average+	Responding well overall in PM's equipment and listening room, this model was mildly criticised for low level and dynamic limitations	5-13g Normal	BB	48
Nagaoka MP10SB £40	Average Average+	Stillton's mods have improved the fine detail resolution of this popular budget model	5-15g Normal	R	This
Nagaoka MP11 Gold £45	Average- Average+	There were mild criticisms directed at most areas, but in general the sound was clear, open and even	3-8g Normal	R	48
Nagaoka MP11 Gold SB £70	Average- Average	Excessive price loading for a blob of aluminium	2-6g Normal		This
Ortofon VMS5E II £14	Average Average	Sound quality was thought fair for the price, though a little 'untidy'	8-18g Normal		38 (Summary)
Ortofon OM5E £16	Average- Average-	The OM10 is a hi-fi cartridge - the OM5E is not	5-16g Normal		43
Ortofon OM10 £21	Average Average	One of the leading "cheapies", this gives a fine level of sound quality for the price, with good matching compatibility	5-15g Normal	BB	48
Ortofon VMS 10E II £21	Average- Average-	Some of its stable-mates fared rather better, and showed less evidence of tracking problems to boot	Normal		38
Ortofon VMS20E II £35	Average Average	One of the most popular cartridges ever, sound quality was a bit laid-back and tracking could have been better	3-10g Normal		48

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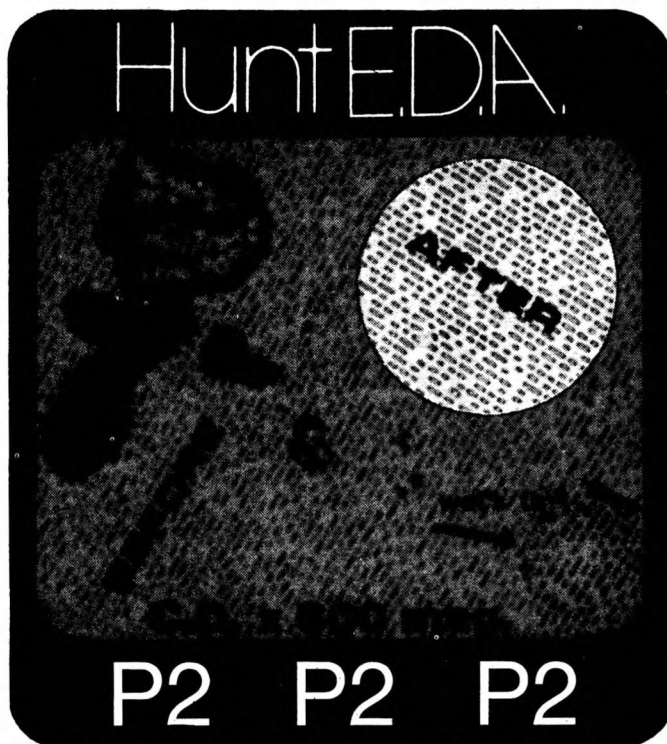
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# DIRECTORY

## CARTRIDGES

NAME PRICE	LAB SOUND	COMMENTS	ARM AMP MATCHING	VALUE	BACK ISSUE FULL REVIEW
Ortofon DM20 £45	Average Average+	This turned out to be the listening panel's favourite among Ortofon's moving magnet models	5-16g Normal	R	48
Ortofon X1 £50	Average Average	The cheaper X1 scored higher marks with our listening panel than the X3, but both were a disappointment	6-15g Normal		48
Ortofon VMS30E II £52	Average+ Average	Rather an old soldier in relation to turntable technology, it will perform undemandingly in demanding circumstances	5-13g Normal		38
Ortofon MC10 Super £65	Average Good	"What a delightfully sweet-sounding cartridge this is..." we said	5-15g Low	BB	48
Ortofon OM40 £75	Average Average+	Highly competent engineering, secure tracking and decent sound quality are major strengths. But it's a little cold, a little polite	3-8g Normal		48
Ortofon X3 £75	Average Average	A lack of bass power, definition and a "zitty" top end makes this competent but uninvolved (see above)	5-15g Normal		48
Ortofon MC20 Super £180	Average+ Good+	An "inviting" sound quality; polite rather than exciting it approaches much more expensive models, but does not better them	6-15g Low	R	48/Coil
Ortofon MC30 Super £270	Very Good Good+	Beautifully engineered and well-balanced, it was slightly criticised as bland, though some may appreciate the lack of rough edges	5-14g Low		
Ortofon MC2000 £450	Very Good Good+	There are few grounds on which to fault the MC 2000, but extremely low output means the expense and aggravation of a transformer	5-10g Very low (transformer)		38
Pradikat by Clear Audio £1225	Average+ Very Good	Sounded absolutely glorious, creating a full sense of scale and a large well-focused soundstage	8-18g		Coil
RATA RP20 £22	Average- Average	Good integration, a clear dynamic midrange and the beginnings of fine stereo imagery merits clear recommendation	6-14g	R	48
Rata RP40 £44	Average Average+	The '40 did a good job of sorting out the layers and complexity of the mix, with good focus, excellent stereo spread and fine scale	6-15g Normal	R	48
RATA RP70 £77*	Average Average+	Clearer and sweeter than the '40 this also seemed heavier and less lively. For £99 you can have a van den Hul stylus	6-14g Normal		43
Rega RB100 £38	Average Average+	Remarkable mechanical performance in the right system context, but "try before you buy"	5-12g Normal	R	48
Shure M92E £15	Average- Average	Though lacking depth, the overall sound quality was competent, but treble was not its forte	10-15g Normal		43
Shure M99E £24	Average- Average-	Sister to the 92E This is a solid but not particularly exciting cartridge	5-10g Normal		38 (Summary)
Shure ME75ED £24	Average Average-	Rather bright and splashy in the high frequencies but nevertheless a competent model	5-10g Normal		38
Shure M104E £32	Average- Average	Capable in many ways, but giving no substantial improvement over the 92E in our view	5-15g Normal		38
Shure ME97HE £43.95	Average Average+	It won't turn a sow's ear of a turntable into a silk purse, but will at least keep going and produce an acceptable result	8-20g Normal	R	48
Shure M105E £45	Average Average-	A slightly 'spitty' sound lacking deep bass and dynamic contrast, but can be used in virtually every system where it will perform "unobtrusively"	5-12g Normal		38 (Summary)
Shure M110HE £55	Average Average	Sound quality was thought eminently presentable, but not exciting; smooth clear high frequencies, but a loss of bass definition	5-10g Normal		38 (Summary)
Shure M111HE £67	Average Average	Early reviews of this cartridge complained principally of the price - which has since come down	5-10g Normal		38 (Summary)
Shure ML120HE £95	Average+ Average+	Quite decent sound quality and a generally fine balanced performance	6-18g Normal		48
Shure ML140HE £120	Average+ Good	Qualitatively the treble of this well-balanced moving magnet model was a match for many moving coil cartridges	6-16g Normal		43
Shure V15 VMR £195	Good Average+	Initial listening gave promising results, but extended familiarity gave the feeling of a lack of energy and a "shut-in" sound	5-12g Normal		38
Shure Ultra 500 £452	Good Good	There was no doubting the accomplishments of what could well be the finest moving magnet cartridge around	6-14g Normal		48
Supex SM100E £115	Average Average+	Delivers as much musical information as many moving coils - the bass in particular having an attractive bounce	6-15g Normal		38
Supex SD900IV £350	Average+ Good+	The 900 is an inherently fine cartridge, but despite a recent update it is beginning to show its age	10-18g Low	R	48/Coil
Supex SD901IV £375	Average+ Good+	This high output model delivered sufficient subjective and objective performance, plus good compatibility, to justify its price tag	8-18g Normal	R	48
Supex SDX2000 £651 L £721 H	Good Good+	The high-o/p 2000 was preferred on listening tests to the low-o/p model, which even so has a unique place among the top designs	6-16g Either		48
Van Den Hul MC10 £699	Good Good+	A neutral balanced performer giving transparent midrange, fine depth and focus with firm extended bass. Gosh!	5-10g Low	R	48/Coil
Van Den Hul MC One £799	Good Very Good	This extended all the positive qualities of the '10 but added greater authority and scale - worth it for the extra money	6-12g Low	R	48/Coil

## AMPLIFIERS

The amplifier sits at the heart of the system, processing the outputs from all the various music sources as necessary and then driving the loudspeakers. These two (quite separate) functions are integrated into a single box at the low-to-middle price points; separated pre- and power amplifiers become increasingly common as one moves upmarket. At the upper end of the specialist market, valve amplifiers provide a popular alternative to the transistor types amongst enthusiasts.

There is a substantial difference between specialist (sound quality oriented) amplifiers and the consumer electronics style models. The former are

bleakly simple, avoiding all unnecessary features to provide the most direct signal path in the interests of best sound quality. The latter range from models with just basic tone controls and tape recorder switching, to those with elaborate facilities such as graphic equalisers, remote control (including volume), surround sound options etc. etc.

Lab measurement provides some useful data, particularly in regard to an amplifier's ability to drive a wide range of different types of loudspeakers, but this is only obliquely related to sound quality. We also include our measured power output (RMS, 8ohm load, 1 channel driven) - but

again, paradoxically, this doesn't necessarily correspond to the loudness capability of the amplifier, and has as much to do with the elegance of the overload characteristics within a given system (valve amplifiers invariably sound more powerful than their rating would suggest). The listing of features provides some indication to the complexity of an amplifier: many users prefer to retain the option of tone controls to 'shape' the overall sound according to taste; many others have found living without tone controls surprisingly easy, with additional benefits in terms of transparency.

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
A&R Arcam Alpha £149.90	Average+ Average	This good all-rounder sounds musical if slightly softened. Good build and presentation	5 inputs hdph MM/MC tone controls 30W	R	50

# DIRECTORY

## AMPLIFIERS

<b>A&amp;R Arcam Delta 90</b> £329.90	Good Average+	Well balanced and sweet-natured in any given system with MC capability, but pricey	70W MM/MC 5 inputs tone controls		50
<b>Audio Research SP8</b> £1998	Very Good Good++	The sound from this valve pre-amp was good enough to do justice to the finest ancillaries	5 Inputs MM	R	48
<b>Audio Research MT00</b> £2850 each	Good+ Excellent	These high end valve mono-blockpower amps justify their cost by providing near state of the art sound quality. Our reviewer was so excited he bought them	100W	R	50
<b>Audio Research SP11</b> £5150	Very Good Excellent	Current state of the valve pre-amp art. A reference point	Straight line MM/MC Disc + phase invert	R	50
<b>Audiolab 8000C</b> £300	Very Good Good	Bettering the high standard set by the integrated 8000A this pre-amp sounds more tidy and refined, if a little clinical and cold	5 inputs MM/MC Disc hdph tone controls	R	50
<b>Audiolab 8000A</b> £325	Very Good Good	A strong contender using high grade circuitry and providing good sound quality on all inputs. Hard to fault at the price	5 inputs MM/MC disc 50W hdph tone controls	BB/R	50
<b>Audiolab 8000P</b> £465	Very Good Good+	A gutsy performer providing high levels into both 8 and 4ohm loads. A power-amp to keep the competition worried	100W	R	50
<b>Beard P35</b> £695	Good Good++	A superbly built and engagingly rhythmic valve power amp, sounding sweet and slightly soft in the classic valve style	35W	R	50
<b>Beard 506</b> £995	Good+ Good++	A versatile valve preamp – the bass sounded lively if a touch softened while the treble was detailed but lacked a little sparkle and air.	4 inputs MM/MC	R	50
<b>Beard M70</b> £1595 pair	Good Good+	A substantial British monoblock power amplifier, but not a great deal more impressive than the P35 at half the price	70W	R	50
<b>Burmester 838</b> £1490	Very Good Good+	A disc-only minimalist pre-amp, strong points include excellent build, extreme neutrality, dry clean bass and notably sharp stereo focusing	MC only, MM option		Collection
<b>Burmester 846</b> £1599	Very Good Good+	Usually coupled with the 838 this high-level pre-amp provides many and versatile input facilities	6 inputs	R	Collection
<b>Burmester 850</b> £3995	Good+ Good+	Each of these monoblock amplifiers contains separate high current 25W amps giving a refined coherent sound over most of the frequency range	100W	R	Collection
<b>Cambridge Audio P40</b> £200	Good Good	A very fine sounding integrated amplifier with simple facilities and MC cartridge capability	5 inputs 40W MM/MC straight line	BB	50
<b>Cambridge Audio C75</b> £260	Good+ Good++	Whilst not quite on par with its A75 companion this pre-amp provided excellent stereo imagery but was a touch "heavy" in character	MM/MC disc	R	50
<b>Cambridge Audio A75</b> £280	Very Good Good++	This strong power amplifier sounded open and effortless, with fine bass drive and dynamics, albeit a touch grainy and harsh at high frequencies	100W	R	50
<b>Cello Audio Suite</b> £6000+	Excellent V Good/Excellent	Cello's pre-amp represents a whole new ball game in flexibility and sound quality (or war of attrition on your wallet)	Optional inputs MC etc	R	50
<b>Conrad Johnson MV50</b> £1795	Good+ Good++	Coupled with the PV5, this CJ power amp performed well on audition	50W	R	Coll
<b>Conrad Johnson PV5</b> £2010	Good+ Good++	The PV5 is a classy sounding valve pre-amp, and natural partner to the MV50	5 inputs MM	R	Coll
<b>Conrad Johnson Motif MC-8</b> £2500	Very Good Good++	A cheaper alternative to the '7, this pre-amp is an undoubted success in maintaining the Motif sound but does not compare on sound quality	MM/MC	R	50
<b>Conrad Johnson Premier Three</b> £3775	Good+ Very Good	The Three is a musically accurate and graceful pre-amp which proved versatile on a wide range of inputs	5 inputs MM/MC		Coll
<b>Conrad Johnson Premier Four</b> £3900	Good+ Good++	Ambience was the four's forte – this power amp proved exceptionally revealing of instrumental locations	100W		Coll
<b>Copland Pre and power amps</b> £649 each	Good+ Good	At £649 each this simple Danish valve pre/power combination is expensive, though the power amplifier sounds very easy on the ear	3 inputs MM, 12W		50
<b>Counterpoint SA7</b> £747	Average+ Good+	Simple valve Californian pre-amp offering inspiring transparency for the price	4 inputs straight line MM/MC	R	Coll
<b>Counterpoint SA12</b> £1250	Good+ Good+	A real power-house power amp, beefy and load-tolerant although like the SA7 a trifle untidy at frequency extremes	100W	R	Coll
<b>Creek 4040</b> £145	Average+ Average	This simple integrated model had a controversial sound, liked by some, plus an acceptable lab performance	4 inputs MM 12W	R	50
<b>Croft Micro</b> £150	Average+ Good+	A real upsetter. This excellent valve pre-amp put the cat among the pigeons proving good sounds can be made at budget price levels	4 Inputs MM straight line	R	Coll
<b>Croft Super Micro</b> £250	Good Good+	With industrial looks and double mono operation, it rated particularly well on disc input, although not so hot on CD	4 inputs MM straight line	R	50
<b>Croft Series IVS</b> £730	Good Good++	A lively and 'fast' valve power amplifier, delivering the goods with a pleasing 'classical' tonal quality	40W per channel	R	50
<b>Deftec DPA 100S</b> £1900	Very Good Good++	A top-quality transistor power amp, sounding fast, articulate and well controlled, though maybe a touch clinical for some tastes	80W	R	50
<b>Denon PMA-707</b> £100	Average+ Average-	Originally a budget 'best-buy' the 707 still merits recommendation with a sound quality that sets it apart from "rack-system" standards	25W MM 4 inputs hdph	R	44
<b>Denon PMA-250</b> £125	Good Average	As a "budget-plus" integrated amplifier the 250 gave an open sound with lively dynamics and should appeal to a wide range of tastes	25W MM hdph	BB	50
<b>DNM 3</b> £1000	Good+ Good++	The DNM3 in its acrylic case is a remarkably revealing and neutral state of the art pre-amp	5 inputs MM/MC twin vol controls	R	44
<b>Exposure VIII</b> £310	Very Good Good	This power amplifier created a good impression of speed and power, but was a trifle fierce in the treble	50W	R	50
<b>Exposure VII</b> £340	Very Good Good	A double mono transistor pre-amp with a notably dynamic and punchy character, though not suited to all tastes	3 inputs MM/MC	R	50
<b>Hatler DH120 kit form</b> £295	Good	We didn't build one; see below	60W		44
<b>Hatler DH120 assembled</b> £360	Very Good Good	On sound quality results were substantially good, but this power amp won't set the world on fire at this price	60W		44
<b>JVC AX-22</b> £110	Average Average-	Serves a market that buys on features rather than sound quality. Includes special "flashing light" power meter	55W MM tone controls		50
<b>Kenwood KA-550</b> £130	Good Average	Decent sound quality and build at an affordable price, it also has a capable moving coil input – something of a rarity among the competition	40W hdph Tone controls MM/MC	R	50
<b>Krell PAM5</b> £1589	Very Good Good+	Superbly built, the Pam 5 pre-amp gave good definition throughout the frequency range with a good measure of excitement	MM/MC	R	50
<b>Krell KSA50 Mk2</b> £2495	Very Good Good++	This power amp still holds its own with good depth and ambience and excellent stereo focus	50W	R	50
<b>Krell KWA-100 II</b> £5900 pr	Excellent Excellent	A genuine reference standard power amp, capable of justifying a wildly extravagant price tag in an appropriate system	100W, Monoblock	R	Coll
<b>Le Tube</b> £585	Good+ Good+	If moving coil sensitivity is not required then this pre-amplifier will offer a clean view with very good stereo	3 inputs MM	R	44

