

# Hi-Fi WORLD

JUNE 1991 £2.00

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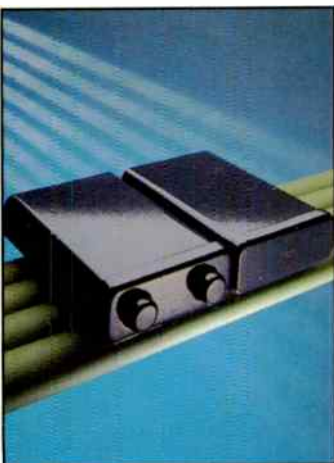
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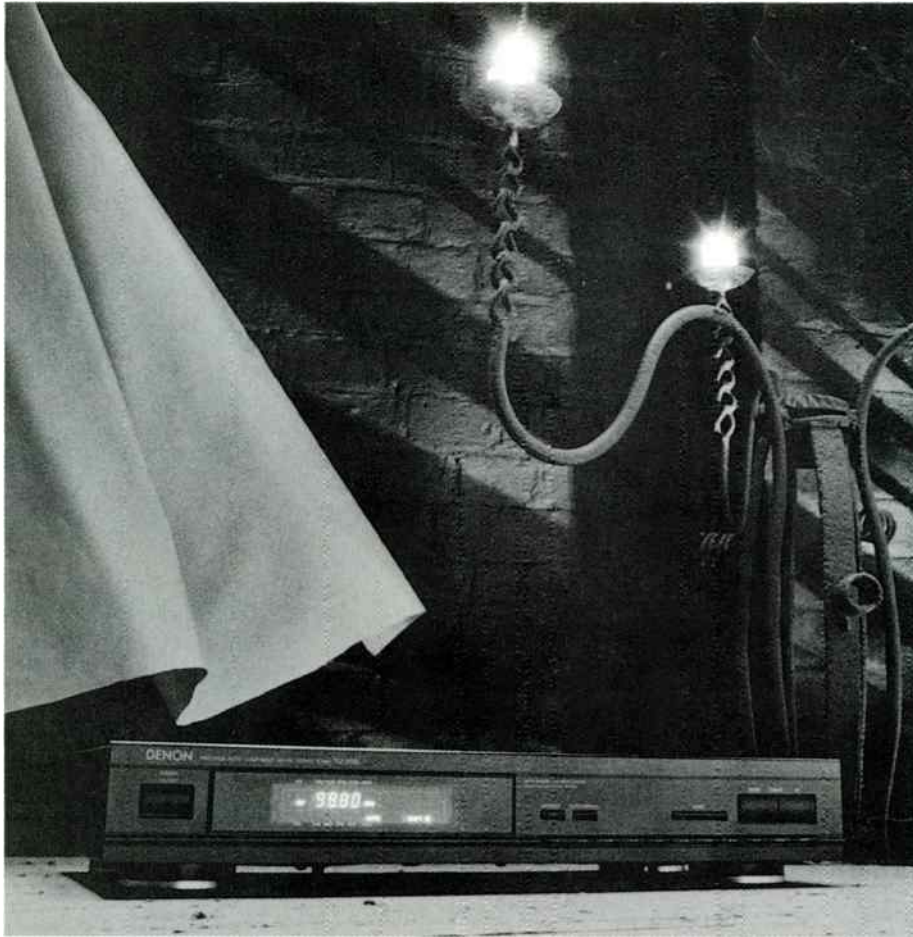
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# *The TU 260L Tuned to perfection*



As a leading manufacturer of equipment for broadcast and recording studios worldwide, Denon has applied its extensive knowledge in making marked advances in basic tuner performance.

The TU 260L is the first budget tuner in the Denon range, but it still offers the build and performance of its highly acclaimed brother, the TU 660L. Denon products may cover a wide range of prices but they represent a single standard of quality.

#### **DESIGN FEATURES**

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#### **WHAT THE PRESS SAY**

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# **DENON**

Enquiries to: Denon Freepost Enquiries, Chiltern Hill, Chalfont St. Peter, Gerrards Cross, Buckinghamshire, SL9 9BS.



## **NAIM AUDIO ANNOUNCE COMPACT DISC PLAYER!**

Naim Audio, hitherto one of the last champions of the vinyl cause, have announced their Compact Disc System, the CDS. Priced at £2937.50, it stands many of the current ideas about Compact Disc playing on their head.

Based around Philips technology, the NA CDS is a two-box unit, consisting of player and power supply, instead of the normal configuration of transport and decoder. The player itself features a top-loading transport mechanism, with a very high grade suspension system. Its fascia features only the most basic controls, with a few more functions available on the remote control handset. The power supply features two massive toroidal transformers and 19 power regulators, as expected from Naim Audio products.

In trying to produce a Compact Disc player with a performance that can match the finest analogue sources, Naim have made developments and improvements to every area of the signal path, from obtaining increased performance at the laser head to a new treatment of the filters at the output stage.

As one would expect from an audiophile unit, variable output and headphone sockets are conspicuous by their absence. Oddly enough, Naim also eschew use of a digital output on the NA CDS, saying that this avoids compromise.

Physically, the NA CDS resembles other full size Naim units, like their top-of-the-range pre-amplifier, the NAC 52, and the player should be available during May. Malcolm Steward, who briefly heard a pre-production version suggested that it was unlike any other Compact Disc player he had ever heard, as it appears to be musical! We shall endeavour to get a NA CDS for full review as soon as possible.



## **RUARK'S LATEST FENCING CHAMPION**

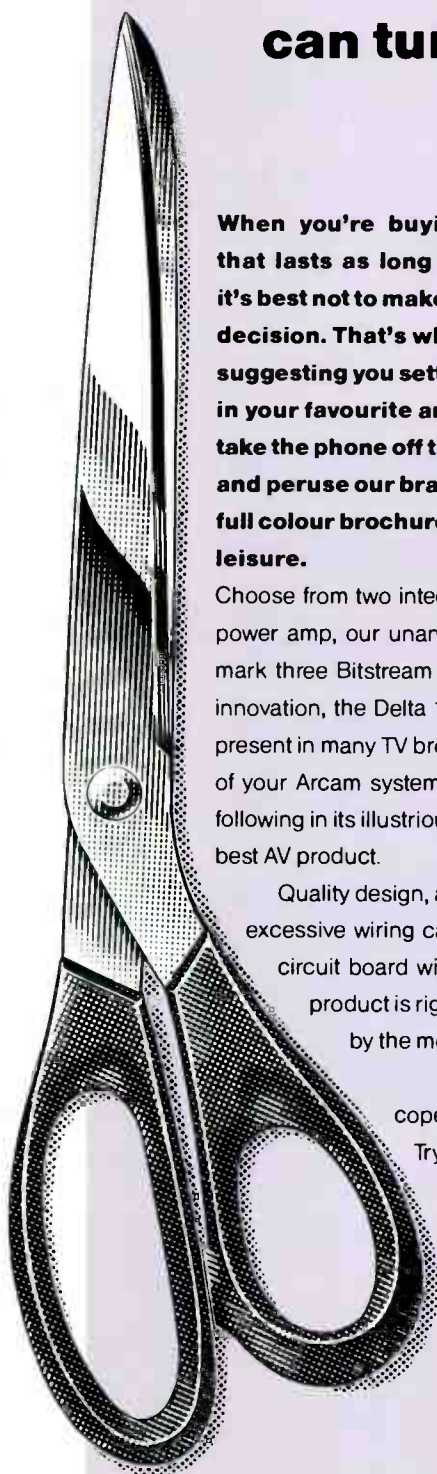
Ruark Acoustics have recently launched an updated version of their best-selling Swordsman loudspeaker, called Swordsman Plus. Successfully received into the export market in September 1990, Ruark are confident that the loudspeaker will be as popular as the Swordsman model it replaces.

The loudspeaker itself is an infinite baffle design, with a 15mm high density medite cabinet, that features extensive cross shelving. Internally, the Swordsman Plus features a hard-wired crossover, instead of placing the crossover on a printed circuit board. This helps to shorten the signal path considerably. The two-way loudspeaker stands 382mm high by 202mm wide by 270 deep and the price is £279. The speakers are now finished in a real walnut veneer.

We, at Hi-Fi World, just happen to have a pair of Ruark Swordsman Plus loudspeakers running in downstairs as this is being written. I feel a review coming on...



## these simple tools can turn this ad into a full colour hi-fi brochure



**When you're buying hi-fi that lasts as long as ours it's best not to make a hasty decision. That's why we're suggesting you settle down in your favourite armchair, take the phone off the hook, and peruse our brand-new, full colour brochure at your leisure.**

Choose from two integrated amplifiers, a tuner, a CD player, a CD transport, a digital preamp, power amp, our unanimously acclaimed Black Box digital to analogue converter (now in its mark three Bitstream version), and the Delta 2 speakers. Then, of course, there's our latest innovation, the Delta 150 NICAM TV tuner. This decodes the digital stereo sound signal now present in many TV broadcasts... what a wizard wheeze to let you get even more enjoyment out of your Arcam system: moving pictures to accompany CD quality sound! The 150 is already following in its illustrious predecessors' footsteps by winning the 1991 What Hi-Fi? Award for the best AV product.

Quality design, allied to simplicity of construction, is the key to our success. For example, excessive wiring can cause all sorts of problems, so our boffins prefer a single fibreglass circuit board with military specification soldering. And, just to make sure, every single product is rigorously tested and repeatedly checked. By the fussiest of computers and by the most finely tuned pairs of ears.

Our 'simple is best' philosophy extends to the controls, too. If you can cope with a pen and scissors, any Arcam component will be a piece of cake. Try it and we'll send you a brochure to feast your eyes on.

Alas, to give your ears a similar treat, you'll have to visit your nearest Arcam dealer.



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## LINN LAUNCH NEW PREAMP

Linn Products have announced the launch of their up-market preamplifier, the Kaim. Priced at £1295, it improves upon many design features found in Linn's current LK1 preamplifier.

As with the existing preamplifier, the Kaim uses solid state switching on the front panel. It eliminates noise that can develop from mechanical controls and facilitates the use of a remote control unit.

The remote control is far more powerful than that provided with the LK1, both in terms of sensitivity and facilities. It has the ability to control both Linn's Kremlin tuner (when it is released) and a Compact Disc player, via the RC5 standard used by most players. The receiver within the preamplifier is also far more sensitive, allowing a user to operate the amplifier from virtually anywhere in the listening room. As yet, the handset lacks a name - I suggested Spock, but Linn were not impressed.

The preamplifier itself has seven source inputs and three line outputs for multi-room, multi-amplifier applications. The Kaim appears to have been designed with flexibility and ease of use in mind, especially with its user programmable functions. These allow the owner to 'customise' the amplifier to suit his or her needs.

Finally, the Kaim has been styled in a minimalist fashion, to match other products in Linn's range and should be available today.

## CELESTION NEWS

Celestion have made major changes to their existing Thousand range of loudspeakers. This revolutionary series of loudspeakers, that feature a ribbon drive unit for the treble and mid-range, have been modified to enhance their compatibility with other hi-fi components.

To this end, Celestion have rebalanced the impedance and sensitivity of the 3000 and 5000 to eight ohms and 84dB/W/m respectively, which enables the loudspeakers to be partnered with a wider variety of amplification and cabling than before. In addition, the crossover has been dramatically redesigned and is said to improve on the integration between the ribbon unit and the bass driver.

To distinguish the new models from the existing Thousand range, Celestion have performed styling changes on both the loudspeakers and the stands. The changes to the loudspeaker are largely cosmetic, whereas the K stand for the Thousand range has been shortened by several inches, which is said to improve the dispersion characteristics of the loudspeakers.

The price of the loudspeakers is now £799.00 for the 3000, £859.00 for the 5000 with the short K stand priced at £165.00.

Moving away from hi-fi, Celestion have sponsored a Chair in European Business at the Nottingham Business School. This title is thought to be the first of its kind in the UK and has been conferred on Professor Robin Ward, the Head of the European Business Centre.

This sponsorship has been seen as proof of Celestion's commitment to reinforcing the links between UK industry and European business research. Ray Cowell, Nottingham Polytechnic's Director and Chief Executive said of Celestion's support: "The decision to fund a Chair in European Business is a remarkable demonstration of fruitful partnerships with industry".

## IN BRIEF

**KENWOOD** have announced the launch of a mere 27 new products. These include five Compact Disc players, seven cassette decks, two DAT (Digital Audio Tape) machines, mini and midi systems and a Dolby Pro-Logic AV (Audio-Video) Receiver, as well as a range of personal hi-fi units.

Some of the more interesting components in Kenwood's plan for world domination include the £499.95 DX-7 portable DAT player, their five channel, KR-V7030 Audio-Video Receiver at £299.95 and their entry-level £109.95 KA-1030 integrated amplifier.

**CREEK AUDIO SYSTEMS** have moved. Their new address is: Creek Audio Systems, Rosehall Industrial Estate, Cotebridge, Strathclyde, Scotland ML5 4TF. Tel: 0236 20199 Fax: 0236 28230

**HECO** have announced a new addition to the HECO range, the Superior Presto 750. Priced around £600, the Presto 750 features two polypropylene bass units that are acoustically isolated within their own sub-enclosures. These effectively act as sub-woofers, allowing the mid-range units to work without being affected by the bass drivers. The unit, which stands 950mm tall, is available in Black and White Ash and Walnut.

**EXCELLENT OMISSION** Last month, our encyclopedic guide to secondhand records shops carefully managed to make a few mistakes. While I maintain that these were deliberately inserted to keep people on their toes, apologies must go to The Elvis Shop, for neglecting to mention that they are based in E12, Audio Excellence Records of 8, Duke St., Cardiff (Tel:0222 664474) for neglecting to mention their shop and finally to the entire population of Croydon for neglecting to mention that we have moved Croydon to Colchester!



## ASTON AUDIO MUSICAL EVENING

Aston Audio, who have recently been appointed Meridian D6000 retailers for the North West are arranging a Meridian musical evening. This is to be held on Wednesday 19th June 1991 at the Stanley Suite of the Stanneylands Hotel, Wilmslow, Cheshire. Starting at 8.30pm, the evening, which should last about 90 minutes, will feature Meridian's new 600 range, with designers on-hand to answer any questions. Admission is by free ticket, available from Aston Audio on 0625-582704.

Aston Audio have also requested people not to burgle them anymore, as they are getting fed up with it! To this end, they have installed a powerful burglar alarm system, with 24 hour video monitoring, machine gun placements, hot and cold running Rottweilers and a very strong door!

● I found the article on the Trough Line interesting and well balanced.

The only point I would make concerns your comments on the derivation of the title 'troughline'. The tuning system is basically as you have said (a shortened quarter wavelength transmission line), but in the original Trough Line tuner the inductor was in the form of an open trough with a square section. It was relatively expensive to fabricate, which was a problem. We did trials on a tube using a brazed end-plate and rod and this proved to be feasible and cheaper in production terms. It is this tube that you can see in later models.

The trough was never made from aluminium. Originally it was copper, but subsequently mild steel heavily copper plated and with a tin 'flash' was employed. At very high frequencies the major current flow is in the skin of the material, hence the need to use a high conductivity material (copper) in order to maximise the oscillator voltage. The tin flash was to reduce corrosion and simplify soldering into the oscillator circuit.

**Ted Ashley, S. Devon**  
(Chief Engineer, Leak)

● I was very interested in your article about, and offer of, a horn loudspeaker kit in your April issue. I would like to ask several questions:

1) Is there any way of attaching floor spikes to the bottom of the cabinets, if used directly on the floor?

2) Do you recommend, and can provision be made for bi-wiring, and if so what difference does that make to the crossover wiring?

3) Is there any arrangement for internal bracing or other methods to ensure cabinet rigidity?

I am intrigued by the whole concept and I do hope you will be able to respond to my queries.

**Patrick Quinn**  
**N. Humberside**

The editor replies: Here are the answers to your questions in the same order you pose them:

1) Target make a set of spikes that can be attached to any loudspeaker. Contact - TARGET AUDIO, Unit 3 - 4 Townsend Centre, Blackburn Road, Houghton Regis, Dunstable, Beds. Tel: 0582-4720037

There is no difficulty in attaching them to our horn. However, we have found it is best to put them on low stands - about 10in will do.

The bass gets even faster like this. Since this is a kit, designed for experimenters and DIY'ers, we suggest you try raising them to a height that gives best results for your room/seat height. Then cobble up a pair of solid stands from wood, broken paving stones or abandoned bricks.

2) The fill-in tweeter can be bi-wired and it would be mildly beneficial to do so. However, the input terminals supplied don't cater for this option. You could fit another pair and we can supply if wanted.

There is no crossover with this loudspeaker. The bass/mid-range unit has been designed by Mordaunt Short to operate gracefully over the entire audio range. To make up for treble loss, there is a "fill in" tweeter. It is fed via a 2.2µF capacitor to block out low frequencies. We have found that for a slightly brighter sound, connecting 1µF in parallel gives a subtle but useful result.

Bass output is modified by the amount of wadding used. Again, the speaker can be tailored to both room conditions and tastes.

The drive units come from Mordaunt Short loudspeakers and give a smooth, refined sound.

3) The cross panels that make up the folded horn in themselves brace the cabinet side walls. There is little need for further bracing.

4) One other query that has arisen concerns power handling. This is a very complex subject, for which there is no definitive answer. However, a sensible maximum amplifier power would be around 80 watts. There's nothing wrong with using more powerful types, providing they are not run flat out. At the other end of the scale, a 30 watt amplifier run into severe overload could cause damage. Bear in mind that these are HI-FI loudspeakers - not disco blasters.

● Although I am in agreement with your technical measurements and comments upon sound quality, I was concerned by your remarks concerning the alleged antiquity of the particular form of Bitstream technology used in the Black Box 3. I would therefore like to make Arcam's position clear.

At Arcam we prefer whenever possible to use proven technology in our products. It is, for example, no accident that our fine sounding (and best selling) Alpha Compact Disc player is based around the highly developed Philips sixteen-bit digital-to-analogue convertors. At the price, we've not yet been able to substantially improve upon this with other conversion technologies. In the Black Box 3 (and Arcam Delta 110 preamplifier), the use of two Philips 7321 Bitstream chips in true differential mode undoubtedly offers excellent sonic results. It is interesting to note that Meridian independently arrived at a very similar configuration in the design of their widely acclaimed 203 D/A convertor and the 206B and 208 players.

The promising new SAA7350 D/A convertor was recently signed off by Philips for mass production. We have been evaluating production samples of the 7350 for some time and it looks to be consistent and useful information in our design armoury. The 7350's performance is clearly superior to a single 7321 chip, as used in many lower cost CD players and certain outboard convertors.

However, it is certainly arguable as to whether or not one 7350 is better than two 7321s as used by Arcam. Frankly, it is our view that the considerable expense required to redesign the BB3 around the 7350 chip would not result in a worthwhile improvement in performance.

Of course, you might like to argue that the market - or at least certain hi-fi reviewers - expect us always to use the latest piece of technology. In my experience most paying customers don't mind what technology you use as long as the results are good. The success of the Alpha CD player, which in the UK presently outsells all other CD players costing over £300, clearly proves that fashion in technology is not always the main consideration.

The up-coming TDA1547 D/A convertor chip to which you referred looks very good indeed on paper. First samples are currently being shipped and we may well consider it for future products. However, the cost of this chip, together with the support ICs you need (including the 7350, for its noise shaper, plus an oversampling filter) make this an expensive route to go. Any high performance D/A convertor employing the '1547 will cost considerably more than the Black Box 3.

Because early production samples of new chips can be both temperamental and variable in quality, we have to be very careful before rushing into production. Possible problems could lead to dissatisfaction amongst our retailers and customers, and also affect our reputation.

Of course we have always been aware of the potential benefits new D/A conversion technologies can bring. Therefore, to protect our customers' investment in Arcam digital products all recent models have been designed in a modular manner. This means that the circuit board containing the DACs can be upgraded or exchanged in the future when worthwhile and proven advances in technology become available. The models to which this applies are the Black Box 3, Delta 110



preamplifier, Delta 70.2 CD player and Alpha CD player.

I believe that no other company anywhere in the world has designed this degree of future proofing into its products.

**John Dawson**  
**Managing Director, Arcam**

**Editor's comment:** But surely, if Black Box 3 works so well with the early SAA7321 Bitstream chip, due to your undisputed ability to support it with excellent circuitry, then B.B.3 would work even better with the newer, improved SAA7350?

Whilst we do not automatically assume 'old' technologies or chips are without merit - hence our coverage of valve amplifiers - the situation with Bitstream is slightly different. By Philips own admission, and as you are well aware, Bitstream has suffered slight flaws. I appreciate that the new TDA1547 is an expensive top-end chip (a Philips representative told me the other day the company make a good profit out of this new line in super-chips), but I feel it is commercially dangerous for UK manufacturers to ignore it, or the SAA7350 which is now six months old.

Readers interested in Bitstream will find chip problems and history listed in our article Bitstream Basics (p28).

Whoops! As if to underline the above, a press release from the Japanese manufacturer Aiwa has just landed on my desk. It says "Aiwa launch one-bit CD players. The XC-700 uses Philips SAA7350 Bitstream circuitry - and costs £179.99". Our worst fears are justified.

● An area which seems to have been completely ignored is the Open Reel tape recorder. There are obvious reasons for its lack of exposure in the hi-fi press, but given the quality of modern cassette tape and decks, what is available on Open Reel?

Also, what is available in tape formulations, what type of noise reduction is utilised and what are the prices of

hardware and software? Had I the money, I would buy an Open Reel machine. Perhaps other readers would be interested too.

**R.G.Bound**  
**Surrey**

There are still strong arguments in favour of Open Reel, especially for professional recording purposes. DAT can be very difficult or almost impossible to use for recording some situations, even though it appears to be the digital answer to analogue Open Reel - at least as far as non-professional users are concerned.

The two main sources of Open Reel recorders are -

TEAC UK Ltd.,  
 5 Marlin House,  
 The Croxley Centre,  
 Watford,  
 Herts. WD1 8YA.  
 Tel: 0923 225235

REVOX,  
 F.W.O. Bauch,  
 49 Theobald Street,  
 Boreham Wood,  
 Herts.  
 WD6 4RZ.  
 Tel: 081-953 0091

Teac can offer domestic and professional models from Teac and Tascam ranges respectively. They are priced from £659 for a Teac 22/2 upward. This machine uses 7in reels and has two speeds, 7.5ips and 15ips. More complex machines cost just over £1000.

Revox offer the B77 MkII two track costing £1806 which offers 7.5ips and 3.75ips. A high speed machine costs just £20 extra but NAB or IEC eq. as specified. There is a C270 series for studio use in 2,4 or 8 track versions, price being anything you'd like to pay, according to specification.

Maxell make Open Reel tapes and Dolby Labs. still make Dolby A two channel noise reduction at £1100 + VAT. More modern, sophisticated and expensive is the new SR (Spectral Recording) system costing £1550.

Contact -



# readers' reply

DOLBY LABORATORIES,  
 346 Clapham Road,  
 London SW9 9AP.  
 Tel: 071-720 1111

Believe it or not, an Open Reel recorder plus Dolby SR achieves 95dB dynamic range, compared to around 92dB for DAT. Furthermore - and this is very important in some circumstances - Open Reel goes into smooth and progressive tape overload if 95dBs is exceeded. DAT goes crash!

For this reason, analogue tape is often preferred for original recording purposes, then DAT is used for copy masters, travelling masters and such like, because it is easier to store or send by post.

Finally, sales (new and some second hand), service and repair of Open Reel recorders is carried out by -

RAPER & WAYMAN Ltd.,  
 Unit 3,  
 Crusader Industrial Estate,  
 167 Hermitage Road,  
 Haringey,  
 London N4 1LZ.  
 Tel: 081-800-8288

They work mainly with professional equipment, but can help with all matters concerning Open Reel.

**Send your letters to:**  
**Hi-Fi World Letters**  
**Page, 64 Castellain**  
**Road, Maida Vale,**  
**London W9 1EX.**

● I was pleased to see that the Pentachord loudspeakers were given a favourable review in the May issue, but was a little bewildered by Alan's remarks that they do not go loud. Even with a modest 15 watt valve amplifier they go as loud as anybody would comfortably wish we feel, even in our 3600 cu ft demonstration room.

**Stephen Harper**  
**Proprietor, Vinyl Tube Audio.**

● I was pleased with the review of my Pentachords in your May issue, but in one respect I think it was unfair. I refer to the comment that they would not go loud. I would guess that Alan Sircom is referring to heavy Rock



played really loud. They were designed for Classical music, it is true, not as a disco loud-speaker. In my view, I think it should have been stated that large scale orchestral music can be played at realistic volume without distress in sizeable rooms, as can Rock music.

**Oliver Brooke**  
**Managing Director**  
**Pentachord Loudspeakers**

**The Editor replies:** As you rightly suspect, Alan was referring to Rock played really loud, as it sometimes is. Richard Kelly and Danny Haikin also sat in on one listening session and they confirmed this aspect of the Pentachords behaviour. We all felt, however, that they sounded superb, a measure of unanimity that is rare for any loudspeaker.

● Having wondered about the reasons for the clear differences between the sound of electrostatic and dynamic loudspeakers, I was interested in reading your articles on Box and Panel Loudspeakers. Unfortunately in my opinion there were errors in one of the contributions which should be pointed out to your readers.

The argument that, because a microphone samples sound over small area, it should be reproduced by a small speaker, is not valid. Suppose we have a concert hall with live orchestra and adjacent to it we have your living room. If the wall between these two does not transmit sound at all, except through two small holes, then we have the equivalent of two small loudspeakers. I don't

think many of us want to listen to a large orchestra this way.

To recreate any musical performance, that is, to create the illusion that there is no wall between the concert hall and your living room, one needs to reproduce the instantaneous amplitude and phase of sound at every point of the separating wall.

An approximate solution is given by putting a number of microphones on a large plane, recording the signal of each separately, and reproducing the signals by an equal number of loudspeakers similarly distributed. In practice one does this by using only two microphones and two loudspeakers.

Which then is better, a pair of small or large loudspeaker surfaces? For a large concert hall and orchestra it is clear that the sound coming through the wall into your living room is rather uniform in amplitude and phase over the separating wall. Making the sound to come through two small holes, like two small loudspeakers, changes the sound field in your living room to be quite different from a plane wave. It becomes two spherical waves and consequently sounds unnatural.

The other extreme would be to have two very large electrostatic panels, each covering half of the separating wall. This too is not optimal because the real sound field varies over each half of the wall, but each of the two speakers radiates approximately in an identical manner over its whole surface. In particular, if there is a singer close to a microphone, the resulting spherical wave is reproduced falsely by such

loudspeakers. For a large distant sound source the waves at microphones are closer to plane waves than spherical waves and are better reproduced by large loud-speaker surfaces such as this.

My own taste runs to Classical music. I prefer to hear the touch of a pianist instead of the characteristics of a loudspeaker box, and I prefer the acoustics of the Vienna opera to that of my living room. Thus it has provided me great pleasure to find out that there are electrostatic speakers which can give me my Mozart with surprising authenticity.

**Eero Byckling**  
**Professor of Technical**  
**Physics, Helsinki University**  
**of Technology**

● I was interested in your article in Hi-Fi World (May) with reference to recording levels. I have been an enthusiast since an early age (open-reel) and at present own a Nakamichi BX-300E.

In your article you intimate that IEC Reference starts at +2dB over Dolby level. It follows that if Dolby is set to +2, IEC should be at +4 on the deck's indicators. If MOL is then quoted as +5, this means recording up to +9 for full potential.

Your column of General Rules I assume refers to IEC MOL levels. If you then suggest a Nakamichi discrete head can hit +10, would it then be +14 above indicated zero if Dolby is set at +2? Or have I completely missed the point? It would seem to explain why I have been able to record to a higher level than your reviews over the years have led me to believe.

As a matter of interest, I list my experiences of a variety of tapes (see box panel).

Despite your recent comments about Nakamichi I would never buy another make, if only because of the excellent backup service they provide.

Good luck with the magazine.

**Ken Gill**  
**Bournemouth, Dorset**

**The Editor replies:** With regard to record levels in General Rules, they are meant to be 'typical' indicated values, assuming Fig 2 conditions where 0VU is set at Dolby level. Record indicators are so approximate, variable in calibration level and coarse in resolution that it is unrealistic to be specific. I was trying to give some rough idea of where to place peak level and they are conservative figures. At the end of the article I make this qualification.

You are absolutely right in your assumptions about recording to +9 when a measured MOL is +5. However, when I say that Naks. can hit "+10" I am trying to generalise within a normal situation and mean +10 as typically indicated. Please bear in mind that these are 'rules of thumb'; they cannot be too accurate. All the same, I will try to remember to be more specific in future!

TAPE	MAX. RECORD LEVEL	BIAS	COMMENTS
TDK AD	+6	4	Good but soft
TDK AR	+8	-3	Very good and solid
TDK SA	+6	-2	Good treble but softens if pushed. Less hissy than AR.
TDK MA-X	+10	0	Excellent, hiss now lower than ever.
That's MRX-PRO	+10	+4	Excellent but hissy
BASF Extra II	+5	-5	Loses treble quickly. Not happy in my BX-300.



Good books on audio are comparatively rare, especially if you don't have easy access to a specialist technical bookshop. Books are going to be the subject of my column this month and good books on audio are going to be featured in the magazine regularly.

I rely heavily on experts to tell me what I need to know - other reviewers do likewise. In fact, I remember one reviewer who, on entering my house, made straight for my bookshelves to see if I had any good books he might lack. Sad to say - I didn't!

Since then I have paid more attention to finding out about and procuring books I consider to be crucial reference works. There are so few good books on hi-fi, that this is a depressingly easy task. Far more exist on audio electronics, but even here there is no surfeit.

Some of the more useful books that have been published are now out of print, creating a collectors market. In the course of my own searches I have met collectors who pay hundreds of pounds for rare and valuable publications. The flip side to this is that a fledgling second hand book market exists where valuable reference works that were once common can now be picked up for a pound or two. These are incredible bargains. Because so few modern books are of much substance, buying old publications second hand is almost a necessity in any case.

Valuable information also resides in the National Reference Library, with BREMA (British Radio Equipment Manufacturers Association) and with the Audio Engineering Society. These are sources I rely on. They possess unique books and research papers that students (and manufacturers) in particular should know about.

### Current Publications

Knowing that Martin Colloms the reviewer is a bit of a book hound too, I phoned him and asked if he knew of any current general book on hi-fi worthy of recommendation. "No" was the reply, "there aren't any at present. All the experts are too busy to spend time writing books." And this is the truth. A few desultory audio books can be found, but there is nothing I would recommend. Martin and I agreed that the last decent ones were a pair written by Gordon King, the reviewer.

Published under the pseudonym John Earl (King and Earl - geddit!), they were entitled

'Pickups and Loudspeakers' and 'Tuners and Amplifiers'. They are detailed, accurate and reasonably understandable. I phoned the original publishers, Fountain Books, and they told me that both had been out of print for a few years. Rights have been transferred to Dixon Price Books (tel: 067-94626) and they confirmed there were no plans to reprint. "Authors of the stature of Gordon are not available any more" I was told, and "there is not enough money in writing a book to encourage busy people to do so. They have to be a labour of love".

Some forms of technical information can date, yet this does not invalidate such books. Gordon's are still worth reading for their basic theory and practical implementations. They would now be second-hand bargains I recommend.

I asked my local bookshop, The Modern Book Co., about hi-fi books. Very conveniently, they are one of Britain's largest technical bookshops and have always had a good hi-fi and audio section.

Current specialist titles they stock are 'High Performance Loudspeakers' by Martin Colloms, just out in its fourth edition and priced at £28.50. Martin recommended this book! Since he designs loudspeakers and deals with most UK manufacturers the information is bang up to date and pertinent to designers. It is a book most people could understand and is unique.

Another is the 'Loudspeaker and Headphone Handbook,' edited by John Borwick. At £65.00 this is expensive and it is a bit variable in content. Some articles are intensely technical, others are not. Good in parts would be my verdict.

Wharfedale are in the process of reprinting Gilbert Briggs fascinating book simply entitled 'Loudspeakers'. Although outdated to the point of being a bit archaic, it is beautifully written. I thoroughly enjoy mine and refer to it regularly. Budding constructors will find plenty of interest here. I still recommend it highly.

Another small, inexpensive but well written book home constructors would like is Vivian Capel's 'An introduction to Loudspeakers and Enclosure Design'. Published by Bernard Babani, it is available generally. Babani tell me, priced at £2.95. See contact details at end.

Anyone seriously interested in Compact Disc and, now, R-DAT are well served by John

Watkinson. He is an authority in these areas, lecturing around the country. The 'Art of Digital Audio' covers Compact Disc and gets very technical, although maths is kept to a minimum. Just released is a follow up on R-DAT, priced at £29.95. It is as comprehensive and correct in its coverage as his CD book. These are authoritative books and by no means are they a lightweight read!

I think I am right in saying there are no definitive books on VHF FM stereo radio. A good one, now out of print, was the Stereo FM Radio Handbook, by Harvey and Bohlman - lecturers at Lincoln College of Technology. This was published by



## Reflections from Noel Keywood

# kaleidoscope

Dixon Price but is now out of print. This is another potential second hand bargain.

There are also no books on cassette technology. Few people in Britain know enough to write a book about it. Richard Kelly interviews the engineers at NAD in this issue - and they are Britain's only experts.

There are some definitive tomes I ought to mention. One about to come out in a new edition is the American 'Audio Cylopaedia' edited by Ballou (previously by Tremaine). Price will be more than £80, but it comes highly recommended by Martin Colloms. Another favourite is the well out of date reference tome called 'Radio Designers Handbook', by F. Langford Smith. First published in Australia, it was distributed by Wireless World in the UK after 1940. It is enormously comprehensive, but now only available second hand.

Electronic theory has never been covered better by anyone than M.G. Scroggie with 'Foundations of Wireless', which is commonly available second hand in various editions. Rare and fascinating is 'Second Thoughts on Radio Theory', also by Scroggie. This is a gem; I love reading it.

And finally we come to my final recommendation. This is a brand new book, available from The Modern Book Co., called 'Setmakers'. It describes itself as 'A History of the Radio and Television Industry' (i.e. British).

Written by Keith Geddes and Gordon Bussey, it is unusually detailed and comprehensive. Everyone in the office loved it, especially for the mink covered 1960's radio! It is well illustrated and a bargain at £14.95.

Don't bother to trek around London looking for hi-fi books. Try -

**The Modern Book Co.,**  
19-21 Praed Street,  
London W2 1NP.  
Tel: 071-402-9176

They have an audio section, component handbooks, radio books and such like. Ask for a free catalogue or phone and ask for help.

Other sources are the Audio Engineering Society and Bernard Babani. The AES are a main conduit for industrial research papers on audio. They sell to non-members and can supply info sheets. Contact -

**AES British Section,**  
Lent Rise Road,  
Burnham,  
Slough, SL1 7NY.  
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A prolific publisher of easily understood and inexpensive electronic and audio books is -

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## Feedback from Alan Sircom sircom's circuits

The vinyl junkies have had one or two let-downs recently. Bitstream Compact Disc players, the downturn in the sales of LPs and the growth of the vinyl-free midi-system have all conspired against intrepid record collectors. Throughout this assault, they have stood resolute, decrying Compact Disc as inferior and more than capable of proving this fact to anyone who expresses interest.

Many of these vinyl addicts are also hi-fi enthusiasts. The two seem to go hand in hand; many hi-fi enthusiasts got into their systems to get the most out of their record collections and vice versa. Many of these people will stand by the manufacturers of their hi-fi equipment, especially when the manufacturer appears to take an anti-Compact Disc stance.

One such company is Naim Audio. Their following among the analogue hordes is almost second to none. Their amplification has been partnered with the Linn Sondek turntable - often enough to make it almost a cliché. While they have not side-stepped the issue, Naim have been quieter than most on the touchy subject of digital audio.

Finally, Naim have spoken! Much to the surprise of the industry, Naim Audio have released a Compact Disc player. As it is priced at nearly £3,000, its impact upon the marketplace will not be too significant. Its impact upon the industry, however, may be.

### End is nigh

People have been heralding the death of vinyl for some time now. Will this player signify the end? I doubt it, somehow. Vinyl might never die, but it may go into a state of semi-consciousness, never to recover. I feel that a CD player by a company so well associated with analogue as Naim Audio can only confirm the near comatose status of vinyl.

As a resolute vinyl addict (I accept Compact Disc can sound good, but at home I have two Compact Discs - both of which make good beer mats!), it saddens me to think of my beloved turntable lying dormant in the future, for want of discs unavailable in LP format. I am also a realist, however; I accept that it is only a matter of time before we all have silver discs in our record collections.

The Naim CD is bound to bring that day one stage closer. This has little to do with sound quality, although I would doubt that a company with the enviable reputation of Naim Audio would risk releasing a poor sounding product. Naim's CD player may well create acceptance of the medium among Linn/Naim owners, surely the largest body of pro-analogue enthusiasts in the UK today.

Having broken down this barrier, the scornful will have to recant, or be considered Luddites. No matter how good the Naim CD player is, it will not replace vinyl from its place of honour, but merely supplement it. The staunch Linn/Naim owner, until now dismissive of the little silver

disc, will no longer have to seek out vinyl recordings as the Compact Disc will now suffice.

If the Naim CD player sounds as good as my colleague Malcolm Steward has suggested, then the Naimophile will have no qualms in purchasing either format. By suggesting this, I am implying that as demand from the audiophile (or, at least some of the audiophile record buying public) slows, so LP sales will take another, perceptible downturn. This will be slow at first, but gaining momentum as more and more devout Linn/Naim'ers turn to Compact Disc.

If and when their counterparts Linn Products launch a CD player (I am not paid to speculate, but I would suggest that Linn will probably follow Naim's lead), another barrier will surely fall. This may be the time the turntable passes into old age rapidly, albeit with considerable grace.

If you've passed a branch of the high street chain, Our Price recently, you may have noticed that the sign outside has changed from Our Price Records to Our Price Music. A subtle change, but a significant one for the vinyl enthusiast. 'Record' shops, the old-fashioned type with row upon row of albums, are scarce now; those that are still in existence are referred to with some reverence.

### Collecting

Collecting records, both new and second-hand has become a more active process. The high street is no longer a source of vinyl, as the chain stores pay little attention to the needs of the "dinosaur with a record player." The hardened addict has to seek out other methods to get his 'fix.' Specialist and second-hand record shops, as listed in last month's Hi-Fi World are fast becoming a haunt for this shady world of shiny black plastic.

Mail order, too, has found a way into the heart of the true enthusiast. I have recently had an Australian mail order thrust under my nose and I am waiting, with some delight, for my copies of Lubricated Goat's 'Paddock of Love' LP and the new disc by 'The Brady Bunch Lawnmower Massacre.' Mail order, as you can see, can be a

source of new and interesting artifacts from around the world.

This is an enjoyable side-effect of vinyl's disappearance. As LP is harder to come by, so the record collector has to become ever more resourceful to obtain recordings. Listings from overseas provide people with a wealth of 'interesting' discs, that would never feature in the high street chain. In this respect, CD's dominance has had a positive effect, although my neighbours may not agree when the Lubricated Goat LP arrives!

We have long past the days where we can be dismissive of CD. One would have thought that LP and CD could have coexisted, thereby increasing chances of record shop sales. When thinking about this idea logically, one realises how futile such a wish was. Two similar formats cannot exist side-by-side: the VHS/Betamax VCR battle proved this.

The video recorder analogy is a good one. Betamax was considered by the cognoscenti to have far better picture and sound quality than the first generation VHS machines, but was still overcome by the popularity of the inferior VHS format.

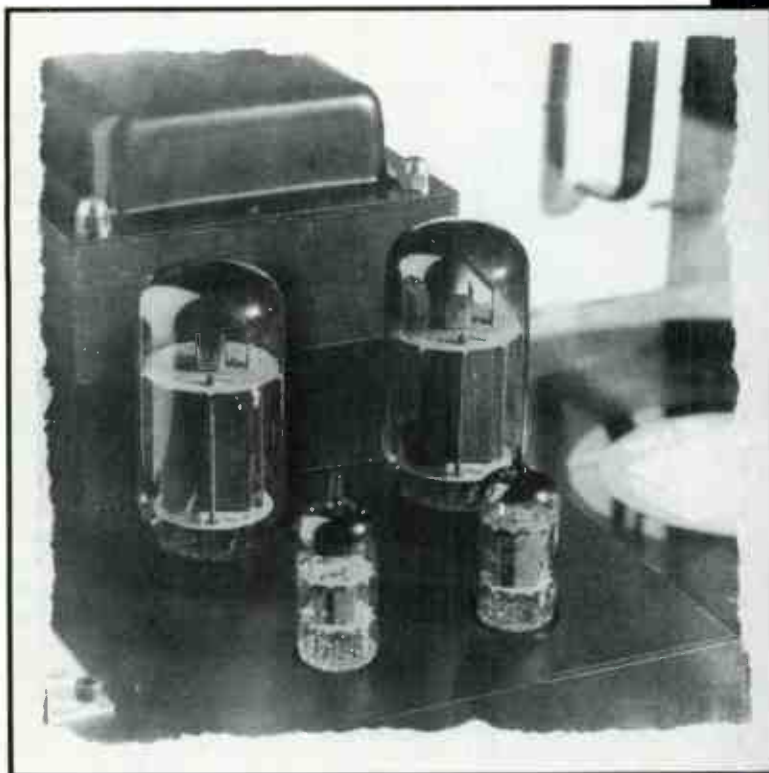
### Inevitability

So where does this leave us vinyl junkies? It will be many years before I make ashtrays and fruit bowls out of my albums. The Compact Disc may now be dominant in the high street; it may now gain acceptance with the enthusiast, but it will not usurp my record deck from its position of power until the very end. It is, nevertheless, hard to avoid the inevitable CD player. And with the onset of players of the quality of the current crop, reluctance to accept CD today smacks of being reactionary. Refuse to change if you must, but base your reasons on sound value judgements, not on blind prejudice.

We are all being 'persuaded' to buy Compact Disc from a variety of sources. The last vestiges of my Punk mentality cry out against such manipulation. I feel that it is already too late; I am starting to succumb. To quote Oscar Wilde: "I can resist everything, except temptation." ●



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We are the only dealer in the UK to specialise in valve amplification and turntables exclusively.

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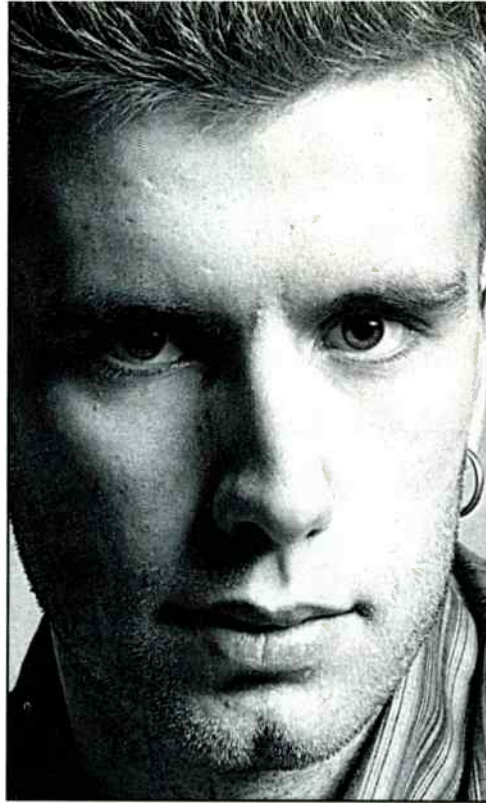
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# desperate dan

This month my hi-fi system has been subject to the best value for money upgrade that it has endured throughout its entire service. I have not added anything to it, nor taken anything away. I have merely set it up in the way it was intended to be used.

The system has always sounded very good. Hence the inspiration to take it all to pieces and then spend hours reassembling and adjusting it has eluded me. But, in an optimistic mood on an otherwise dreary Sunday morning, and partly to relieve the nervous anticipation of the omnibus showing of *East-Enders*, I embarked on my most extensive tweaking session to date.

## Supports

Having invested several hundred pounds in equipment supports, but never got them totally rigid and therefore correctly positioned, I started here. I use an Audiotech ATT-1 table for supporting my turntable (Linn) which I consider to be one of the best I've come across. Whichever you use, it is very important that it is level and rigid. On a carpeted floor, this process of spike adjustment was made much easier after I poked a Stanley blade through the

carpet to make a tiny hole just small enough for the spike tip to fit through. The spikes themselves are not really sharp enough to pierce the carpet backing, and contact with the actual floor - concrete or wood - becomes much firmer. Even in isolation, the improvement that this wrought was immediately obvious: a tighter, more focused sound with improved dynamics.

I next turned my attention to the arm balance of the turntable. I don't know how, but on my Ekos arm this was slightly out, even though it was adjusted only two months ago. Then, I rubbed the drive belt through a slightly damp cloth and cleaned the motor pulley and inner platter with some isopropyl alcohol (available at chemists). If you follow the same procedure, remember when putting the belt back in place, that one side of it will sound better than the other - presuming it is a flat belt.

If the turntable's arm lead is terminated in phono plugs, the plugs themselves may have become loose; mine certainly were. This may sound over the top, but tighten them up! Grip one end with an adjustable spanner and turn the top part until it is firmly done up. The minute vibrations a loose plug sends up an arm lead will

affect the turntable's suspension. Lastly, if you own a stylus cleaner (which you should), use it at least once a day. Even the dirt that is invisible to the naked eye can adversely affect performance.

The cumulative effect of all this was quite remarkable. The resulting sound was cleaner, more defined and above all seemed more pitch stable.

My other equipment sits on a four legged table. I had assumed that the rigidity of this would be hardly important as everything on it was primarily electronic. As this was a go-for-broke, really thorough set-up job, I decided to insert its spikes and stop it gently rocking in the wind. As you may have guessed, even this made an improvement.

## Window cleaning

There are two things that I found combined to give a huge increase in sound quality. The first has almost been recommended to death - Stilton Audio's Kontak cleaner! I have used this sporadically in the past, but have never cleaned an entire system with it. The results are incredible. Its effect is like a really good window clean: you don't 'see' any more, but what you do see is brighter and sharper. Kontak may not give you the fresh

insight into a piece of music which an improved piece of equipment might, but it does consolidate and clarify what is already there.

There is more, however. If you have a stacked table with lots of equipment on it, you will also have the same messy heap of wiring lying behind. So when it comes to linking all the equipment back together, arrange the different leads away from one another. Try to keep all the mains leads to one side, and interconnect leads to the other. Make sure particularly that the turntable's arm lead is not covered by a heap of mains leads. Also, you should find that high quality interconnect leads are marked at one end for source (source being where the signal is coming from). If they're not, you will probably find that any interconnect cable will sound distinctly better one way round to the other.

## Experiment

Finally, loudspeakers. I was amazed to discover that for years I've been using mine too far apart. If you haven't done this before, experiment with different placements. My loudspeakers (Linn Kan - a small bookshelf design) sounded far more coherent and, surprisingly, produced far better stereo at five feet apart as opposed to six feet. Also, do get the stands as rigid as possible; there is little point in buying expensive stands if they still wobble about. If a suspended wooden floor makes stability difficult, the well known tweak of sinking Philips head screws into the floor is always recommended. Use quite large screws (no. 10 or 12) and screw them right down into the floor. The stand spikes can then be used for adjustment, not the screws themselves. As always, do the locking nuts up tightly with a spanner.

What a day! There I was thinking that Sunday's only redeeming features were The Waltons and an hour of mindless tedium from down in the square. Even a week later I remained surprised at how such seemingly small things could result in such a big improvement in sound quality. Still, stranger things have happened, and most of them in *EastEnders* ●



# THE IDEA BEHIND THE NEW MOTOROLA PERSONAL PHONE.



Take a look at the telephone in your home or on your desk. Chances are it's perfectly ordinary with no particularly special features or functions. Why then should a portable phone be any different? The Motorola Personal is a simple straightforward portable telephone. Its design is unique. The mouthpiece folds neatly away when not in use making it small enough to fit into a pocket. And like all Motorola portable and car phones, it is built to exceptionally high standards and stringently tested well beyond the rigours of normal daily use. So it's one of the most durable phones around. The new Personal. Another bright idea from the world's largest and most experienced cellular portable phone manufacturer. For more information about the Motorola Personal and the rest of the Motorola range, dial 100 and ask for Freephone Motorola.





# the advantages of power

**Enormous power is offered  
by preamplifier/power  
amplifier combinations -  
but prices and quality  
vary widely. Noel Keyword  
tests a range of models  
and finds the best are not  
the most expensive.**

Separate preamplifier and power amplifier combinations are usually taken to represent the ultimate in audio quality. They have a certain presence suggestive of fullsome power, coupled with very high quality. And it is a simple truth that all the best amplifiers around are in separate preamplifier/power amplifier form. Naim and Deltec spring into my mind in particular, not to mention various delights sporting warm valves!

The group of preamps and power amps gathered together here are not exclusively from the UK specialist stable. We decided to

inspect the whole pre/power rationale, across a broad price range, by getting in a variety of designs at differing prices. At the bottom end of the range lies the new NAD 1000 preamplifier, priced at £170. It was partnered with an NAD 2100 power amplifier which, at £280, brings the price up to £450 in all. Designed in the UK, but made in Taiwan, NAD sells well worldwide.

Perhaps surprisingly, next up the price scale comes a Quad system. The 34 preamplifier (£329) is a compact and unintrusive unit, beautifully styled, very well made and superbly finished. It can be partnered with the 306 (£290) or 606 (£570) power amplifiers. Although Quad say otherwise (they usually do) the 306 was designed for their electrostatics and it often sounds a bit bass shy with conventional loudspeakers. The 606 has a lot more grunt, but it costs quite a lot more too. We checked out both.

Pitched against each other are the Pioneer and Audiolab combinations. Worlds apart in design philosophy, it is peculiar that they compete almost head on in price and power output. The Pioneer C-73 preamplifier (£450) and M-73 power amplifier (£550) are Japanese giants, designed to stand out wherever they are put. In contrast, the Audiolab is a paragon of UK serious design,

being discreet and understated. You'd hardly know the 8000C preamplifier (£365) and 8000P power amplifier (£525) had any muscle, let alone slightly more than the enormous M-73.

Determinedly at the top of the scale comes Denon's large DAP-6600A monoblock power amplifiers costing £999 each. You need two for stereo, plus a preamplifier of course. We chose Denon's less expensive DAP-2500 (£550) "digital" preamplifier, which accepts digital signal inputs and has remote control (the only one in the group). The complete shebang comes out at £2548 and is powerful enough to run a small disco.

## Top Dog

Usually, the Denons would be top dog as power amplifiers go. The Japanese do like to have potent looking flagships and the large 6600s are sufficient to match or eclipse potential rivals. Trouble is, just a few miles North of the Hi-Fi World offices lies a factory that produces the world's largest power amplifiers. How was it, we are still asking ourselves, that they got to know about this group test? And who was it that said "yes" when Musical Fidelity offered to deliver an SA-470?

The SA-470 has four handles for one good reason: it takes four men to carry one. Costing £5,999, we couldn't in all seriousness include it in this group but how could we leave it out? The SA-470 is an offer you want to refuse, you know you should refuse but, in the end, you can't refuse. We got one.

I am never quite sure whether preamplifiers and separate power amplifiers are fully justified, especially when they turn out 50 watts; even moderately sized integrated amplifiers can manage this. Yet there is a certain satisfaction to be had from knowing, whilst you are twiddling with the volume control, somewhere close to your feet lurks a powerhouse able to respond to any wish. It may not be of course, and this is where I sometimes wonder whether the attraction of pre/power combos is more apparent than real. My first one was a Quad 33/303, bought back in 1972 I believe, and I loved every second of owning it, but the 303 was hardly powerful.

Quad do make their preamplifiers small, attractive and easy to use, which alone is enough to justify their existence. Quad buyers are a certain breed that want a product that is both well made in a traditional manner, yet discreet too. What then can we make of the massive Pioneer C-73 preamplifier? It is bigger than most integrated amplifiers - and many power amps too. It can only exist as a statement, since there is no need to make a preamplifier this big, nor so brassy either.

So our group contains all sorts, reflecting some of the variety available in preamplifiers and power amplifiers. And yes you can mix and match preamps and power amps from different manufacturers, but this is only advisable if you know precisely what you want and what various makes of amplifier have to offer in terms of sound quality. To help make such a choice, all the preamplifiers were individually assessed to determine their own particular sound quality and level of ability. ●



### Measured Performance

The 8000P power amplifier delivers a healthy 144 watts into a standard eight ohm load - representative of a typical loudspeaker. Because the power supply transformer is a quality item it allows a substantial power increase to 240 watts. The 8000P is one of the most powerful of the power amplifiers tested. It is only outgunned by the giant Denons.

The CD input exhibits flat frequency response right down to 6Hz, which is an appropriately low limit, since some CDs do possess sub-sonics and all players reach 4Hz. The upper limit is deliberately set at 40kHz, high frequencies being attenuated to avoid slew rate limiting and transient intermodulation distortion. Noise was very low at -96dB, which again matches the characteristics of CD well. Unlike many UK amplifiers, DC offset on the direct coupled loudspeaker output measured just a few millivolts, meeting Japanese standards.

I was not surprised to find a complete absence of distortion. The critical high frequency distortion analysis, below, shows this well. Note the complete absence of spikes along the bottom. Whilst this is via the CD input, disc measured the same.

The disc stages were accurately equalised, but I was a bit surprised to find differing low frequency roll off points on MC and MM, the latter going lower - down to 16Hz. MC rolls off at 30Hz and could go lower in my view. Both inputs have very little hiss but the MC input suffers hum, which needs to be eradicated.

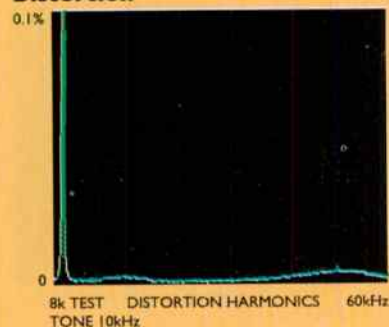
Power 144 watts

#### CD/tuner/aux

Frequency response 6Hz - 40kHz  
 Separation -76dB  
 Noise -96dB  
 Distortion 0.005%  
 Sensitivity 180mV  
 dc offset 2/7mV

Disc	MM	MC
Frequency response	15Hz-40kHz	30Hz-32kHz
Separation	-69dB	-83dB
Noise	-79dB	-73dB
Distortion	0.006%	0.006%
Sensitivity	3.5mV	0.2mV
Overload	170mV	10mV

#### Distortion



No measurable distortion



## AUDIOLAB

8000C PRE-AMP £375  
 8000P POWER AMP £545

In their own way, the Audiolab pre-amp and power amp are sizeable objects. The pictures will show their low height, but not their 45cm width and 30cm box depth. With leads protruding from the rear, these units would just squeeze onto a 12in shelf, with front overhang.

Relative to output however, the Audiolabs are small. I was taken aback when the modest looking 8000P, with its barren fascia and lack of lights, proceeded to turn out more power at 144 watts than all the others - massive Denons excluded. This rose steeply to 240 watts into a low load, indicating the presence of a superb power supply, which in turn suggests a muscular sound with solid, powerful bass.

Eager to see how Audiolab managed to get so much out of so slim a box, I whipped the top cover off quickly. Awaiting my gaze was a beautifully built amplifier, so finely finished in every precise detail that it was a delight to study. A massive toroidal transformer and its associated power supply components sit inside a screened compartment. Bus bar wiring, neatly laid out and well secured by ties to look visually pleasing, as well as functionally efficient, underlines the perfectionist attention that has been paid to build quality. Special heat sink blocks carry massive bipolar transistor output devices and high quality, glass fibre circuit boards are studded with neatly aligned discrete components. I still find it peculiar that the apparently fastidious Japanese don't bother to match this sort of thing.

Paralleled output sockets are provided for biwiring, but only one pair of loudspeakers can be used, in order to eliminate mechanical switching of the speaker lines. A chunky power switch needs a good push, after which the clunk of a relay signals that the 8000P is ready to deliver current.

The 8000C preamplifier has tuner, video and CD inputs, as well as independent moving coil and moving magnet cartridge inputs. The MC stage is a serious one intended for high quality, low output cartridge types. Even with its enormous gain, it has little hiss. Two tape decks can be con-

nected also, monitoring from a three head machine being possible by setting the record selector to the input required and the input selector to tape. It's a convoluted way of doing things but satisfactory all the same. High quality tone controls are fitted, together with a bypass switch. There is a headphone output, mute button and balance control too. This pre-amp has been sensibly configured to possess a wide array of sensible facilities.

### Sound Quality

The initial preamplifier assessment routine through the Musical Fidelity SA 470 showed in vivid detail just how good the 8000C was. The moving coil input surprised me a bit by exhibiting slight hum at full gain. Hiss was low, if not quite as low as that of the NAD. However, these matters apart, the 8000C gave such a beautifully open and lucid performance from LP, via its moving coil input, that I just sat back and listened in enrapt awe. The detailing and insight was unmatched by the other preamps, bringing a superb sense of presence to performers and bands. I was drawn right in and revelled in the music.

Much the same abilities were obvious through the moving magnet stage and from Compact Disc. The 8000C is a thoroughly excellent preamplifier that I proceeded to use as a reference.

Connecting up the 8000P power amplifier brought no drawbacks. The two units offer a sound so precise and pure, with such superb insight into the finest details of a performance, that I remained beguiled. Echoes I had not really been aware of with the other units rang and faded around a soloist, for example, requalifying the whole performance. Here was a real environment with a singer in it, not a dry and unreal construction. The power amplifier seems to have unrestrained dynamics too, allowing instruments to rise and fall freely in strength. This enriched the sense of modulation achieved by artists within their playing, bringing extra interest and character to a performance.

### Summary

The Audiolab 8000C and 8000P shocked me by the depth and extent of their abilities. This is one of the best amplifiers I have heard for some time. I thoroughly recommend it is auditioned.





## DENON

**DAP-2500 PRE-AMP £569.00**  
**POA-6600A POWER AMP**  
**£999.00 (pair)**

Not much can overshadow an amplifier capable of 300 watts output into a normal load and no less than 500 watts into a low load. What's more, each POA-6600A mono block only weighs 15.6kgs (34lbs) and can be carried by one person without difficulty. I was surprised to find that Denon use a screened toroidal transformer in each block; this is UK practice not commonly adopted in Japan. There are massive smoothing capacitors too, plus a copper plate heatsink for superb thermal conductivity, in order to keep the output transistors cool.

Denon use "optical Class A" bias, a form of dynamic bias system that makes each output transistor handle all of the output waveform in Class A fashion, whilst reducing bias in quiescent conditions to prevent overheating. Dynamic Class A bias was first devised by Threshold in the USA I believe and has subsequently been taken up enthusiastically by the Japanese. There's lots of scepticism amongst designers I speak to about any dynamic biasing system, so it is best to keep an open mind about its possible effectiveness. Two pairs of loudspeakers can be driven by a pair of monoblocks.