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Linn LK2 £373	Good+ Good	This pre-amp was marginally less successful than the LK1 but the pair (of Linns) worked well together and are well worth considering	5 inputs MM/MC	50
Linn LK1 £425	Good+ Good	A durable tolerant power amp, setting a respectable standard on both lab test and audition	60W	50
Linx Stratos £999	Good+ Good+	Facing strong competition in the UK this New Zealand pre-/power combination gives good sound quality... but not exceptional at the price	120W MM/MC straight line	50
Luxman LV-105 £599	Very Good Good	Superbly finished and built, in a sense this model managed to capture the "valve" sound with an easy musical quality and good bass register	85W MM/MC	44
Magnum A100 £1995 pair	Good+ + Good+	Given their massive power rating a pair of A100's make a fine stereo power-amp, ideal for high levels and with a wide dynamic range for digital programme	320W	R 50
Marantz PM26 £110	Average Average-	Well built and attractively presented this just manages recommendation, though sonically falling somewhat short of the best examples of its type	30W MM sliding tone controls	R 50
Marantz PM45 £200	Good+ Average	Generally pleasant and polite with above average clarity; there was some softening in the bass, restricting dynamic output somewhat	40W MM/MC tone controls	R 50
Mission Cyrus One £150	Good Good	A reference standard amplifier for its price category the Cyrus 1 attained a high sonic standard. A stylish, neutral performer	5 inputs MM - medium MC 30W straight line	BB 50
Mission Cyrus Two £300	Good+ Good+	A significant improvement on the already competent 'One, the 'Two remained neutral and confident over the whole frequency range	50W 5 inputs MM/MC Disc straight line	BB 50
Mission Cyrus Two with PSX £500	Good+ Good+	Although making the 'Two more powerful, the PSX power supply does not offer significantly better sound quality	A power supply, see above	50
Musical Fidelity A1 £229	Average+ Good	Fine-ranking in terms of overall sound quality for money, the excessive heat output could be hazardous to your vinyl if you're careless	20W MM/MC 4 inputs straight line	R 50
Musical Fidelity A100 £400	Good+ Good+	This is another one recommended for fine sound with which you could keep your Chinese carry-outs warm	50W MM/MC 5 inputs	R 50
Musical Fidelity P170 £499	Very Good Good+	Acquitted itself well, later samples showing steadily increasing refinements	85W	R 50
Musical Fidelity MVT £999	Very Good Very Good	The MVT pre-amp was "simply a knockout in its class", providing competition for £2000-plus amplifier systems	MM/MC 5 inputs	R 50
Musical Fidelity P270 £1000	Very Good Good+ +	If the hot-box aspect is not a deterrent, this is something of a bargain. A big amplifier scale of sound which is just a little rough-edged	135W	R 50
Musical Fidelity A370 £2049	Very Good Very Good	Arguably the finest sounding power-amplifier manufactured in the UK	185W	R 50
Myst TMA3 £288	Very Good Average+ +	This excellently-constructed, no-frills, dependable amplifier should offer long life with above average sound quality	35W MM/MC 4 inputs	50
NAD 302De £110	Good Average+	A little tight in balance and "weight" but superior to run-of-the-mill budget amplifiers	20W MM/MC 4 inputs	BB 50
NAD 2200 £339	Good+ + Average+	Not recommended on grounds of sound quality, but worth serious consideration for its exceptional power output	100W	44
Naim NAIT £258	Average+ Good	Well built with good load tolerance the NAIT delivered a fully competitive sound in spite of its modest measured power output	15W pc MM 3 inputs	R 50
Naim NAC 32 £425	Very Good Good+	A natural partner to the Naim power-amps, with power supply options at different prices	MM/MC, 5 inputs	R 50
Naim NAP 250 £966	Very Good Good+	Well-matched to the Naim pre-amps, and capable of high quality sound levels over the whole dynamic range	70W	R 50
Nuance £795	Very Good Good+	A subtle civilised pre-amp though a little lacking in resolution and detail; suited to some tastes but not top-drawer	4 inputs MC	R 50
Perreaux SA3 £690	Very Good Good	This exotic New Zealand-built pre-amp did not really offer the sort of sound quality expected at the price	4 inputs MM/MC	44
Perreaux 1850 £990	Very Good Good	This power amp's musical qualities were disappointing, though powerfully delivered. Build and finish were exemplary	180W	44
Plenitude £795	Very Good Good+	Rating slightly higher than its Nuance partner, this power amp provided a tight, controlled sound, if somewhat lacking in scale and grace	80W	R 50
PS Audio PS4.5 £696	Very Good Good+	Sonically the best pre-amp in its class, but on the bright side, so purchasers should try it with their prospective equipment	MM/MC	R 50
QED A230/240CD/240SA £119/£149/£199	Good Average+ / Good	Each model proves a worthwhile step up. The cheaper A230 was civilised, while the '240s were more dynamic with fine resolution of space and depth	4 inputs 40W hdph (MM) (240 SA MC)	BB 50
Quad 34 £269	Very Good Average+	This well-built durable pre-amp has useful filtering and above average tone controls but was found lacking in sound quality (viz: detail/dynamics)	4 inputs MM/MC tone controls	44
Quad 405 £329	Very Good Average+	Not an impressive power amp but easy on the ear if not pushed and very reliable	100W	44
Quicksilver £1775 pair	Good+ Good+ +	A remarkable valve power amplifier with little to criticise; fast, articulate bass, neutral midrange and open clear top end	60W	R 50
Radford STA25 Renaissance £977	Good Good+ +	Offering superb midrange performance if not quite as good at the extremes, the Renaissance valve power amp is a genuine audiophile product	25W	R 50
Robertson Forty Ten £987	Very Good Good+	Here is a neat little power amp (60W) you can fit and forget, it proved most satisfying over long listening sessions	60W	Coll
Rotel RA-820BX II £150	Good Good	Rating very highly for the price, it proved a hard and fast amplifier, easily achieving a best buy rating	4 inputs MM hdph 25W	BB 50
Sansui AU-G11X £139	Good+ Average	Tightly controlled if somewhat congested and lightweight, but a reasonable compromise between features and sound quality	25W MM hdph 4 inputs, tone controls	R 50
Sansui AU-G30X £199	Good+ + Average	A very competent amp with no glaring faults, performing well with phono and compact disc inputs	4 inputs MM 45W tone controls Hdph	R 50
Sansui B2301 £1880	V Good Good	Rating better than the pre-amp and providing generous power output, this amp could not be considered competitive in its price bracket	300W	Coll
Sansui C2301 £2306	Excellent Good	Sansui's flagship pre-amp did not really rate well given its price, but is not short on features	All facilities	Coll
Sony TAF 500ES £349	Good+ Average-	Not too hot at the price, lacking in bass action, rating poorly on vinyl, and only marginally improving on CD	75W hdph tone controls MM/MC	50
Sony TAF 700ES £500	Good+ + Average	Scoring higher than the 500 but still not offering the sort of standards set by the competition. But many buttons to push	100W MM/MC tone controls	50
Tandberg 300BA £564	Very Good Good	Although featuring comprehensive facilities this pre-amp was considered a little clinical and lacking in musical integration	6 inputs tone controls hdph	44
Tannoy SR-840 £1713	Very Good Good+	A "muscle" power amp, capable of impressive levels into difficult loads while remaining quite subtle and revealing	250W	R 50
Technics SU-500 £100	Average Average-	Technics have something of a knack in creating models which just border on what we regard as the minimum standards for Hi-Fi. This is an example of that	40W MM hdph tone controls	50
VTL Minimal £340	Good Good	Providing decent sound quality at the price, this basic pre-amp sounded open and clear in mid and treble	3 inputs (MM)	R 50
VTL 50W £1150	Good Good	Rating good on audition and providing complementary characteristics to the minimal pre-amp, these monoblock power amps sounded a little slow and unrevealing	50W 3 inputs	R 50
Yamaha AX-300 £120	Good Average	A lively and dynamic performer, offering a credible if bright sound at a competitive price	30W hdph tone controls (MM)	R 50

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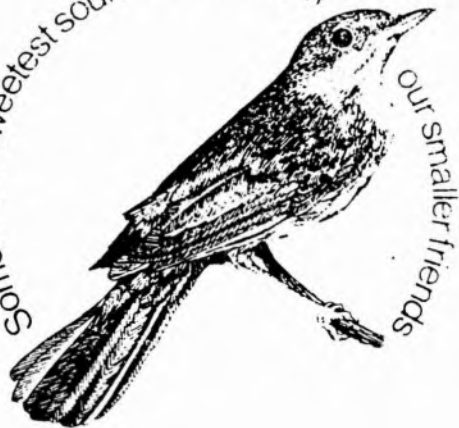
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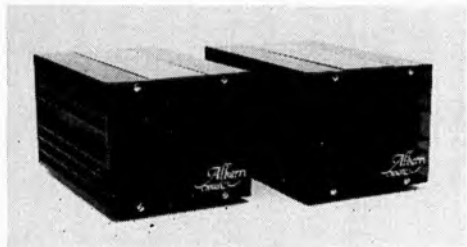


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## LOUDSPEAKERS

Last item in the hi-fi chain, to some extent the loudspeaker is merely the slave of what has gone before, capable only of reproducing a signal as good as it is fed. Nevertheless the distortions (colorations and stereo effects) introduced by loudspeakers (and rooms) tend to be more immediately obvious than those anywhere else in the chain, so careful choosing according to taste is very important.

The average loudspeaker consists of a smallish enclosure, much of which may have begun life as

part of a tree, plus a couple of drive units hidden behind a removable grille. Inside the box lurks a simple electrical circuit known as a crossover, which divides the incoming (full range) signal into the right bits for the drivers to handle. Variations on the above formula are specifically identified in the entries. The designer's primary task is to balance the sensitivity of the loudspeaker (how loud it goes for a given electrical input) against the bass

extension (how low does it go) for the given box size. After that such subtleties as coloration and

dispersion come into the equation.

Careful placement of the loudspeakers within the room is as important as the initial choice of model. For good stereo they need to be more or less the same distance from nearby walls, and preferably on similar rigid stands. The listener should be about the same distance from and listening angle to each loudspeaker. The ideal placement depends on the way a particular model has been balanced (not to mention a number of other factors), and our recommendation is given in the entries.