The DAP-2500 preamplifier has remote control of volume (motor driven), input selection and power. It is a so called "digital" pre-amp, meaning it has an on board Digital to Analogue convertor (DAC). A Compact Disc transport or DAT recorder can be connected up direct, using an optical or electrical link. There are plenty of inputs, plus provision for the connection of two tape decks, with monitoring between them. Tone controls are fitted, together with a bypass switch. A moving coil or moving magnet cartridge can be accommodated, selection being from the front panel. Most minor or little used controls are hidden beneath a flap, in order to keep the fascia uncluttered.

### Sound Quality

Listening to the DAP-2500 preamplifier connected to the Musical Fidelity SA-470, in

my initial preamp assessment routine, I noted that via its moving coil stages it did not quite have the clarity or openness of the Pioneer C-73 that preceded it. There was also some dirtiness or clutter through the mid-band, albeit slight in amount. Overall the presentation from moving coil cartridge was fast and tight, but not finely textured or insightful. Some hum was noticeable at high volume too.

The moving magnet cartridge stage sounded a bit dull and bass heavy. There was far less insight here than that offered by some of the other preamps. A greater sense of incoherence arose between low frequencies and the mid-range and top. I started to wonder whether the DAP-2500 was loading the Audio Technica AT450E badly, since this cartridge is load sensitive. In all the DAP-2500 was pretty mediocre on moving magnet.

Compact Disc sounded a trifle bland and some incisiveness in the treble was present. Again, the sound was not especially open or lucid, I felt. There was a lack of real finesse or insight. This is not a subtle sounding pre-amplifier.

Using both the Denon DAP-2500 and a reference pre-amplifier, the POA-6600A power amplifiers also failed to shine. They have a reasonably neutral mid-band but some treble coarseness and a plodding bass. Left/right imaging was superb, but stage depth and fine detailing was not too strong.

It was unlikely that the complete combo of DAP-2500 pre-amplifier and POA-6600A power amplifiers could rise above the results achieved above - and they didn't. The power amplifiers were a trifle disappointing. They have a soft, indistinct bass quality, albeit with plenty of quantity. The combination did produce a big, bold sound that some people may find alluring. Unfortunately, I found this big sound somewhat lacking in authority, ultimately.

### Summary

I can only say I was disappointed by this big Denon combo. The pre-amplifier is poor and the power amplifiers are mediocre in sound quality. Except for sheer power, I feel that in many respects this combination is overshadowed by some of the better integrated amplifiers currently available.

### Measured Performance

Power output measured 300 watts into eight ohms and 500 watts into four ohms. The power supply is a good one. These big Denons can move some current: they are very suited to large, inefficient or difficult loudspeakers.

I was fascinated to note that Denon limit high frequency extension on all inputs, like UK designers - but unlike their Japanese rivals, most of whom seem to think bigger numbers are better per se. The CD input extends down to 6Hz, matching CD's low frequency limit closely. High frequency output rolls off above 40kHz however, which is only sensible since CD reaches 21kHz before dropping dead. Any output above this frequency is unwanted and should be attenuated or cut out completely.

The digital section of the DAP-2500 uses Burr Brown PCM56P sixteen bit convertors, with Most Significant Bit adjustment fitted - an option specified by Burr Brown. As usual, they produced very little distortion and displayed flat frequency response too. Denon have used the same convertor technology found on their better players.

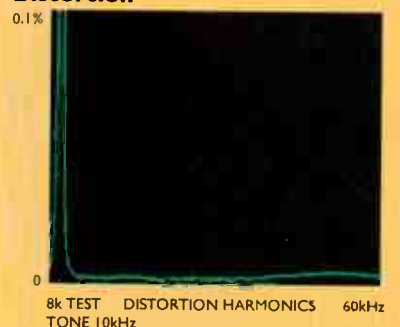
High frequency extension of the disc stages was inconsistent. Moving Magnet was fine at 39kHz, but Moving Coil reached only 16kHz (-1dB), which is too low. This has been badly engineered. Hiss was low however.

Power	300watts
Frequency response	6Hz - 37kHz
Separation	-67dB
Noise	-97dB
Distortion	0.004%
Sensitivity	170mV
dc offset	6/0.1mV

	MM	MC
Disc Frequency response	9Hz-39kHz	24Hz-16kHz
Separation	-70dB	-65dB
Noise	-90dB	-73dB
Distortion	0.005%	0.005%
Sensitivity	2.8mV	0.28mV
Overload	180mV	17mV

Digital input:	
Frequency response	5Hz - 20.8kHz
Distortion	-6dB      0.005%
	-30dB      0.04%
	-90dB      45%

### Distortion



No measurable distortion



## Measured Performance

Although the 2100 is rated at 50 watts continuous output, I found it gave no less than 150 watts for a short length of time (around 1 second), to accommodate musical peaks. This increases to no less than 225 watts into a low four ohm load.

So for the price, the 2100 appears to pack some punch. However, although NAD say their real music power system is to accommodate short term peaks, it effectively drives heavy, continuous bass for long periods and will deliver full output. I had to run a test to check this, the 2100 being made to give full output with music, feeding dummy loads. It gave 150watts continuously, providing it was not driven into very heavy clipping.

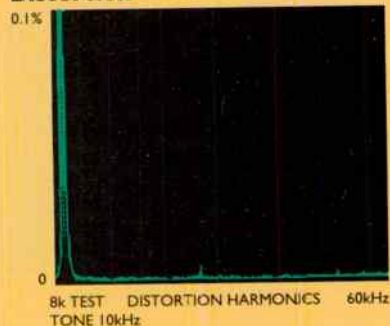
Half of the 2100 case is empty, this being space reserved for components required in the more powerful 2400 and 2600A models I suspect. For those that might want more continuous power output, the two channels can be connected together in bridged mode to give 150 watts (300 watts peak).

The preamplifier measures beautifully, but it does have a fixed sub-sonic filter operative on all inputs, including CD. Whilst there is an argument for this being applied to LP, there is none for CD.

Distortion through the entire chain, through all inputs, was negligible. The spectrum analysis below shows this.

Power	150 watts	
CD/tuner/aux		
Frequency response	14Hz - 50kHz	
Separation	-73dB	
Noise	-104dB	
Distortion	0.005%	
Sensitivity	250mV	
dc offset	-20/-20mV	
Disc	MM	MC
Frequency response	16Hz-61kHz	22Hz-40kHz
Separation	-72dB	-65dB
Noise	-9dB	-76dB
Distortion	0.006%	0.006%
Sensitivity	4.5mV	0.3mV
Overload	200mV	14mV

### Distortion



A trace of third harmonic distortion



## NAD

### 1000 PRE-AMPLIFIER 2100 POWER AMPLIFIER

The new NAD Monitor 1000 preamplifier tested here costs just £170, yet in measured performance it was better than the Denon and Pioneer pre-amps in certain crucial areas, like hiss on the Moving Coil cartridge input for example. It matched the Audiolab as well. NAD have styled the 1000 cleanly, finished it superbly and at the same time reached a standard of build quality equal to that of Oriental rivals, but not UK built items.

But look at some of the technology. It has special tone controls that operate only at spectrum extremes, in order to be able to fine trim response errors whilst not affecting the mid-band. It can drive long lines to distant power amps and it has two sets of outputs for bi-amping. The moving coil input is probably the quietest in the world. I have tested most and the NAD is significantly quieter than the norm. Its equivalent input noise is exceptionally low, approaching the theoretical limit. Integrated circuits are not used, only high performance discrete devices. There is a quality volume control from Alps, plus a headphone output.

NAD fit a tape monitor button, but there is also a switched tape input on the input selector switch. Video, tuner and CD inputs exist also.

The 2100 power amplifier is rated at 50 watts continuous power, but much more on short musical peaks. An I+HF music power figure of 200 watts is quoted, which will confuse just about everybody. I must admit I don't remember the details of this little used specification. Two pairs of loudspeakers can be driven, with switching between them being located on the front panel. The 2100 can be bridged to operate in mono and give more output.

### Sound Quality

The NAD 1000 preamplifier sounded very smooth, even creamy across the treble region and slightly opaque. It has a characteristic sound that, dare I say it, is typical of NAD. Quite how they, like Arcam, always get the same sort of sound I don't know. The disc stages were quieter than those of all the

other preamplifiers, which is quite a tribute to their engineering expertise. I know from measurement that the NAD moving coil input is one of the quietest available in the world; no Japanese amplifier has yet matched it.

If ever there was a synergy between components it has to be between the preamplifier and the 2100 power amplifier. Whilst I wasn't unduly impressed by the 1000 preamplifier on its own - but I had been listening to designs costing four times as much - its sound falls into context with the 2100 to form a cohesive whole. And as always the NAD sound is highly individual, being just about unique. Generalising, I would describe it as rounded, extremely easy on the ear but slightly enclosed and lacking real lucidity. Yet other factors take ones attention, like the easy, uncluttered presentation that just sounds delightfully clean, satisfactorily detailed yet simple. The 1000/2100 combo imaged superbly as well.

The moving coil cartridge input proved rich in the way it resolved information, but really low level detail was a bit lacking. A big and solid bass performance gave weight to the sound, more so than that of the other amplifiers. I liked this performance a lot, finding it both relaxing and entertaining. I felt the original intentions of musicians were well conveyed, in that phrasings and contrasts were differentiated and reproduced faithfully.

With the Audio Technica AT450E cartridge matters were less happy. The sound was over warm and somewhat opaque. Big, solid bass became obvious. The lack of real clarity I found distracting.

Compact Disc was as successful as moving coil. Although not an especially insightful or lucid amplifier, I found the NAD rich in the way its resolved and reproduced dynamic contrasts, very easy and quiet in its background and of fine extreme left/right separation. A strong sense of power was conveyed by the 2100; it is very muscular yet quite pacy too. All in all, I found it very enjoyable but, as always, the NAD sounds very different from other amplifiers.

### Summary

This combo successfully offers a powerful sound with big bass and plenty of action. At the same time it manages to be relaxed, smooth and easy on the ear. All of this is pure NAD - and very enjoyable too.





## PIONEER

C-73 PRE-AMP £449.95

M-73 POWER AMP £549.95

US glitz styling is one distinguishing feature of top end Pioneer products you have to accept before anything else. It dominates overall appearance and graces them with all the subtle charm of a 1970's Cadillac. Both the preamplifier and the power amplifier are tastefully finished with high gloss fascias and side panels, broken by gold lettering, trims and push buttons. It's no product for those with more conservative taste.

The power amplifier is technologically distinguished by being switchable for Class A or Class B operation. However, I suspect both descriptions are inaccurate. Pure Class A is meant to give the best sound, but since half maximum current is passed at idling, Class A amplifiers run very hot, even when of low power. In Class A the M73 was low powered, producing just 24 watts - little more than a Musical Fidelity A1 (substantially Class A). It did not run very hot though.

The power amplifier will feed two pairs of loudspeakers, switch selected from its front panel.

The C-73 pre-amplifier has a line of input selector buttons along its front panel, controlling five auxiliary inputs, plus CD, tuner and tape. All are of the same sensitivity. The disc stage is switchable between moving coil and moving magnet. Pressing an input selector brings forth the click of a relay. Looking inside it is obvious that signal paths have been kept short by the use of relays and a good quality volume control potentiometer is driven by a shaft for the same laudable reason. Otherwise, internal layout was scrappy.

### Sound Quality

Inspection of the C-73 preamplifier did not predispose me to liking it. I thought it would sound pretty poor, possibly the worst of the group. I was very surprised when it showed itself to be quite fine all round, better than all except the Audiolab 8000C.

A lovely sense of clarity and coherence was obvious through the moving coil input, with sweet and well differentiated treble. I

felt there was some loss of precision of imaging and real insight in comparison to the Audiolab, but any losses there were would go unnoticed except in a direct comparison. I had to admit that whilst this preamplifier looks pretty tacky inside and out, it actually sounded very good via its moving coil input.

Results through the Moving Magnet stage were similar, except that deep bass output was stronger, becoming almost thunderous at times. I suspect that this was more due to the preamplifier revealing the bottom end performance of the arm and cartridge (Rega RB-300 + Audio Technica AT-450E) in use, than any inherent characteristic of the pre-amp itself becoming known.

I was less enthusiastic about the complete Pioneer set up, with the M-73 power amplifier. Generalising, Class A was a disappointment. It gave balanced results in a tonal sense, but its ability to resolve dynamic contrasts was poor, robbing music of much of its life. I was quite shocked by the improvement Class B provided. Suddenly the M-73 had power and drama; it was conveying the scale of a performance and showing how it had been achieved by the musicians concerned. The only drawback now was a quite fierce treble quality. However, this gave the M-73 enormous transient speed and impact, making it frightening to listen to at times. It also has dry, tight bass, helping toward a feeling of speed and control.

Moving coil sounded clear, possessed insight and was quite sweet sounding. Moving magnet was less satisfactory generally, sounding somewhat incoherent. It was the sort of sound I would expect from an amplifier of no great pretensions.

Compact Disc reproduction was characterised by power and speed: the M-73 began to sound quite threatening at times and also very fast. However, it lacked the ability to resolve real low level information and provide either great insight or much of a sense of atmosphere. In outline I could tell a big power amplifier was at work - it was the fine details that were missing.

### Summary

The C-73 preamplifier worked very well. It sounded clear and lucid. The M-73 power amplifier was a disappointment in Class A, but in Class B offers both power and speed. What it lacks is insight and finesse.

### Measured Performance

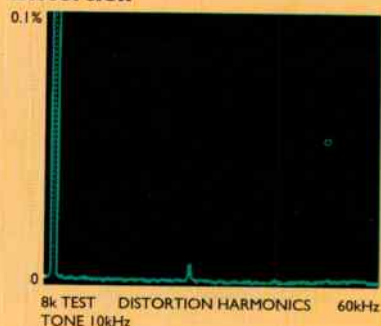
Output of the M-73 power amplifier measured 144 watts into a normal eight ohm load - representative of a typical loudspeaker (in a simple way). Low loads are coped with successfully, output increasing to 225 watts. This is about on par with the less expensive NAD 2100 and Audiolab 8000P power amplifiers in terms of the volume level it will provide. As a result, the addition of Class A operation might be seen as justification for the higher price of the M-73.

Whilst Class A is, traditionally, meant to provide a sweeter sound, power has to be limited to keep internal temperatures and heat output in check. The M-73 will deliver just 24 watts in Class A, this rising to 42 watts into a four ohm load. This is on par with a Musical Fidelity A1 amplifier, costing £300, so I am not so sure the bulk, weight and expense of the M-73 is easily justified as a Class A amplifier when looked at in the overall market context.

Distortion was low in Class B and sank to negligibility (0.005%) in Class A. The spectrum analysis below is for Class B operation. The CD input has an extended low frequency response, which is complementary to the medium. The high frequency response unnecessarily reaches 133kHz though, which is injudiciously high, allowing rubbish through. The disc stages have an extended sub-sonic response and a necessary switchable warp filter. In comparison to the Audiolab and NAD, the moving coil input was noisy.

Power	144 watts	
CD/tuner/aux		
Frequency response	4Hz - 133kHz	
Separation	-86dB	
Noise	-101dB	
Distortion	0.007%	
Sensitivity	160mV	
dc offset	-17/-17mV	
Disc	MM	MC
Frequency response	8Hz-70kHz	9Hz-70kHz
Separation	-89dB	-73dB
Noise	-88dB	-dB
Distortion	0.007%	0.007%
Sensitivity	3mV	0.3mV
Overload	130mV	15mV

### Distortion



A small amount of third harmonic distortion



### Measured Performance

What Quad do not freely admit to is that both the 34 and the 306 are specified to be ideal for the Quad Electrostatic loudspeakers. Don't let me mislead you into thinking that they suffer for it or are inappropriate for wider general use. Neither is true. In fact, although the 34's facilities suit the ESL-63s, they also suit most other loudspeakers too. But some apparent curiosities are explained by this.

The little 306 gives just 50 watts, roughly matching the power handling of the '63s. It doesn't have much grunt: power increases to 65 watts into four ohms, which isn't much for a £295 amplifier. However, the 63s do not like bass wellie, it only puts them under strain, so what the 306 does is sensible.

The bigger and more expensive 606 is for those who want a meatier sound from Quad. I tested one for this report: it gave 136 watts into eight ohms and this increased healthily to 225 watts into four ohms, putting the 606 on par with the Audiolab, NAD and Pioneer power amplifiers in terms of power. At £583 it is just a shade more expensive than the Audiolab and Pioneer.

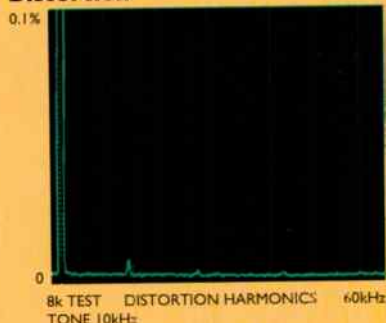
Quad amplifiers measure all but perfectly, using conventional steady state tests. At normal music levels distortion of the 34/306 combination hovered around 0.005% and near full output at high frequencies it rose to just 0.012% - comparable to the best. The 606 measures likewise. Frequency response, noise, separation and all other major parameters measured perfectly. The disc stage is very quiet and accurately equalised to possess flat frequency response. Low frequency gain is rolled off below 24Hz to cut out warp signals.

Power 50 watts

CD/tuner/aux  
 Frequency response 15Hz - 65kHz  
 Separation -75dB  
 Noise -84dB  
 Distortion 0.005%  
 Sensitivity 240mV  
 dc offset 0.1/0.2mV

Disc	MM	MC
Frequency response	25Hz-34kHz	not tested
Separation	-75dB	
Noise	-80dB	
Distortion	0.003%	
Sensitivity	2.2mV	
Overload	140mV	

### Distortion



Slight amount of second harmonic distortion



## QUAD

34 CONTROL UNIT £336

306 POWER AMPLIFIER £295

The Quad 34 preamplifier and 306 power amplifier offer domestic convenience and harmony. The little 34 preamplifier can be put almost anywhere. It will nestle comfortably on a 10in shelf and, being low, remains visually unintrusive. Unlike all the other preamplifiers, the 34 has a switched mains output. This runs to the power amplifier, so it powers up automatically when the preamplifier is switched on.

The styling of the 34 is starkly simple in comparison to the old 33 which was a three dimensional crafted wonder. The front panel is a casting, giving it enormous solidity, strong rolled edges and perfect end detailing, unlike that of extruded Oriental front panels. Quad have always used front castings I believe - and only now are others beginning to follow suit. It's an expensive process, but it gives unmatchable results.

The controls are rather sweet to use though - especially the light-touch push buttons. These select inputs and are so easy to use, you wonder why everyone doesn't adopt the system. Clear legends are printed onto the buttons and an LED warning light shows which input has been selected. As always, sensitivities have been carefully set and are clearly stated in the handbook. Radio is more sensitive than CD, for example, and no fewer than six disc input modules are available, in order to accommodate all types of pickup cartridge. These offer low, medium or high sensitivity for moving magnet and moving coil cartridges, loading conditions being standardised at 100ohms/220nF for MC and 47k/220pF for MM. Quad fit a medium sensitivity MM (3mV) module as standard.

Instead of tone controls the 34 has a fine tilt control that alters basic tonal balance right across the audio band. It works superbly, in measured performance and subjective action, making the 34 sound subtly "lighter" or "heavier". It is more delicate and yet more effective than tone controls. A deep-bass boost and cut control is added to compensate for the low frequency behaviour of small loudspeakers and this works well also.

Rarely seen nowadays is a treble filter,

Quad's offering two operating frequencies and two roll off rates. That it should be left in with LP is an absurdly outdated view: it is time Quad bought themselves a decent modern turntable and listened to LP properly.

### Sound Quality

The 34 preamplifier connected up to the SA-470 showed itself to be neutral sounding in tonal balance. It has a smooth, even handed presentation very suited to classical music. The MM disc stage was especially good in its basic structuring of the music; I got no impression of the treble of our Audio Technica AT450E being divorced from the rest of the performance, nor did I hear any turgidity, due to incorrect loading. The 34 made a better job here than many, although it did not have the highest degree of transparency or image placement sharpness. I found I enjoyed listening to LP however. Compact Disc was also presented faithfully, with some loss of insight and lucidity.

The 34 preamplifier in conjunction with the 306 power amplifier gave a smooth and relaxing performance. It would appeal more to the classical listener than the Rock fan however; the 306 does not go down very deep and bass definiton is on the soft side. The strengths of the combination in subjective terms are an inability to offend due to smoothness and even handedness.

Far more bass was available from the 606 power amplifier; it seemed to go down an extra octave and give more slam. Yet again, the 606 maintained the sense of smoothness of the 34/306 combo, bordering on being warm sounding. It was not especially insightful however: I wished for a greater sense of communication of the players abilities and intentions and more of a feeling of being close to the performance. The perspective was rather more distant than is possible. However, yet again the bottom line is that this Quad combination offers smoothness and total freedom from offense. It is a sound that can provide pleasure long term.

### Summary

The Quad amplifiers are unintrusive and offer a smooth, civilised sound. Whilst not being the last word in transparency or power, the disc stage was especially fine and they proved very relaxing over long periods.

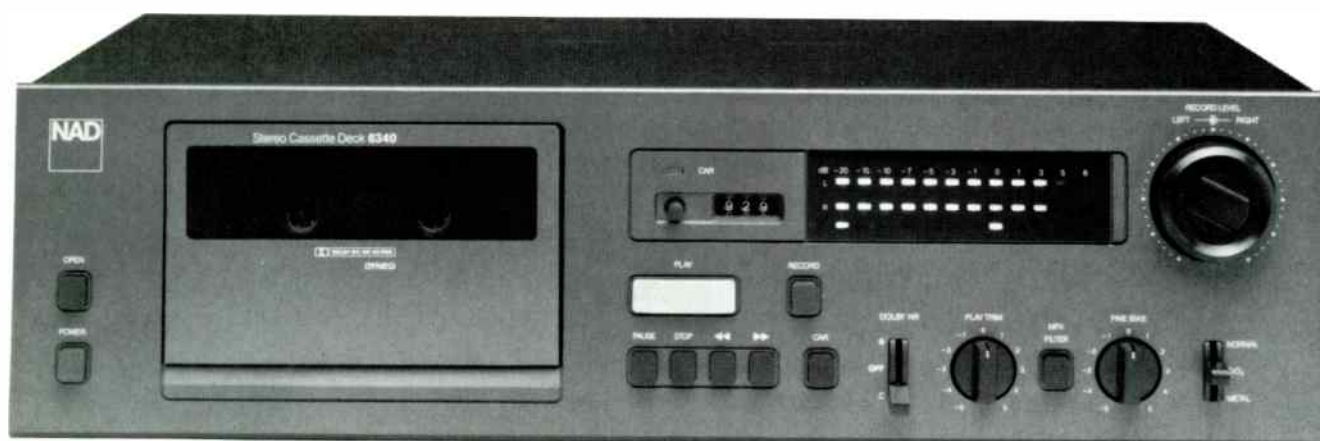
CONT

# THE NAD 6340 CASSETTE DECK

DESIGNED FOR THE AUDIOPHILE BY  
“BRITAIN'S ONLY CASSETTE DECK EXPERTS”

“This deck is simply the yardstick of sound quality in cassette decks, over a wide price region around it. You would have to spend much more to get better and even then differences might be disappointingly small. Measured performance proves it, sound quality confirms it. And with pre-recorded tapes no amount would bring improvement, because the NAD 6340 simply is the best.”

*HI-FI REVIEW*



We didn't make the statement that we considered ourselves to be ' Britain's only cassette deck experts' — the statement was made by a leading audio critic in a recent technical report on a number of leading decks. While we were gratified to hear this verdict, we were not surprised. Sonic performance has always had first priority with NAD. The deceptively simple no-frills NAD 6340 may be the only cassette recorder in its price range that can faithfully copy the full brilliance and dynamic range of any recorded source without dulling its sonic impact. Compared to other decks that cost more but don't sound as good, the NAD 6340 sets a new standard for value. Audition one at your NAD stockist today.



**6340 – £219.95 FROM NAD SPECIALIST DEALERS**

- \* Dolby B, C & HX Pro
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- \* DYNEQ Circuit
- \* Two-motor belt drive
- \* Low flutter tape transport

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## CONCLUSION

Our diverse group of preamplifiers and power amplifiers neatly illustrated the fact that there is little of certainty in this field. Not all power amplifiers have a lot of power, which might seem a contradiction in terms. Quad's 306 produced just 50 watts for example. Many people, it seems, buy separate preamplifiers and power amplifiers either for domestic convenience or in the belief that higher price brings higher quality. Extra power doesn't necessarily come into it.

### Stylish

The Quad 34/306 set up is, consequently, for those who want a stylish, well built and reliable product in their home - and one that is not overly intrusive. The 306 is not just an entry level Quad, but it is intended to match the Quad ESL-63 electrostatic loudspeakers as well. These will accept little more than 50 watts before complaining.

Measured performance of all Quad amplifiers is exceptionally good and this, they say, is proof that they have no sound quality of their own, being completely transparent reproducers of music. The analogy used to be that they effectively act as "a piece of straight wire with gain" - but that was before someone said that wire sounds different! I feel the 34/306 combination is smooth and civilised in its presentation, but the 306 in particular does not have much bass punch. It is more suited to classical music than Rock, an observation that would not go unappreciated at Quad, where Barry Manilow would be mistaken for a Hells Angel. More wallop is provided by the 606, but again this offers smoothness and civility over all else - and it is quite expensive. The 34/306 combo costs around £620.

I would suggest that the 34/306 is meant to appeal to those who want a fine product that operates reliably for years, won't be replaced by a new model tomorrow and will provide gentle and civilised listening with a high level of fidelity. Headbangers - especially poverty stricken ones - should look closely at the next item on our agenda.

### NAD

It is NAD's 1000 preamplifier and 2100 power amplifier. Of all the units in our group these items cost the least - just £450 - yet they offered the most potent and immediately obvious threat in terms of blatantly presented power. Anyone looking for an amplifier that has big, yet supple bass and an apparently unlimited ability to go loud, without strain, need look no further. In fact, because the NADs sound so incredibly smooth and relaxed in the way they generate thunder, I rate them as unrivalled value in this respect.

There's a lot of flexibility in the system too, adding to its superb value. The 2100 can be bridged to make it a monoblock, whereupon power output more than doubles, reaching 312 watts. This is a match for the big Denons, yet at £280 a 2100 costs less than one third their price. NAD have two more powerful models as well: the 2400 and the 2600A. Since the 2600A is rated as three times more powerful than the 2100, it should manage 1000 watts in bridged mode!

NAD use a short term peak handling circuit that does, as they suggest, fail to operate under steady state measurement conditions. Worried about real life behaviour with music, I tested the 2100 by running it flat out with Led Zeppelin, feeding dummy loads. What happened was interesting. When not overrun, it delivered a true 150 watts. Pushed well into overload, it became hot and started to reduce its output down to the rated continuous maximum value of 60 watts. Backing volume off caused power to go back up after a few minutes cooling off. At a party or such like this would probably save the loudspeakers. I was satisfied that, operated normally, the 2100 easily gives its rated peak power output with all sorts of music.

The preamplifier accepts many inputs and has one of the quietest moving coil stages available. However, my listening tests suggest it is not neutral sounding and that buyers wanting an inexpensive preamplifier should bear this in mind. I would run the 1000 with NAD power amplifiers and not remove it from this context. They work superbly together and offer exceptional value, as usual from NAD.

Occupying the middle ground are Pioneer and Audiolab. Both combos cost around £900 and both offer 144 watts but past this, similarities are scarce. To get straight to the point, the Audiolab 8000C preamplifier and 8000P power amplifier are amongst the best

I have ever heard. They offer a totally coherent, natural and insightful sound that completely draws you in. There is plenty of power and more than enough indication of its existence. Solid, fast bass of superb fluidity underpins the Audiolab with Rock music, making it a potent sounding amplifier. At the same time it lacks nothing in delicacy and finesse when the programme demands these properties. But it is perhaps in construction of the sound stage and the way artists play on it that the Audiolab really shows its pedigree. Here it offers a level of performance far more effective and convincing than the other combos, placing it comfortably at the top of this group by quite a significant margin in my view. I would be very happy buying and owning the Audiolab 8000C and 8000P; they are completely superb in what they do.

### Speed

Pioneer's C-73 and M-73 fulfil the outline promise made by big pre/power combos: they deliver lots of whack and they sound pretty good too. I appreciated the clarity and neutrality of the Pioneers, I liked their incredible transient speed and fast, tight bass. Unfortunately, they did not have the fine sense of analysis, nor the precision of sound staging nor the revelation of players abilities I heard from the Audiolab in particular.

At the top of our price scale comes the £2550 Denon combo. It was somewhat compromised by the preamplifier and the power amplifiers were also something of a disappointment for me. Yes, they do go very, very loud, but as I have already noted a bridged NAD 2100 equals their output at one third the cost and it sounds more muscular and cohesive. The Denon items suffered from comparison. Had they been reviewed alone then such discrepancies would not have arisen in so obvious a fashion. I would have been far less dismissive.

This is one of the great strengths of a comparative test though: it gets products into context and reveals value. Number one for value in this group - and on a wider stage - are NAD. Number one for quality are Audiolab - and at a sensible price. I was equally impressed by both in their own way.

there is broad consensus on the sound of most amplifiers, arguments over exceptions getting somewhat more publicity.

### CHART OF POWER AMPLIFIER PERFORMANCE

MODEL	POWER (watts)		Power Increase	PRICE	Watts/£
	8ohms	4ohms			
Quad 306	50	65	30%	£290	0.17
" 606	136	225	65%	£570	0.24
NAD 2100	53	225	47%	£280	0.55
Pioneer M-73	144	225	56%	£550	0.26
Audiolab 8000P	144	240	67%	£525	0.27
Denon POA-6600A	300	500	67%	£999/pr.	0.3
Musical Fidelity*SA-470	300	500	67%	£6000	0.05
Deltec ** DPA-50S	50	100	100%	£995	0.05

\*see page 50

\*\* not tested in this issue

The chart shows output and price of the power amplifiers, enabling quick comparisons to be made.

Manufacturers quoted power outputs are usually into 8ohms, which is a standard load value. We have included a 4ohm rating as well, to show how much power increases.

The relative increase is given in percentage terms in the 'Power Increase' column. Ideally, it should double (100%), as shown by the Deltec. You have to pay for this ability, as the Watts/£ rating for the Deltec clearly shows.

The Watts/£ column also shows that the NAD 2100 is unusually good value. However, please do remember that Watts/£ ratings on their own do not take into account quality. They should not be used as the sole basis for value judgements.

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- Linn
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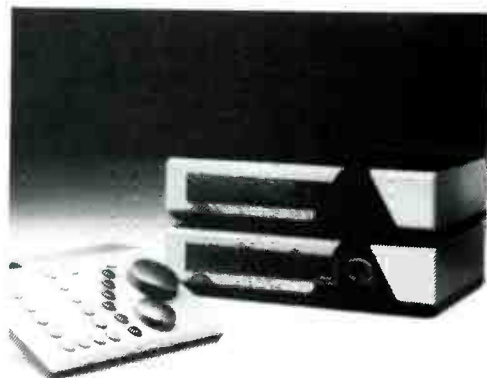
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**Rob Watts, founder of Deltec and designer of their new, advanced, PDM-II Bitstream convertor for Compact Disc, talks about the problems and innovations behind it.**



# hot chilli & silicon chips

Recently, Philips announced the introduction of yet another Bitstream processing chip for Compact Disc - the TDA1547. Within weeks, Deltec Precision Audio claimed they had a prototype up and running and that final production plans for a new Compact Disc super convertor, using this chip, were complete.

We interviewed Rob Watts, designer and founder of Deltec, about the background to this new PDM-II convertor. At the time he was labouring through a bowl of hot chilli soup at a Malayan restaurant in Paddington, London - standard torture for manufacturers foolish enough to visit us. Less serious comments come from Alex Raffio, Deltec's Sales Director.

Note that whilst the new chip is officially designated TDA1547, we used its semi-official nickname: DAC-7 (DAC is short for Digital to Analogue Convertor).

**What did you think when you heard Philips were going to introduce yet another Bitstream chip for Compact Disc? Were you surprised?**

No. I had already been working on a similar development myself. Our new PDM-II convertor was started about one year ago. The SAA7350 and SAA7321 PDM (Pulse Density Modulation) chips are very sensitive to the digital environment they are in. For example if you have a 7350 chip with, 10cms away, a digital chip doing something or other, if you change the layout or the earthing, then that will affect the 7350s operation. You will get either anharmonic noise coming out or distortion spectra changes, or fundamental linearity will change subtly.

Before this new chip appeared, we were very aware of these problems from our work with the previous Bitstream chips. Initially, we were going to have all the digital filtering in one box and the 7350 chip in another box in order to separate the two. The circuit was quite well developed. Then suddenly Philips told us about DAC-7.

**Had you any idea that Philips were developing DAC-7?**

We knew they were working on something, but we had no precise

details. Obviously, Philips knew about this environmental problem I have described. What they have done is to use the 7350 to carry out the digital processing and have re-packaged the vital switched capacitor network into another chip. This helps isolate the very sensitive analogue conversion from the digital processing.

The one bit code gets fed into a switched capacitor network to perform the final digital to analogue conversion process. This form of convertor is truly digital and of all types it stands the best chance of being optimised to yield near perfect results. The way it works is that the one bit code sets up charge packets that add or subtract. They make the output voltage go up or down.

The difficulty is that the capacitor is so small and is very sensitive. There is a lot of digital processing going on in the chip itself and it is signal dependent. You get coupling between the digital domain processing and the capacitor. That coupling causes distortion: it is related to the signal itself but in a very odd fashion.

That's all DAC-7 is about. It reduces the correlation between digital RF (radio frequency) noise that is music signal dependent and the analogue output. It is that crosstalk that generates distortion.

Within the DAC-7 itself, the performance figures Philips are quoting

are a whole order of magnitude better for fundamental linearity and about 10dB or 12dB lower for distortion figures.

**Although the switched capacitor network is in another chip, is the 7350 driver the same as ever or is it a new version without its own network?**

Within Philips application notes you have a 7350 feeding DAC-7 through thin lines on one board. What we are doing in PDM-II is taking the whole thing a stage further. In one box we have the digital processor with digital filter, a clock recovery circuit and a very high speed 20 megabit per second fibre optic link. This links the output of the 7350 in one box to DAC-7, which itself resides in the second box.

‘ The good thing about PDM-II is that we have taken the concept behind DAC-7 to what we feel is its ultimate conclusion

It is important to do this for a number of reasons. The distortion components will be a great deal lower. Any amount of RF generated is audible: it adds a hardness and aggression to the sound. By keeping the RF away from the analogue convertor we get a smoother and sweeter sound. In addition, each box will have its own power supply. In fact there are two for DAC7, because the digital input side should be totally isolated from the analogue.

What I have done within the PDM-II is in fact use two DAC-7s. Each is a stereo device - it has two channels. One channel is used solely to derive an out-of-phase RF noise cancellation signal, effectively giving a 16x oversampled, digitally filtered output signal. That again results in a sweeter, smoother sound, since there is less RF output.

**Where did you get that idea from?**

I thought of it!

**OK, Fair enough. How's the chilli prawn soup? Is it hot?**

Alex Raffio: I had it in Thailand when I was working for the military. After a spell in Vietnam it was the only thing that stopped the dysentery.

**Oh really?**

Where was I. Oh, yes, the reference

voltage is crucially important. When the analogue voltage is being constructed it is drawing current from the reference voltage, which actually falls slightly as a result. That causes modulation which produces a DC voltage modulated with the signal. That distortion is of low frequency origin and it accounts for a lot of the criticisms of PDM: that it is slow and thick in the bass, that it is not as tight as multibit.

In standard Philips application notes they filter the reference voltage, but they use an RC network. You get an output that is amplitude modulated by the ripple that's on the power supply and that upsets the sound dramatically.

By not using the RC network we avoid this problem. Instead, we use a very high purity reference source, very carefully filtered from the power supply so no noise gets through.

In sound quality terms this tightens up the bass quite dramatically, improving the tempo and timing, making the sound more dynamic and fast. Deltec PDM units have a tight bass, and they are both dynamic and fast. But they also have the richness and the musicality that PDM has got, especially in the mid-range and treble.

**How are you going to implement Deltec surface mount technology?**

There are Deltec op amps on the output stage. Bulk foil resistors are used in certain key circuit areas to avoid thermal modulation effects as well. There are no DC coupling capacitors either, as usual with our products.

The resistors give better detail resolution and sound staging. Smaller changes in dynamics are better discriminated, by eliminating heat dependent amplitude modulation. You can hear fine changes in phrasing in background instruments for example, even when a stronger solo performer is dominant. (Cough) This soup is getting hotter!

**It's the chilli lurking at the bottom. Are there any other improvements?**

Yes. We use a Yamaha clock chip which, as standard has a small amount of jitter on it. We regenerate this to eliminate the jitter. Typically, this gets rid of a slight rasp on female vocals.

Could you pass me the water please Alex?

Another factor that is important is that the output from the 7350 itself is included in the feedback network to reduce jitter from the 7350s own internal clock.

One last thing we are doing with the PDM-II is for when our transports become available. The master clock is on the DAC where it is very close to

the 7350 chip - which is good for the sound. This is then fed back into the transport and that signal is used by the transport itself for its own clock. That way you have no locking and jitter problems at all. I am expecting this to greatly improve sound quality yet again.

**So you must be pretty happy about the introduction of DAC-7?**

Yes. I could never have arranged the original 7350 as well, even though I was in the process of attempting such a rearrangement. The good thing about PDM-II is that we have taken the concept behind DAC-7 to what we feel is its ultimate conclusion by putting the digital and analogue sections in separate screened boxes, connected only by fibre optic links.

**So the whole DAC-7 operation by Philips, although seeming to admit the SAA7350 super chip was flawed is, as far as you are concerned, a welcome move forward.**

Yes, but for the likes of people who haven't yet fathomed how to use the 7350 - and there are lots of them - the DAC-7 is even more complex. Philips are trying to nurse manufacturers through the problems, although not with much success it seems. They don't understand some of the problems themselves.

People are still using the 7321, which is an old chip with some significant problems. It cannot measure as well as Japanese MASH chips, which counts for a lot in the East. This new Bitstream chip set now equals or improves upon the best the Japanese can do and it should go a long way to satisfying certain critical markets where judgements are made solely on measured performance.

Alex Raffio: What you have to bear in mind is that Philips are in a battle with the Japanese to retain a significant slice of the CD market world wide. To do this, they must have chips that measure as well or better and this hasn't been the case up to the present, even though sound quality has been fine in most cases.

With DAC-7 they have really taken the bit between their teeth; we feel that it is a true high-end CD product of quite astonishing performance and it should help them maintain a premiere position in the Compact Disc market worldwide. What we have done is take their basic philosophy to its ultimate conclusion, by using a much more complex and expensive implementation having the most sophisticated circuits, components and physical layout possible. Now can we have something cooler to eat please Noel! ●





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# bitstream basics

**Philips have issued a series of ever improved Bitstream silicon chips in an increasingly rapid and determined attempt to eradicate problems and overtake the Japanese. Here's a short and non-technical history, revealing the problems (taken from a confidential memo to manufacturers) and listing the improvements. Details of the new TDA1547 are also given, bringing the story up to date.**

Bitstream is Philips own word for a system that converts the sixteen bit code from a Compact Disc to a true one bit code that runs at a very high rate. The benefit of this is said to lie in the use of a unique true digital convertor that, ultimately, should provide near perfect results. It uses what is known as a switched capacitor network to change the digital signal directly into analogue.

In contrast, Japanese systems are low-bit (typically 3.5bits) and cannot use such a convertor. However, they give better measured results, which has been a problem for Philips. Perhaps worse is the fact that outside equipment manufacturers (OEMs), customers for Philips chips, have had little success in applying Bitstream, being defeated by the thorny problem of unwanted pickup of RF (Radio Frequency) radiation.

Whilst this is basically an unmitigated tale of woe, it has some bright sides. Every time Philips upgrade their chip set in an attempt to minimise the problems, they get more good publicity, because sound quality has always been a strong point with Bitstream and it only gets better. The difficulties haven't been great enough to compromise this.

Although Philips have used their best Bitstream chips in inexpensive players like the excellent CD-840, others have used them in more expensive and esoteric locations - often independent digital to analogue convertor units. This has helped improve both the image and the visibility of the system, which in turn has enormously improved Philips own corporate image, portraying them as a company able to research and produce leading edge audio technologies. It is a reputation that has eluded them, with increasingly bad effect, for many years. Now, having rediscovered how to get people interested in their technology and gather

credit, they are exploiting this new found ability with vigour.

Here's the chip list in date order, with the applications and problems identified.

## BITSTREAM CHIP HISTORY

### SAA7320GP

This was the original Bitstream chip. It had "idle pattern noise", a form of noise that occurs only during silences.

### SAA7321GP

Introduced as a replacement for the 7320, the 7321 is unusually noisy, especially against competitors or good sixteen bit systems. The noise level was around 8dB worse than that of other CD chips. This chip is still being used by many manufacturers.

### SAA7323GP

This is a version of the '20, but without the idle pattern noise. It is meant to replace both the '20 and the '21, but seems to have gained little popularity.

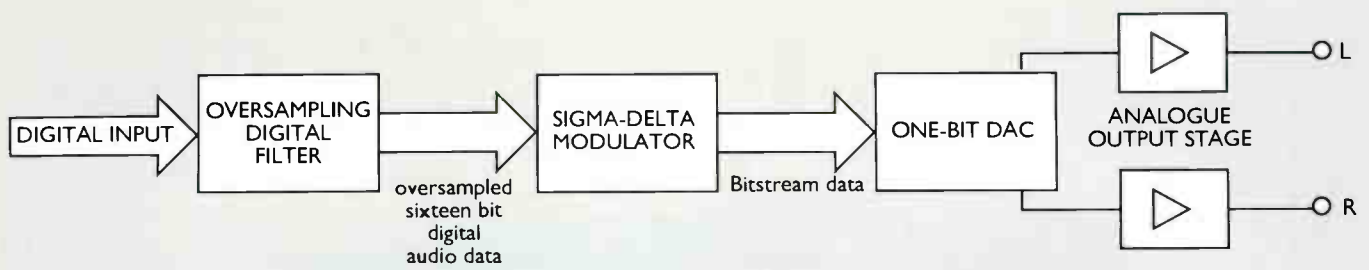
### SAA7322GP

A budget version of the 7323 of slightly lower specification. It is meant for undemanding applications, like budget players or NICAM tuners.

### SAA7350

Billed as the ultimate and introduced little more than six months ago, the 7350 has raised even more problems amongst outside manufacturers than the earlier chips. It is notoriously difficult to use. That it can be used has been proven both by Philips themselves and by Deltec





**Fig 1 - This is the configuration of the Bitstream reconstruction system using Philips new TDA-1547 chip. Raw digital data from disc is fed into an oversampling digital filter chip. The output, still in sixteen bit form, is then converted to one-bit form, a process**

carried out by the Sigma-Delta Modulator in an SAA-7350 chip. The high speed, one-bit, data stream output is then passed onto the new TDA-1547 One-Bit DAC chip. This produces an analogue output which is amplified, filtered and fed to the output terminals.

In Deltec's new PDM-II, the digital filter and Sigma-Delta modulator are housed in one case and the One-Bit DAC in another, so keeping the digital and analogue sections totally separate. This prevents mutual interference, improving sound quality.

(after early difficulties). It was even being said by some disgruntled customers that Philips were keeping and using all the good ones themselves and supplying duff samples to everyone else, so widely spread were the problems. Generally, excessive distortion was experienced.

Properly applied, using a Yamaha digital filter, in preference to Philips own noisy 7321 chip acting as a filter for example, the 7350 can yield a fine measured performance and excellent sound quality.

### TDA1547

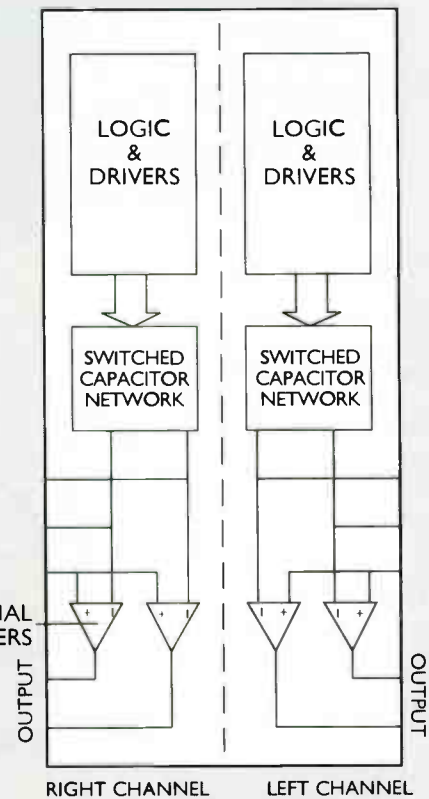
This differs from all the foregoing chips by being a stand alone Bitstream convertor, without any prior signal processing. Two extra digital processing chips have to be used in front of the TDA1547 (a digital filter and sigma delta modulator for upsampling and noise shaping - obvious innit?). It is this separation of functions that so improves sound quality.

By potentially relaxing the layout problems of the 7350, caused by putting high level, high frequency signals and sensitive low level audio conversion on one chip, the TDA1547 should make Bitstream easier to implement. Philips provide recommended layouts and much advice to help ensure their customers can use the TDA1547 successfully.

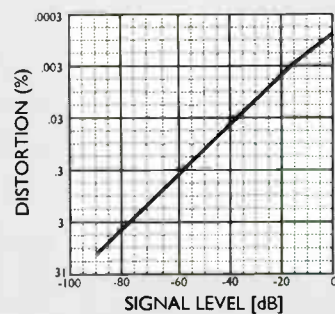
The '1547 also gives specialist designers even more options for making their own improvements, according to available budget and design philosophy.

**Fig 2 - The new TDA-1547 chip, shown here in block function form, contains the vital switched capacitor network digital to analogue convertor that is unique to Philips Bitstream system. It feeds a pair of on-board, high quality operational amplifiers. Philips make assurances in their notes about the quality of these devices.**

Deltec feed the analogue output directly into one of their own DH-032 operational amplifiers. It is this sort of purist approach that Philips have now learnt to accommodate and assist.



**Fig 3 - Here is a graph, issued by Philips, of distortion against signal level off disc for the new TDA-1547 convertor. Note how, with a digital system, distortion increases as music gets softer (i.e. its level decreases). A sixteen-bit system in such a high state of development as Bitstream still produces 0.3% of nasty sounding digital distortion at -60dB. This will only be eradicated when true eighteen or twenty bit digital systems are adopted.**





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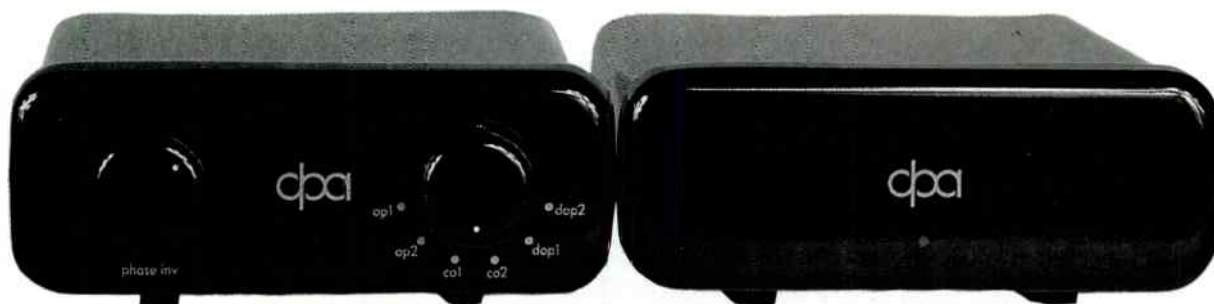
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## true convert

**The world's most advanced Compact Disc convertor  
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ultimate in CD technology.**

The new PDM-TWO Compact Disc convertor from Deltec is the first available using Philips latest Bitstream super-chip, the TDA1547. Priced at £1995, it forms a three box Compact Disc player having the most advanced specifications currently achievable, when used with an independent transport unit.

Philips, the inventors of Compact Disc, are eager to try to maintain their presence at the prestige end of the market and even wrest a lead from the Japanese. Their new chip is meant to be a crowning glory, a final touch that makes Bitstream digital to analogue conversion all but perfect. Deltec have responded by speedily designing the PDM-TWO convertor to make the most of its properties.

Until now, external convertors have

resided in a single box. This is for good reason: with the necessary transport a final assembly comprising two units must be fitted somewhere within the hi-fi system. This is not especially convenient, but the benefits in sound quality invariably outweigh aesthetic and practical drawbacks - at least for those with a keen ear.

To exploit fully the necessary separation Philips new chip demands, Deltec put it within its own case, forming an 'analogue processor' unit. The accompanying chips go into a second 'digital processor' case. Both housings employ Deltec's standard format of sturdy cast front panel, attached to a base and covered by a sleeve, both made of aluminium. Each case is fairly compact, needing 20cm width clearance and a minimum of 30cm shelf depth. Together,

they occupy the same amount of space as an amplifier of normal size. As you might guess from a company that uses custom castings, the cases are ruggedly strong and a dark grey sprayed paint finish is applied.

There is little on the front panels to catch the eye. The digital processor has two rotary switches and a small green power warning light; the analogue processor has nothing on it at all except a green power light.

Round at the back, things look different. Bunches of optical cables connect the two processors together. These carry the master clock signal, de-emphasis, right channel data, right channel delayed data (a cancellation signal) and the equivalent left channel signals, making six lines in all. It all looks pretty complex - and, of course, it is.

### Inputs

Then there are the inputs: four of them exist on the digital processor box, two optical and two electrical for connection of CD or DAT transports. They can be selected by the front panel input selector switch. Also on this switch are two curious legends: dop1 and dop2. They relate solely to use of a Deltec transport, which is planned but not yet available. Selecting either switches on an internal master clock that takes control of the whole system, including the transport. To be able to manage this, another clock feedback connection has to be made from the digital processor to the Deltec transport, as our accompanying diagram shows. Deltec say such a system produces a very worthwhile improvement in sound quality, making everything sound tighter and better controlled.

As with the latest Deltec convertors, the PDM-TWO has optical inputs. This is a recent addition; because optical transmitters and cables of high performance have become available at a price that comes within the manufacturing budget. With a data rate of 20 megabits/second, they are considerably faster and more capable than current types that run at 5 megabits/second. Deltec believe that optical coupling has traditionally sounded different - and in their view inferior - because of its limited data rate. All optical connections made to PDM-TWO should use high performance optical cables - not conventional Toslinks.

The digital processor also has a phase invert switch, to make loudspeakers 'push' instead of 'pull', as it were. Changing absolute phase like this has always left me with the feeling that something might have happened, but quite what I am not sure. I am told that some records and programme material benefit considerably from absolute phase change. Perhaps so far I have just not encountered them.

Like all Deltec products, the PDM-TWO uses miniature surface mount components, robot assembled in a clean room and soldered in an inert nitrogen atmosphere. Critical components are of special quality. Bulk foil resistors are used and the analogue output amplifiers are Deltec's own DH-032 thick film hybrid type - not cheap industry standard NE5532s or similar. Other manufacturers should take note of the lead Deltec have established in the area of component quality. Deltec amplifiers and convertors are built to far higher standards than is the industry norm, at present.



## Sound Quality

I became seriously interested in Compact Disc after hearing the Cambridge CD-1. Since then I have made efforts to review any stand alone convertor as it appears. My most recent reference has of choice been a Deltec PDM-ONE (MkII). This has proved altogether more lucid and convincing in its sound staging in particular than other convertors. As a result, I harboured certain preconceptions about the nature of the improvements likely to be offered by the PDM-TWO. They proved mostly incorrect.

PDM-TWO offers a separation - an untangling - of performers and instruments. It also heightens dynamic contrasts quite strongly, giving individual instruments and performers a much stronger and more richly etched presence than is normal. These two effects result in a starker but a more dramatic and - I found - more violent presentation than Compact Disc usually offers. Someone said "it is like running a master tape" and after a while I realised what they meant. However, master tapes do not sound euphonic and warm. Quite the reverse: they sound very 'close', and have a stark power that is threateningly real - even discomforting.

The PDM-TWO displayed similar properties. It banishes muddle and the 'euphony' that comes with transient softening. Drums are hit hard - very hard and very quickly, for example. They stand out with a solidity that so far has not been offered by normal high quality convertors. Do not expect your senses to be spared or wooed, however. What the PDM-TWO offers is something altogether more engaging.

Similarly, vocalists are more firmly and strongly embodied, yet I would not say that stage depth has been improved. A new and different type of focus appertains that more clearly reveals studio echoes as such and blatantly exposes the production and editing methods used in Rock Music. With live recorded material there was, however, better resolution of depth.

Then came the big surprise - a rich but thunderous bass output displaying superb articulation and a seemingly effortless ability to go down clearly to foundation shaking frequencies. That a new convertor chip - or perhaps it is Deltec's new circuits - should come up with such a large improvement of this nature is a surprise. It may have been due to the quality of Deltec's support circuits and power supplies. Whatever, I was constantly overawed by this change. My Celestion SL-6000 sub-woofers shook the very building with superbly resolved bass lines. They were full of the richness that comes from the preservation of harmonics and overtones. I became quite fascinated - even transfixed - by this phenomenon. It adds a fullness and a power to music that is impressive.

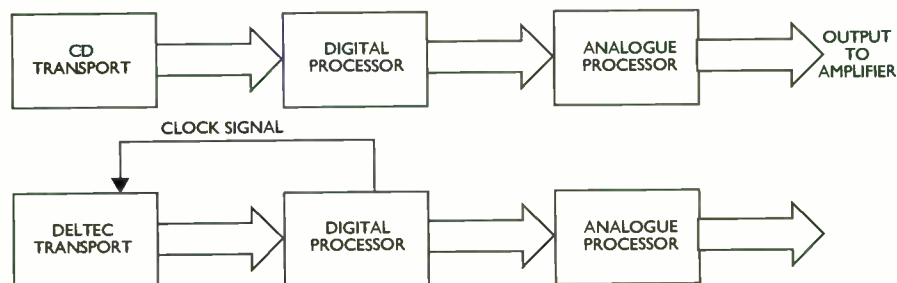
There was a certain strengthening and clearing at high frequencies too. Cymbals rang or crashed with a strength and presence that demanded attention; but then, the whole presentation of PDM-TWO demands attention. It is a remarkable but quite different sound to the one I have become accustomed to from Compact Disc.

Deltec's new PDM-TWO convertor moves Compact Disc reproduction forward

by a remarkable degree in - for me - an unexpected direction. I doubt very much that there'll be much to compare to it for a long time. The new chip line up from Philips, which finally overcomes Bitstream's niggling problems, is both advanced and difficult to implement. Other manufacturers seem unwilling to consider even using it. This leaves Deltec's PDM-TWO as an undisputed leader in Bitstream technology. It is one of the world's most advanced and impressive sounding CD convertors ●

**Deltec's PDM-TWO comprises separate digital and analogue processor units. With a transport they form a CD Player (top).**

**In future, a Deltec transport will be controlled by the clock signal from the digital processor, for better sound quality.**



### Measured Performance

Philips had to get their new implementation of Bitstream very right. They have made enough attempts at trying to perfect Bitstream, missing the mark each time by a small but detectable degree. This time they appear to have succeeded.

Key indicators of success are distortion levels and signal level reconstruction accuracy. In both parameters the new system, as implemented in the PDM-TWO, proved perfect. Distortion was lower than that of any previous player I have measured. At -30dB there were no harmonic products at all (see spectrum analysis below), only some anharmonic noise that may have been generated by the test disc. Measuring this noise, as well as distortion, gave a low 0.18% distortion figure. Inspection showed the only distortion components present were second and third harmonic. Measuring these exclusively gave a distortion value of 0.008%, which is remarkably low.

Down at -90dB distortion was lower than usual, especially on a dithered signal (2% second harmonic only). Dither is usually applied to recordings these days.

Due to the excellent filtering used by Deltec, the PDM-TWO produced virtually no out of band spurious or intermodulation products. Again, it exceeded the performance of all other players I have measured to date in this respect. There was less supersonic noise too, which is a feature of low-bit systems. Whilst all previous versions of Bitstream have measured around -96dB noise, this one manages -106dB without preemphasis and -109dB with preemphasis (all figures IEC A weighted).

As with earlier convertors, Deltec use a low roll off frequency in their analogue output filters. It reduces to an absolute minimum the output of unwanted high frequency rubbish (i.e., noise, distortion, sampling rate signals, etc). This affects frequency response slightly, rolling down output above 10kHz, as the analysis below shows. Surprisingly, whilst such a roll-off is usually audible - as it was on the original PDM-ONE - it was not audible on this model. There was no sign of dullness or warmth tinging the sound. Deltec say they are likely to fine tune this out on full production samples, all the same.

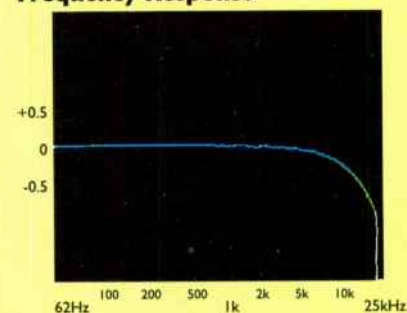
Channel separation figures were exceptionally high, being better than -100dB at all frequencies. This is almost certainly due to the total isolation of the channels on the chips and Deltec's ability to maintain the property in surrounding circuits.

Quite simply, Deltec's PDM-TWO is superior to all other CD players and convertors that I have yet encountered in measured performance.

### Test Results

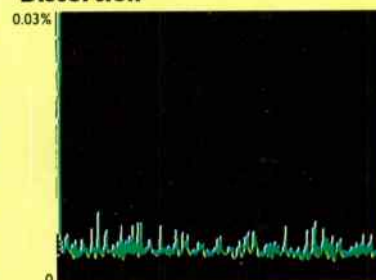
Frequency response	4Hz-20.3kHz	
Distortion (%)	left	right
-6dB	.005	.004
-30dB	.008	.008
-60dB	.46	.48
-90dB	28	28
dithered	2	2
10kHz	.02	.02
Separation (dB)	left	right
	-106	-106
	-104	-105
Noise (dB)	-106	
(emphasis)	-109	
Dynamic range (EIAJ)	109dB	
Output		1.9V

### Frequency Response



Treble roll off above 10kHz

### Distortion



Negligible distortion (0.008%) at -30dB

**OUR HI-FI DRIVES  
THE CRITICS WILD.  
WHAT WILL IT  
DO TO YOU?**





Imagine you are a critic and spend all day listening to hi-fi for a living. Sounds okay until you realise how much mediocre hi-fi you have to endure. Boring isn't in it. But wake up, one British company makes hi-fi that isn't like the rest. The company is Musical Fidelity. We're different because we design hi-fi for people who want to enjoy recorded music delivered through the cleanest, most elegant signal path possible. We spare you the dross such as flashing lights and fiddly gizmos that only clutter the signal path. Our low feed-



back amplifier circuits sound open and natural, for the most realistic sound possible. They can deliver astonishing dynamic range. And create an aural image that lets you pinpoint every voice or instru-



ment. The results can be stimulating, to say the least. "From this tiny inferno issues 50 watts of the nearest thing to magic" is what Audiophile with Hi-Fi Answers say about our A100 integrated amplifier. And in Hi-Fi News & Record Review, a critic writes that our huge 250 watts per channel



SA470 super power amplifier is "probably the best amplifier ever produced in the UK." In fact, we make a wide range of hi-fi separates and loudspeakers that deliver maximum performance. To hear hi-fi that could send you wild, visit a Musical Fidelity stockist. Where you'll soon discover why *hearing is believing*.