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	BACK ISSUE FULL REVIEW
<b>Acoustic Research 8BX</b> £100	Average Average—	Spacious and informative sound quality with bass well under control. Not that there was much bass to control	40 x 25 x 19cm shelf or 50cm stand near wall	88.5dB/W 70Hz		53
<b>Acoustic Research 22BX</b> £160	Average Average	Basically well-engineered with sound "nicely out of the box". Some of our "ears" were less enthusiastic	47 x 29 x 22cm shelf or 50cm stand near wall	89.5dB/W 55Hz	R	53
<b>Acoustic Research 35BX</b> £250	Average Average—	This is quite loud, with some boom and fizz, making it suitable for supine strummers of imaginary guitars perhaps	58 x 26 x 27cm free space on 40cm stands	91.5dB/W 55Hz		53
<b>Apogee Scintilla</b> £4950	Good Very Good	These take-me-to-your-leader speakers gave exceptional transparency and can achieve excellent results in a true audiophile system	145 x 88 x 9cm free space on floor	79dB/W 20Hz	R	46/Coll
<b>A&amp;R Arcam Three</b> £150	Average+ Average—	Arcam's baby speaker did not delight our listeners, but it might do better in less expensive systems	34 x 18 x 23cm close to wall at head height	88.5dB/W 95Hz		53
<b>A&amp;R Arcam Two</b> £250	Good Average	Most things to most men this compact is unlikely to disappoint with its lively "bally" character though lacking weight... a bit	38 x 23 x 28cm near wall shelf or 40cm stands	88dB/W 55Hz		53
<b>A&amp;R Arcam One</b> £349.90	Good Average+	Some boxiness in the midrange and fizz in the upper treble prevented this from getting the "R" tag	47 x 27 x 33cm open stands, free space	88dB/W 55Hz		46
<b>Audiostatic ES200</b> £1495	Average Average+	Sounding forward and unbalanced with limited bass power, these excelled in transparency and detail, and might suit some tastes	150 x 53 x 23cm low (10cm) stands away from wall	79dB/W 45Hz		46
<b>Audiostatic ES300</b> £1995	Average+ Good	Marred by similar problems to its cheaper ES200 stablemate, this line source electrostatic was superb in the upper-mid and treble but lumpy in the bass	44 x 5 x 93cm free standing	82.5dB/W 30Hz		46
<b>Avance 120</b> £279	Average+ Average+	This unusual "after eighties" looking speaker has the recipe for success, but not quite the right seasoning yet	42 x 30 x 30cm 30cm from wall on 40cm stands	86.5dB/W 60Hz		53
<b>B&amp;W DM100 (I)</b> £100	Good+ Average	This market leader has recently been 'improved' - though the original was good enough	37 x 22 x 22cm open stands near wall	89dB/W 75Hz	BB*	46
<b>B&amp;W DM110 (I)</b> £140	Good+ Average+	Another established favourite, it has recently been 'improved', but not yet checked by us	49 x 26 x 25cm open stands	89.5dB/W 56Hz	BB*	46
<b>B&amp;W LM1 Mk II</b> £199	Average+ Average	Probably one of the best 'micros' ever made, worth considering for special applications (boats or vehicles). Upgraded since our review	24 x 15.5 x 20cm shelf or flush mount	86.5dB/W 80Hz	*	31
<b>B&amp;W Matrix 1E</b> £595	Very Good Good+	There was enthusiastic and consistent praise for these speakers with their "revealing and seductive" midrange	41 x 23 x 32cm free space on 35cm stands	85.5dB/W 50Hz	R	53
<b>BBC LS3/5A</b> £164	Good+ Average+	As a working tool it does its job but as a piece of value engineering this old-timer is beginning to look a bit grey-haired	30 x 18.5 x 16cm open stands, free space	81.5dB/W 57Hz	R	Coll
<b>Boston A4011</b> £110	Average Average—	Competent performance for size and price but below average relative to the UK competition	34 x 21 x 20cm on stands near wall	88.5dB/W 63Hz		41
<b>Castle Clyde</b> £112	Average+ Average	A tidy little performer packing punch, but beginning to show its age in the light of new competition	37 x 21.5 x 22cm open space on stands	89.5dB/W 64Hz	R	46
<b>Castle Durham</b> £179	Average+ Average	Listening results were encouraging, well engineered and finished, but lean on treble and a bit weak on bass, still recommended	41 x 21.5 x 25cm near rear wall	89dB/W 67Hz	R	46
<b>Castle Pembroke</b> £269	Good Average+	Comfortably recommended, a sweet smooth sound with good overall balance of engineering-based performance	55 x 37.5 x 30.5cm open space on stands	88dB/W 46Hz	R	31
<b>Celestion DL 4 (II)</b> £109	Average+ Average	Strong stereo and controlled bass gave BB status, 'shrill' top end only real criticism. (Now in untested Mk II form)	38 x 21 x 23cm stands near wall	89dB/W 85Hz	BB*	46
<b>Celestion DL 6 (II)</b> £139	Average Average+	The control and power sets it well apart from the run-of-the-mill. It has since been updated	45 x 25 x 25cm open space on stands	88.5dB/W 60Hz	R*	46
<b>Celestion DL 8 (II)</b> £199	Good Good	An easy speaker to live with that will not 'close up' when driven loud. (Also updated since our review)	50 x 28 x 27cm on stands open space	88dB/W 55Hz	BB*	46
<b>Celestion SL 6S</b> £350	Good Good+	A luxury compact speaker that gives a sweet treble sound with fine musical detail	37.5 x 20 x 27cm free space on 40cm stands	84dB/W 50Hz	R	46
<b>Celestion SL 600</b> £700	Good Good++	Clearly an exceptional device in terms of design and transparent sound quality. An audiophile miniature	37 x 20 x 25.5cm open space on stands	83dB/W 55Hz	R	46
<b>Celestion 6000</b> £1470	Very Good Very Good	A genuine fullrange audiophile quality speaker system - with Star Wars styling to suit a high tech environment	Complex, on floor in free space	82.5dB/W	R	Coll
<b>Gale 301</b> £259	Average Average+	Of unusual, distinctive appearance this produced a mixed response, being lively but lacking depth	44 x 23.5 x 22cm on stands quite near wall	86.5dB/W 63Hz		46
<b>Gale GS402</b> £599	Average+ Average+	Clean but rich and powerful bass, stereo focus was not a strong point, but it is worth considering	61 x 35.5 x 28cm on matching stands near wall	88dB/W 48Hz		46
<b>Goodmans Maxim Two</b> £80	Average+ Average	More wham-bam-thankyou-mam sound that imitates much bigger speakers when you let these babies yell. (A well-controlled yell)	26 x 17 x 19cm near wall on shelf or stand	86dB/W 85Hz	BB	53
<b>Goodmans Point 3</b> £90	Average+ Average—	Recommended as good value for money, but our listeners' differing opinions mean your ears should judge for themselves	47 x 25 x 20cm shelf/high stand near wall	90dB/W 80Hz	R	53
<b>Goodmans Point 7</b> £170	Average+ Average	Basically competent performance - mix and a lot of speaker for the money, but a certain lack of refinement nonetheless	69 x 33 x 26cm free space on 35cm stand	89dB/W 47Hz		53
<b>Harbeth HL Mk 4</b> £475	Good+ Good+	Recommended for the good results at its price, and only mildly criticised for heavy bass and a mild 'chestiness'	64 x 33 x 30cm free space on 46cm stand	89dB/W 40Hz	R	53
<b>Heybrook HB1</b> £169	Good Average+	No longer an over-bright character, a strikingly clear sound and fine transient performance now merits recommendation	47 x 29 x 23cm on stands near wall	88dB/W 61Hz	R	46
<b>Heybrook HB2R</b> £269	Average+ Average	Criticism of the mid and treble balance made this dynamic model less attractive on listening test than was hoped	41 x 23 x 23cm on stands, tilted, near wall	88dB/W 61Hz		46
<b>Infinity Reference Standard IIB</b> £3850	Average+ Good+	Sonically easy to live with, these had areas of truly great performance, but were complicated by many controls	160 x 57 x 30cm free space on low stands	90dB/W 25Hz	R	46/Coll
<b>JBL TLX-3 CI</b> £130	Average Average—	Lively and punchy but also untidy this little speaker may have deviated from the Hi-Fi standard but cannot be summarily dismissed	38 x 25.5 x 22cm free space on stands	87dB/W 55Hz		46
<b>JBL L 60T</b> £370	Good+ Good	Well balanced and offering realistic value for money, the fine treble and extended bass make it suitable for larger rooms	78 x 30.5 x 26.5cm low stands or floor	88dB/W 40Hz	R	46

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## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	BACK ISSUE FULL REVIEW
JBL 18Ti £559	Good+ Good	Beautifully engineered, well finished miniature with many good points, but unexceptional overall. Try the cheaper L20T	34 x 24 x 22.5cm 50cm from wall on rigid stands	85.5dB/W 53Hz		46
JBL 250Ti £3300	Good+ Good+	In general this speaker did not show the required level of dynamic presentation transparency and stereo depth expected of a pricey flagship model	132 x 57 x 36cm free space on floor	89dB/W 53Hz		46
JPW AP2 £145	Good Average+	Few grounds for criticism but purchasers should check out the treble qualities to avoid hammering the ear anvils	46 x 26 x 25cm 40cm from wall on 45cm stands	89dB/W 65Hz	BB	53
JPW AP3 £210	Good Average+	Pretty good stereo and well balanced overall it had its own character which is well suited to vinyl replay	52 x 25 x 29.5cm near wall on stands	90dB/W 57Hz	R	46
JWS Quintet £100	Poor Poor	Poor stereo focus with up to 3dB channel difference, coloration, boom, "sting" and the grille rattled. Oh dear	46 x 19 x 19cm close to wall head height	86dB/W 55Hz		53
KEF C10 £94	Good Average-	Listening panelists gave this a poor reception	30 x 20.5 x 17.5cm stand near wall	87.5dB/W 75Hz		46
KEF C40 £209	Average+ Average-	Criticisms were made of a lack of fine detail and loss of depth and transparency, but it could handle power well	65 x 24.5 x 26.5cm free space on stands	90dB/W 55Hz		46
KEF 103/3 £630	Good+ Good	Technically impressive, excellent bass/power handling for size, but not for the audiophile system. Better among cheaper components, and good in a large room	56 x 27 x 30cm supplied stands free space	90-95dB/W 35Hz		53
KEF 104/2 (inc KUBE equaliser) £800 (£900)	Very Good Good++	A reference point for dynamics, preferred without KUBE, suited to many rooms Good stereo, high sound levels	90 x 28 x 41.5cm floor standing in free space	92dB/W 50Hz	R	53
KEF 107 £1890	Very Good Good+	A welcome sense of ease and lack of strain at most normal levels. Minor criticisms included a dulling in the extreme treble. Excellent bass extension	116.5 x 33 x 45cm on floor in free space	87.5dB/W 20Hz	R	Coll
Linn Kan £271.95	Average- Average-	The acid test of "blind listening" may dissolve the Kan's high status with strong criticism, but the answer, as always, is: "suck it and see"	30.5 x 19 x 16.5cm back to rear wall on rigid stands	85dB/W 90Hz		41
Linn Isobarik £1568	Good Good++	Exceptional capabilities in the dynamic range and bass performance; demands serious consideration as a state of the art contender, but odd stereo	76 x 33 x 41.5cm low stands against rear wall		R	Coll II
Magneplanar SMGa £697	Average- Average	Tonally "rich", in the right room it proved a satisfactory musical experience	122 x 48 x 4.5cm on floor clear of wall	85dB/W 56Hz		46
Magneplanar MG11a £2750	Good Very Good	Another excellent true-audiophile loudspeaker this American panel speaker helps to convey much of the original character of the music	180 x 62 x 38cm well clear of walls	84-86dB/W 35Hz		46
Marantz LD20 DMS £130	Average Average	Recommended more for CD users than vinyl keepers, soundly engineered and built but should be heard before bought	36 x 23 x 24cm free space on 45cm stands	86.5dB/W 55Hz		53
Meridian M30 £725	Average+ Average	Pricy but easy on the ears and worth considering especially where space is at a premium	38.5 x 18 x 32cm free space on stands	Active 40Hz		46
Mission 70 II £100	Good Average	Lively and transparent, the 70 II was favoured for its speed, though the sound had a mildly 'thin' tonal balance	35 x 21 x 21cm on stands or shelf near wall	89dB/W 68Hz	BB	46
Mission 700LE £130	Good Average	Mission re-submitted this popular model and again got a positive review - which proclaims their (and our) consistency	38 x 21 x 21cm straight ahead stand near wall	89dB/W 66Hz	R	53
Mission 737 £240	Average+ Average	To its credit the 737 was generally articulate and well integrated but stereo was poor and it could sound loud and hard	54 x 25 x 27.5cm low stands near wall	89.5dB/W 58Hz		46
Mission Argonaut £700	Good Good	Perhaps not the most subtle or sweet these were recommended for their excitement, drama, power handling and ... good looks	95 x 23 x 31cm floor-standing near wall	91dB/W 40Hz	R	53
Monitor Audio R100 £130	Average+ Average-	Tonally quite neutral, but with small box character, negligible low bass and a rather 'hard' midrange	40.5 x 25 x 21cm free space on stands	87.5dB/W 70Hz		46
Monitor Audio R252 £150	Average+ Average	Rating well for its price this model displayed a rather rough top end and a generally dry character helped by good detail and focus	47 x 25 x 24cm stands quite near rear wall	89dB/W 62Hz	R	46
Monitor Audio R352 £250	Good Average	Well-built and finished, 'sensitive' speaker which is easy to drive and capable of extracting good results from any good amplifier	64 x 25 x 32cm on stands in free space	90dB/W 50Hz	R	46
Monitor Audio R700 MD £269	Average+ Average+	Lively and involving with good, punchy, if rolled off bass. The metal dome speaker gives a clean and open treble	32 x 21.5 x 25cm on stands 0.4m from wall	87.5dB/W 62Hz	R	46
Monitor Audio R352MD £280	Good Average+	Better suited to CD than vinyl perhaps, this is clearly good value for money. But some found it coarse while others praised its cleanliness	64 x 25 x 32cm 25cm stands in free space	89dB/W 42Hz	R	53
Monitor Audio R652 MD £369	Average Average+	Mild bass and crossover weaknesses were criticised, but the sound was quite well liked and it is decently built	51 x 20 x 26cm free space on 40cm stands	86.5dB/W 45Hz		53
Mordaunt Short MS10 II £90	Average Average-	One of the best miniatures around. A borderline Best Buy because of the bass limitations, which may depend on your taste	29 x 20 x 17cm wall bracket	86dB/W 75Hz	BB	53
Mordaunt Short MS100 £179	Average+ Average+	A mid 'forward' tonal balance is main drawback but other aspects such as ambience, transparency and stereo depth compensate	32.5 x 22.5 x 21.5cm stands near wall	85dB/W 80Hz	R	46
Mordaunt Short 45Ti £220	Good Average	A sensitive tandem-bass number that can be driven loud but loses its balance a bit and can be unsubtle	63 x 26 x 30cm low (20cm) stand near wall	90.5dB/W 52Hz		53
Mordaunt Short MS300 £309	Average+ Average+	Not considered particularly competitive in its class, though it has good power handling and stereo focus	54 x 22.5 x 25cm on stands near wall	89dB/W 65Hz		46
Mordaunt Short 442 £1150	Good+ Good++	A resounding success with the listening panels. Make sure your room can accommodate the bass	95 x 26 x 38cm floor standing in free space	87.5dB/W 40Hz	R	53
Quad ESL-63 £1458	Good+ Good++	With its unusual but subtle characteristics this classic electrostatic may not be punchy in the bass, but has strengths that some cannot live without	92 x 66 x 27cm open stand well clear of wall	84dB/W 34Hz	R	46
Rogers LS2 £170	Good Average+	A coherent and polite speaker considered more suited to classical music. Tonally well balanced, neutral and with good power handling	36 x 23 x 22cm on stands near wall	86.5dB/W 51Hz	R	46
Rogers LS6 £240	Good+ Good	Sonically fitting in between the LS2 and 7, the 6 was a consistent success on audition - well balanced with an open and informative nature	51 x 27 x 28cm open stands, free space	87.5dB/W 50Hz	BB	46
Rogers LS7t £360	Good+ Good+	A fine combination of classic qualities at reasonable price produces the "R" tag, but try to get a pair home on approval to check for bass 'heaviness'	56 x 27 x 28cm free space on 40cm stands	88.5dB/W 48Hz	R	53
Roksan Darius £1150	Average Wrong but interesting	A controversial speaker which when set up right can deliver impressive performance, but with a far from neutral balance	98 x 31 x 51cm integral stands near side walls	88dB/W 50Hz		53
Rotel RL850 II £120	Average+ Average	Strongly recommended. Well-balanced, clear, with decent focus and fine stereo, but tendency to 'heaviness' needs decent stands and space	44 x 25 x 24cm free space on 40cm stands	86.5dB/W 50Hz	BB	53
Royd A711 £99	Average+ Average	Lively clear sound; good upper bass and dynamics, but treble "ramp" made vocals sound shut in. Try before you buy	31 x 20 x 17cm shelf or 50cm stands near wall	86dB/W 75Hz		53
Royd A25 £100	Average+ Average-	Receiving mixed reactions on audition, the A25 is flawed but offers a lot of speaker for the money	51 x 29.5 x 24cm, stands near wall	87dB/W 52Hz	R	46
Ruar k Broadsword £700	Average- Average-	Fancy cabinetwork is no real compensation for technical weaknesses which led to three mentions of "suckout" in our review	43 x 23 x 28cm free space on 40cm stands	82dB/W 43Hz		53
Sony APM10ES £100	- Average	An obvious Best Buy at its highly competitive price point, it can do justice to a good hi-fi system of Sony or specialist origins	40 x 25 x 20cm, 40cm stands 40cm from wall	87dB/W 55Hz	BB	53
Sony APM 20ES Mk II £150	Very Good Average+	A smooth integrated sound with little to criticise at the price. If anything, a little bass forward, but remarkable nonetheless	43 x 25 x 29cm, free space, stand	86dB/W 50Hz	BB	46

# DIRECTORY

## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	BACK ISSUE FULL REVIEW
Sony APM22ES £249	Good+ Average+	Sounding notably clear, the 22ES scored well on listening tests was easy to drive and achieved high sound levels	51.5 x 29 x 30cm free space on 40cm stands	88.5dB/W 46Hz	R	46
Spendor Prelude II £320	Good+ Good	Good clarity and detail were evident everywhere in this speaker. Though a little boxy or muddy in the midrange it is strongly Recommended	50 x 26 x 28cm open stands in free space	88dB/W 52Hz	R*	46
Spendor SP2 £420	Very Good Good+	Conceding little to the SP1, this 30 litre model displayed good tonal balance with a highly articulate midrange, only slightly marred at frequency extremes	50 x 25 x 30cm free space, stands	87dB/W 45Hz	R	46/Coll
Spendor SP1 £640	Very Good Good	A very subtle and musical performer that works particularly well with digital material. An exceptional allrounder	63.5 x 29.5 x 30.5cm stands in open space	87dB/W 41Hz	R	46/Coll
Spendor SA3 Passive £1320	— Good+	Same as Spendor SA3 active	85 x 38 x 46cm low	89dB/W 32Hz	R	46
Spendor SA3 Active £2308	Good+ Very Good	Substantial speakers designed to deliver high sound levels and killer bass. Suited to larger rooms and power hungry ears	85 x 38 x 46cm low rigid stands in free space	89dB/W 32Hz	R	46
Spica TC-50 £595	Average+ Good	These American wedge-shaped-cabinet speakers just merit recommendation at their price and were detailed and clear	40 x 33 x 28cm free space on 50-60cm stands	85dB/W 48Hz	R	53
Tannoy Westminster £3300	n/a Good+	These awesome horn loaded speakers are remarkably controlled and impressive, if only suited to a few pockets and rooms	Huge, flat against rear wall, away from corners	96dB/W (manuf.)	R	Coll
Technics SBC 250EK £130	Average+ Average-	Despite a fairly even tonal balance, the 250EK sounded muddled in the midrange and dull in character	36.5 x 23.5 x 20.5cm free space, stands	86dB/W 60Hz		46
Technics SB-RX50 £500	Very Good Average+	With its unique coaxial drive unit the RX50 proved a smooth and well balanced loudspeaker, its minor weakness being a mildly excessive low bass	48 x 30 x 26cm free space on 40cm stands	86dB/W 40Hz	R	46
Wharfedale 504 £129	Average+ Average	Acquitting itself well on audition, the 504 produced a clear, reasonably balanced sound with above average treble	21 x 18.5 x 20cm stands, near wall	85dB/W 75Hz	R	46
Wharfedale Delta 50 £130	Average+ Average-	Given the price this was a mild disappointment - there is nothing obviously wrong but it just seemed a bit mundane	48 x 27 x 19cm near wall on 40cm stands	88dB/W 55Hz		53
Wharfedale Super Diamond £140	Average Average-	Although there are improvements on the basic "legendary" model, listening panelists did not get airborne about this upgrade	24 x 19 x 19cm close to wall at head height	88dB/W 57Hz		53
Yamaha NS 1000M £900	Good Good+	Living up to its monitor label, and tonally well suited to digital material, the NS 1000M is superbly crafted and capable of high levels	67.5 x 37.5 x 32.5cm 30cm from wall, stands	90dB/W 40Hz	R	46

\* rating refers to original, tested model.

## 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 - see **Comments**.)

There is no problem in connecting a cassette deck to any normal amplifier, but some care needs

to be taken in choosing the best tapes for a specific machine. (Trial and error is one effective technique, but many decks have manual bias adjustment and some match up to the tape automatically.) Lab performance and sound quality often go hand in hand, and are frequently somewhat dependant upon factory alignment. The mechanical integrity of the mechanism itself is another crucial factor, that is often reflected in the asking price.

All modern hi-fi decks have Dolby B and the majority have Dolby C besides; the very worthwhile HX Pro system is becoming steadily more

widespread. Remote control remains rare, though sometimes it is available as a system option. Three-head recorders allow simultaneous checking of the recording being made. Auto-reverse is a useful convenience feature, but usually with some mechanical compromise, while double-mechanism 'dubbing' decks of dubious quality are fashionable at the bottom end of the market. The welter of different 'music search' systems available is some indication of their frequent ineffectiveness.

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Aiwa AD-F260 £90	Good Poor	Well equipped conventional budget recorder measured rather better than it sounded	Dolby B, C, Bias adjust, auto tape select		52
Aiwa AD-R460 £149	Average Average-	Some worthwhile features but sound quality was not especially liked	Auto reverse, Dolby B, C, Track search, Bias adjust		52
Akai GX-6 £329	Good Good	There is a strong sense that someone has really thought this one through; it has an indefinable 'specialness'	Dolby B, C, Bias adjust, Track search	R	52
Denon DR-M07 £140	Average+ Excellent	Despite minor operational and measured shortcomings, sound quality is excellent for the price	Dolby B, C, Record bias adjust	BB	52
Denon DR-M10 £180	Good Good	With the money spent where it counts, this deck rates well at the price. A wide dynamic range and real sense of sonic consistency	Track search, Dolby B & C, Three motor	R	52
Denon DR-M12HX £220	Good Good+	Well constructed and pleasant to use: a lack of true pitch constancy kept it from sounding superb	Dolby B, C, HX Pro, Track search, Bias adjust	R	52
Denon DR-M30HX £319	Good Good+	Ergonomically fine with infra red remote, the M30 fared well on pre-recorded material and was at its best with ferric tapes	Infra Red Remote, Dolby B, C, Hx Pro, 3 Head, bias adjust	R	52
Denon DR-M44HX £400	Excellent Excellent	A well designed deck that also performed fine sonically, working very well with ferric and metal tapes	3 head auto tape set up, real time counter, Dolby B, C, HX Pro,	R	52
Harman Kardon TD202BL £249	Average Average	A competent middle-ranking performer but lacks sonic incisiveness and is a bit expensive	Dolby B, C, Bias adjust		52
Harman Kardon CD491 £695	Good Good+	Excellent audio engineering and tremendous flexibility make this an audiophile cassette deck 'par excellence'	Dolby B, C, MPX Bias/Sensitivity adjust, Track search	R	52
Hitachi D-007 £300	Average- Poor	This double 'dubbing' deck proved a mixed bag - good in parts but disappointing overall	Continuous auto reverse, twin deck, Dolby B & C, dubbing, High Speed		52
JVC TD-X202 £130	Average Average	A bit of a mixed bag, with rather basic controls and an unimpressive sound quality	Dolby B & C		52
JVC TD-X502 £250	Average- Average	Inconsistent sound quality and lab performance, alongside complex ergonomics and elaborate search facilities	Dolby B & C, Music Search, Intro Scan, Remote Option		52
JVC TD-V66 £350	Average Average	A user-friendly modern player marred by a 'lazy' undynamic sonic character	Auto Tape Sel., Track Search, Dolby B & C		52
Kenwood KX550HX £150	Average Average+	This well-laid-out and attractive deck ultimately lacks the edge to stand out in a competitive field	Dolby B & C, HX Pro, Auto tape select, Track search		52
Luxman K-100 £199	Average+ Average+	Poorly laid out but it fared quite well on metal tapes. Commercially recorded tapes sounded bright and cramped, however	Dolby B & C		52
Luxman K-105 £349	Average Average	Rating quite well for an auto reverse deck, and featuring complex track search facilities, it was not sonically competitive on price	Auto Rev, Dolby B & C, Auto Tape Sel.		52
Marantz SD-35 £160	Good Good+	Rock steady tape transport gives very competitive sound quality for the price. Based on rock steady tape transport, this slightly bright replay may not appeal to some	Auto Select, Dolby B & C	BB	52
Marantz SD-4511 £200	Good+ Good+	Well built and dynamic sounding player, working better as a recorder than with musicassettes	Dolby B & C, Separate MPX, Auto selection	R	52

# DIRECTORY

## CASSETTE DECKS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Marantz CP230 £250	Average Average	This is a competitively priced portable recorder though not suited to replay of musicassettes	Dolby B, Bias adjust, Pitch control, Portable	R	52
Nakamichi BX-125E £395	Good Good	This well engineered budget Nakamichi fared very well on all but pre-recorded material. Fundamentally very, very right	Dolby B & C	R	52
Nakamichi BX300E £645	Good Good	Playback of tapes made on the machine is excellent, sounding quite unlike a cassette deck. Musicassettes were not so hot	Optional Remote, B & C	R	52
Nakamichi CR-7E £1500	Excellent Excellent	Remarkably this deck is not only ergonomically but also sonically superior to the Dragon, particularly on record/replay	B & C, Auto Tape Type, 3 Head, Infra Red Remote	R	52
Nakamichi Dragon £1750	Excellent Excellent	Previous to the birth of the CR-7E, this machine stood head and shoulders above the rest. It is still the ultimate for musicassette replay	Dolby B & C, Auto Azimuth Correction, Manual EQ and Bias, Auto Reverse		52
Onkyo TA 2130 £140	Average+ Average+	Rating fairly well on both pre-recorded and record/playback, ergonomics were a little poor but overall performance was generally consistent	B & C, Auto Tape Select, Intro Scan	R	52
Revox B215 £1461	Good Average+	Superb engineering and good sound, but lacking the subjective qualities that characterise the very best hi-fi equipment	Dolby B, C, Remote control, Headphones		52
Rotel RD-830 £99	Average- Poor	A pretty fundamental if slightly dated design with little sonic merit but an attractive enough price	Dolby B		52
SAE C102 £495	Average+ Good	Looking most unlike a cassette deck designed in the States and proving competitive in its price group. Not sonically that outstanding, however	Auto repeat, Track Skip, Real Time Counter, B & C, Auto Select	R	52
Sony TC-FX 150 £90	Average+ Average+	Recording and playing back on this deck itself gave acceptable results, whereas pre-recorded stuff was a joke. But it's a good £90 worth	Dolby B & C	BB	52
Sony (WMD6C) ProWalkman £249	Good+ Excellent	"One of the finest sounding cassette decks on the market today. A mandatory Best Buy, which also fits in your pocket"	Dolby B, C, Portable, Mic/Headphones	BB	52
Sony TC-R502ES £279	Average+ Good	The deck sounded crisp, alive and gave quite good stereo and tonal quality. Wide dynamic range material can be handled with ease	Auto reverse, Dolby B & C, HX Pro, Remote control, Bias adjust	R	52
Sony TC-K444E SII £349	Good Average	Even the best this deck has to offer is not truly commensurate with the price	Dolby B, C, Memory stop and replay, Headphones		52
Sony TC-K700ES £499	Excellent Excellent	Firmly in the esoteric league, this is easy both to operate and to listen to. Best points: first class imagery, focus and stability	Dolby B, C, Auto tape select, Memory/auto play, Bias/sensitivity adjust	R	52
Teac V-200 £80	Average- Average+	At this price you don't get fireworks, but it offers real value for money and sounds open and honest	Dolby B	R	52
Teac V-210C £99	Poor Poor	It could have been our sample but we found inadequate speed stability and a 'messy' sound	Dolby B, C, Bias adjust		52
Teac W300 £115	Poor Average-	Sonically a mixed blessing, it does well with pre-recorded tapes but home-made recordings sound a little rough	Twin-deck high speed dubbing, Dolby B		52
Teac W-310C £129	Average- Average-	Dubbing performance is poor, especially using the high speed mode but normal record and replay performance standards are not too bad	Dolby B, C, Twin transports, bias adjust		52
Technics RS-B305 £140	Good+ Excellent	Well built and offering excellent sound quality at the price, working well with metal tapes if not so hot on pre-recorded material	Dolby B & C, dbx	BB	52
Technics RS-T22 £150	Excellent Average	Good value for a twin deck machine, and fairly simple to use, but sonically no competition for single transport machines	Twin, Dolby B & C High Speed Dub.		52
Technics RS-B705 £250	Average Average-	3 heads: for the price of two, but not the sound quality to go with them	3 head, Dolby B & C & HX Pro		52
Technics RS-T80R £400	Poor Poor	Flexible and pleasant to use but poor transports led to poor sound on our latest sample	Twin Deck Auto Rev, High Speed Dub, Auto Tape select, B & C & DBX		52
Yamaha KX-200 £140	Good- Good	Cheap, well-equipped and workmanlike with the sound quality less obviously processed than most - the whole is more than the sum of the parts	Dolby B, C, Headphones, Track search/scan, Optional remote	BB	52
Yamaha K-340 £160	Average Average	This deck doesn't make the grade on the grounds of poor speed stability, and an unwelcome degree of record level dependency	Dolby B, C, HX Pro, Auto search/scan, Optional remote control		52
Yamaha K222 £200	Poor Poor	Beautifully made, but it makes little sense in purist audio terms	High speed dubbing twin deck, Dolby B, C, Auto search, Track sensing		52
Yamaha KX-400 £200	Good Good+	A highly commercial package with every widget under the sun. Happily it sounds good too.	Auto reverse, Dolby B, C, Hx pro, Track search/repeat remote control	R	52
Yamaha K-540 £210	Average Average	Satisfactory but not especially satisfying, and also a bit gimmicky, it failed to match its brothers' good-performance-at-the-price ratings	Auto search/repeat, Dolby B, C, HX Pro, Bias adjust, Remote		52
Yamaha KX-1200 £500	Excellent Average+	A veritable rats' nest of buttons and dials, albeit well laid-out. This is nearly a great recorder, but lacks simplicity of sound	Dolby B, C, HX Pro, Bias adjust, Auto search/repeat, Remote, headphones		52

## TUNERS

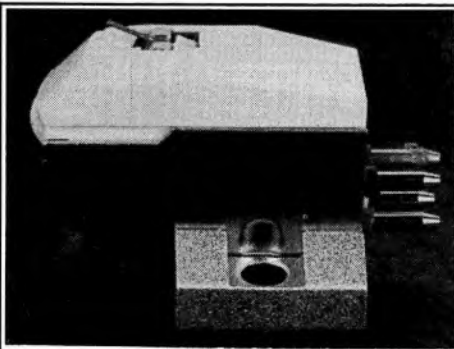
The radio medium operates at a much lower profile than TV, but in areas outside pop music the BBC service is the envy of the world. Live Prom concerts can rival all other sources from a hi-fi perspective. Only the FM (VHF) bands give stereo hi-fi sound, though AM (MW & LW) are useful for receiving certain transmissions in the UK.

Something of a hi-fi afterthought, tuners are

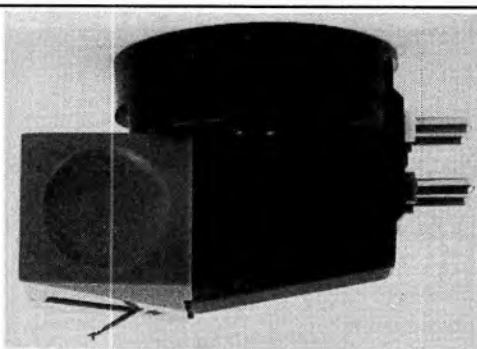
often selected merely to match a chosen amplifier cosmetically. However, the task they carry out is far from simple (or cheap), combining the skills of RF (reception) and audio (signal processing) engineering. The importance of the former will depend on local reception conditions, but money invested in a high quality outside aerial system is usually well spent.

Tuners come in two basic types. Analogue models tune gradually (and usually manually) across the bands, and can have analogue or digital displays; they are often preferred for sound quality, and are certainly best for AM bands. Digital tuners offer convenient automatic tune facilities and hold many station positions in pre-set memories.