**MUSICAL FIDELITY**

**Noel Keywood looks at  
one of the modern  
classics of the cassette  
world, the Denon  
DRM-800A**

# capstan full strength

## Potentially Sophisticated

There's plenty of room for attention to slip and things to go wrong when a deck gets as complex and potentially sophisticated as this one. For example, the transport mechanism is a dual capstan type with nearly twice as many cogs and wheels as usual. These are the exclusive domain of 'serious' designs, due to the sheer number of finely tuned, interlocking parts that must be assembled and carefully adjusted to perform correctly at the end of the production line. Thrown together with scant adjustment, dual capstan mechanisms are more trouble than their simpler and cheaper single capstan equivalents, so it is here I look, listen and measure carefully to catch a flavour of what has been happening in the commercial background.

Fundamental decisions made by Denon about the cost/performance balance to be struck, about quality control, about market expectations and awareness can all be

combined into a siamesed head assembly, for the potential benefits of extended high frequency response and low distortion, plus the ability to listen to a recording as it is being made. By this technique, sound quality can be checked subjectively. It is an easy and fast way to assess tapes, for example. The third head is the erase head, in case you were wondering.

Denon say the revised 'A' model has a combination (i.e. siamesed) record/replay head assembly made from amorphous alloy, a material capable of accepting high flux densities. It is wound with PC-OCC wire (Pure Copper by the Ohno Continuous Casting process). We are told that these things result in improved MOL (Maximum Output Level), a vital head property I always measure, and that the result is "transparent clarity and highly precise stereo imaging".

## Ceramic Stabiliser

Like Aiwa, Denon now use a "ceramic composite cassette stabiliser" to "enhance



Because Denon have traditionally proved so adept at producing fine cassette decks, free from serious flaws yet sensibly priced, testing the DRM-800A is like re-confirming a value benchmark. It should offer excellent results all round, giving top quality recordings and, additionally, accurate reproduction of prerecorded tapes. Launched at £399 during September 1990, price has now slipped to £330, suggesting it might be good value too.

In spite of my regard for Denon cassette decks, it is always wise nowadays to harbour a residue of doubt. Too many Japanese companies have suddenly and silently gone cold on quality, turning beauty into a beast at just one model change. Only the clothes are likely to remain the same. I hoped that Denon's revisions to the original '800, bringing it to A status, wouldn't be downward, hidden beneath a flimsy outward disguise and obfuscating sales talk.

sensed from the transport. I could say that it is akin to testing the outlook and resolve of Denon. For a cassette deck manufacturer to flunk the transport is a potentially serious indictment of ability - one that Denon has with good consistency over the years managed to rise above. It is not only the transport that can be used as a commercial weather vane of course: the head is another key item of significant cost in the build budget, yet hidden from view to consumers and most reviewers.

## Dual Capstan

So the DRM-800A has a complex dual capstan transport. The idea is to pull the tape past the heads at a very, very constant speed, in order to eliminate all types of speed variation: jitter, long, slow changes and such like.

Then there's the heads. At this price level, three heads are commonly fitted. Separate record and play heads are

sonic clarity, for a more lifelike quality'. Removing this little wonder, I found it comprised a white and flexible plastic frame with attached rubber pads. The "ceramic" bit of it might have been a china clay filler, which would make it white. And I see little relevance in its presence when the cassette shell is contacted by soft rubber pads. Measurement consistently shows that such "stabilisers" have no affect upon performance whatsoever, at least in the way claimed.

In addition to these main features, there is the usual panoply of goodies one can expect to see on a deck at this price. Dolby HX PRO raises the overload limit of high frequency signals when recording, giving brighter, less confused treble. Hiss reduction is provided by Dolby B and C. Variable bias has been fitted for tape tuning and I found it works with metal tape, as well as ferric and chrome. This is good news, since many decks - even



expensive ones - do not have such a facility and it is important to get metal tapes matched in very well if seamless recordings are to be achieved.

**Solenoid**

The transport mechanism is solenoid controlled, a row of short action push buttons set along the bottom of the front panel being the user end of the system. Punch in recording is available, so a new recording can easily be spliced in at the end of one already on tape. Denon always fit automatic tape type selection, which makes life very easy for users. Just pop a tape in and its identity - ferric, chrome or metal - is immediately determined and confirmed by small legends on the large display panel.

The same panel also possesses a long record level indicator that stretches from -40dB up to +10dB, peak record level (0dB) being set at Dolby reference flux exactly. The tape counter has large blue numerals clearly visible at a distance and allied to it is a memory function which causes the transport to stop at zero when fast reeling. Volume to the headphone socket is adjustable, the same control affecting line output too.

A music search system finds gaps between tracks and will stop the transport at them. This is a track search function that can be useful for those who play a lot of prerecorded tapes.

The DRM-800A is well made and cleanly styled as cassette recorders from Japan go. It has a minimum of spurious go faster legends, the most blatantly silly being Ceramic Composite Cassette Stabiliser emblazoned across the ledge beneath the cassette door. Just above lies something altogether more important - an orange illuminated window that shines through the cassette to make the amount of tape remaining clearly visible.

**Sound Quality**

Recording onto TDK MA (+2 bias), peaking at around +4, confirmed subjectively the even tonal balance I had measured. There was some graininess across the upper mid-band, plus a certain loss of clarity and coarse edges to transients were a trifle unsettling. A good sense of general control and stability prevailed, the transport maintaining tempo well. I also noted that this deck has fairly tight, clean bass. TDK MA-XG at full bias was just a trifle clearer and less edgy. The DRM-800A was very good with metal tape, if not exceptional.

As expected from measurement, recording onto chrome tape was troublesome. All seemed reasonable until I tried recording really fast transients with strong bass too. Then, I found it hard to balance transient speed against brightness and tonal accuracy. There was no effective solution to this: either transients were maintained but the recording became unpleasantly bright, or some rounding off was accepted in order to avoid emphasised upper treble.

The problem got worse with ferric tape. Beloved TDK AR hardly worked at all. Bias had to be turned right down to minimum for obvious dullness to be avoided and even then, vocals were a bit bland and soft. TDK AD proved a better potential match, when bias was increased to -2, but I cannot say it ever sounded tonally even.

Sound quality from prerecorded tapes was generally clear and stable. I was slightly perturbed to notice a bit of wiriness caused by capstan wow; it polluted piano notes only slightly. My Nakamichi ZX-9 reference deck demonstrated that better was possible. This apart, the Denon proved refined and easy to listen to.

**Summary**

The Denon DRM-800A is very good and almost makes the grade as a really fine product - but not quite. Maximum recording levels with metal tape should have been higher and record equalisation for ferric and chromes more accurate, in order to provide recordings of better subjective tonal balance. Median bias conditions were poorly chosen, with TDK AR sounding dull at all except minimum bias. An expensive deck like this must work well with ferrics and chromes, as Nakamichis do. More thought, attention and care are needed to make this deck the product it should be. ●

**Measured Performance**

Replay frequency response, which affects the sound quality of prerecorded tapes and the compatibility of recordings on other machines, measured flat from 30Hz right up to 20kHz, within fine 1dB limits. At the price and the intended quality level, this should be the case, but it isn't with so many manufacturers for whom the intricacies of cassette deck set up are not apparent. This is where certain manufacturers - most notably Denon, NAD and Nakamichi - can now be relied upon to get things right. The DRM-800A gives a tonally balanced sound from prerecorded tapes, free from muffling and dullness, because it has correct head azimuth and replay equalisation.

With blank tapes I was a little less happy. The head has a natural high frequency peak at around 22kHz. This significantly affected frequency response flatness with recordings made on ferric and chrome tapes. Tuning bias to bring down the rise in treble response depressed the upper mid-range; tuning for a flat upper mid-range resulted in rising treble. In truth, record equalisation was wrong for IEC I and II blank tapes, which are typically equivalent to TDK D ferric tape and TDK SA chrome tapes. The pattern was not repeated with metal tape, as you can see from the frequency response analysis published below. This is made with TDK metal alignment tape AC-712, representative of normal commercial metal tapes (i.e. not super metals), and using slightly raised bias. Obviously, record equalisation was accurate in this case, a phenomenon I have noted before in cassette decks. Most effort is put into optimising performance with metal tape, yet less than 1% of all tapes sold are of this type. Quite often a deck will work well with metal, but be found wanting with ferrics and chromes. This was the case with the DRM-800A.

The head was a good one, although better now exist. In my view Denon have set bias injudiciously; high frequency overload almost matched that in the mid-band, a characteristic that does not accord with the energy spectrum of music. It also shows that bias has been set low, limiting the mid-band overload limit. In this case it measured +3dB, which is low for a quality cassette deck. Models costing £200 or even less can match this mid-band result. The replay electronics overloaded at +7dB on the record level indicator, which is far too low. Usually, at least +20dB of headroom is available.

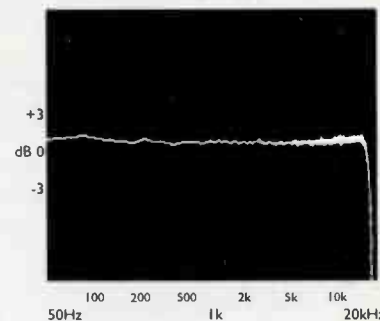
The transport worked very well, justifying its dual capstan configuration. Low rate speed variations (drift and wow) were low and so were high rate variations (scrape flutter, etc). A stable transport greatly improves sound quality by removing unwanted sidebands that pollute the sound, making it dirty, temporally hazy and unclear.

On balance, the Denon measured reasonably well, but ideally it should have been just a bit better. I would like to have seen higher mid-band overload figures and a flatter frequency response with ferric and chrome tapes.

**Test Results**

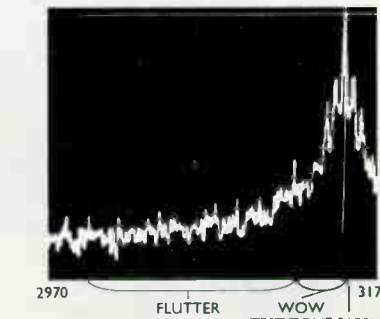
<b>REPLAY (prerecorded tapes)</b>	
Frequency response (-2dB)	30Hz - 20kHz
Speed accuracy	+0.8%
Hiss (70uS, Dolby out)	-58dB
<b>RECORDING (blank tapes)</b>	
Frequency response(IEC Primary Refs.)	
ferric(IECI)	12Hz-7kHz
chrome (IECII)	12Hz-18kHz
metal(IECIV)	11Hz-21kHz
Separation (1kHz)	-50dB
Distortion(315Hz)	1%
Hiss (70uS, Dolby out)	-55dB
Speed variations(DIN total)	0.06%
Flutter energy (3-3.13kHz)	-35dB
Modulation noise	-42dB
MOL/SAT(IEC Refs)	315/10k
IECI(ferric)	+2.5dB/-2.5dB
IECII(chrome)	+1dB/-2dB
IECIV(metal)	+3dB/+1dB

**Frequency Response**



Flat frequency response with metal tape

**Speed Stability**



Good speed stability, shown by thinness of peak at right

# tape secrets

(from the manufacturer's mouth)

**Richard Kelly visited NAD and asked their experts what to look out for when buying an inexpensive cassette deck. Inside information provided by Erik Edvardsen, Chris Evans and Steve Wilkins.**

**Richard:** When you're looking to buy an inexpensive cassette deck, is it worth stretching the budget to include three-head machines or is a two-head machine still a safer bet at the £200 price break?

**Erik:** It would be madness to put a three-head mechanism in at this price point, simply because of the cost. Not only is the extra head a problem, but there's the factor of two Dolby chips and extra licence fees to be taken into consideration. This would only compromise the rest of the machine - even if you tried to bring it in for between £350 and £450.

**Steve:** A £250 three-head machine would also have to use a sub-optimum transport mechanism to be so priced.

**Chris:** I feel we've shown with the NAD 6325 (£170) that by concentrating such a large proportion of the cost in the mechanism, which is

the most important part, together with a relatively inexpensive head and good electronics, you can have a successful product without lots of features.

**Richard:** At this end of the market, is it worth considering a machine with metal tape facilities?

**Chris:** To get the benefits of metals you have to have a high quality head, and these are not found on budget decks. But it appears that if a customer buys a deck without metal facilities, he feels he has an inferior machine simply because he may wish to use the feature in the future.

**Steve:** Yes, it's rather strange especially when you consider that the market share of metal tape is actually very small.

**Erik:** We were considering leaving it out of our next budget model. In fact, we did leave it out of one of our models. It is cheap to put in but when you leave it out you get a huge choir of complaints from distributors and sales persons who feel it's necessary to retail the product.

**Richard:** The reason many people want to spend so little on a deck is because Digital Compact Cassette (DCC) is waiting in the wings. One of the features of this format is that it will replay analogue cassettes. Is it going to be able to work with cheaper ferric tapes or should I use the best quality tapes I can afford?

**Chris:** Though the DCC cassette is a specially bodied tape, we are led to believe that machines will have full auto tape selection facilities so they should be fully analogue compatible.

**Steve:** The latest type of ferric tapes in the medium price bracket are really excellent and they are probably the best choice at present.

**Erik:** Yes, they are very, very good, with one exception and that is that they do tend to lose a bit in the treble after repeated use over a few years or if kept in storage over a period, which of course is where our Play Trim facility is useful.

**Richard:** Is print through still a problem with modern tapes?

**Steve:** It all depends on the environment the tapes are stored in. Leave them in the car and for sure you will have problems. In the normal domestic situation, stored at least a foot away from equipment that changes temperature and gets warm, there should be no problems.

**Richard:** Are facilities such as auto reverse and auto levels reliable or are these likely to start playing up three hours after the warranty expires?

**Chris:** I would assume they are reliable - reliably bad!

**Steve:** To make a £200 deck with auto reverse, you have thrown away any chance of making a high fidelity machine. Tape azimuth, tape guidance stability and wow and flutter are severely compromised. Because you are introducing a lot more mechanical parts, so reliability is down.

‘ if a customer buys a deck without metal facilities, he feels he has an inferior machine simply because he may wish to use the feature in the future

**Erik:** We have been looking at many different auto mechanisms up to the highest price that we could sell at. All except the most expensive were basically totally useless. The player will work in one direction, but when reversing, the azimuth will often be out of alignment.

The impact on the critical faces of the mechanism when it auto reverses is quite severe. The 'stops' indent and lose their accuracy, ruining azimuth.

**Chris:** It isn't a case of the deck playing consistently well in the forward direction and consistently badly in reverse. Every time the head clicks, it may or may not locate itself perfectly; there's always a tolerance error.

**Erik:** The thing is that this happens with a new machine and after being used for some time the problem can only become worse. Basically, the mechanism wears out very quickly because of the severity of the action. Mind you, other auto facilities that are electronically or micro switch controlled such as auto bias, tape selection or alignment, provided that they are correctly executed, are theoretically fine and are a benefit and do not degrade performance.



**Steve:** Auto levels are an exception to this. If you record a classical piece of music, in the quiet passages the level comes up together with rumble and noise, and when you get a crescendo, the levels come crashing down. This is rather disturbing if you enjoy listening to music.

**Richard:** About the composition of the heads. Sendust and Permalloy - are there any definite advantages to one type?

**Erik:** About six or seven years ago we used Sendust heads as they were superior to Permalloy heads at the time regarding wear, in particular. High frequency performance was also superior but the cost was considerably higher. The improved hard Permalloy heads that came out about three years ago are so close in performance that the incremental cost of using Sendust is a

**Erik:** The best way to demagnetise is with a cassette bodied type of demagnetiser such as the one made by TDK.

**Steve:** It won't cope with really heavy magnetisation, but it's perfectly adequate for normal use.

**‘ To make a £200 deck with auto reverse you have thrown away any chance of making a high fidelity machine**

have the necessary level of voltage to drive the amps fully. The other thing, of course, is that you would probably have to have the motors running as you would be in record mode. This wouldn't help prolong the life of the machine.

**Richard:** All machines these days appear to use LED metering. Are these as accurate as they are claimed?

**Chris:** The only place they need to be accurate is around the Dolby level.

**Steve:** If, as on some cheap machines the first indicators either side are of 10db, that means you have 20db covered by only three LEDs; this is obviously not desirable. You need at the most 3db increments and if you have 1db increments then so much the better.



questionable spending. We use the best Permalloy heads we can get and that's good value for money!

**Steve:** Unfortunately, there are still quite a lot of soft Permalloy heads in budget machines, some in quite well known makes as well. The only way a customer can find out about head life is to talk to someone who has or had such a machine.

**Richard:** Do modern heads need demagnetising frequently?

**Steve:** This is always a good practice if you have a valuable collection of tapes. There are a few electrical reasons, such as hiccups in the power supply and power leakage on the input stages that magnetise a head. With constant switching on and off, gradually the heads become magnetised.

**Chris:** This is definitely the easiest way and the safest. It's all too easy to scratch the heads using the "wand" type.

**Erik:** I don't feel that anything has really happened over the years to change this necessity to demagnetise the heads.

**Richard:** As several machines have a level out control, are there any sonic reasons for not using it as a volume control for a CD player or a tuner?

**Steve:** Very few machines are line in straight to line out with a pot to control level. There are nearly always some buffer stages and various other circuits to go through and therefore I wouldn't recommend controlling your CD or tuner in this fashion.

**Chris:** That isn't to say that you can't use a cassette deck by itself to drive the amps, but again few machines

**Chris:** Significantly under the Dolby level there isn't a great need for accuracy. In fact the only reason for metering here is just to show that something is happening.

**Erik:** So the answer is yes, these types of meter are accurate, but only as accurate as the increments allow.

**Richard:** Well, thank you, gentlemen. You've cleared up a lot of confusion I had about budget decks ●

We are currently in a renaissance period for valve amplification. As the black vinyl disc smoulders down to its last embers, the almost extinguished valve amplifier has begun to glow again, bathing music in a warmth that was largely forgotten by a transistorised world.

One of the foot-soldiers in the advance of the valve amplifier is Art Audio's Maestro Power Amplifier. These are components that are not that well-known in this country, as Art Audio export over eighty percent of their products. In some ways, however, these are well worth listening to, even if some travelling is involved.

# master of arts

**The Art Audio Maestro power amplifier is a bit of a musical virtuoso, according to Alan Sircom.**

## Interesting Design Features

One of the most interesting parts of the Maestro design is its ability to switch from ultra linear pentode operation to triode operation without difficulty. Put simply, this means that the Maestro amplifiers are capable of running in a more powerful, party (ultra linear) mode or changing to the serious listening (triode) operation at the turn of a dial. Most other valve amplifiers currently available are pentode operation only; until somebody brings out a powerful triode amplifier, true grace and power remain adversaries. In this respect, the Maestro presents a worthwhile compromise.

The "art" in Art Audio must also be attributed to the aesthetic quality of the amplifiers. The exposed valves, matt black finished chassis and chrome plated end caps for the transformers create a pleasing package that everybody in the office without exception felt was pretty. In terms of build quality, the Maestro amplifiers appear to be very well constructed, the only minor problem in terms of finish are one or two blemishes on the top plate where the valves are fitted.

One important point which must be made concerns their weight and its distribution. The two massive transformers at the rear of the unit are quite weighty beasts, but the valves at the front are not. This creates a very uneven distribution of weight over the length of the amplifier, more uneven than most that I know of. While most people will not be moving the amplifiers a great deal, it comes as a shock when the bulky rear of the amplifier plummets towards one's shoes. Damaged amplifiers are one thing, damaged feet another!

## Petty Carping

While I am in the mood for petty carping, the volume control potentiometers are not evenly arranged. To get an accurate balance between the two channels one volume control was set to the twelve o'clock position, while the other was set to about three o'clock. As these volume controls are designed for controlling a line level signal (such as Compact Disc) this can create serious problems for the listener. The volume controls themselves do not feel as solid as some I could mention. This one reservation lets the side down; if working from a pre-amplifier or the variable output of a Compact Disc this is not a problem as they are set and then forgotten.

Using the pot as an outright volume control, however, would not be successful in the long run. In all fairness, I feel that this control has been designed in the "set and forget" style, as placed behind the valves, it is not in the most accessible of places.

My only other niggle also concerns accessibility. The on/off switch is placed at what appears to be the rear of the unit. This might be fine except that valve amplifiers get too hot to leave on and also too hot to touch; unless the rear of the amplifier is easily accessible, how do you switch the amplifier off without getting burnt? My singed forearms, perpetually smelling of scorched hair, suggest that I have yet to find a way.

## Little to Criticise

If this appears to be a little nit picking, it is purely because these amplifiers are so well constructed that there is little to criticise otherwise, especially as the equipment is from a smaller manufacturer. Moving over to the circuit itself, it is a relatively conventional design, relying on the wealth of existing information on valve amplification, rather than trailblazing an innovative path. This is not to say it is a poor valve amplifier, but this, like many other valve designs, is based on success stories of the past.

The design is based upon eight EL34 pentode valves, which are run

conventionally for ultra linear operation, but have a different connection arrangement which is switched in for triode performance. This cuts output power virtually by half, but substantially improves sound quality.

## Monster Amp

At the time of writing, the listening room was dominated by a monster amplifier, the Musical Fidelity SA-470. Thus, the Maestros sat atop the beast, dwarfed by the sheer scale of Wembley's finest. We attempted to compare the two amplifiers sound qualities, but they are so different that it would be akin to comparing a Porsche to a Rolex!

I enjoyed the performance of the Maestros in their pentode guise. The smoothness and grace that they portrayed more than made up for their failings in some respects.

To begin with, the Maestro amplifiers were set to "ultra linear", connected up, checked and double checked carefully to prevent unnecessary explosions and then finally switched on. This may sound like undue paranoia, but prospective valve enthusiasts should note that there are some quite fierce voltages running around a valve amplifier. That, combined with bits of hot glass, have a tendency to make people cautious.

## Warm Up

After a couple of minutes to get the amplifier thoroughly warm, I started the listening session. From the outset, I found the amplifiers were very musical indeed, sounding lively, clear and accurate. On "Girlfriend is Better" from Talking Heads "Speaking in Tongues" LP, David Byrne's eccentric lyrics were easy to follow and distinct from the rest of the mix. Towards the end of this track, there is a curious synthesiser break which does not sound as deep as I have heard in the past, but sounds accurate nevertheless.

On the somewhat difficult subject of accuracy, I am not convinced that a valve system can be 100% accurate.





However, there is something inherently enjoyable about amplifiers like the Maestro. Who cares about ultimate accuracy when it sounds this good? On some tracks however, a few ideosyncracies appeared over the protracted listening session. The album which showed up the failings of the amplifier more than most was John Fogarty's "Centrefield". On this track, I noticed a bloated, muggy quality to the bass and the voice. Bass notes, especially those that have been somewhat over-produced, sounded a touch flabby and lifeless, with a slight "one note" monotone quality about them. Bearing in mind that valve amplification is quite system dependent, this could be eliminated with careful loudspeaker matching.

### Enjoyable Performance

I feel that I am splitting hairs again, as I enjoyed the performance of the Maestros in their pentode guise. The smoothness and grace that they portrayed more than made up for their failings in some respects. When moving over to triode operation, the positive feelings that I had for the amplifiers were magnified. The volume dropped noticeably, but this was offset by a sense of coherence and control that was only hinted at in the pentode sound. The criticisms that I had toward the bass response of the Maestros in their pentode operation, were eradicated almost entirely, leaving only the delicate, lively nature behind.

When listening on pentode to Siouxi and the Banshees "Peepshow" compact disc I felt that although Siouxi's voice had an ethereal quality I liked, the synthesiser bass and bass guitar were starting to get out of control. On switching to triode operation, however, the amplifier disappeared, leaving behind the music. All the usual veil-removing analogies seemed to be in order here: not quite all seven veils, but Salome certainly took off her woolly tights and anorak!!

### Never Grating

On classical music, triode operation created a seamless sound that was never grating or troublesome, even on "difficult" loudspeaker loads. Rachmaninov's piano concerto, for example had a silkiness that is difficult to fault, but difficult to achieve. Even on the more dynamic passages, where many amplifiers are sadly lacking, the Maestros sing on, without fuss. Moving down the alphabet to ZZ Top (whom I know are not a classical music trio but allow me some creative license) the grunt factor is surprisingly powerful for such a low powered amplifier. In triode mode, while not going as loud as I would like (being a bit of an animal at times), the Maestro catered for the vast majority of my catholic tastes, with the possible exception of Rap music. Even here, the Maestros fared well, but nowhere near as well as an amplifier of the calibre of the A470!

“ All the usual veil-removing analogies seemed to be in order here; not quite all seven veils, but Salome certainly took off her woolly tights and anorak!!

There are few reservations that I have about the overall sound. I feel that the performance falls apart a little too easily, especially at frequency extremes

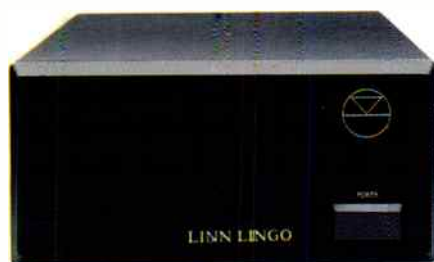
Again, as with the Audio Innovations loudspeakers reviewed elsewhere in the magazine, this is a product that covers its tracks with a gorgeous, alive sound. If partnered with a complimentary system, I am sure that it would prove an enjoyable, relaxing and capable amplifier. It is not a component that begs analysis, but instead the Maestro is part of that rare breed of hi-fi that makes you forget about the equipment and think about the music. In all, unlike the car, the Maestro lives up to its name.

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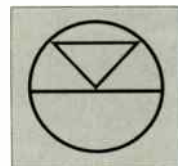


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Special Edition is a description that used to be seen on car boots: witness those little French cars with plastic bits and Go-Faster stripes, but little else. Marantz apply the phrase across a range of products, including the £230 PM40SE amplifier tested here.

Marantz even use the car analogy in their literature, albeit a more potent one. In their view, the SE models are equivalent to rally tuned versions of standard saloons. Whereas car tweaks are usually obvious and in some cases awesome, the sort of thing we are talking about with the PM40SE is altogether less obvious. Marantz list a range of improvements, including twinned terminals for bi-wiring, straight through signal path due to elimination of tone controls, special output stage configuration and over-specified or extra high grade components in crucial areas.

Looking inside, I wasn't quite as impressed as I had hoped

volume control potentiometer behind. These things make me feel uneasy. When equipment wears, it is usually the mechanical components that go first, notably input sockets, selector switches and volume controls. As an engineer, I would be reluctant to use such a small potentiometer as no matter what its quoted life span was, I feel that it has greater potential for wear than a larger device.

I was surprised at the method of construction. It owes something to Philips production engineering - Marantz now being a part of Philips. Sheet steel is used for the case and cover, but the fascia is a plastic moulding designed to perfectly mimic an alloy extrusion. The surprising thing is that Marantz have even included bad end detailing into the moulding to make it look authentic! When the Japanese copy something, they do make a good job out of it.

**Fresh to the "A-400 beater" battle comes the £230**

**Marantz PM40SE amplifier.**

**Noel Keywood assesses the latest challenger. Alan Sircom and Roy Gregory also pass comment.**

# class contender



to be. Whereas some Japanese manufacturers are now using screened transformers - and such things are very expensive - I could see less of obvious merit in the PM40SE. It has a large, standard pattern frame transformer (entitled Sailor!) and a sensible but conventional board layout. The disc stage uses discrete transistors for the Moving Coil input, but an integrated circuit placed directly after it to handle the subsequent signal and the Moving Magnet input. Selection is by front panel push button, a very convenient way of doing things. There is only one pair of disc input sockets. Other inputs are for CD, tuner and auxiliary items. There are two sets of tape sockets with full switching between them to allow copying. An increasing number of Japanese amplifiers are so equipped, which suggests that taping is of rising importance in Japan. I presume the co-existence of DAT and cassette is part of the reason, with the threat of DCC also contributing.

Marantz fit a large volume control knob with a proportionately small

## Sound Quality

We briefly compared the Marantz to a Denon PMA-350 which, although cheaper, has a similar specification and, to listen to, is a pretty potent sounding device. It is a good quality benchmark at this price level I feel, the only problem being it has no Moving Coil stage. The Marantz does have an MC stage, albeit a rudimentary one.

With a pair of Celestion 3 budget loudspeakers, the Marantz produced much cleaner bass. However, whilst others immediately declared it better because of this, I had doubts. The problem - confused and choked bass - was with the loudspeaker, I suspected. The Denon was driving them too hard at low frequencies, the Marantz was not.

We changed to a pair of Tannoy Ells, which are more able to accept and deliver strong bass than just about all rivals. This confirmed my suspicions: the Marantz has dry bass, limited in depth and potency. It is by no means a weak amplifier, but it is

controlled and measured in its low frequency delivery. Such an amplifier suits bass heavy loudspeakers; the Denon arguably suits bass light designs, although our experience showed it can also push small, low power types into trouble very quickly.