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
A&R Arcam Alpha £149	Good Average++	Attractively classic British analogue tuner with sound quality comfortably better than most	FM/AM Analogue	BB	50
Creek CAS3140 £150	Very Good Good+	A true front-rank tuner, excellent ergonomics and audiophile sound quality albeit with the minor handicap of having FM only	FM only	BB	50
Denon TU 45L £130	Average+ Average+	Poor AM sound quality may be a deterrent but the FM performance fully merits recommendation	FM/AM Digital	R	50
Harman Kardon TU915 £325	Good Good	This gave good FM performance but was thought "wretched" on AM. (Psst... you don't necessarily buy a tuner for the AM.)	FM/AM 16 presets auto seek		50
Hitachi FT5500 II £250	Very Good Good+	Soundwise highly rated on FM, and on AM basically satisfactory - a versatile all-rounder	Auto and manual tuning, 16 presets	R	44
Mission Cyrus £180	Average Good+	Best Buy material on sound quality but radio frequency performance let it down	FM/AM auto seek tuning	R	50
NAD 4020B £139	Good Average+	Not the quietest or most sensitive tuner tested, it still provided good sound for the money, being "musical and ambient"	Analogue FM/AM	BB	50



AT-F5/OCC



NAGAOKA MP10 SB



GOLDRING 10-10

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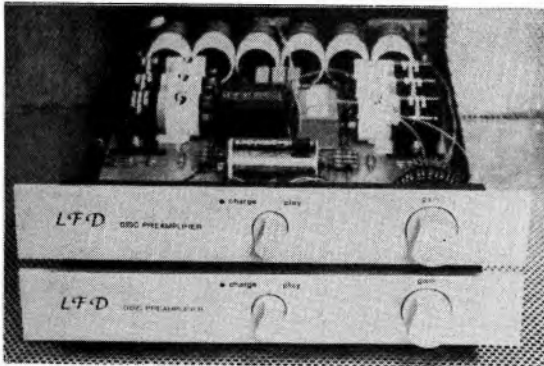
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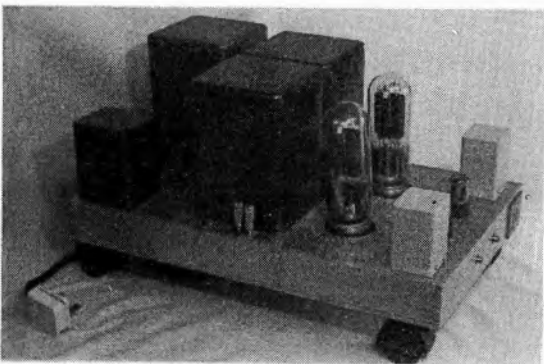


## Not for the sheep.....



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Here at Abbott Audio we pride ourselves in choosing products at our discretion. Never stocking a product simply because of a good review. We let our ears decide. Likewise we believe that you the customer must be the final judge. Whilst offering good, honest, friendly advice and guidance we will never push you into a product simply because we like it. Feel free to disagree.

Two products we do wholeheartedly recommend (for those of an open mind and uncompromising standards) and for which we are UK distributors, are the LFD Pre amp and 'Air' amplifiers. Both are hand crafted units of exceptional sonic merit built by craftsmen who really care and constructed with the finest components available.

The LFD is the latest NO COMPROMISE design from Dr. Malcolm Hawksford and the Essex design team. The pre amplifier is dedicated to vinyl disc reproduction, no other source is selectable. Features include dual mono construction, full 'STAR' grounding, LC, PTFE single strand wiring, high quality switched attenuators, and a sophisticated power supply management system. We think you will agree with us when you hear this amazing product that the UK is firmly back in control when it comes to state of the art pre amplifier design. Retail price is £3695.

Complementing the LFD products and offering the same unequalled quality are the 'Air' valve, and mosfet power amplifiers. Top of the range is the Air 2:11, a single ended class A design. The unit is built like a battleship, hand



constructed throughout featuring hand wound transformers and the Western Electric 2:11 valve. Power out is 16 watts per channel and in the valve tradition this goes very loud indeed, coupled with the most breathtaking transparency. Units are competitively priced at £4500.

Please phone for a weekend or evening demonstration or to take advantage of our NATIONWIDE demonstration service.

Our range includes: YBA, Kiseki, Vecteur, Stad, Audlostatic, Beard, Decca, Odyssey, Jecklin, Glanz, Pawel, Nuance, Omega-Point, Audio Innovations, Audio note, Gryphon, Milltek, Phono Amplifier, Plenitude, Quicksilver, Souther, Snell, SAE, Voyd, Albany.

**Abbott Audio**

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# DIRECTORY

## TUNERS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACKISSUE FULL REVIEW
Naim NAT 01 £1098	Very Good Very Good	There may be better sounding tuners in the world, but we have yet to hear one	No presets. Two box, flywheel tuning FM only, Analogue	R	50
Quad FM4 £289	Very Good Good+	Fine sound, excellent ease of use, good build and finish and a more than satisfactory technical performance	7 presets. Digital	R	50
Revox B261 £1174	Excellent Good+	A sophisticated and well-executed example of modern broadcast design; could be the logical choice for the deep-pocketed radio enthusiast	FM only, twin headphones. 20 presets	R	50
Rotel RT-850L £150	Good+ Good+	Scoring well on listening tests and one of the best sounding tuners at its price level, it was a bit let down on AM but RF performance was good	FM/AM, digital	BB	50
Sansui TU-D99XL £249	Very Good Good+	This slimline compact model gave good FM sound quality and strong RF performance. But the AM sounded unpleasant	FM/AM, 16 presets	R	50
Sony ST-S 700ES £299	Very Good Very Good	First class in every respect including FM sound quality. Even AM was well above average	FM/AM, 10 presets, digital scan	BB	50
Technics ST-500L £100	Average+ Average+	Fine RF performance and fair FM sound at bargain price = Recommended tag. Alas the AM sounded as if it was coming "down a long furry tunnel"	FM/AM 16 station presets, scan	R	50
Technics ST-G7 £400	Very Good Good+	Muffled AM, but fine stereo FM quality and well built	16 presets, digital	R	50
Yamaha TX-500 £150	Average+ Average	Under a gaudy coat, this sensitive tuner gave reasonable stereo results. However, the AM had again been thrown down a well	20 presets (10 buttons) digital		50

## CD PLAYERS

This new all-digital music source seems set fair to becoming properly established, despite still high disc prices and the opposition of many hi-fi enthusiasts. Compact Disc's strengths over conventional vinyl are complete freedom from surface noise with automatic and programmable play, plus track skip and fast music scan – frequently under full remote control. However, many

vinyl enthusiasts find CD's sound less involving than top quality vinyl replay.

Introduced five years ago at around £500, CD players now average half that price, and for the main offer improved performance besides. Even cheaper players may have the latest decoding chips and the most useful play features; extra money can buy remote control, audio 'tweaks', plus improved build

and component quality control.

Compared with many hi-fi components, CD players give impressive lab performance, though there are differences between players nonetheless. **Sound quality** variations are even more marked, particularly in a good quality system. As it behaves very like a pre-amp, there are no problems connecting a player to a normal amplifier.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACKISSUE FULL REVIEW
Acoustic Research CD-04 £290	Good Average+	Stylish but basic player, based on Philips 14-bit 4 x oversampling with respectable sound tweaks and remote control	Remote Control, headphones	R	51
ADC CD-250X £230	Good+ Average	Well made and engineered, and above average soundwise; trumpets could sound 'thin' though violins were liked so it may prefer Stephan Grappelli to Miles Davis	Skip and search, manual, repeat and 16-track programming	R	53
Aiwa DX-500 £179	Average— Average—	Adequate build quality and reasonable features, but this unit did not do very well in the lab and was sonically a disappointing experience	No remote control or headphone socket, but scan, skip, search etc		53
Akai CD-A70 £299	Average Average	A full feature 16 bit 2 x oversampling remote control player with fine presentation and finish and a pleasantly laid back sound quality	Full width rapid access, keypad programming, remote control		51
Cambridge Audio C01 £1500	Good+ Excellent	Advanced design and circuitry give this top class two-box machine exceptional performance, so the intrinsic qualities of CD, (eg. silent surfaces), make themselves felt	No headphones, seven audio filters, skip and scan	R	Coll
Denon DCD 300 £210	Average+ Average+	Unspectacular all round competence with remote control can't be bad at the price	Skip, remote control, headphones	BB	51
Denon DC-500 £250	Average+ Average	Pleasant and lively, offering a fine combination of sound and build quality at a realistic price	Headphones, search, skip	R	51
Denon DCD 700 £290	Average++ Average+	Sound quality is pretty good at the price, and facilities adequate. A competent middle ranking deck at close to budget cost	Remote control, scan, skip, search, programming, headphones	BB	51
Denon DCD-900 £330	Average++ Average+	Decent sound and build quality and comprehensive facilities. A good but unexceptional performer	Keypad programme, search, skip, headphones, remote control	R	51
Denon DCD 1500 £480	Good Good	Rated well with a neutral and dynamic sound though a little forward in character. Good facilities and construction	Fast track skip, keypad programming, timer, remote control, headphones		51
Denon DCD 1700 £599	Good+ Good++	The overall sound was strong and coherent approaching reference standards. Fine build quality and facilities make this a firm contender	Remote, skip, scan, headphones, programmable	R	51
Denon DCD-3300 £1200	Good++ Good++	Sounding tight and coherent though not significantly better than the cheaper 1700. Very well built and comprehensively equipped	Remote control, with volume, keypad programme, scan, search, headphones		51 51
Ferguson CD-04 £149	Average+ Average	Could well provide an answer for those appalled by the complexities of many CD players, who seek a low cost, good quality, simple performer	Track skipping, nine track memory	BB	51
Goodmans GCD-500S £160	Average— Average—	User-friendly but flimsy build quality and second class sonics make this poor value even at the price	Audible scan and track skip, programming		51/45
Harman Kardon HD100 £399	Average Average—	With a mixed subjective performance this well built player failed to make the grade in its price class	Skip and scan, programmable		51
Hitachi DA-7000 £180	Good Average	Generally competent, especially considering the price, this was well built and styled if lacking in some facilities – a good budget starter	Memory and repeat, plus the basics	BB	53
Hitachi DA007 £330	Average Average	Unusually fitted with wooden end cheeks and comprehensively kitted out, but only average in sound quality	Full remote control, adjustable headphone output keypad programming		51
JVC XL-M700 £599	Average Average+	An autochanging, twin drawer player offering fair sound quality and the possibility of endless play!	Auto changer, full remote control, random play, intro scan repeat		51
JVC XL-V1100 £659	Average+ Average+	A substantial and very well built flagship model with 16 bit 4 x oversampling, though sound quality was disappointing at the price	Full remote, headphones, scan, skip, intro-scan		51
Kenwood DP990D £299	Average+ Average	A good all-round package, just deserving recommendation, but comparable sound quality can be found more cheaply elsewhere	Headphones, remote control, (manual override)	R	51
Luxman D-100 £449	Average Average—	Sparsely equipped with a slightly old fashioned sonic character, offering little but physical weight for a quite high price	Remote control, skip, scan, headphones (variable)		51
Marantz CD273 £199	Good Good	An ambitious machine at the price, offering pretty good sound quality but a slightly below average build standard	Skip, scan, programmable	BB	51
Marantz CD873 £240	Good Good++	Putting many 'audiophile CD's to shame in terms of sound quality this proved another winner, though there was slight criticism of control accessibility at times	No remote control, but the usual skip, scan etc	BB	53
Marantz CD-273SE £240	Good+ Good+	The Euro-tweaked version of the standard 273, this model fulfills pretensions to audiophile standards at a budget price	Manual control, skip and scan (audible), 20 track programming, repeat	BB	51
Marantz CD65 £250	Average+ Good	Comfortably above average sound quality, this best selling model still represents good value for money	Search and programme, manual control	BB	51
Marantz CD75 £300	Good+ Good++	It delivers a sound quality that can rival machines twice the price even though it may lack some luxury touches	Remote control, search, programmable	BB	51/Coll



## NEWSLETTER

Vol 3 No 8 – January 1988

We should open this month by greeting our many readers, friends and customers throughout the world with our best wishes for the Holiday Season and our renewed thanks for your friendship and support. We hope that your music will provide hours of pleasure over the festivities.

Our crusade for finer quality of sound will continue to innovate throughout our ninth year, and it may not be out of place to remind people that it was The Music Room who pioneered many of today's accepted practices such as the very idea of the High-end in Britain, subjective sound quality in addition to specs, separate dem-rooms off the main showroom, two year guarantees and no staff-incentives from manufacturers. We enshrined these principles when we participated in founding BADA at the meetings called some years ago at Huntingdon by the then young Mission Electronics Group.

To restate our principles, we not only concentrate on quality sound engineering in Hi-Fi as opposed to gimmicks and fashion, but we like to recommend British products which often give excellent value for money and advanced design. Today this is even more true than in 1979. To a surprising extent, we have played a role in feeding back opinions and ideas to designers in many companies, and we see this as a major function of a creative dealer. We also believe in offering a very wide range of alternatives to facilitate comparison of similar models impartially.

We prefer to win customers rather than sales, because even commercially this makes long-term sense. For example we will not automatically agree your needs (Yes Sir, you really need to replace your old speakers) and for several years held back on CD Players while they had sonic problems and were overpriced. Normally, this policy works well and leads to mutual confidence.

Professionalism means product

knowledge and an interest in your personal needs, not the ability to persuade you to buy today. And we like to communicate our findings by monthly Newsletter, which is read and trusted through many countries. Last year we introduced the annual *Festival of Sound & Vision* and its magazine, in partnership with Russ Andrews Hi-Fi and In Hi-Fi both of Edinburgh. And we began to direct-import Meitner amplifiers, so that customers could buy High-End products at the same prices as their American cousins.

This year we would like to continue to move forward. We propose two areas. Often people ask us if/how we are qualified Hi-Fi Consultants, and of course there is no formal training or qualification. We have therefore approached the University of Strathclyde with a view to establishing just that, with a long-term objective being the recognition of High-Fidelity or Audio Engineering as a profession. Hobbyists and amateurs could benefit from extra-mural classes, and professionals could qualify before entering the trade by full-time training. Secondly, we seek this year to appoint a number of part-time Consultants or checkers who will offer a service to customers to visit their homes to check, optimise and tweak Systems. This is aimed to solve the serious problem of so many Systems performing below par.

### VALVE AMPLIFIERS

As announced last month, the SP-11 Mark II has arrived and its sonic performance simply reveals the previously hidden detail, accuracy, scale and drama on records, old and new. We know that £5,150 is a huge price tag, but urge anyone who can extend himself to dare to audition it in his System. We will shortly have our Mk. I updated to a II and it will be for sale at £4,000 inc. vat. We also have a D-250, recently updated and revalued: an awesome amplifier which makes loudspeakers turn

into soundstages, and vinyl turn into live music: special once-off price of £3,995!

We recommend the amazing new SP-9, of course, at £1,695 with easy terms to our customers. But do not neglect the Conrad-Johnson PV-5 pre-amp, which the current issue of *Stereophile* actually prefers. So if you agree, you can save over £400 on an ex-dem sample at only £1,250. Current ex-dem and second-hand bargains include an SP-8 (£1,150), a Premier Four (£2,650), a Threshold S/150 (£995) and Tannoy SR-840 Mos-FET (£1,200). A regular bargain is the Croft Micro Pre-amp at the amazing price of £150!

The best solid-state designs are now musical, and less trouble in their longevity. The MEITNER PA-6 Pre-Amp at £1,695 is an alternative approach to state-of-the-art performance which has attracted a considerable following in America. The MEITNER Power-Amp at only £970 and the monoblocks (£1,895 per pair) are astonishing designs, beautifully made, and one of the very few truly capable of doing justice to anything that Apogee Acoustics care to present! An affordable driving force for these amazing loudspeakers is indeed a desirable product.

### LOUDSPEAKER BARGAINS

Most interesting this month are a pair of ProAc EBS at £1,000 per pair and a pair of Accoustat-X at only £450! The ProAcs are very expensive and highly praised overseas, so if we British overlook one of our best exports then another work of art will be lost to our shores. We are selling many of our Infinity demonstrators complete with the odd scratch or dent, but with very tempting discounts such as RS1b (£3,995, were £7,495); RS11b (£2,300, were £3,800), RS4b (£690, were £890) and RS6b (£450 were £660). All represent excellent opportunities as Infinity offer the sonic advantages of panel systems from eleg-

ant cabinets.

### NEW PRODUCTS

New to us is Cambridge Audio, whose amplifiers and CD Players are sought after throughout the world. The CD-2 is technically and sonically amazing, and demand will far outstrip supply for the foreseeable future. We still love the Nakamichi OMS-4E at £1,200, but we are proud to announce the affordable OMS-1E at only £399. Don't expect the same sound quality, but it is as much a Nakamichi product as any, so again we expect much demand at this time of year and have stocked accordingly. Phone or visit us for our experience on CD Players.

Audio-Technica are about to launch their flagship Moving-Coil cartridge, the OC-9 at a bargain price of £399. We received our privileged sample and were strongly requested not to sell it. A few days later, a customer heard it on a Roksan Xerxes/Mission Mechanic and negotiated it out of our shop with a rather expensive complete system and a Gold AmEx (cash would have sufficed!) AT have also introduced cables of astonishing sonic quality which supersede everything else to date. Speaker cable costs £11.95 per metre and Stereo Pairs of 1 metre phono to phono cost £49.95 and even *look* worth the money. However, for ultimate perfection, we have obtained from Audio Technica the Japanese ultimate version of phono – phone interconnects which use continuous casting through to the plug itself. The cost is £89 per set, but the resulting sound quality makes you delighted with the investment.

We have many accessories for your pleasure and small gifts, including some magazines for sale – TAS, *Stereophile*, various Hi-Fi Choice special issues. Finally, our team in Manchester thank readers of Hi-Fi News for their nomination for the Sony/Hi-Fi News Dealer Award. Happy Listening!

The Music Room,  
221 St. Vincent Street,  
Glasgow G2 5QY.  
Tel: 041-248 7221.  
(Open Six Days)

The Music Room,  
50 Bridge Street,  
Manchester M3 3BN.  
Tel: 061-835 1366.  
(Now Open Six Days)

DESIGNER & LIFESTYLE HI-FI,  
TV & VIDEO: Stereo Showcase,  
98 Bath Street, Glasgow G2 2EN.  
Tel: 041-332 5012.  
(Now Open Six Days)

IN CAR HI-FI &  
AUTO-ELECTRONICS:  
Mobile Fidelity, 98 Bath Street,  
Glasgow G2 2EN. Tel: 041-332 5775.  
(Closed Tuesdays)

All shops accept ACCESS, VISA and AMEX on presentation or by 'phone and are licensed brokers. Instant and personalised credit readily available subject to normal requirements. We will shortly open a private Showroom and Service dedicated exclusively to ultimate components and systems optimising and invite you to contact Jack Lawson and obtain a copy of our Information Sheet No. 9 (Source Owners should request a copy of No. 8.)



# DIRECTORY

## CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Marantz CD94 £800	Good++ Very Good	Clearly the best Marantz CD player, with high build quality and good objective and subjective performance	10 digit keypad, headphones, favourite track selection, remote	R	51
Meridian 207 £950	Very Good Very Good	A very stylish two box player with onboard pre-amp, providing excellent sound quality and remarkable flexibility	Fully remote, full track search, programming	R	51/Call
Mission PCM7000 £600	Good Good++	Stylish with a large informative LCD display this deserves recommendation on the basis of sound quality alone	Remote volume control, digital filtering	R	51/Call
Nakamichi OMS-3E £995	Good Good+	Superbly built and presented this expensive machine was a bit of a "stuffed shirt" when it came to sound quality	Remote control, skip and scan, headphones		51
Nakamichi OMS-4E £1200	Very Good Very Good	Solidly controlled and comparatively simple this clearly represents one of the major benchmarks for CD sound quality, though the midrange sounded a touch thin	Skip and scan, headphones	R	51
Nakamichi OMS-5EII £1500	Good+ Very Good	"... delivers near state of the art performance and build quality in a deliberately starkly functional package, but at a very high price..."	Skip and scan, simple track programming, manual control		51
Nakamichi OMS-7EII £2000	Good+ Good+	The only serious criticism here is of the price. And in our not always humble opinion you can get better sound quality for less elsewhere in Nakamichi's range	10 digit track entry keypad programming, headphones		51
Philips CD 160 £200	Good Average+	A little tinny in construction and "plasticky" in feel, this popular model rated well on sound quality despite its budget price	Skip, (20 track) programming, repeat/display	BB	51
Philips CD360 £250	Good+ Good+	Fine lab performance and exceptional listening test results, plus the 200 disc favourite track selection makes this modestly priced unit a Best Buy	Remote control, favourite track selection, skip	BB	51
Philips CD473 £250	Good Good+	In the forefront as regards sound quality, this is one of the best sounding Philips players yet; we were unable to catch it out on classical through Jazz program	Favourite track selection, remote control with volume, headphones etc	BB	53
Philips CD960 £700	Good++ Good++	Simple to use with exemplary lab performance, this showed no sign of weakness while sound quality improvements over mainstream models more or less justify the price	Full remote control, favourite track selection, etc	R	51/Call
Pioneer PD-6050 £230	Good Average+	Much liked on Jazz and rock program this was highly rated in terms of value for money. The midrange sounded a little forward and thin though	Everything but a digital out socket and remote volume control	BB	53
Pioneer PD-M70 £399	Average Average	A remarkable catalogue of features justify the price. Soundwise it rated just above average overall	Remote control, 6-disc autochanger, 8 programme memory, headphones etc		51
Revox B226 £756.70	Good+ Good	The traditional Revox house style is combined with the fine Philips 16 bit chip set, but this player doesn't really offer sound quality to match the price	Infra-red remote control, full search, scan, programming		51/Call
Rotel RCD-820 £249	Average++ Average+	Though essentially a Philips clone, the 820 does offer a very respectable sound quality for the price, plus remote control	Remote control, 20 track programming, repeat, step	R	51
Rotel RCD 820BX £350	Good Good	A respectable performer with adequate build quality and features, this got the "R" for good musical reproduction	Remote control, repeat, 20 track programming, step	R	51
Sanyo COP-M50 £200	Average- Average-	A no-frills mid-sized package, this was not up to the usual Sanyo sonic or technical standards but it was well built	Skip, search, repeat, 16-track memory, programmable		53
Sharp DX-R700H £249	Average- Average-	A workmanlike player that does not offer exemplary lab or sound quality but which is well-built with good facilities and should perform well in use	Remote control, track selection keypad, skip, scan repeat programming		53
Shure Ultra D6000 £495	Average+ Average+	Ergonomically well thought out with full function remote control, but not really scoring sonically considering its price	Remote control (full function inc volume)		51
Sonographe SD1 (by CJ) £799	Good Very Good	Distinctive with oak end-cheeks, using Philips based 14 bit x 4 oversampling, Conrad Johnson electronics make this a musically rewarding player	Full search programme and timing	R	51/Call
Sony COP-M20 £199	Average+ Average	Keeping pace with improvements in the marketplace, it combines decent performance with good build and is competitively priced	20 track programme, skip and scan, repeat and random play	R	51
Sony D30 £230	Average- Poor	At 50p per hour to run, the sound quality is poor compared to mains machines although reasonably competent overall for a Discman	LCD display, skip, shuffle, and repeat, "in-ear" headphones		51
Sony COP-310 £250	Average++ Average	Fine build, facilities and healthy enough sound quality - recommended, but look around the range	Remote control (+ usual)	R	51
Sony COP-M50 £269	Good+ Average+	Fine build quality, good technical performance and extravagant features make this a very competitive package	Shuffle, skip, search, remote headphones	R	53
Sony COP 710 £299	Good+ Good++	One of the outstanding contenders in our 1987 edition. The build was cool, the sound was hot	Remote control, 20 digit direct entry keypad, etc	BB	51
Sony D100 £300	Average Average-	The best all round portable tested, but also the most expensive, and still no substitute for a conventional player	Skip, repeat, 21 track programming, headphones, LCD display		51
Sony COP-222ES £449	Good Average+	Exceptional build quality and presentation plus respectably good sound quality merits the "R", but some of its kin were preferred	Remote control, 20 digit keypad, track access, programming	R	51
Sony COP 555es £1000	Very Good Very Good	Extravagant build quality, sophisticated features and near state-of-the-art performance, it competes effectively with more expensive models	Remote control, 20 digit keypad, track access, programming	R	51
Teac PD-250 £250	Average Average	16 bit 2 x oversampling with fair if lightweight build quality. Sonically falling short of recommendation, but not bad all the same	Remote control, skip, scan, programming		51
Teac ZD3000/ZD5000 £899/£999	Very Good Average+	Although achieving a superb technical performance, these players are not competitive on sonic grounds in this price category	Full remote control, keypad, fast track skip, headphones		51
Technics SL-P 111 £179	Good Average	An above average sound quality at a well below average price, but this is only most things to most men	Skip, audible scan, programme repeat, preset edit play	BB	51
Technics SL-P220 £229	Average++ Average	Sound quality keeps this out of the top ranks but the facilities (wow) and fine technical performance will make it hard to resist for some	Everything except a digital out socket, which is no great loss to most	R	53
Technics SL-XP5 £250	Average- Poor	A contender for the "World's smallest" title, this beautifully crafted miniature falls short in terms of sound quality	Headphones, "high cut" filter, skip, search		51
Technics SL-PS20 £350	Good+ Average+	With features and facilities to satisfy the most eager button pusher, this also produced decent sound quality	High/Low scan ratios, headphones, memory, programming and more	R	51
Technics SLP 720 £400	Good++ Good+	More buttons for sonic pilots - this was the most sonically super of the top Technics models	Search dial cueing, high scan speed optics, disc menu, programming	R	51
Technics SL-P1200 £800	Good++ Good+	Looking more like a desk work station than a stackable component, this will appeal to the creative recordist and semi pro user. Sounded pretty good	Headphones, remote control, search dial cueing, etc		51
Yamaha CD-X5 £200	Average+ Average	Good build quality, respectable lab performance, and decent enough sound delivery for your money	Skip, scan, manual only, etc	R	51
Yamaha CDX-900 £450	Good Average+	A real button bristler with extensive facilities; well built, but sound quality might suggest a lower price	Programme calendar, remote control, 26 key direct track entry		51
Yamaha CDX-1100 £700	Good+ Average+	A pearyl king might like the button overkill here... yet despite exceptional lab performance, listeners were not unduly impressed. It's worth considering	Volume handset, random play, space insert, 26 direct track entry keys		51

# THE WORLD'S NO 1 GUIDE TO BUYING HI-FI

So you want a hi-fi, but you don't want to make a fuss about it. A pre-packaged system with everything matching up and no aggravation may not rank with carefully chosen separates on **sound quality**, but there's no denying the attractiveness or popularity of this approach – the market for pre-packaged component hi-fi systems is at least as big as that for separate items, even ignoring the vast numbers of low-cost single unit stacker systems.

The arrival of compact disc led to a new fashion

for shelf-standing compact systems, or 'midis' as they are known in the trade, as a replacement for earlier floor-standing rack systems (themselves the upmarket development from music centres). Only some 330mm wide, midis can more or less match full-size (430mm) rack components for performance, and are certainly cheaper to make, ship, sell and buy.

Whereas specialist hi-fi is moving steadily towards ultra-simple 'no-frills' components, midi systems tend to be sold on a feature count at a price

point, usually with little opportunity for demonstration and comparison. Our test programme includes extensive auditioning and lab testing, while making allowance for the different aspirations of designers and expectations of users. Key features valued highly by customers include system remote control, automatic switching, double 'dubbing' cassette decks, and elaborate equaliser tone controls. And the top end of the market is developing with surround sound audio/video-ready packages.

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACKISSUE FULL REVIEW
<b>Aiwa V-990DX</b> £750	Good Good	Refined up-market system with most modern features. Sound quality is good all round – even the speakers are acceptable.	Remote, timer, auto source select	R	This
<b>Aiwa V1500DX</b> £999	Good Good	Remarkable features level even includes independent record feeds to each cassette. High class build, satisfying sound, but best without loudspeakers	Separates system, twin auto-reverse cassette, full remote, timer	R	This
<b>Akai 990</b> £1400	Average Average+	A gadget oriented expensive system with good compact disc player and remarkable loudspeakers. Let down by the tuner and turntable and not helped by obscure ergonomics	Twin deck cassette, Auto rev., Remote Control, Auto source selection		Systems
<b>Binatone Laser CD System 2000</b> £270	Bad Bad	A bit of a disaster even at the price. Built to extremely low standard with an appalling turntable. CD and loudspeakers OK, but let down by amp	Twin cassette		Systems
<b>Ferguson HF03</b> £400	Average+ Good	An all round success with British built speakers and all sources achieving a reasonable standard. Compact disc was weak compared to other units	Twin cassette	BB	Systems
<b>Fidelity MS202</b> £340	Bad Bad—	Very cheap and poorly finished. Thin, raw sound to match appearance and build	Twin cassette, one-piece system		This
<b>Fisher Midi System M46CD</b> £500	Average Average	Somewhat overpriced, the M46 is let down by a poor amplifier and worse speakers. Other elements perform reasonably, CD being its strongest point	Twin transport		Systems
<b>Fisher Midi System M56CD</b> £580	Average Average	Fitted with a pretty good amp, but dire loudspeakers; otherwise a competent combination including a pretty fair cassette deck	Twin cassette, 5-band graphic Equaliser		Systems
<b>Fisher 2400</b> £600	Average Average	An ambitious and competent package with a strong amplifier and CD player. Given its new lower price it would have merited recommendation if the loudspeakers hadn't let it down	Twin deck, Graphic eq, 5-band		Systems
<b>Goodmans 5100</b> £380	Poor— Bad	A combined electronics package, with performance standards only too typical of the breed. Speakers good for type but don't compensate	Twin cassette, one-piece system		This
<b>Goodmans 5200</b> £459	Average+ Average+	Offering possibly the best speakers around in this midi system market, the Goodmans wins on a fair standard for the price, though the turntable was not too hot	12 Band Graphic Eq, Twin deck	BB	Systems
<b>Goodmans Maxim-Midi System</b> £550	Average Average+	De-luxe version of 5200 system – very good value for money and readily upgradeable. Sonics rough but OK and speakers good; CD crude	All separates with twin cassette	R	This
<b>Hitachi MD280</b> £430	Good Good	Better than average cassette and CD – even the turntable and the loudspeakers work satisfactorily. Good all-rounder	Remote, auto T/T, twin cassette, extra tape & aux inputs		This
<b>Marantz Studio System</b> £449	Average+ Good	More a hi-fi system than a true midi package, it's good if uninspired. A stronger amplifier could help	Only amp, CD, & speakers – rest optional	R	This
<b>Marantz Concert System</b> £649	Good+ Good+	Well matched and achieved high fidelity standards. Strong characterisation with some treble loss – this wasn't quite neutral, but a pleasure to listen to	Only amp, CD & speakers – rest optional	BB	This
<b>Marantz MX673CD System</b> £999	Average+ Average	Tremendously flexible audio/visual system. Sound quality is satisfactory at best and ergonomics a mess	Various A/V inputs, remote, speakers optional	R	This
<b>Mitsubishi CD51</b> £429	Average Average—	In some ways a well balanced system, in that the amp and speakers smooth the rougher edges of some sources, but not very satisfactory on the whole	Remote, twin deck		Systems
<b>Mitsubishi E602CD</b> £500	Poor— Poor—	Totem-pole aesthetics match the mixed constructional quality. Sound quality is already poor, but featured synthesised bass can make matters worse still	Spare in/output set, twin cassette		This
<b>Mitsubishi 100R</b> £650	Average Average+	A pretty good package, flawed by 'tinny' loudspeakers, but having a fair turntable – a rarity in this category of equipment	Remote, Multidisc CD, Twin	R	Systems
<b>Philips FCD 565</b> £370	Poor Poor	An unimpressive system. While the compact disc player and tuner were OK, its main tonal characteristic on all sources was a coarse top end	Double deck, 5 band graphic eq.		Systems
<b>Pioneer S-7000</b> £478	Average+ Average+	Excellent beer-budget system that really works, with the exception of wobbly sounding cassette	One piece + (optional) CD and speakers	R	This
<b>Pioneer System 10</b> £678	Average Average—	Loudspeakers sound cluttered, and cassette unstable and thin, but tuner and CD are fine	All separates, twin cassette		This
<b>Pioneer System 30</b> £978	Average+ Average+	Odd remote system means two handsets. CD and radio work well, but turntable and cassette weak. Expensive	Remote, separates, twin auto reverse, multi-disc CD	R	This
<b>Sanyo W40CD</b> £380	Average Average	Low cost, no options package with attractive displays, cassette had high wow and flutter, but the rest worked OK	Semi auto T/T, auto record start, twin cassette	R	This
<b>Sanyo W36</b> £550	Average Average	For a change, this outfit comes with excellent loudspeakers and CD player. The main weakness seems to be the amplifier but the turntable was OK, if not fab!	Two H/phone, 5 band graphic, twin deck cass.	BB	Systems
<b>Sharp SA-CD800H</b> £800	Average Average—	A superficially high grade, high spec system, the SA-CD800H actually sounds clean but a little 'synthetic'	One-piece, 6-disc CD, no T/T		This
<b>Sony Compact 310</b> £450	Average+ Average+	Low cost but well built and finished and better sounding than most at the price	Remote, auto T/T, twin cassette	BB	This
<b>Sony Compact 510</b> £599	Average+ Average+	Very good control layout. Shabby loudspeakers not up to otherwise uniformly good system	Remote, twin cassette	R	This
<b>Sony Compact 610</b> £700	Average Average—	Inconsistent. Same turntable used in much cheaper Sonys gave 'iffy' record reproduction. Cassette likewise	Remote, 'shuffle' play CD, twin cassette		This
<b>Sony FH1215CD</b> £800	Average Average+	Probably the ultimate miniature system. The CD player is particularly good. Best to chuck the speakers away though	Miniature, transportable (AC only). Single auto-reverse cassette	R	This
<b>Sony Compact 710</b> £999	Good Good	Typically well built and presented but complicated to use except via remote. Record deck poor but remainder good, including speakers	Full remote, auto T/T, twin auto reverse cassette	R	This
<b>Sony Compact Series 90</b> £1500	Good Good+	The best of a not too wonderful bunch, the excellent compact disc player and pretty good speakers make for reasonable sound quality, though the tuner wasn't of quite the same standard	Twin deck, auto reverse, timer, extra tape socket	BB	Systems
<b>Technics X800CD</b> £400	Average+ Good (cass poor)	Very unstable sounding cassette lets system down badly. Tuner a bit dull, but remainder OK	No T/T, twin cassette		This
<b>Technics X820</b> £580	Average Average	Tuner and CD player work well but the speakers sound ragged	Remote, auto record starts		This
<b>Technics X840</b> £730	Good Good	Expensive, but well made, good sounding system. Turntable, tuner & CD player similar to X820	Full remote separates system	R	This
<b>Technics X880</b> £900	Average+ Average+	Complex, high spec unit with good performance except for the indifferent speakers, which are completely out of keeping	Remote, auto source selection, programmable T/T		This
<b>Toshiba V17CD</b> £399	Average Average+	Loudspeakers are the weak link, with cassette and turntable also indifferent. Tuner and CD worked well though, so reasonable value for money	Twin cassette, semi-auto T/T	R	This