## Civilised Delivery

Generally, I found the Marantz gave a smooth and civilised delivery from Compact Disc, easy to listen to and very refined. It placed images well and they possessed no raggedness around the edges, as it were. Whilst always refined and smooth however, I still harboured some reservations about the PM40SE. Donna Summer's breathless whispers from "The woman in me" seemed quite normal when reproduced through the Marantz. "Yes" I thought casually, "this is good hi-fi". Then it suddenly struck me that the PM40SE's smoothness and civility failed to really engage

any interest or appreciation in me; Donna Summer never came close, became real or whispered with an emotion that immediately captured my attention. Fine intonations and inflections in her voice were missing. In contrast, the Denon brought her to life.

With LP (AT-450E MM cartridge, Rega RB-300 arm on Thorens TD-3001BC turntable) the PM40SE imaged securely, again indicating that it is good in this area. With LP I noticed that differences between the two amplifiers here highlighted. Cymbals and snare sounded smooth but perhaps compressed by the Marantz, whereas they jumped out with brashness and incision from the Denon. I felt the Denon was possibly a bit more "right", mainly because it displayed better differentiation between fine details. However, there's no doubt at all that the Marantz was much smoother, more civilised and easier to listen to. Lack of real bass power and a sense of restriction from LP made itself felt with the PM40SE. This was due to its early bass roll off.

However, there's no doubt at all that the Marantz was much smoother, more civilised and easier to listen to.

#### Ideal Solution

The ideal solution showed itself to lie in the use of a Linn Sondek with Ittok arm and Asaka moving coil cartridge. This sounded so sparkingly clear and lucid, so well controlled and yet natural that Moving Magnet became a no-no. However, as expected, hiss became obvious with the Asaka and volume had to be cranked right up to near maximum. The PM40SE Moving Coil stage is none too clever.

To summarise, I found the PM40SE amplifier to be a smooth and civilised performer, especially with LP. This observation carries with it some background qualifications though. Real detail retrieval was limited and the rounding out and blurring of high frequencies in the time domain did little to aid analysis. The PM40SE tended to gloss over and smooth out wrinkles present in source components. Feed it something nasty - and out comes something nice. It is a polite and tidy performer that we found "improves" bad sources and eases the life of incapable loudspeakers. **NK**

### THE MARANTZ PM40SE HAS BEEN HERALDED AS THE NEMESIS OF PIONEER'S A-400 SUPER-AMPLIFIER.

Alan Sircom and Roy Gregory pass comment on the ensuing battle.

● My turn to enter the "Best amplifier in the known universe" debate! There has been an awful lot of hot air expelled over the Pioneer A-400 and its possible usurper, the Marantz PM40SE, but a lot of it has been flatulence. Moving away from the methane and the marsh gas for a moment, let us try to put these amplifiers into some perspective.

I do not decry that both the Pioneer A-400 and the Marantz PM40SE are very good amplifiers. I wish that I was as competent in both amplifier design and in marketing strategy as the people behind these products. The two amplifiers have some of the finest line level (read Compact Disc) stages in their class, capable of turning in a performance that belies their price.

Why are products like these successful? In many ways they leave comparably priced British amplifiers standing, as a number of the well established manufacturers are, at this price level, essentially producing good phono (read Turntable) stages with an amplifier circuit attached. The Pioneer and Marantz units are not blessed with superb phono stages; they have no need to, as a large number of Marantz/Pioneer owners will no longer be using LP as their prime source. This is a gross oversimplification, I admit, but accurate when looking at who buys the amplifiers, as opposed to who reviews them!

As the amplifier designer feels that the phono stage is now largely superfluous and can be dismissed out-of-hand with an off-the-shelf phono stage from an older amplifier, we must now look as to where the money has been spent in the design and construction of a £200-£300 amplifier. This is what, to their credit in many ways, Pioneer did with the A-400, only to be followed by other companies, such as Denon and now Marantz. They are the first in what may become a new breed of post-vinyl amplifiers. With the phono stage out of the way, the designer has to concentrate on producing a strong contender, or fall by the wayside.

The British hi-fi market, is truly diverse. No longer can a product survive on reputation alone. To successfully compete, it must be capable of standing up for itself in the demonstration room, as well the bookshelf. This has been ably demonstrated by the Pioneer A-400, which is outselling every other

amplifier in its class by an alleged factor of 5:1. Every amplifier manufacturer would like a slice of that cake, hence the rapid rise of the Denon PMA-350 and the Marantz PM40SE. Expect to see more soon, from bakeries like Rotel.

This is a gross oversimplification, I admit, but accurate when looking at who buys the amplifiers, as opposed to who reviews them!

Getting back to the differences between the two amplifiers, I do not feel that the Marantz is a better amplifier than the Pioneer. I'll qualify this by saying that I also feel that in some systems, the Marantz will actually sound nicer!!! The PM40SE is a smooth, relaxed sounding amplifier that, although detailed, is a little lacking in the bass. By contrast, the A-400 is far more dynamic and transparent, with a greater appearance of bass weight. I cannot back this up with any test data, only my ears!

When partnered with some equipment, especially in and around its price bracket, I feel that the Marantz will sound far more listenable than the Pioneer, whose demanding nature will be too demanding for the rest of the components in the chain. The Pioneer amplifier is more in line with components outside its price range, where it can easily slot in, as long as the loudspeakers used are not too taxing.

So there you have it! My opinion on the great amplifier debate. Both are good sounding, products. The Marantz PM40SE would work well in a mid-priced system, but its relaxed, easy sound may be a limiting factor in the long term. The Pioneer A-400's main fault is that it can show up the flaws in cheaper equipment. The ball is in your court! **AS**

● The Pioneer A-400 dominates the integrated amplifier market. Not since the days of the Pioneer PL12D, Dual 505 and the NAD 3020 have products enjoyed such uncontested control of the vital "starter system" price bracket. The A-400 is different to those products. Different because, unlike them, it competes head on



with the sales of British specialist manufacturers and retailers. Amidst the flotsam bobbing in the wake of Pioneer's one amp onslaught you'll find the likes of the Mission Cyrus One, Musical Fidelity B1, Arcam Alpha and a whole clutch of Creeks and Rotels. After all, how many "serious" dealers have a Pioneer agency?

The result of this has been an intense, almost frenzied, storm of invective and slander against those who have supported or reacted favourably to the A-400. Whilst the "pro's" have been busily holding up the A-400 as the latest potential of Japanese majors should they ever take the UK market seriously, the "anti's" have been searching frantically for a stick - any stick - to beat it into submission. They've seized on the Marantz PM40SE II, improved, or whatever you want to call it.

Why the Marantz? Because the man responsible for the capacitor modifications that have elevated its performance is none other than Doug Randall, the man who wrote the original "job description" for the A-400. Wags have dubbed the PM-40SE, "Randall Amp II" and sure enough the "better than the A-400" reviews and the "King is dead" headlines have started to roll.

Unfortunately, such black and white responses are both simplistic and misleading. These amplifiers are very different beasts - and not just sonically. As a long term A-400 user I was asked by both Pioneer and Marantz to carry out a detailed comparison.

The first thing to realise is that they are each the product of an entirely different process. The A-400 is a one off, ground up, design exercise, aimed to achieve a particular goal. As such, all aspects of its construction are subordinate to a single rationale. Indeed Pioneer make much of the complementary technology employed; the Super Linear Circuitry, short signal path and Clean Ground arrangement. Design supremo Kimihiko Sugaro even claims that the non gold plated input socketry sounds better! I agree!

This should give the A-400 a definite head start and, I think, it is certainly reflected in the sonic results. Extensive comparisons involving equipment varying from the cheap but cheerful, to the ludicrously expensive revealed consistent differences between the two products. The Marantz has a warm and weighty sound with a sweet top end and a good sense of body. However, it can't match the A-400 in agility and speed of response, transparency and resolution. The A-400 is quicker, cleaner and crucially, more organised. It leaves the Marantz sounding rather

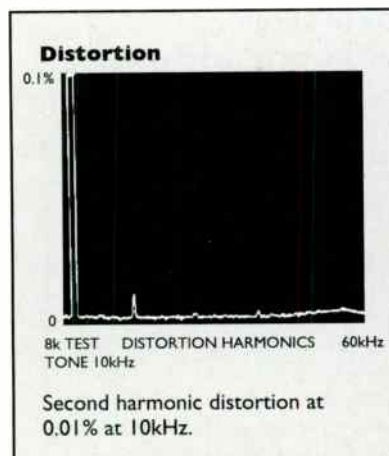
muddled and murky. Does it win overwhelmingly? No.

The thing that has always separated the A-400 from the competition is the stamp of high-end authority. The A-400 will grow with its ancillaries until, phono stage aside, it can be used quite happily with some very esoteric front and back ends. Plug in a Michell ISO phono stage and you have a genuine giant killer.

The downside of this is, that with budget ancillaries, the A-400 can be a little ruthless and sometimes it'll tell you things you don't want to know. In that context the Marantz might be the better bet. For me, the A-400 has an ability to convey exactly why Heifetz, Milanov and Reiner were head and shoulders above other performers then or since. As the ancillaries improve, so that ability increases and the gap between it and the PM40SE widens.

For me, the A-400 has an ability to convey exactly why Heifetz, Milanov and Reiner were head and shoulders above other performers then or since.

I prefer the A-400. I have tried to explain why. But I've also tried to explain that in this instance, such is the political pressure cooker in which these two products face off, that it is more important than ever to decide for yourself. They are both excellent amplifiers. British manufacturers should try to match them rather than simply knock them. **RG**



## Technical Performance

Wheeled into our offices and openly promoted as a Pioneer-beater, the PM40SE, Marantz claim, is a breathed on version of a standard production model. The main changes, we were told, concerned the power supply. This always amounts to improved regulation - and often improved smoothing. Regulation is the ability of internal current supply lines to maintain a steady voltage (i.e. regulate themselves) under varying load conditions imposed by music signals. These same lines should be free from noise and hum - or smooth. In a simple arrangement these properties are, to a degree, mutually exclusive.

Improve the smoothing and you worsen the regulation - and vice versa. A smooth and well regulated supply can be provided, but at extra cost. Typical benefits are a punchier, more dynamic sound, free from apparent compression or weediness, one might say. This currently is a widely recognised design aim in amplifiers, at least in the UK. An increasing number of Japanese amplifiers are being modified to meet it, in order to make them more competitive with home grown models in terms of sound quality.

First off, in the recent batch, has been the much acclaimed Pioneer A-400, at which the PM40SE is aimed fairly and squarely; both are priced at £230. However, our files show the £170 (or so) A-300 to be little less powerful, whilst the similarly priced Denon PMA-350 which is a muscular little devil - is actually more powerful. The figures are compared below and show that all three have beefy, well regulated power supplies.

	MARANTZ PM-40SE	DENON PMA-350	PIONEER A-300
8 Ohms	60W	78W	50W
4 Ohms	100W	132W	80W
Increase	67%	69%	60%

Power output and regulation of the Marantz and some of its competitors. Ability to deliver current upon demand, under varying load conditions, is demonstrated by the proportional increase of power with a halving of load from 8 ohms to 4 ohms. Ideally, power should double (Increase = 100%) in this situation. In practice only expensive designs like Naims and Deltects achieve this however. For their price, all three models here manage well.

In all respects, the PM40SE measured well. It produces very little distortion, less than 0.01% over most of the audio band, through the CD input and through the disc input. A spectrum analysis of distortion, shown below, showed that second harmonic was dominant. The CD input is wideband, having a frequency response that stretches from 12Hz up to 164kHz. The upper extension is neither wanted nor needed I feel; there is some argument over the rights and wrongs of such extension.

The disc preamplifier has a very quiet Moving Magnet stage and a reasonably quiet Moving Coil stage. The latter isn't ideal for high quality, low output designs however. The disc stages have a strong low frequency roll off built in to suppress warps, but this also weakens deep bass perceptibly in systems capable of a deep bass response. Otherwise, equalisation proved very accurate, ensuring natural tonal balance.

Power	60 watts	
<b>CD/tuner/aux</b>		
Frequency response	12Hz - 164kHz	
Separation	-85dB	
Noise	-99dB	
Distortion	0.005%	
Sensitivity	180mV	
dc offset	10/18mV	
<b>Disc</b>	<b>MM</b>	<b>MC</b>
Frequency response	44Hz-91kHz	47Hz-33kHz
Separation	-79dB	-65dB
Noise	-87dB	-70dB
Distortion	0.005%	0.006%
Sensitivity	2.7mV	0.3mV
Overload	150mV	17mV

First, an apology. In the April issue, I suggested, in error, that the new Audio Innovations loudspeakers are manufactured in the U.S. by Snell Acoustics. In fact, the loudspeakers are produced almost entirely in the United Kingdom, based on the original Snell Acoustic designs.

Having apologised, I can now talk freely about the new £799 Audio Innovations Model J loudspeakers, which are, as everybody knows, designed in China and built in Papua New Guinea, using components from Siberia, Northumberland and Mars to produce that "spacious" sound!

On their recommended £269 Huygens stands, few have commented on the aesthetic qualities of the Model Js. The most polite description would be "functional". The quality of the box is very good however, with a choice of finishes; Black Ash, Light Oak and Walnut.

In use, the Model Js do have a lot in common with the earlier Snell Type Jll loudspeakers, but improve upon some of the older loudspeakers weaknesses. As with all of Peter Snell-designed loudspeakers, the Model Js image supremely well, almost up to the standard of good panel loud-

In use, I felt the Model J loudspeaker creates a true and accurate picture of what goes before it. The Js have a powerful facility to portray the hi-fi chain with microscopic detail, every feature and flaw displayed with equal clarity. It is to this end that I feel that the nature of these loudspeakers is better suited to the warmth of valve amplification, than to solid state amplifiers. Solid state amplification can sound a little fierce through these loudspeakers. In using a valve amplifier, the warm, relaxed sound, counterbalances the inherently analytical nature of the loudspeaker.

When using the loudspeakers in a complimentary system, one finds oneself being drawn to the more natural analogue recordings in the record collection. More recent recordings, that involve multi-tracking and digital techniques sound almost sterile in comparison to their earlier compatriots. With regard to my own collection, I found myself playing more 1960s recordings, possessing that air of spaciousness which can only come from simple recordings. Classical, jazz and folk were in, rap and some indie pop were most definitely out!

#### Antiseptic

In truth, I found this initially a little difficult to live with. I can accept that some modern music is overtly processed and has what could be called an "antiseptic" acoustic, but I have a great many albums that sound somehow incorrect on these loudspeakers, but are well dealt with on others. Up to a point, I feel that this is due to the "cloaking" nature of many other comparable loudspeakers, which drag all music down to a lowest common denominator, instead of letting well made recordings shine through.

On material which is complementary to the loudspeakers (ie, not too bright, processed or digital), the Model Js cope better than almost any other loudspeaker I have heard to date. They have the capability of just reproducing the music and its attendant acoustic. This is performed without interference but instead with grace and artistry. Curiously, one hardly notices the 'digitalness' of some obviously digital recordings (Ry Cooder's "Bop 'Til You Drop" for example), whereas others sound harsh and synthetic. I am reticent to suggest that this is a fault of the loudspeakers as I feel that the fault lies earlier in the chain, with the recording engineer. What I do feel, however, is that these loudspeakers, as with many of the Audio Innovations products, cast a spell over many good quality recordings, a spell that doesn't quite stretch to the poorer ones.

# jackpot!

**Joyful, jolly, jovial Alan Sircom jousts journalistically  
with the Junoesque**

**Audio Innovations Model J loudspeaker.**

Looking at the loudspeaker with a more serious eye, we see that the 'Innovations Model J bears close physical resemblance to the earlier Snell Acoustics Type J loudspeakers.

Originally, Audio Innovations were more than happy with the sound quality of the American loudspeakers. Following the sad death of Peter Snell in 1984, the company changed direction; Audio Innovations actively preferred the earlier models. To this end, Audio Innovations originally specified earlier models of Snell loudspeakers. Recently however, it became apparent that this situation was not acceptable and as such Audio Innovations have taken the initiative, producing their own range of loudspeakers.

The new 'Innovations loudspeakers differ from their American counterparts by having tightened up the specifications for the loudspeaker in all respects. Snell Acoustics have a policy of matching drive units to a reference driver and then partnering the units by close matching. Audio Innovations have improved upon this by taking the tolerances down to a quoted figure of only  $\pm 0.3\text{dB}$  to the master drive unit and to within  $\pm 0.5\text{dB}$  between the two drive units. In addition to this, Audio Innovations have refined the components within the crossover, simultaneously improving the layout and the internal wiring by using AudioNote cable throughout.

One reservation I have toward the loudspeakers concerns their looks.

‘ The Js have a powerful facility to portray the hi-fi chain with microscopic detail, every feature and flaw displayed with equal clarity.

speakers. Unlike panels, they have an intensity and dynamic scale that can see off many a good box loudspeaker.

#### Dead Shrub

Instead of the usual "I listened to the twenty-second track on the third side of Dead Shrub's seminal "Fish-Bicycle" album, I listened to my entire record collection, via both a LP12 (Valhalla) turntable, Linn Akito tonearm, Linn K9 cartridge, Naim NAC 42 pre-amplifier and NAP 110 power amplifier and also a Systemdeck 11X (with acrylic platter) with a Helius Scorpio tonearm, Goldring 1012 cartridge and a Audio Innovations Series 500 amplifier. Throughout the test, I used AudioNote ANB loudspeaker cable.



### Point the finger

One can point many accusing fingers at the Model Js, saying that they do not image as well as an Electrostatic or go as low as an Isobarik, but it must be noted that the Model Js are usually only bettered by what is considered to be the reference loudspeaker in a particular field. This reference loudspeaker is usually many times the cost of the Model J. In addition, very few of these "industry standards" perform well in all fields, choosing instead to excel in one facet of audio reproduction, generally at the expense of other, equally valid criteria.

I have noted some slight reservations with regard to the bass response of the loudspeaker. In some respects, the Model J sounds as if certain frequencies are missing. Rock recordings that I know well are lacking in attack on bass guitar notes and some notes of the cello disappear for no apparent reason. These are not major grievances and are also appertaining to the choice of amplification. This is merely niggling, trying to offset an otherwise remarkable performance.

They have the capability of just reproducing the music and its attendant acoustic. This is performed without interference but instead with grace and artistry.

In practice, I found that the Model Js were a happy compromise, which at no time sounded like a compromise. Partnered with the right system, the Model Js were inherently listenable, covering their tracks (or idiosyncracies) with a layered sound that seduces with some material, but merely reproduces the poor relations of ones record collection. While I realise that saying "go out and listen for yourself" is a reviewers cop-out, go out and listen for yourself! Take a cross section of your record library along; if your taste in music is predominantly 80s and 90s pop, thrash metal and house music, you may well look elsewhere. Otherwise...



Looking at the loudspeaker with a more serious eye, we see that the Audio Innovations Model J bears close physical resemblance to the earlier Snell Acoustics Type J loudspeakers.

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My aesthetic preferences have always favoured minimalist hi-fi: a happy coincidence because the best-sounding gear is generally uncomplicated and tidy to behold. Where tuners are concerned, most look untidy and sound the same way. I have developed a particular dislike for those unnecessarily complex examples of the breed; I prefer those whose operation is unhindered by a host of widgets, knobs and switches.

# positive Ion



**Ion Systems £295**

**FMT1 tuner is a minimalist**

**design of some quality, so says**

**Malcolm Steward.**

My past experience has shown that few of the facilities found typically on Far Eastern designs rarely serve any useful purpose - unless the listener enjoys searching out distant or foreign stations. For that pastime a communications receiver would seem a better choice than a hi-fi tuner: high fidelity is supposedly to be about quality and not quantity. A hi-fi tuner should, therefore be designed to extract the maximum quality of information from a good signal, and not to render intelligible weak, noisy signals.

To that end my personal choice of tuner is the Naim NAT 02, reviewed in the last issue. It has a tuning display, tuning control and an on off switch,

the latter being superfluous as it's never powered down. The fascia of the £295 Ion Systems FMT1 isn't quite so spartan but it still looks frugal in comparison to the majority.

## Controlling Interest

The component count on the FM-only FMT1 runs to one display panel containing a tuned-frequency readout and two bar-graph meters, a rotary tuning knob, and six push-button switches - power, mono, manual tuning, and three pre-set selectors. The tiny LED stereo beacon doubles as a standby indicator - release the power button whilst the tuner is still connected to a live mains feed and the main display is extinguished while the beacon lights or remains lit. The FMT1 houses all this in casework which

matches the rest of

the Ion Systems' range of electronics but little else from other manufacturers. To its credit it is compact: with much of its competition you are buying a

larger case the bulk of whose content is fresh air.

If you're one of the many people who refuse to read set-up manuals, only to discover that you can't then figure out the correct button pushing sequence required to programme stations into your tuner's presets, you will enjoy the FMT1. Tuning its presets is simplicity itself and is accomplished by adjusting three screws let into the underbelly of the tuner's case: select the preset, twiddle the appropriate screw until the tuner display registers the desired frequency, twiddle a bit more until the signal strength meter indicates maximum level, and that's that. Mission accomplished. Other tuners might offer a great many more presets but I always question their worth: my listening centres around two or three stations at most, and I know of others who have invested large sums of money just for the pleasure of listening to Radio 3 alone. Before making judgements as to

whether three presets is ample you should carefully consider your listening habits. Manual tuning for the odd occasion when you want to pick up an infrequently used station won't deplete most people's energy reserves too severely.

## Plugging in

Installing the FMT1 is fuss-free. Mains power is connected by an IEC pattern plug and socket; audio output is via phono sockets - both conventional arrangements. The aerial input differs by offering two choices for connection of a 75 ohm downlead: the first socket accommodates a regular television-type coaxial plug, the second an American screw-fit J-type connector, where the 'male' portion of the plug is the centre conductor of the coaxial cable itself. This is suited to the Canadian Magnum Dynalab FM

aerials imported by Ion Systems.

To get the best from any tuner a correctly aligned external aerial is a necessity. This needs to be taken into account when you contemplate buying your tuner but, provided you don't require massive amounts of gain, it need not add too much to the bill. For example, from my home, south west of London, with the tuner connected to a three-element, roof-mounted Antiference aerial, I picked up stations with sufficient gain to light seven of the elements on the signal strength display, from the VHF transmitter south east of London at Wrotham, more than 40 km away. Even when listening at high volume levels to quiet passages of a Radio 3 classical broadcast hiss was never a problem. And that statement should be interpreted as doubly encouraging: how many tuners can you think of which can be enjoyed at high listening levels?

## Sound Judgement

Auditioned in my usual system - Naim amplification driving active SBL loudspeakers - the FMT1 put on a fine show. Similarly-priced offerings normally sound woefully inadequate fronting this system but the Ion proved enjoyable and capable. It hadn't the finesse or startling poise of my regular NAT 02 but that does cost £799, so we are talking about a considerable price difference.

Radio Three's live output brings out the best - and worst - from a tuner, so that's where listening tests began. From the outset the FMT1 sounded agreeably well detailed, but not at the expense of cohesion or an integrated presentation. For example, the breathing and lip sounds made by a speaker were brought out distinctly but with no sense of artifice or highlighting. The high level of detail merely increased the realism of the



portrayal of the speaker, adding depth and character to the voice. The same was true on musical programmes, each instrument in an ensemble or orchestra section being portrayed with good insight and 'personality', its timbre and note-shape being evinced with clarity. Stereo imagery, the lateral disposition of instruments, was good and the separation between instruments allowed easy following of musical lines as they passed from section to section or between players.

## From the outset the FMTI sounded agreeably well detailed, but not at the expense of cohesion or an integrated presentation.

Jazz FM's output showed that the FMTI offered a suitably dexterous ability when it came to presenting rhythmic information - both fundamental beats and the timing interplay between the musicians. It also captured dynamic relationships well, sounding wide-ranging on good quality broadcasts, contrasting, for example, the might of a double bass and the delicacy of a brushed cymbal.

On less than wonderful broadcasts, from one or two of London's commercial stations, the FMTI made the best of what it was offered. Its powerful bass register added body to its presentation which helped considerably: the combination of a thin-sounding tuner and Capital Radio I can happily live without! Whilst it rendered such stations listenable, however, it shone where the broadcast was of superior quality.

### Summary

The Ion tuner is well built, good looking, easy to set up, use and offers commendable performance. At £295 it isn't cheap but nonetheless represents good value for money. Pay less and you can't expect this kind of sound quality which can make serious radio-listening satisfying and thoroughly enjoyable ●

### Measured Performance

Although the FMT I looks as if it might be a synthesiser tuner, it is in fact a voltage tuned analogue type with a digital readout of frequency. So those wary of "digital" tuners can rest easy: this isn't one!

The red LED frequency readout is bright and clearly visible from a distance. It accurately indicates frequency in 50kHz steps, which are fine enough to tune onto a station with a high degree of accuracy. This is important: it optimises performance by minimising distortion and maximising channel separation on stereo. I measured low levels of distortion, average level hovering around 0.18%. The spectrum analysis of distortion at 50% modulation level (equivalent to half full volume), seen below, clearly shows that what small amounts of distortion were present comprised of innocuous second harmonic. This is impossible to detect, since it only lightens timbre and to do so much more than 0.5% is needed.

Whilst distortion was very low on both mono and stereo, channel separation proved a bit limited. This appeared to be due to sub-optimal alignment, because altering pilot tone phase to an incorrect value corrected the problem. I listened carefully for signs of degraded stereo imaging but found none in practice. Either the limited measured separation was adequate to give a satisfactory impression of stereo, as it is with pickup cartridges, or phase accuracy is not absolutely vital in practice.

Frequency response can be seen in the analysis below. This clearly shows a flat characteristic, measurement showing the -1dB limits to be a respectable 10Hz-13kHz. Upper treble rolls down slowly above 10kHz, then plunges suddenly in the analysis, due to the notch produced by a pilot tone filter (set at 19kHz). The overall effect is to ensure a basically even tonal balance, free from the treble sharpness or dullness that can come from a poorly terminated MPX filter. ION have engineered this tuner carefully. Whilst listening carefully to stereo I did note that against a Hitachi FT-5500MkII reference tuner the little ION sounded warmer in its presentation; there was obviously a little less treble.

The pilot tone notch filter is a good one. It effectively removed unwanted signals at and above 19kHz, namely pilot, sub-carrier and intermodulation products.

With a strong signal, hiss sank to -68dB. Although this is a reasonably low value it is now commonly bettered. I hope and expect to see -70dB minimum, even from budget Japanese tuners. Moreover, the FMT I needed a lot of signal (10mV) to reach a minimum hiss state, known as full quieting. However, it appears only to have a quieting curve different from that usually found, because sensitivity proved reasonably good. I measured 28µV to achieve -50dB of hiss with a stereo transmission and 1.2µV with a mono transmission.

What all this means is that to get least hiss you need a very strong signal for the FMT I. However, in comparison to other tuners, for any particular aerial it is likely to be only marginally more hissy - and then only at certain signal strengths. I did not notice any problem in this respect and I think most people would be hard put to detect what the test equipment picked up.

I was fascinated to note that ION seem to have taken a leaf out of Creek's book. The Creek T-40 (old version) was the first tuner I ever tested to give in gracefully when overwhelmed by a strong interfering signal. The ION FMT I behaves in much the same manner. It clings onto a weak signal even when a fairly massive interfering one is close by. When the going gets too tough, it doesn't crackle and

spit, but mutes. Overall selectivity was high at -72dB, this being a measure of immunity to an alternate channel signal (i.e. one spaced 0.4MHz away).

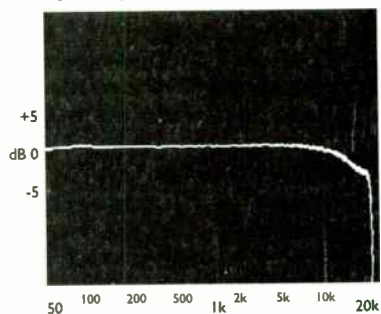
ION fit an interesting and effective combined signal strength/tuning indicator. Two rows of bright red LEDs occupy a large window on the small front panel. No fewer than nine separate segments exist in each row, lighting progressively in response to signal strength. Strangely, the first five run up to 6µV, which is a minuscule signal, so they will be alight most of the time in practice. The interesting ones are numbers eight and nine. These only light at very high level. Ideally, because it comes on at 6mV, number eight should light up, but few aerials will manage to make it do so. The ninth light is effectively an overload warning indicator, coming on at a massive 50mV. This is the first time I have encountered such a thing, but it has occurred to me in the past that such a light would be useful.

Generally, the ION FMT I measured well in all respects. It has no weaknesses and it seems to me that quite a lot of thought has gone into the fine details of the way it operates.