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# SELECTED DEALER DIRECTORY


Choosing a good hi-fi dealer is the most vital step in acquiring the system that is right for you. This unique directory gives full information on dealers in your area.

## AVON


ABSOLUTE SOUND AND VIDEO, 65 Park St, Clifton, Bristol. (0272) 264975. A&R, Denon, Dual, Linn, Mission, NAD, Quad, Roksan, Rotel, Yamaha, etc. (closed Weds). BADA MEMBER 


PAUL GREEN HI-FI LTD, Kensington Showrooms, London Rd, Bath. (0225) 316197. A&R, Creek, Dual, Heybrook, Linn, Musical Fidelity, Rotel, Systemdek, Wharfedale. Dem facilities available, ring for appointment, car park. Open Tues-Sat, 9-5.30. Home trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Visa. BADA MEMBER 

## BERKSHIRE


READING HI-FI CENTRE, 4-6 Harris Arcade, Friar St, Reading. (0734) 585463. The best equipment, advice and service from Berkshire's premier Hi-Fi emporium. BADA MEMBER 

## BUCKINGHAMSHIRE

AUDIO INSIGHT LTD, 53 Wolverton Rd, Stony Stratford, Milton Keynes. (0908) 561551. A&R, Audiolab, Heybrook, KEF, Linn, Mission Cyrus, Musical Fidelity, Nakamichi, Nytech, Rotel. Dem facilities available. Open Tues-Sat. Home trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Visa. Service dept. BADA MEMBER 


AYLESBURY HI FIDELITY, 98 Cambridge St, Aylesbury. (0296) 28790. Dual, Heybrook, Linn arms, Musical Fidelity, Mission, NAD, Nakamichi, Quad, Rotel. 2 Dem rooms available, ring for appointment. Open 10-6 Mon-Fri, 9.30-5.30 Sat. Home trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Amex, Diner, Visa. Service dept. BADA MEMBER 

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CAMBRIDGE HI FI, 1 Hawthorn Way, Cambridge. (0223) 67773. AR, Mission Cyrus, Monitor Audio, Panasonic, Pioneer, Sony ES, Technics, Thorens, Kenwood, Yamaha. Demonstration facilities. No appointment required. Open 9.30-5.30 Mon-Sat. Free installation. Credit facilities. Up to any amount. Credit cards: Access, Barclaycard. Service dept. available. BADA MEMBER 

STEVE BOXSHALL AUDIO, 41 Victoria Rd, Cambridge. (0223) 68305. Quad, Rotel, Dual, Denon, Krell, Nakamichi, Marantz, Monitor Audio, Tannoy. Demonstration facilities. No appointment required. Open 10.00-6.00, Mon-Sat. Home trial facilities, free installation, credit facilities. Credit up to £3,000. Credit cards: Access, Barclaycard, Service dept.

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ASTON AUDIO, 4 West St. Alderley Edge. (0625) 582704. Wide selection of equipment in N.W. Two-year guarantee. Dem facilities: 3 dem rooms, appointment required. Open 10-6 Tues-Sat. Home trial facilities, free installation. Instant credit up to £1,000. Credit cards: Access, Amex, Diners, Visa. Service dept. BADA MEMBER 

DOUG BRADY HI-FI, Kingsway Studios, Kingsway North, Warrington. (Padgate 0925) 828009. 1986 Sony/Hi-Fi News Best Dealer in N.W. England and Wales. Largest choice of specialist Hi-Fi in N.W. £100-£20K. All credit cards. 3 Dem Rooms. Dem facilities. BADA MEMBER 

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NEW DAWN HI-FI, 1-3 Castle St, Lower Bridge St, Chester. (0244) 24179. Linn, Quad, Technics, National Panasonic, Denon, Rotel, Dual, Meridian, Aiwa, Philips. Dem facilities: 2 dem rooms. Open 9.00-5.30 Mon-Sat, closed Wed. Free installation, instant credit. Credit cards: Access, Visa, Trustcard. BADA MEMBER 


SWIFT OF WILMSLOW, 4-8 St Annes Parade, Wilmslow. (0625) 526213. A&R, Aiwa, Denon, Dual, Marantz, Mission, Monitor-Audio, Pioneer, Trio, Yamaha, NAD. Dem facilities available. Open Mon-Sat 9.15-5.45. Closed 1-2 Lunch. Home

trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Visa. Service dept. BADA MEMBER 

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TRURO HI-FI & E.T.S. Ltd, 25 King St, Truro (0872) 79809. A&R, Denon, Dual, Heybrook, Linn, Mission Cyrus, Nad, Quad, Rotel, Thorens. Dem facilities: Single speaker studio. Open Mon-Sat 8.45-5.30. Home trial facilities, credit up to £1,000. Credit cards: Access, ETS Visa. Service dept.


## DERBYSHIRE

ACTIVE AUDIO, 12 Osmaston Rd, The Spot, Derby. (0332) 380385. Meridian, Mission, Denon, Yamaha, Rotel, A&R Cambridge, Monitor Audio, Trio, Marantz. Demonstration facilities. Open 9.30-6.00 - early closing Wednesday. Home facilities: credit up to £1,000. Credit cards: Access, Barclaycard, Diners, American Express. Service dept. BADA MEMBER 

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PETER RUSSELL HI-FI ATTIC, 58 New George St, Plymouth, Devon (0752) 669511. Quad, Linn, Mordaunt-Short, A&R Cambridge, Revolver, Heybrook, Denon, Harmon-Kardon. Dem facilities - no appointment required. Open Mon-Sat 9.30am-5.30pm. Home trial facilities. Free installation. Credit facilities. Credit cards: Visa, Access. Service dept.


## ESSEX


A.T. LABS, 442/4 Cranbrook Rd, Gants Hill, Ilford. (01) 518 0915. Open Mon-Sat, 10-6. Two single speaker dem rooms. Credit cards: Access, Amex, Visa. BADA MEMBER 

BEECHWOOD AUDIO, 6 Market St, Braintree. (0376) 29060. A&R, Ariston, B&W, KEF, Meridian, Musical Fidelity, NAD, Nakamichi, Pink Triangle, Quad, Rotel. Dem facilities: 2 single speaker rooms. Open Mon-Sat, 9.30-6.00. Home trial facilities. Free installation, instant credit up to £1,000. Credit cards: Access, Amex, Diners, Visa.

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
## GLOUCESTERSHIRE

ABSOLUTE SOUND AND VIDEO, 40/42 Albion St, Cheltenham. (0242) 583960. A—R, Denon, Dual, Linn, Meridian, Mission, NAD, Rotel, Technics, Yamaha, etc. (Closed Wed). BADA MEMBER 

AUDIO EXCELLENCE, 58 Bristol Road, Gloucester. (0452) 300046. Audio Research, Dual, Krell, Linn, Magneplanar, Naim, NAD, Yamaha and lots more. Closed Mon. BADA MEMBER 

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ACOUSTIC ARTS Ltd, 101 St Albans Rd, Watford, Herts. (0923) 45250. A&R, Audiolab, Denon, Magneplanar, Quad, Rogers, Meridian, TDL, Jadis, Krell. Dem facilities: 2 dem studios, ring for appointment. Open Mon-Sat 9.30-5.30. Home trial facilities, free installation. Instant credit up to £1,000. Credit cards: Access, Visa. Service dept. BADA MEMBER 

THE AUDIO FILE, 40 Hockerill St, Bishops Stortford, Herts.

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MONITOR SOUND, 54 Chapel St, Chorley. (02572) 71935. A&R, Dual, Mission, Quad, Rogers, Rotel, Spondor, Thorens, Nakamichi, Yamaha, etc. Dem facilities, 2 dem rooms. Open Mon-Sat, closed Weds. Free installation, instant credit up to £1,000. Credit cards: Access, Visa, Service dept.

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
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
MUSICAL IMAGES, 45 High St, Hounslow, Middlesex. (01) 570 7512. AR, A&R, B&W, Bose, Denon, Dual, Harmon Kardon, Musical Fidelity, Nakamichi, Quad. Single speaker dem room. Open 9.30-6 Mon-Sat. All credit cards.


SUBJECTIVE AUDIO, 12 Park Avenue, Palmers Green, London N13. (01) 886 2650. A&R, Burmester, Krell, Magneplanar, Meridian, Linn, Nakamichi, John Bowers. Dem facilities: 3 single speaker dem rooms, appointment required. 10-6 Tues-Fri, 9-5 Sat. Home trial facilities, instant credit up to £1,000. Credit cards: All. Service dept.

TELESONIC Ltd, 92 Tottenham Court Rd, London. (01) 636 8177. A&R, B&O, B&W, Hafler, Luxman, KEF, QED, Quad, Nakamichi, Rogers. Dem facilities available. Open Mon-Fri 9-6, Sat 9.30-4. Home trial facilities, free installation, credit facilities. Credit cards: Access, Amex, Diners, Visa. Service dept.

THE SOUND ORGANISATION Ltd, No. 1, Cathedral St, London Bridge, London SE1 9DE. (01) 403 2255/3088. Counterpoint, Denon, Exposure, Koetsu, Linn, Naim, PS Audio, Roksan, Rega, SME and others. Dem facilities available, ring for appointment. Open Tues-Sat, 10-7. Free installation. Credit cards: Access, Visa. Service dept. BADA MEMBER 


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Denon, KEF, Marantz, Meridian, Mission, M.A., The Source, Philips. Dem facilities available, appointment required. 10-6 Tues-Sat, closed Mon. Home trial facilities, 3 demo rooms, service dept, free installation, instant credit. Credit cards: Access, Visa, Amex.

FIVEWAYS HI-FIDELITY Ltd, 12 Islington Row, Edgbaston, Birmingham. (021) 455 0667. A&R, Denon, Dual, KEF, Meridian, Musical Fidelity, Nakamichi, Philips CD, Quad, Revox, etc. Dem facilities. Single speaker dem room. Open 9.30-6 Tues-Sat. Home trial facilities, free installation, credit facilities. Credit cards: Access, Visa. Service dept.

GRIFFIN AUDIO Ltd, 94 Bristol St, Birmingham. (021) 692 1359. Linn, Naim Audio, Rega, Creek, Denon, Nakamichi, Quad, Mission, Monitor Audio, Rotel. Dem facilities 2 single speaker rooms. Open Mon-Sat 9.30-6. Home trial facilities, free installation, interest free credit up to £1,000. Credit cards: Access, Visa. BADA MEMBER 


NORMAN H. FIELD LIMITED, 35-37 Hurst Street, Birmingham B5 4BJ. (021) 622 2323/3619. AR, B&W, Denon, Dual, Monitor, Audio, Kenwood, Mordaunt-Short, NAD, Technics, Yamaha. Dem facilities available. Open 9.15-6.00, Saturday 9.00-6.00. Closed Weds. Home trial facilities on selected systems. Credit up to £1,500. Credit cards: Access, Visa. Service dept.

WARSTONES HI-FI STUDIO, 54a Warstones Rd, Penn, Wolverhampton. (0902) 345114. Dem facilities 3 rooms. Open Mon-Wed 10-6. Thurs-Fri 10-9. Sat 10-6. Home trial facilities, free installation. Credit cards: Access, Visa, Eurocheque. Service dept.

## OXFORDSHIRE

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
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
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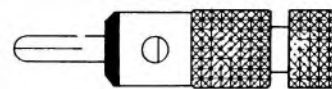
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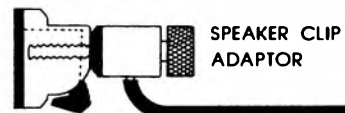
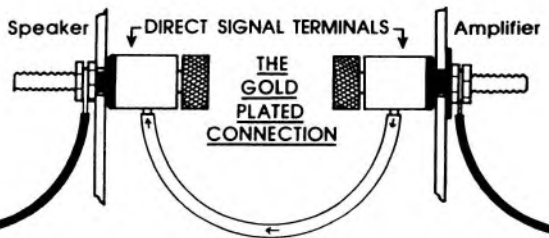

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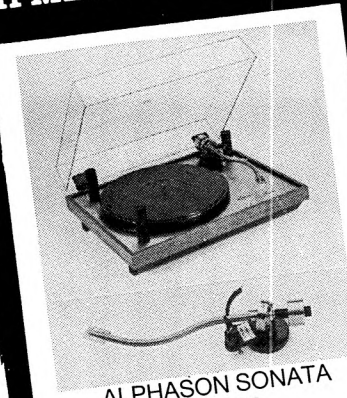
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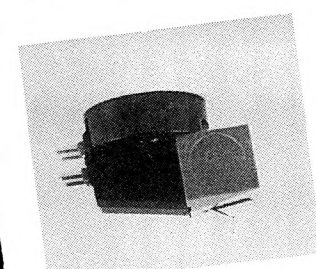
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# GLOSSARY

*The Hi-Fi Choice dictionary of audio terminology, explaining all the weird and wonderful adjectives used by our reviewers, as well as technical abbreviations.*

**AM:** Amplitude modulated; see 'Medium Wave'.

**ACOUSTIC BREAKTHROUGH:** Sound that gets into the turntable and hence the cartridge from the air and thereby creates a risk of acoustic feedback.

**ACOUSTIC FEEDBACK:** If any sound in the room can find its way through the body of the record deck to the cartridge stylus, then that sound will be reproduced from the loudspeakers, along with the wanted programme material. If too much of this sound from the loudspeakers is picked up by the cartridge in this way then a vicious circle of acoustic feedback will be created.

**ACTIVE:** Speaker systems which contain electronic crossovers and where the drive units are connected directly to power amplifiers.

**ALIGNMENT PROTRACTOR:** A device used to minimise the lateral tracking error of a cartridge/arm combination.

**AMPLITUDE:** Size or magnitude; hence the amplitude/frequency response, known normally simply as the frequency response, which describes the relative loudness of the system at different frequencies with a constant input voltage.

**ANECHOIC:** Without echo; a special room or 'chamber' with thick sound absorbing materials on all surfaces to prevent reflections.

**ARM MASS:** More accurately called *effective* arm mass, because it is *not* the weight of the arm on a pair of scales. It is the mass of the arm and cartridge combination that appears to be concentrated at, and thus felt by, the stylus tip which is tracking a record groove. There is nothing inherently good or bad about arms with light or heavy effective mass; what matters is the manner and choice of their combination with cartridges of different compliance and the low frequency resonance produced by such combination.

**AZIMUTH:** With reference to tape and cassette recorders, the alignment of head gap to tape path.

**BALANCE:** 1) The overall relative loudness perceived at different frequencies (eg bass, treble); 2) the accuracy of the match between the two channels of a stereo transducer (eg cartridge or pair of loudspeakers).

**BANDWIDTH:** A range of frequencies with presumed defined upper and lower limits.

**BASS:** Lower part of the frequency spectrum.

**BELT DRIVE:** The motor has its rotational speed geared down to the required platter speed (33 $\frac{1}{3}$  rpm for LP discs) by a rubber or similar resilient belt which runs round a small pulley on the motor shaft and a large pulley attached to or part of the platter.

**BEXTRENE:** A plastics material frequently used for bass and mid-range cones.

**BIAS:** (*turntable/arms*) Because the cartridge on a pivotal arm is being drawn across the record surface by the stylus tracking at an angle offset from the pivots, groove friction produces an imbalance of lateral force. Bias is the application of a compensatory lateral force acting in the opposite direction.

**BIAS:** (*tape*) This refers to a high frequency current passing through the record head which allows the audio current also passing through the head to produce reasonably linear magnetisation of the tape at all levels permitted by the combination of each machine with the tape. The lowest level of bias is

required for ferric cassettes, a slightly higher one for ferrichrome, an even higher one for chrome or pseudochrome, and the highest for metal.

**BOTTOMING:** The stylus scraping on the distorted rounded bottom of the groove due to incorrect stylus geometry.

**CANTILEVER:** The thin rod or tube that connects the stylus to the armature and hence the cartridge body.

**CAPACITANCE:** An element of electrical impedance that is particularly important when matching pickup cartridge, arm leads and amplifier input characteristics to achieve a flat frequency response from discs.

**CLIPPING:** This is reached when a circuit is overloaded and overdriven, resulting in bad waveform distortion and audibly unpleasant effects.

**COLORATION:** A general term used to describe the audible effects of distortions, particularly in loudspeakers and record players. These are usually caused by frequency response irregularities and/or resonances.

**COMPATIBILITY:** The selection of interdependent components to achieve optimum system performance; notably arm/cartridge mass/compliance matching, cartridge electrical loading, or loudspeaker compatibility with amplifiers.

**COMPLIANCE:** A measure of the springiness of the cantilever/armature seen from the stylus, expressed in compliance units (cu), where 1 cu = 10<sup>-6</sup> cm/dyne.

**CROSSOVER:** An electrical circuit which uses combinations of inductors, capacitors and resistors to divide the signal from the power amp into the required frequency bands and with any necessary equalisation for feeding to the individual drive-units of the speaker system.

**CROSSTALK:** The leakage from one channel to the other in a two channel stereo system.

**CUTTER:** Mechanism used to cut recorded signal onto lacquer master; consists of turntable, lathe, cutting head, cutting and servo amps.

**DIN:** German standards body, responsible amongst other things for a popular range of standard plugs and socket specifications.

**DAMPING:** A means of controlling resonances by means of a resistive medium (electrical, mechanical, or acoustic depending on situation).

**DECIBEL (dB):** A logarithmic unit that is convenient for expressing ratios that span a wide range on a linear scale. For simplicity it can be regarded as a measure of relative loudness.

**DISTORTION:** Literally this can mean any deviation from the original, but usually refers to harmonic rather than intermodulation distortions when not specified.

**DOPING:** A technique involving the application of damping to a loudspeaker driver cone in order to assist in controlling resonances.

**DOWNFORCE:** The weight, measured at the stylus, which holds it down in the groove.

**DRIVE UNIT (DRIVER):** The term used to distinguish the loudspeaker unit itself, be it bass, mid-range, treble or fullrange in application, from the complete loudspeaker system which combines drive units, cabinet and crossover into a total design.

**DROPOUTS:** Momentary reductions of programme level due to inadequate head/tape contact caused by oxide particles shedding off the tape onto the head gap, or inadequacies in tape transport or tape.

**DYNAMIC RANGE:** The ratio in dBs between the quietest sound that can be successfully recorded and the loudest which can be accepted without serious distortion on an average programme.

**EFFECTIVE MASS:** The inertia, or mass-controlled resistance to movement, of a device, particularly important with regard to tonearms.

**EFFICIENCY:** The amount of acoustic power delivered for a given electrical input power.

**ELECTROSTATIC:** A principle employed in some loudspeaker transducers using static electricity effects to set up a polarising field within which the modulated transducer medium moves.

**ELLIPTICAL STYLUS:** A specially shaped stylus profile that makes the 'plan view' radius along the length of the groove smaller than the 'elevation view' contact radius viewed from the front.

**EQUALISATION:** (*general*) The deliberate modification of frequency response, usually in response to some engineering limitation or deficiency.

**EQUALISATION:** (*tape*) This refers to the necessary change in frequency response required of an amplifier so that overall flat frequency response is obtained from a tape medium. Equalisation is required both on record and replay. Any tape recorded on a good cassette recorder should have the same inherent response when played back on another correctly set up machine, since all playback equalisations should have been standardised. These standards are normally specified by the time constants of the circuits involved, eg 70 $\mu$ s or 120 $\mu$ s (see 'Microseconds').

**FM:** Frequency modulated; often used to describe radio transmissions of high fidelity potential on the VHF band.

**FERRITE ROD:** A short rod type aerial used for AM reception; may be fitted internally or externally to tuner or receiver.

**FERRO-FLUID:** A magnetic fluid which is introduced into the voice-coil gap to provide damping and/or improved cooling.

**FILTER:** A circuit (normally) used to restrict the bandwidth of a system; may be fixed or switchable.

**FREQUENCY RANGE OF SPECTRUM:** Can refer to any particular group of frequencies, but commonly applied to the audible band from 20 to 20,000 cycles per second (Hz), extending from the deepest bass to the highest audible harmonics.

**FREQUENCY RESPONSE:** The variation in output over a frequency range, particularly of a transducer; can be expressed as a range with decibel limits, or depicted graphically.

**Hz (HERTZ):** 1 Hz = 1 cycle per second and is a measure of frequency which corresponds to musical pitch (the higher the frequency the higher the pitch).

**HF:** High frequency.

**HARMONIC:** Harmonics are the whole number multiples of a base frequency called the *fundamental*.

**HARMONIC DISTORTION:** The addition of unwanted harmonics to a signal.

**HUM:** A low frequency interfering sound produced by break-through or interference from mains wiring or circuitry.

**IHF:** American Institute of High Fidelity, an important standards body.

**IEC:** An international standards body.

**IMPEDANCE:** Measure of resistance (and reactance) in alternating (ie audio) signals; this is of some importance in the compatibility of both cartridges and headphones with amplifiers. For convenience sake is measured in ohms.

**INTEGRATION:** Used to describe the success with which the output from two drive units combine to give smooth output through the crossover region.

**INTERMODULATION (IM):** A form of distortion arising from two or more signals producing non-harmonic signals that correspond to the sum or difference of the two frequencies.

**KILO (k):** prefix meaning one thousand.

**LED:** Light Emitting Diode; an indicator light.

**LF:** Low frequency.

**LATERAL FRICTION:** The resistance to movement of an arm and cartridge combination in the horizontal plane (ie across a record), caused by friction in its bearings.

**LINEAR:** A transducer that produces an output that exactly portrays its input over the required operating range is described as linear, and is hence distortion free. Hence also nonlinearities (distortions).

**LINE-CONTACT:** A special stylus profile that extends the ellipse, increasing contact length up and down the sides of the groove.

**LOAD OR LOADING:** The impedance (including resistive and reactive components, ie ohms, mH, pF) seen by one component looking back to its interconnected component; of importance in compatibility of cartridge/amp, and amp/headphone.

**'LOUDNESS':** An equalisation circuit frequency switchable on amplifiers which is designed to compensate for presumed hearing characteristics at low listening levels by boosting bass and treble.

**MOL:** Maximum operating level of tape normally referring to 5% distortion of 315Hz or 3.15kHz.

**MEDIUM WAVE:** An AM transmission band incapable of high fidelity signals.

**MICRO- ( $\mu$ ):** Prefix for units meaning one millionth of.

**MICROSECONDS ( $\mu$ s):** The time constant of a resistor capacitor combination involving a frequency response change (equalisation).

**MIDRANGE, MIDBAND:** The central part of the audible frequency range where the ear is most sensitive.

**MILLI- (m):** Prefix for units meaning one thousandth of.

**MODULATION:** The audio signal is 'stored' by means of modulations within a medium, eg the 'wiggles' in the groove of a plastic disc, or the magnetic coding on a tape.

**MODULATION NOISE:** An additional noise added to tape noise, which increases with the degree of modulation of the tape, caused by the properties of the magnetic coating. This noise has most of its energy near the modulation frequency (causatory tone).

**MOVING-COIL:** A transducer (eg cartridge or

headphone) where the signal is generated by the movement of a coil within a magnetic field.

**MOVING-MAGNET:** The most common form of cartridge transduction, where the magnet moves while the coils are held relatively stationary.

**MULTIPLEX FILTER (MPX):** A circuit which introduces severe attenuation at supersonic frequencies to decrease interference encountered with the output from some stereo FM tuners.

**NANO (n):** Prefix meaning a thousandth of a millionth of.

**NOISE:** Random unwanted low level signals.

**NOISE MODULATION:** An unwelcome breathing effect that can be heard on some programme material, produced by poor noise reduction systems, or circuits.

**OCTAVE:** Two-to-one ratio of pitch or frequency.

**OFFSET ANGLE:** The angle measured between the centre line of the pickup cartridge and the line which joins stylus and arm pivot point.

**OHM:** Unit of electrical impedance (including reactance) or resistance; also kohm, where 1 kohm = 1,000 ohms.

**OVERHANG:** The extent to which the cartridge stylus extends beyond the centre of the platter is critical, and controlled by fore and aft adjustment of the cartridge on the arm.

**PASSIVE:** The most common type of system, where drivers and crossover are driven from a single power amplifier.

**PEAK RECORDING LEVEL:** A level above which distortion becomes apparent. This distortion is introduced when the oxide particles almost reach magnetic saturation, and thus will accept no more level.

**PHONO:** The most commonly used plug/socket combination in audio components.

**PICO (p):** Prefix meaning one millionth of a millionth of.

**PORT:** An opening in a cabinet which is tuned to characteristics of the bass driver and the enclosure volume to provide reflex type bass-loading.

**POWER AMPLIFIER:** The part of an amplifier that provides power to drive the loudspeakers: usually integrated, it is sometimes a separate component.

**PRE-AMPLIFIER:** The part of an amplifier that accepts the input signals, sorts them, applies any necessary equalisation, and then passes the signal to the (normally integral) power amplifiers.

**PRESENCE:** A quality of forwardness or immediacy in a sound balance, generally related to an upper-middle frequency response boost.

**PRINT-THROUGH:** A pre- or post-echo of a loud signal created by magnetisation occurring from one layer to an adjacent layer after the tape has spooled or been recorded.

**Q:** A measure of the magnitude and shape of a resonance; the higher the Q, the sharper and more severe in amplitude the resonance.

**REFLEX:** A system of bass loading (using port or ABR) which offers improved efficiency and bass power handling at the expense of subsonic control compared to a sealed box.

**RUMBLE:** The low or medium frequency sound produced mechanically by any moving parts in a turntable, mainly the motor and platter bearings.

**SENSITIVITY:** The volume of sound output for a

specific electrical voltage input.

**SEPARATION:** As between the two channels of a stereo pickup; see *crosstalk*.

**SHIBATA:** A special stylus extending the elliptical to a 'line-contact' type of profile.

**SIDE-THRUST:** A force acting on cartridges in pivoted (ie not parallel tracking) arms, due to the stylus/vinyl 'friction' acting along the line of the offset angle; hence bias or side-thrust compensation.

**SIGNAL-TO-NOISE, SIGNAL/NOISE, S/N:** The difference in total output when an applied signal is removed.

**STYLUS:** The specially shaped piece of diamond in contact with the groove and connected to the cantilever.

**SUBSONIC:** Below the audible range, ie below 20Hz.

**SQUARE WAVE:** A signal which consists of a fundamental plus a (theoretically infinite) series of odd (3rd, 5th etc) harmonics in a precise phase and amplitude relationship. It is useful for examining transient performance, symmetry, resonance control and 'ringing'.

**THD:** Total harmonic distortion.

**TRACING:** The following of the groove modulations by the stylus; hence for example tracing distortion, caused by the inability of a spherical stylus to trace the high frequency inner grooves on a disc.

**TRACKABILITY:** The ability of the cartridge to cope with large amplitude modulations (or of the arm and cartridge to follow the groove itself properly).

**TRACKING ERROR:** The discrepancy between the truly tangential angle at which a record is cut and the slightly off-tangential angle at which it is tracked by a stylus on a pivoted arm during some parts of the arm's travel.

**TRANSIENT:** Signal of very short duration.

**TREBLE:** Upper part of frequency spectrum, typically above about 3kHz.

**TWEETER:** A small drive unit designed to operate over the high frequency range.

**ULTRASONIC:** Frequencies above audibility, ie greater than 20kHz; also *supersonic*.

**VERTICAL TRACKING ANGLE (VTA):** The angle at which the plane of motion of the stylus is set with respect to the vertical when viewed from a side elevation of the cartridge. Should match the 20° cutter standard.

**WEIGHTING:** A factor or function that is applied to a measurement to increase its relevance and usefulness.

**WOOFER:** A drive unit that operates over the bass portion of the audio range.

**WOW AND FLUTTER:** Low and high frequency pitch variations (from poor tape transport of turntable platters with speed drift).

System illustrated here shows optional compact disc player and graphic equaliser.

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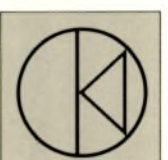
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