### Test Results

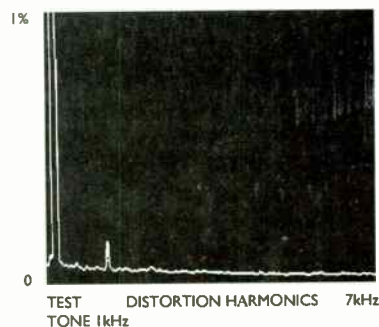
Frequency response (-1dB)	10Hz -13kHz
Stereo separation	-20dB
Distortion (50% mod.)	0.18%
Hiss (CCIR)	-68dB
Signal for minimum hiss	10mV
Sensitivity	
mono	1.2µV
stereo	28µV
Selectivity	
alternate channel	-72dB
Signal strength meter	
indicator 1	lights at 0.3µV
2	0.6µV
3	1.5µV
4	4µV
5	6µV
6	12µV
7	30µV
8	6mV
9	50mV

### Frequency Response



Flat response to 10kHz

### Distortion

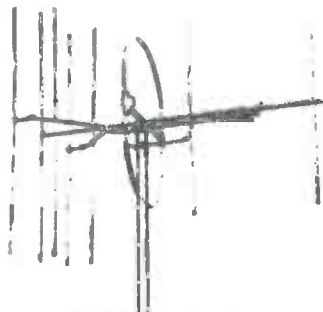


A small amount of distortion

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# The trend that demands a new aerial concept

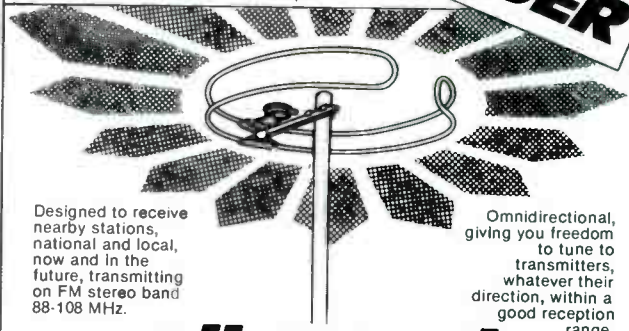
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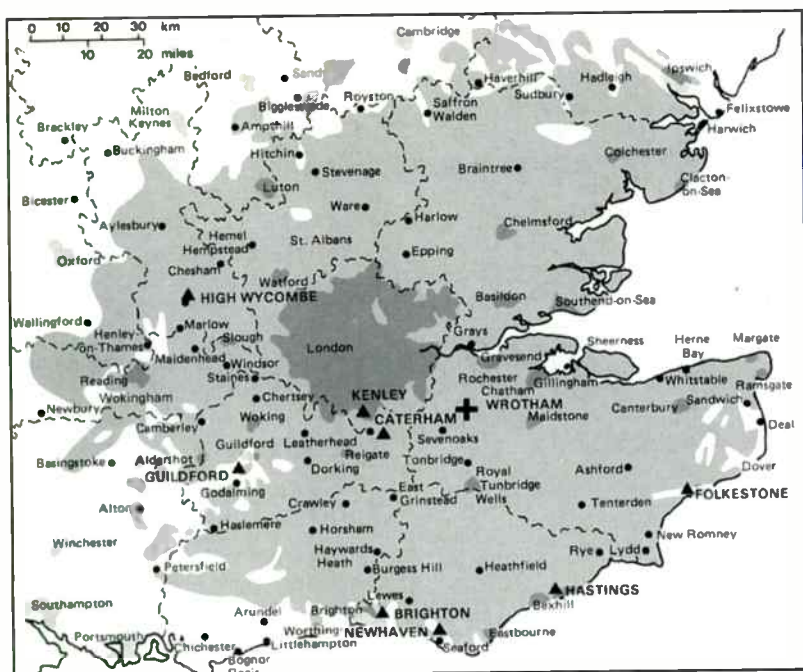
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First things first. We'll take it as read that you already have a good directional aerial, so you now need to find out where your local transmitter is situated. Contact the Beeb or the Radio Marketing Bureau (addresses at end) who will send you packs with full details, complete with maps and illustrations.

Two maps from the BBC are printed here to show you what to expect. First note that they leave out all the IBA transmitters (!), so for example Londoners would not know that Capital Radio and others are transmitted from Croydon, due South of London, as well as the BBC's own GLR. Do not therefore assume any one map is a definitive guide to transmitters covering a region. The Wrotham map is just that and no more; it shows you where Radios 1, 2, 3, and 4 come from, namely Wrotham Hill in Kent, South East of London. Speak to BBC or IBA engineers by telephone if you have a problem; we find them both knowledgeable and helpful.

Armed with a map, you must first determine your position on it. If you've got problems with this, find yourself an aerial installer! Once upon a time these maps had a compass marked on them. Now, just assume North is upward and determine the compass bearing of the transmitter from your position. The next task is to get a compass to indicate this direction, although using the sun's zenith at midday in the Summer months can give a fair approximation.

You might notice that you are a long way away from the main transmitter and that a relay transmitter is closer, as marked by a black triangle. In that case, try aiming at the relay. Note carefully though, by scanning the info. carefully, whether the relay is transmitting at the same

frequency as the main transmitter or whether it is re-transmitting at a different frequency. For example, Brighton's Whitehawk Hill transmitter is a Wrotham relay transmitting at different frequencies, but Kenley and Caterham are relays transmitting at identical frequencies.

Note also the polarisation of a transmitter. If it is horizontal, which is the traditional orientation, then a normal horizontally mounted VHF aerial is used. If it is vertical, twist the aerial so the rods on it are aligned vertically. If it is mixed polarisation, either alignment will do, so try experimenting. Finally, don't take the maps as Gospel Truth for your area. They don't show local obstructions like Battersea power station, for example, which can produce a radio shadow. This may cause aerials to be pointed in strange directions within the shadow.

‘ don't take the maps as Gospel Truth for your area. They don't show local obstructions like Battersea power station

Having found your nearest transmitter, point your aerial roughly in its direction. For example, if you're aligning an aerial to Rowridge from Petersfield, point the aerial in a South-Westerly direction; whereas from Dorchester, point due East. (Inciden-

**Following last month's article on choosing an aerial, it's time to look at the difficult subject of tuning it in.**

**The easy way is to find a professional installer. But we know many of you like to do things the hard way. Here's our guide for the intrepid.**

# a map, a compass and an aerial

(or how to point your aerial in the right direction)

tally, in this article, we have used, as examples, the Wrotham and Rowridge transmitters, both of which are South East stations. This is not to add fuel to the North/South divide feud, it's just that these are the closest transmitters to hand and ones that we know well.)

## Simple Beasts

This is only the starting point, however, as some care and attention is needed. Aerials are simple beasts: if they cannot 'see' the transmitter, they find it hard to receive from it. The

maps provided by the authorities make no account of the line-of-sight nature of Very High Frequency transmissions, so you must assess your area personally. By using the mean aerial height, now usually expressed in metres 'agl' (above ground level) and 'aod' (above ordinance datum), check to see if there are any large obstacles obscuring the path between aerial and transmitter. This is best done using Ordnance Survey maps, although local knowledge and guess-work do also play a part as well. The closer the obstacle is to your aerial (for example a large building or hill), the harder it becomes to get a good signal from the transmitter.

If there is a large object blocking the aerial's view of the transmitter, as a last resort you can aim the aerial at a hill or tall building that is reflecting the signal. In most cases, this reflection causes severe problems, creating what is known as multipath (this is where a reflected signal arrives at the aerial slightly later than the direct signal, causing 'shhh'-like sibilants, or 's' sounds). While you should usually attempt to eliminate this multipath 'echo', in this particular circumstance, and where no other option is available, it is advisable to aim for the source of the 'echo' instead of the transmitter.

### Field Strength

Regardless of this, in order to get the best reception, ideally you should use a field strength meter. These are always used by members of the Confederation of Aerial Installers (if you live in an area prone to thunderously high winds, which rip your aerial off its mountings every few days, you might find it expedient to make

friends with a CAI member who has such a meter). Failing this, a number of quality tuners are fitted with signal strength meters. To use the signal strength meter on a tuner is a two-man process. Person A (who is not scared of heights) is on the roof, adjusting the aerial, while Person B stays on the ground, by the tuner.

From here, B adjusts the tuner to pick up a specific station, at the broadcasting frequency given by the transmitter information sheet (for

When the strongest signal appears, B screams at A to stop moving the aerial. It's like adjusting the aerial on a portable television, except on a much larger scale.

example, Radio 1 is broadcast at 98.8 MHz by Wrotham, 98.2 MHz by Rowridge). It is important that you tune to a quoted frequency, not attempt to find a station and then tune the aerial around it. This is because one could easily tune into the tail end of a distant transmitter, ignoring the stronger transmitter by accident. In practice, it is a little difficult to do this, but for people on

the boundaries of two transmitters this is worth bearing in mind.

Person A, having roughly positioned the aerial using a compass, an Ordnance Survey map and a ladder, then moves the aerial, constantly asking B how good the signal is, until the best signal is achieved. This is usually displayed as a bar display, similar to a cassette recorder's, although some tuners actually display the signal strength in microvolts or millivolts. When the strongest signal appears, B screams at A to stop moving the aerial. It's like adjusting the aerial on a portable television, except on a much larger scale.

### Relay Stations

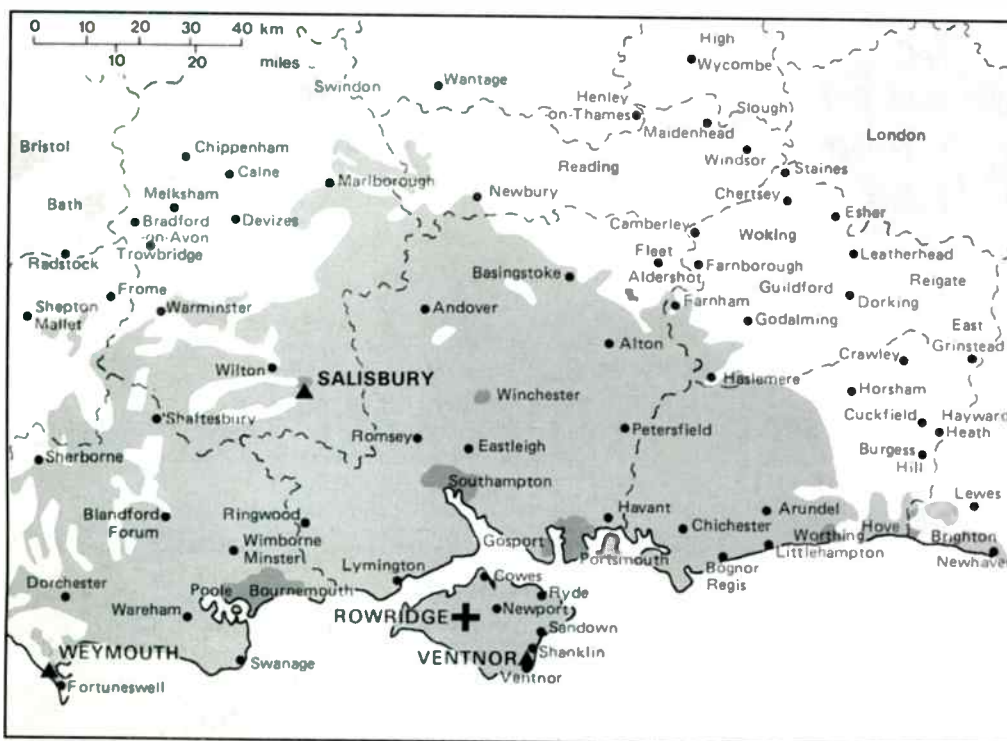
After a certain distance, the signal strength of a main transmitter begins to grow weak. To overcome this, a number of relay stations have been built to boost weak signal areas. In some areas, the relay station and the main transmitter achieve about the same strength so people living in these areas may notice that other people's aerials are pointing seemingly in random directions.

Another problem that is not mentioned in the reception maps concerns other transmitters interfering with the signal. In areas like Greater London (covered by the Wrotham transmitter), it can be a serious problem, although one that can be minimised by use of a highly directional aerial. Pirate stations, who broadcast locally, can interfere with the reception of other stations. Pirates are not the only culprits however; in Brighton, a large police transmitter effectively destroys the signal broadcast from the BBC's relay station. As such, although the signal from the Rowridge transmitter is weaker, a large number of listeners in the Brighton area have no option but to direct their aerials toward Rowridge.

By and large, however, these are rarely insurmountable problems. There are areas where good reception is virtually impossible without a aerial mast about the same height as the transmitter itself. But with improvements in broadcast transmission, aerial and tuner technology, these places are becoming few and far between ●

BBC Engineers Information Dept.,  
201 Wood Lane,  
London W12 7TS.  
081-752 5040.

Radio Marketing Bureau,  
Radio House,  
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Monitor Audio currently produce fourteen loudspeaker designs. These fall into three ranges that appear to be orientated towards different markets. The most esoteric of these is the Studio range, featuring high technology drive units and dedicated speaker stands. The Studio 5, at £650, is the latest, smallest and least expensive addition to this range.

The Studio 5 is not just small, it's tiny. Measuring just 32cm high x 18cm wide x 20cm deep, it is well within the Acoustic Energy AE1's realm of smallness. But why buy a small box with only two drive units when for less money Monitor Audio produce a far bigger model with three drive units? Well, in common with other small but up-market designs (such as the AE1s and Celestion's SL700), the Studio 5s feature some very expensive technology. The small size brings it into an affordable price bracket. (For those who don't have to worry about such matters, the Studio 20 at two thousand pounds is the company's ultimate statement.)

This technology is to do with drive units. The people at Monitor Audio are quite rare in that they design and manufacture their own unique ones. In common with the other models in the Studio range, the 5 features a recently developed ceramic/aluminium sandwich alloy cone. Whereas most are made of plastic or paper, Monitor Audio's is a stress relieved aluminium extrusion that is ceramic anodised on both sides.

In the Studio 5 this is a 13cm unit with a 9cm cone. The idea of this is that the alloy's rigidity is strengthened by the ceramics, which further tailor the cone's resonances. Combined with a controlled roll-off at 8kHz, it is claimed that these factors give the Studio 5 a life-like transition of sound between the two drivers. The inherent strength of the drive unit also permits a very generous 80-100 watts to be played without damage. As a person who has inflicted much damage on small drive units in the past, I was very relieved to hear this.

Monitor Audio's gold anodised aluminium tweeters have been described at length often before. Suffice it to say the anodising process is claimed to add stiffness and, hence, a higher (28kHz) break-up point. It certainly looks the part.

### Superb Finish

As with all the company's loudspeakers, the Studio 5 is superbly finished. The infinite baffle (sealed box) cabinet is made of 18mm Medium Density Fibreboard. A brief rap of knuckles will reveal its strength. The cabinets are veneered in virtually any finish that exists (rare ones to order) and even boring old black looked extremely elegant. I have also seen a light ash veneer that was similarly excellent.

Lastly, the Studio 5 is bi-wirable and of only medium sensitivity (86dB/W at 1m). In practice this means two sets of speaker cable are necessary as well as a reasonably powerful, good quality amplifier. Bi-wiring takes place through

gold plated speaker terminals that can be linked for single wire operation.

On the first occasion that I heard the Studio 5s, I was left with doubts as to their worth. They were aggressive, bass light and very muddled. This brought to light several factors. First, an extremely long running in period is needed; not in terms of hours but weeks. Secondly, bi-wiring makes such a big difference that it should be considered as mandatory. Finally, I felt that Monitor Audio's own £379 stands were a large part of the problem.

Duly run in and bi-wired, I tried again in a system that comprised the following: Linn LP12 Lingo/Ekos/Asaka, Linn LK-1/Dirak/ LK-280/Spark amplifier. An alternative system consisting of Arcam Delta 170/ Deltac PDM-ONE and Naim 72/Hi-cap/140 was also used to assess Compact Disc performance.

The Studio 5s proved to be very sensitive to placement and stand type. Monitor Audio's own stands gave the loudspeakers a forward and muddled sound that didn't do a lot for me. The Linn Kan II stands improved things but lost a lot of bass output. The best match came in the shape of Slate Audio's 23" model that also suited visually. At around £300 they are not cheap, but I found no other satisfactory platform. Positioning the Studio 5s also took some time. In a large room, the best position was about six feet apart, firing straight into the room and about one foot from the back wall.

The most striking aspect of the Studio 5s is the sheer size of its sound. It was almost comical the way in which Mahler's sixth symphony grew from one end of the room without any regard for the small box it left. It was similarly dynamic. The power of a full orchestra was evident, exhibiting no strain at the louder moments. I imagine those who find small loudspeakers small sounding and feeble would have been greatly impressed.

This is not all that makes a performance, however. In other respects I found the sound to be merely reasonable. For example, on a live James LP, 'One Man Waving' it again conveyed a massive, powerful sound, but didn't achieve the same success in allowing one to follow the instruments. The bass line was very lightweight. It was also only reasonably articulate. At times, I was left feeling that the bass player had stopped playing, or was using a guitar instead. I also felt that voices and cymbals were pushed forward in the mix. It was almost as if the thread that links the instruments together was missing. On REM's brilliant new album, 'Out of Time', this bifurcation of performance was even more explicit. There were good dynamics and superb speed and attack, but little coherence. The whole effect was such that inherently simple songs became complicated and confused.

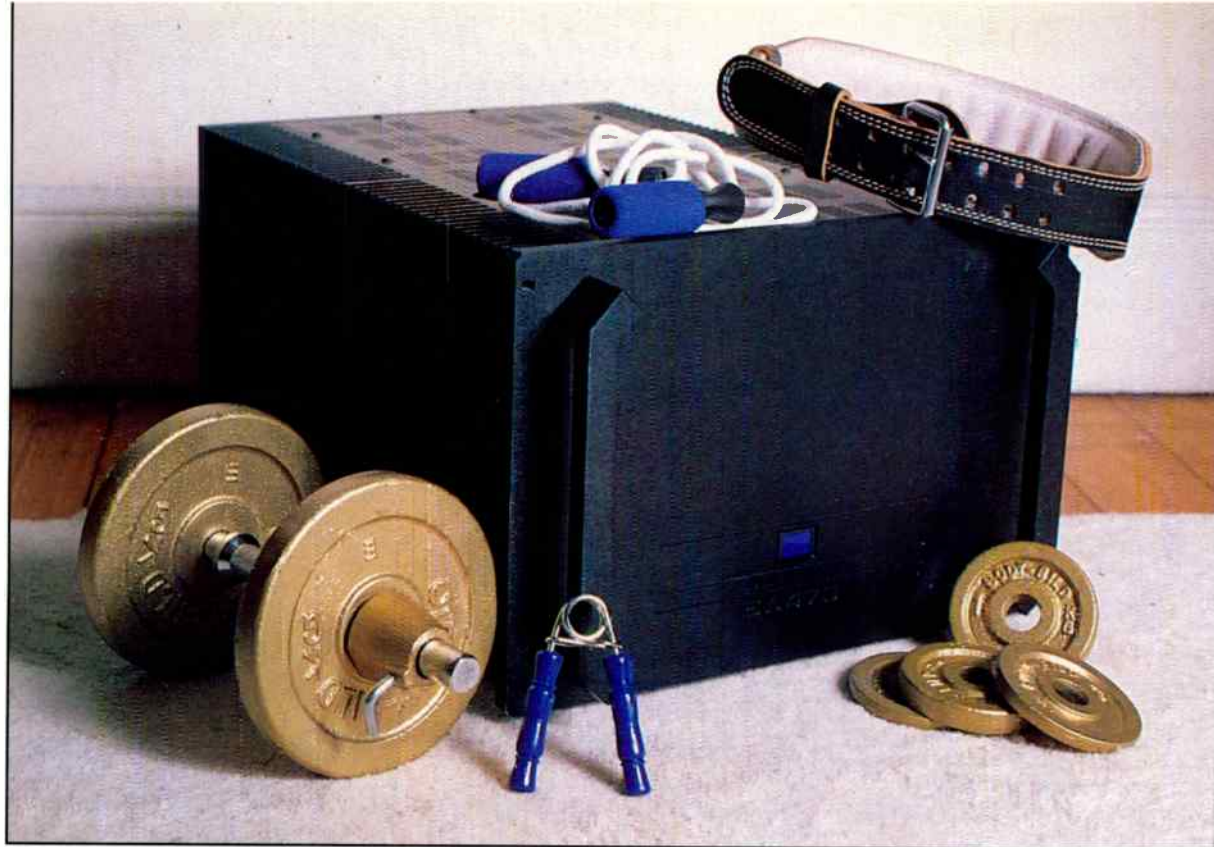
At the end, the Studio 5 is not a loudspeaker I can recommend overall. The problem is that any hi-fi product should have a degree of all-round success. It may be better in some

**Danny Haikin listens to the new Monitor Audio Studio 5 loudspeaker and discovers a small box with a big sound.**



quart in  
a pint  
pot?

respects than others but the Studio 5 does not attempt a balanced performance. It is in this respect that, for me, the Studio 5 failed. On the plus side, the speed with which this loudspeaker can react is second to none. It is also the most un-small sounding small box that I have heard to date. In these, and many other respects, it has outstanding qualities that are unequalled anywhere ●



# gentle giant

**Noel Keywood grapples  
with the £6,000 Musical  
Fidelity SA-470 power  
amplifier and finds beauty  
within the beast.**

"Er...no, we don't really want to review the SA-470. Please don't send it down!" Some hours later a large lorry turned up.

Rarely will you ever read about this amplifier, even though it is one of the largest, most expensive and esoteric hi-fi amplifiers ever built. The reason is simple: it is so absurdly large and enormously heavy that it takes four people to move it. That's why the thought of reviewing it filled everyone in the office with horror.

Three of us struggled to get the SA-470 up our stairs. We were barely able to move the brute one stair at a time. Musical Fidelity tell us it weighs 95kgs, or 209lbs! That's little less than one tenth of a ton.

Anyone contemplating buying an

SA-470 must be ready to part with £6,000. It gets delivered from the factory in a wooden crate. Keep the crate for when a speaker cone flies out and kills someone; the body goes in the crate. Pray it won't be you!

## Toil and Trouble

I have heard many, many large power amplifiers and I did not think this one could be worth the sort of toil and trouble we were going to have to go through. Big power amplifiers, in my experience, generally have the advantage of sounding relaxed at high volumes and quite frightening in their unrestrained dynamism. The downside to this is that they usually lack subtlety and quite often have fierce treble. They're great fun for a few hours, after which the assault becomes too much and one starts to wish for something more gentle - like a valve amp!

I thought we'd listen to the SA-470, perhaps test it and then get the lorry back again as quickly as possible. Instead, I phoned Musical Fidelity a few days later and offered to give it free storage until they found a buyer. This monster proved so superb to listen to, I fell in love with it straight away. What it has that the others don't is comparatively smooth, sweet and clean treble and the ability to reproduce subtleties and low level ambient information - coupled with vast dynamics. Performers and instruments were placed within a background context, bringing both life and credibility to a performance. In our group amplifier test, only the Audio-lab 8000P power amplifier came close. In truth it was possibly a bit

more subtle and insightful, but far less able to maintain and distinguish the dynamic push of individual instruments and the complexities behind the individual efforts of the players.

## Life and Fire

In line with big power amplifiers in general, the SA-470 breathed life and fire into loudspeakers, taking a fearsome grip on the bass unit and throwing it violently in and out. This is where the drama of a big power amplifier starts to make itself known. Turn the volume up and the sound level gets louder, but the lack of strain is deceptive. Loudspeakers suddenly start making painful crashing, groaning and wallowing sounds as the drive units reach their mechanical limits, coil cores start to saturate and resistors glow hot. The other warning sign comes when someone in the room tries to say something, their mouth moves and you hear nothing. At this point, unless you are driving a pair of Tannoy Dreadnoughts, it is time to turn the volume down, quickly, before things start to fall apart. Otherwise you may end up involuntarily occupying the packing crate on a permanent basis.

Keep away from the temptation to push volume up to unhealthy levels and the SA-470 remains a civilised monster, on par in terms of sound quality with the very best currently available. It does grab and control loudspeakers so brutally that they dance to its song. This is not an amplifier to let a loose loudspeaker flap and wander. It gets yanked into line.

In a follow up conversation I said



to Musical Fidelity that we would appreciate its use for assessing loudspeakers, since it can properly drive anything available. They frankly pointed out that whilst this was true, and whilst loudspeakers were properly driven by it, its use as a reference drive amplifier was unrealistic. Even the weediest budget designs would rock their stands with the SA-470 in control, but in real life nothing like it would ever be used. Then, the sound would be modified by the weaknesses of the driving amplifier. The results we got would always be far better than those achieved in the field. Sadly, I had to agree.

What it has that the others don't is comparatively smooth, sweet and clean treble and the ability to reproduce subtleties and low level ambient information - coupled with vast dynamics.

### Magic

Inside an SA-470 lies two huge power supplies, one per channel. And this is where the magic starts. Each has its own massive toroidal transformer, but each transformer feeds a two stage choke/capacitor smoothing filter. Chokes went out with valves, as they are both cumbersome and expensive. What Musical Fidelity have done is to revive valve amplifier practice, not for its own sake but because a choke provides smoothing without affecting regulation. Normally, one choke would be used, but because this is a quite insanely over-specified amplifier there are two per channel, plus enormous smoothing capacitors to complement them. So successful has the use of chokes been that Musical Fidelity now offer them as an upgrade path for the new P-180 power amplifiers too. One buys a CRPS (Choke Regulated Power Supply) to go with it.

Fewer than eleven complementary pairs of Hitachi FETs are used in each

output stage and they are run heavily into Class A mode. This means that at normal and even high volume levels the SA-470 is effectively Class A. This was a fact that soon became obvious in use: the amplifier runs hot. Although it does not run hot enough to burn, the external heat sinks are so large that great draughts of hot air rise from them; the whole amplifier runs hot in fact, which is a trifle frightening. However, there is so much metalwork and so much heatsinking that actual temperatures remain reasonable.

Another frightening feature of big power amplifiers is the enormous bangs and thumps they can produce at switch on. Having had one US monster blow up on me at switch on, taking a loudspeaker with it, I was very wary about the SA-470. Everything else has to be switched on and stable; I checked this more than once! Keeping well back and turning my head away, I pressed in the big blue button on the enormous front panel. Almost nothing happened! There was a slight thrum, but not the sort of deep shudder that can be so intimidating when ten of amperes surge back and forth, building up a magnetic field. I waited for the clunk of a giant relay and the possible flight of a deeply unhappy cone past my left earhole. There was a muffled click from somewhere deep inside the monster, accompanied by the slightest click from the loudspeakers. I couldn't quite believe that that was it; there was no noise from the loudspeakers. Turning up volume on the preamplifier, I heard a slight hiss, so the beast was working.

### Civilised

It subsequently turned on like this at all times. Not once was there any drama. The SA-470 is actually more civilised than many integrated amplifiers. However, it wouldn't be wise to switch on a preamplifier or source component after it has become active. Any thump would be amplified and is liable to terminate the life of the loudspeaker with little equivocation. Luckily, we have not, up to the point of writing, experienced any dramas like this.

A certain degree of underlying fear remains every time I so much as look at this monster though. It's just too awesome not to instill some sort of reaction. Why Musical Fidelity ever built it you may well wonder. I suspect it is a statement product: "this is what we can do when we try". Then for some reason they decided that it wasn't enough. There is a monoblock version of the SA-470 called the SA-570 and as I told Musical Fidelity on the 'phone ... "no, we don't want to review it!" We are waiting for the lorry to turn up ●

### Measured Performance

I was determined to measure this amplifier - but it wasn't going to be easy. Getting it up a flight of stairs to the lounge produced more grunting than you'd hear in a pig sty at a hoe down. To test it, another flight of stairs had to be surmounted. At the right psychological moment - that is when four sturdy males in a good mood were gathered together talking hi-fi and reflecting carelessly on how wonderful life could be - I made my move. "We are going to have to carry the SA-470 upstairs to test it. The first person to run out screaming is a cissy!"

The heaving and grunting, the expletives and sweat would have left the aforementioned pigs covering their eyes and ears. But we got it up the stairs and onto a strong steel framed table - 95kgs of metal monster nestling beside the test bench (which itself would have collapsed from the weight).

Nobody would come close when power output tests were being performed, but the process wasn't so awesome. In fact, it wasn't awesome at all. The SA-470 is unusually civilised; it made no noises and showed no strain when made to run flat out. As predicted by Musical Fidelity, output was exactly 50 volts which, into eight ohms, amounts to 300 watts. Into four ohms, which is a low load, output fell to 45 volts, equivalent to 500 watts. Need I say that such power will cause your neighbours to complain - the ones that live four miles away. Any living closer will assume Nostradamus was right and flee.

I soon found why the SA-470 sounds so utterly smooth - it has virtually no high frequency distortion. The spectrum analysis below clearly shows this, the small blip at the bottom being 0.006% second harmonic distortion on a 10kHz signal. In the mid-band this figure sank to 0.003%. Even at very high output powers, distortion at high frequencies rose little, hitting 0.05%. These results are due partially to the use of Class A working up to high outputs.

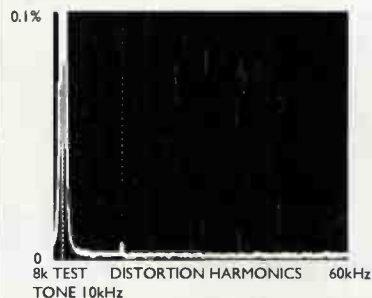
Frequency response was wide, noise extremely low and DC offset negligible. Input sensitivity is 750mV for full output. There is no input level control to adjust this value.

The SA-470 measured wonderfully. In my view it sounds even better! But now we've got to get it back down the stairs again.

### Test Results

Power output	300watts
Frequency response	6Hz-50kHz
Distortion (1kHz)	0.003%
" (10kHz)	0.006%
Noise	-112dB
Sensitivity	0.75V
DC offset	+8mV/-9mV

### Distortion



A minuscule amount of second harmonic distortion at 10kHz, measuring just 0.006%.

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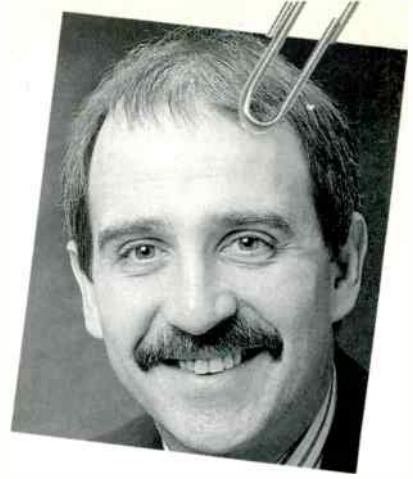
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# Curriculum Vitae



**NAME:** John Dawson.

**CURRENT POSITION:** Managing Director, Arcam.

**BORN:** Enfield, north London, England 4 July 1950.

**EDUCATION:** Richmond House Primary School. Enfield Grammar School (1961-1968), gaining 9 "O-levels" and 4 "A levels".

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**UNIVERSITY EDUCATION:** Went up to Trinity College, Cambridge, in 1968. Studied Natural Sciences (Physics, Chemistry etc.) Gained 1st Class Honours Degree in Materials Science in 1971. At university I joined CUTRS (the Cambridge University Tape Recording Society). This was effectively a hi-fi and live recording club and it owned lots of good audio equipment such as BBC ribbon microphones, Calrec condenser microphones and 2 Revox tape recorders, a G36 and an A77. We used to record and replay numerous concerts around the university. This gave invaluable experience of live vs. recorded sound and of various recording techniques.

Later became Secretary and then President of CUTRS, where duties included inviting audio people to visit and speak to the society. During my period of office guests included David Robinson of Dolby Laboratories (David and Ray Dolby were both former students of Cambridge University), Angus McKenzie, Bob Stuart (now with Meridian) and Spencer Hughes of Spondor Loudspeakers.

Undertook postgraduate studies in superconducting materials 1971-74.

---

## EMPLOYMENT HISTORY 1976-1991

I started Amplification & Recording (A & R) in 1972 whilst still at college, initially building and hiring out amplifiers and loudspeakers; also performing 2 track recording and live sound reinforcement. Most famous client then was the classical guitarist John Williams. We used Calrec microphones, A & R amplification and Spondor BCI loudspeakers to ensure he could be heard playing Rodriguez' Concerto for Guitar & Orchestra with the University Symphony Orchestra. Almost no-one in the audience noticed his guitar was amplified, which shows how good this simple system was!

As the decade progressed A & R undertook audio design for well known companies, mostly in the professional audio field. Projects included audio mixers, power supplies and diagnostic hearing equipment for the Royal National Institute for the Deaf.

A & R also retailed some hi-fi equipment, mostly to students. We soon found that popular Japanese amplifiers were not very good to listen to; some British designs were sonically better but they were poorly built and not very reliable. We therefore decided to design our own hi-fi amplifier that would both sound good and be reliable.

We launched this amplifier, the A60 in 1976. It took us 6 months to sell the first 50, but then the audio magazine reviews started coming in and we sold 500 in 1977 and 2000 in 1978. By the time we stopped production in the mid 80's we had sold over 30,000.

Later the company expanded to make tuners and pickup cartridges. By 1979 it employed 20 people. We started to plan the move to a new, larger and better factory.

We purpose-built a new factory as we could not find suitable premises in the area and moved at the end of 1980, with just 2 weeks' loss of production. Total cost of the project was over £290,000, more than half our annual sales at the time.

In 1981 we introduced our first pre and power amplifier - the 200 series. These were quite successful overseas particularly in the Far East but not so much in the cost conscious UK market. By 1982 Arcam's sales reached £1 million/year for the first time.

In 1983 and '84 we concentrated on introducing our loudspeakers, the Arcam One and Two models. But sales of the A60 slowed, and without a replacement ready, the company lost some ground in the market. Some directors left in 1985 and, as managing director of the re-organised business, I concentrated on writing new business plans and formulating new model ranges with Mike Martindell our chief designer. These centred around two areas - the Alpha range for new buyers and the more expensive Delta range for audiophiles. Compact Disc players were envisaged as part of the Delta range from the outset and were planned to be introduced down into the Alpha range later, when we had gained experience of the new medium. (As you may know we now have 3 CD players in our range - quite a feat for a company of Arcam's size).

We refinanced the business in 1986 and launched the new Delta range at the end of that year. We then concentrated on our core businesses of amplification and CD so that by 1989 sales were up to £3.6M/year. Products then included the world's first low cost D/A converter (the Black Box design, which even includes our own custom I.C.), the Delta 170 CD transport, a revised Alpha amplifier and, at last, an Alpha CD player, which met with universal acclaim.

In 1990 we added our new pre & power amplifier, the Delta 110 and Delta 120, with built in Bitstream D/A converters, a separate Bitstream outboard D/A converter, the Black Box 3, and our innovative Delta 150 NICAM TV sound tuner. The latest phase is the Delta 100 cassette deck and you can still expect one or two surprises from Arcam in the future!

---

## HOBBIES AND INTERESTS

I first became interested in audio and electronics through my father, who had built his own audio equipment in the early 1950s. (This included an original "Williamson" 15W valve power amplifier, which I still have). My father also owned a Ferrograph tape recorder in the 1960s, which introduced me to live recording work.

I started building my own electronics, including etching my own printed circuit boards, from about age 14. This included a radio, then various audio amplifiers. My school encouraged my work and later I built a complete demonstration computer for the school in my own time. I also operated and sometimes provided equipment for school films, dances and amateur dramatics.

Early musical influences ranged from Beethoven (particularly the DGG 4th & 5th piano concertos) to the Beatles, especially Sergeant Pepper. I felt that the quality and production of this music was really fresh and ahead of its time.

# Tickled Pink!

**The £690 Pink Triangle  
Export turntable tickles  
Malcolm Steward's fancy.**

First a little bit of history to explain the origin of the Pink Triangle Export. The first Pink Triangle turntable (1979-1985) had a DC motor, using a servo system to keep it running at the right speed. But times weren't good for DC motors. Japanese direct drive turntables which employed them were getting some bad press because they had problems running at a constant speed. Then the PT was accused of "slowing under load", a problem attributed to its motor. Despite the company's denial of this claim, it was forced to switch to the industry standard AC synchronous motor, to gain acceptance for the product.

The revised deck was christened the PT TOO and it was on sale from 1985 to 1990. It was supplied with an external power supply unit called The Pacesetter. This added to the deck's cost but the designers felt it was necessary to realise the best performance from the inferior - in their view - AC motor. Then came the budget PT, the Little Pink Thing. Also AC-driven, it had its motor control circuitry housed within its plinth.

One of the company's overseas distributors then suggested to Pink Triangle that they should incorporate the drive electronics from the LPT into the PT TOO, to keep retail prices down in export markets. PT liked the idea and so the Export

turntable was born. Had the PT TOO survived it would now cost over £830 but it has been replaced in all markets, the United Kingdom included, by the Export. Because of this expedient the price of PT's bread and butter deck is only £690. (For big spenders the company offers the innovative Anniversary turntable at £1198.) Buyers who wish to have a PT TOO specification deck, in essence an Export driven by the external power supply, are catered for by a socket on the deck's rear. This allows for the connection of a Pacesetter (£331).

The rest of the Export turntable is standard Pink Triangle fare. It follows the same principles established in the decks that preceded it: a three-point suspended Aerolam sub-chassis, acrylic platter, inverted main bearing, and lightly tinted (in pink, naturally) acrylic lid.

## **Pink and Perky**

The Export is easy to set up and use, although this task, which includes the fitting of the arm and cartridge, will be performed by the dealer selling you the deck. The sub-chassis is supported by springs in extension - as opposed to springs in compression as found on the Linn LP12, Thorens TDI60, Heybrook TT2 et al. This allows for adjustments to be made without the deck's plinth. It also results in a suspension system that is exceptionally free in both vertical and lateral planes: caution should therefore be exercised when cueing discs and parking tonearms. Motor start-up and speed control functions are managed by a semi-transparent knob on the front of the solid ash plinth. This is illuminated when the deck is running: red signals 33rpm, green 45rpm. The turntable's 'conventional' motor is not mounted in the conventional position: it is placed in the left hand front corner instead of the left hand rear. The idea is that unwanted vibrational energy transmitted into the platter from the motor through the drive belt travels parallel to the cartridge's cantilever instead of across it, so cutting down induced vibration.

Those coming to the Export from a more conventional deck - one that uses a felt mat to twist the platter and record - will have to modify their disc swapping procedure. If you always leave the deck running during listening sessions, as I do, you will have to get used to stopping the platter when changing discs. It is not possible to rely on the mat slipping to decouple the platter allowing it to remain spinning whilst you remove and replace records. The Export has a naked, frost finished acrylic platter, the designers having rejected the use of any mat, preferring instead to support the record with material

offering similar mechanical properties to that of vinyl.

## **Arms Deals**

The Export can be fitted with a variety of arms. The manufacturers can supply pre-cut arm mounting boards to suit most popular choices. I asked for the deck to be sent with a Linn Akito tonearm (£149), this combination making for an entry-level top-flight turntable. I suspect that many users will buy their first Export with this arm, or a Rega RB300 or Roksan Tabriz. You can then upgrade later to a more expensive tonearm that the deck favours. The SME series V often accompanies the Anniversary and there is no reason it shouldn't be used with the Export. (Interestingly, I never liked the SME V until I encountered it on the Anniversary). To complete the review package I fitted an Audio Technica AT-OC5 moving coil cartridge (£119) into the arm, which brought the grand total up to £958. Not an unreasonable charge for admission to the turntable high end.

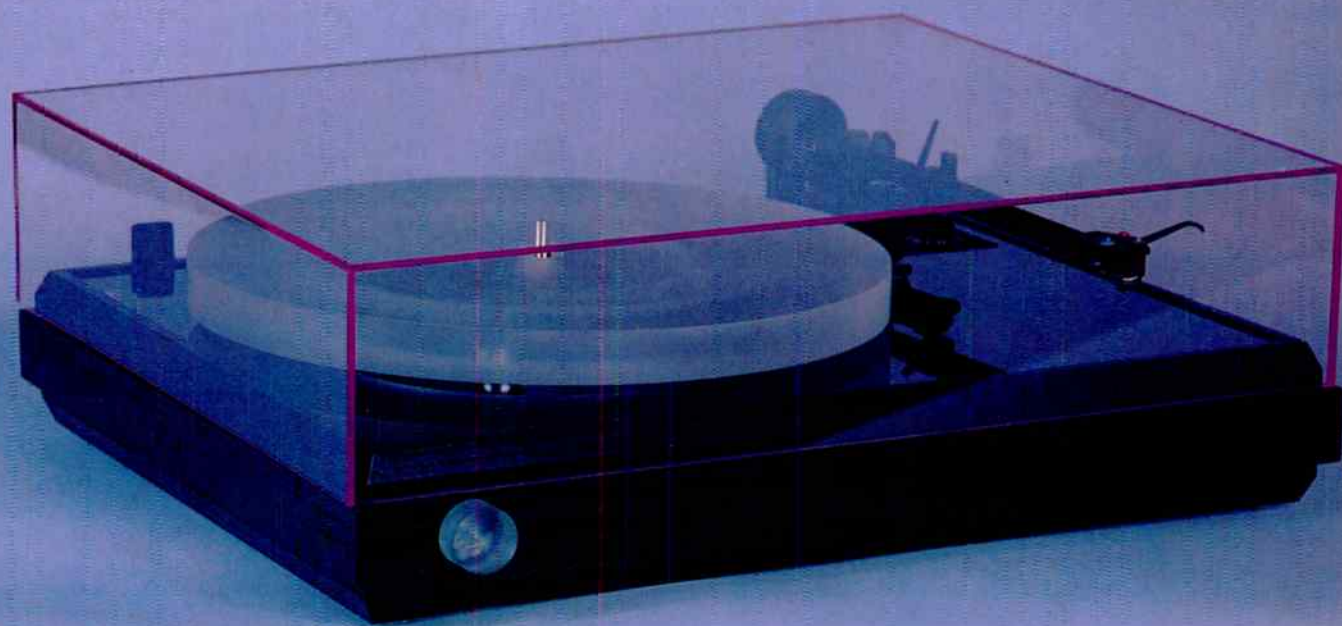
I used the turntable with an assortment of amplifiers and speakers but most of the time it was hooked up to a Heybrook C3/P3 pre/power combination driving Epos ES11 loudspeakers. This made for a very respectable system costing just over £2300, not including stands and cables. On the subject of equipment support, I used the Export on a Mana Acoustics three tier Reference Table. Whilst all turntables benefit from being placed on this excellent platform I have to note that the (suspended sub-chassis) Pink Triangle models seem to benefit to a smaller degree than most. This tends to suggest that their suspension is less susceptible to structure-borne vibration than that of competing designs.

It can be difficult and unreliable attempting to isolate which component is causing what effect in a turntable system, attempting to attribute artefacts of the performance to any one of three elements. It is therefore better to judge the whole set-up as one component. The turntable system here worked well, bringing out what I consider to be the strengths in each of the individual constituents: the analytical composure of the Export, the dynamism and rhythmic positiveness of the arm, and the fine detailing and insight offered by the cartridge. The partnership was indeed a harmonious one.

## **Sound Quality**

Throwing the deck in at the deep end I began the listening with some animated Cuban jazz. Even when presented with demanding material such as that which forms the Paquito





D'Rivera and Arturo Sandoval LP 'Reunion', the deck kept a firm grip on the music. It clearly portrayed, and maintained, the intricate counterpoints of the melodies and rhythms. When Sandoval played his finger-breaking trumpet runs, the deck captured his every note. David Finck's sinuous bass lines were depicted with similar clarity and dexterity; every twist and turn of Mark Walker's fiery drumming and Fareed Haque's adroit guitar playing was exposed ruthlessly. Yet all their contributions merged effortlessly to present a convincing picture of the performance: in the face of these impressive hi-fi attributes, the drive and cohesive quality of the music still shone through as the dominant factor. This agglomeration of artifacts couldn't suppress the magic of the Mambo.

Delving into the classical repertoire I selected Jean Fery Rebel's 'Les Elements', a musical assault course that stretches the rules of harmony to their virtual breaking point, especially in the opening movement 'Le Cahos', which represents the elements that will constitute the earth after God's hand imposes order upon them. And orderly would be a fitting description for how the deck presented this taxing composition. It was never less than composed and in control, all it really lacked was the sense of drama that a better arm and cartridge would have afforded it. As the music

## 6 The Export could be renamed the Explicit for the way in which it provides an insight into multi-track recordings

progressed towards the final de-brouillement the combination didn't generate the same tension, the need for a musical release, that I have heard from my own turntable (a modified Linn LP12 with Naim Aro tonearm) or the PT Anniversary equipped with SME V. However, it's churlish to be too critical; with many similarly priced decks one wouldn't remain listening long enough to reach the final harmonic unravelling. With the Export, my interest was maintained up to and beyond the close of the movement. The combination gave a fine account of the Academy of Ancient Music's playing, and brought out the marvellous tonal colours and dynamics of their period instruments.

On straightforward rock material - including albums by The Law, Velvet Underground, and Little Feat, the

player exhibited far better rhythmic drive than PTs of yesteryear. I would still recommend that those who are particularly sensitive to a turntable's ability to boogie should compare the Export with the Linn LP12, the undoubted paradigm in this respect. Pink Triangle themselves admit that the Linn has undeniable strengths in this area: they add that the PT philosophy centres more on stripping away colorations and aberrations than on overt musicality. This is evinced by the deck's ability to show up recordings in a new and different light to other decks. Often a familiar piece of music will surprise as some previously unnoticed element is brought to light. The Export could be renamed the Explicit for the way in which it provides an insight into multi-track recordings.

### Summary

With appropriate partnering equipment, the Pink Triangle Export is a truly competitive product. Along with the arm and cartridge chosen for this test it provided a seductive taste of the true high end performance. After the honeymoon period is over the deck cries out for a better arm and cartridge so that it can reveal even more of the music. Those who want to get the most from the deck ought to consider fitting a Pacesetter power supply before making plans to upgrade elsewhere ●

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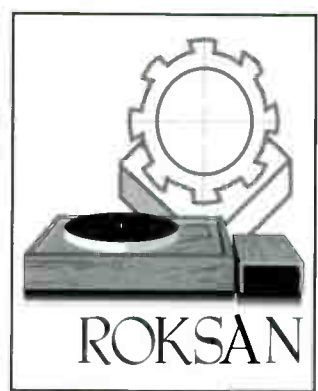
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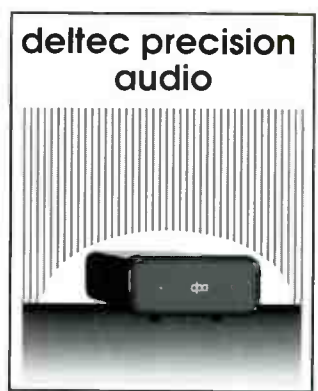
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pressing. More than most, a first pressing becomes far more exciting than third and fourth pressings. I have a copy of The Cure's 'Three Imaginary Boys' LP that is an original pressing, but has seen better days. The crackles are still there, but the action and vibrancy that lurks beneath the surface noise stands out. My copy of 'The Songs The Lord Taught Us' by The Cramps lost a lot of this life, purely because of it being stamped over ten years after the original pressings. I cannot comment if this is a sign of the Valdi being a good deck, but it seems a strong indication of quality to me.

Citing specific tracks that were of note is quite difficult as the Valdi did at no time disgrace itself on any particular track, its character was so benign. I became aware of many aspects of recordings that I had not noticed, or had previously only noticed by default, when a turntable was masking certain areas of a performance.

### Summer Hippies

Subtle details, such as string buzzes on the guitars in 'Alone Again Or' by Love or 'Forever Changes' (another early pressing - a definite 'must buy' record for all Sunday afternoon summer hippies along with Iron Butterfly's 'In A Gadda Da Vidda' and Jefferson Airplane's 'Surrealistic Pillow!') or the delicate fluctuations in Kate and Anna McGarrigle's voices on

‘The Valdi stands apart from the masses in this respect; the pace and life is not there in the Valdi; instead it is in the record

'Heart like a Wheel', become important. The Valdi has a facility to give insight into the recording studio, without sounding sterile, that few turntables can match. It is difficult to compare turntables primarily from memory, but the new power supply seems to have added depth, control and solidity to the overall sound. This seems to have emphasised the bass, which sounded quite light by comparison to the newer deck, if my memory serves me well.

### Inkstained Wretch

Criticisms? I don't want to appear like some inkstained wretch but some records can sound almost unlistenable on the Valdi. I am hesitant to point the finger at it, but feel that the blame lies with the producer of the record in the first place. For example,

Zodiac Mindwarp's 'Tattooed Beat Messiah' sounded so bright and harsh that it barely got into the first chorus before being replaced. The people who have suggested that the bass is 'one-note' on the Valdi have got a point, but not much of one! I feel that this criticism could have been levelled at the earlier Valdi, as the new power supply brings a control to the bass that its price competitors can only hint at.

Lest you think that the Valdi is incapable of playing any records that are less than ten years old, I have been listening to 'Entact' by The Shamen, '3am Eternal' by The KLF and 'Jane From Occupied Europe' by Swell Maps as I write. In fact it is playing so loud that the rest of the street is listening too and the Valdi is doing a sterling job! In fact, the subsonics that are used on Acid and Deep House music shows up just how good a deck the Valdi is.

The Valdi, like all hi-fi products, is not for everybody. When it was delivered to my house, I had two enthusiast friends around. One of them was not sure if he could live without a certain amount of euphony; the other found the deck so beguiling that he is strongly considering buying one. At its price level, I feel that it is possibly the turntable to beat. With its new power supply, the Voyd Vald gives the better-known turntables in the £700 bracket a real run for the money ●

**Fig 4 - One common way of increasing output is to fix the rubber hinge further down the tube. This makes the flux cut the coils at a higher rate, increasing output. It also reduces the mechanical advantage of the cantilever, increasing effective tip mass and reducing high frequency tracking ability. Nowadays it is used in budget models.**

and ripping noises you hear from old records are due to this form of groove damage.

We have already explained how the magnet mass and its position on the cantilever has a bearing upon tip mass; so do other factors.

The cantilever tube must be light, especially at its lower end. It is usually made from thin wall aluminium tubing, often tapered downward to be thinner at the lower end. This increases strength and reduces tip mass. Sometimes a solid rod is used, usually with a material that is difficult to form into a tube, like Beryllium.

Tip mass can be reduced by using a smaller diamond as a stylus. You'll often encounter the curious term 'nude' diamond. This means a tiny

which the permeable element moved.

Ortofon place a ring magnet in the magnetic circuit with the VMS cartridges. A permeable element sits at the top of the cantilever.

There are two supposed advantages to moving iron cartridges. The permeable element is usually a light tube, not a heavy magnet, so reducing tip mass. Magnet strength and therefore output can be increased without affecting tip mass. The moving iron principle effectively eliminates this interdependence.

well in principle. All that matters is that the flux moves through ('cuts') the coils. Where the magnet and the coils go is of no consequence, provided they move relative to each other.

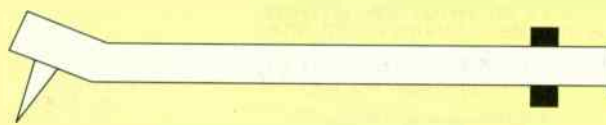
Superficially, the moving coil arrangement looks less than sensible. Miniature coils must be wound and attached to the cantilever. Being so small, they have few turns and consequently provide very little output, usually one tenth that of a moving magnet cartridge (0.3mV instead of 3mV). The need for coil leadout wires makes the stylus

assembly non-removable, unless some plug and socket arrangement is used.

There is another peculiar problem.

Because the coils have a very low output impedance they are unaffected by

loading. There is no upper range droop caused by generator losses. The peak in output at around 18kHz caused by tip mass resonance is therefore not lessened, making MCs potentially very bright sounding. Various ways are found to overcome this now, at least in expensive models, giving them a flat frequency response and correct tonal balance. However, it is not uncommon for budget MCs to have a treble



**Fig 5 - Here is the moving coil cartridge. The coil wiggles in a stationary magnetic field, having a voltage induced into it. Leadout wires make the stylus assembly non-removable.**

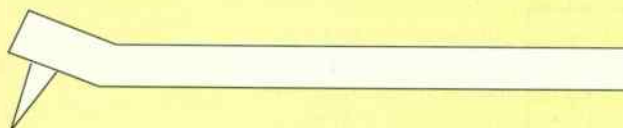
**Because the coil must be small and light, it produces a very weak signal. In spite of its disadvantages, the moving coil cartridge can sound superb.**

diamond mounted directly onto tube, rather than onto a 'rondel', which is a base on which the diamond sits. The advantage of a rondel to a user (as opposed to a manufacturer) is that it causes less fluff to become trapped. The disadvantage is that tip mass is raised. Consequently, rondels are confined to budget cartridges.

## MOVING IRON CARTRIDGES

One popular form of the moving magnet cartridge, where the magnet doesn't move, is called the 'moving iron' cartridge. This generic name isn't often applied these days, probably because it sounds like the invention

Somehow, in practice, moving iron cartridges have never quite made it. They can be good, but they have never become significantly better than moving magnet types, even though in theory they should be.



of a scrap merchant. Ortofon call their version 'variable magnetic shunt' whilst Goldring have called it 'induced magnet'. The magnet is put into the stationary magnetic circuit formed by the core. At the top of the cantilever is placed a light 'permeable' element that affects the flux in the gap. It induces flux changes in the circuit, so causing a variable flux to 'cut' the coil, as usual

There are different ways of arranging all this; Goldring used an isolated magnet in their long lived G800 Series I believe, sitting above the cantilever. It was not in the magnetic circuit, but created a field in

## MOVING COIL CARTRIDGES

Finally, we come to the moving coil principle, shown in Fig 5. Here, the generator is simply turned around, putting the coil at the top of the cantilever and the magnet in the body of the cartridge. This works perfectly

peak and a bright sound.

In case you are still wondering why MCs exist, it is because they have always sounded clearer. This has been acknowledged from the very early days and it remains the case today. Listen to a good moving coil cartridge and you will hear the difference immediately. The moving coil reigns supreme in providing good sound quality from LP ●



If you are invited to dine at a restaurant with a good reputation for the quality of its food, you would naturally expect that the meals it cooks are made from the finest fresh ingredients. You would also expect that the restaurant's reputation for excellence depended on its ability to maintain the quality of its supplies. You would certainly not expect to bring your own spices and sauces to improve the flavour of the meal.

If you are interested in the enjoyment of music and you buy a recognised high quality hi-fi system you would be likely to find, if you had the technical knowledge, that individual parts from which it is made are of quite ordinary performance.

Cables designed on the same principles as high quality loudspeaker cables if used for the mains will show a marked improvement in sound quality on any piece of hi-fi equipment.

Good quality moving coil cartridges can cost several hundred pounds. But if you look carefully at your amplifier, the cartridge loading resistor which can affect the sound dramatically is most likely a type you can easily buy for less than 10p. And if you investigate further, you may find that resistors are available of higher manufactured quality which can actually make your cartridge sound better at a very small cost compared to the cost of the cartridge. Such resistors have been designed and developed for accurate performance in instrumentation, transport or military applications under wide variations of temperature, but are also very effective at improving the sound of hi-fi systems.

#### Past Claims

Although some manufacturers have in the past made claims for using high quality parts in their products, it is only in the last five years that designers have started to understand fully just how much individual component

quality influences overall sound quality. My own experience shows that every single part in a hi-fi system plays its part in determining our final enjoyment of our favourite music.

Fifteen years ago, almost all medium sized loudspeakers were supported on stands fitted with castors for easy moving. Now almost all loudspeakers are mounted on stands fitted with sharp spikes to hold them firm, because they sound better that way. And there is a strong and expanding section of the hi-fi industry designing and building firm supports not only for loudspeakers, but also for amplifiers, tuners, turntables, cassette decks and CD players. These expensive specialist products only sell because their price is justified by the improved sound quality they offer.

#### Mains Supply

More recently we have begun to understand how the quality of our mains supply can affect our enjoyment of music. It started with electronic power supplies for turntable motors in which a clean sine wave signal was accurately generated and amplified to a level capable of driving the motor. I remember the first time I heard the electric version of the Logic turntable some ten years ago and on a familiar record the improvement was immediately obvious. Now we have turntable power supplies to upgrade the one we already have such as the Linn Lingo.

Another area in which the mains supply can be improved lies in the reduction of RF interference, by means of filters and mains conditioners. Whilst many filters manufactured outside the hi-fi industry were considered to be relatively ineffective

at reducing the effect of RF, they were also found to degrade the rhythmic qualities of music due to their series resistance. A number of audio firms have developed ranges of mains 'conditioners' which have become more effective in improving sound quality and the popularity of models by firms such as Lynwood, Radar Developments and EC Audio (Pandora) is growing steadily.

#### Degrading the Sound

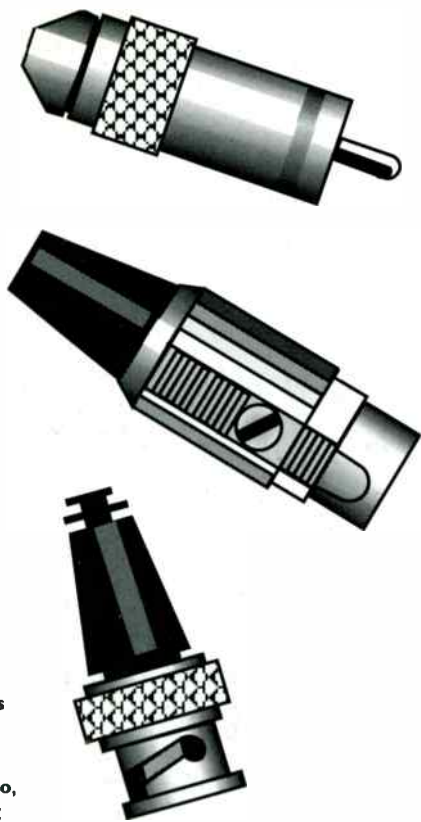
My own research work on cables shows that the mains cables supplied with hi-fi equipment seriously degrade

**Bored with your old amplifier? Handy with a soldering iron? The answer could lie with improving the components, as Graham Nalty of Sonic Link explains.**

## tweaky corner



Examples of different kinds of connector. From top to bottom: phono, DIN and BNC



the sound quality. Cables designed on the same principles as high quality loudspeaker cables, if used for the mains, will show a marked improvement in sound quality on any piece of hi-fi equipment.

It is often asked why we should want to use a metre of expensive, specially developed mains cable for the short length from the amplifier (or CD player) to the wall when there are miles of ordinary quality cable back from the wall socket to the power station. The answer is that the cable from the wall socket back to the fuse box degrades the sound far less than the short short flexible length supplied with equipment, because its conductor is much thicker. And the further back you go the the power station, the thicker the cable conductor.

Many hi-fi enthusiasts have used house wiring cable to connect their equipment to the mains as an audible upgrade. But such cables are still inferior to mains cables designed for audio equipment, and it is not safe to use cables having single core conductors to connect to equipment which is free to be moved.

While the number of people who use a dedicated spur from their fuse box to their hi-fi is growing, more and more will want to have this spur wired with the best heavy duty hi-fi mains cable instead. After this we must look more carefully at mains plugs and the return of the old round pin 15 amp plug (or equivalent) is obviously the correct way ahead. At the same time we also need a series of connectors of similar quality to the 15 amp to replace IEC connectors at the back of higher power amplifiers.

### Three Factors

Much has been written in hi-fi magazines about loudspeaker cables and interconnects. A lot does depend on the three main factors - the quality (purity) of the conductors, the electrical properties of the insulator and the size of the conductor.

Other factors such as cable geometry, screening and the 'solid' versus 'stranded' debate add to the mix. Cables that follow these rules will generally play music on the widest range of equipment whilst cables designed against these factors will find support only from those whose system has been designed around cables of certain characteristics.

there is still some way to go to reach the goal of matching the quality of internal wiring to that most likely to be connected to it by the user.

Although we can judge cables quite easily by their quality of construction, it is difficult to make similar decisions about the connectors. Phono connectors are almost universal for interconnects, but apart from gold plating, there is little we can do to say whether one phono plug or socket is better than another. Obviously this is an area which bears closer inspection by reviewers and cable designers. An obvious solution would be to try different type connectors. Whilst some people show a preference for BNC or DIN connectors, these have a major disadvantage in that highest quality cables which are often quite large cannot be accommodated for size.

### Serious Quality

Although many serious hi-fi users will connect their equipment with cables of a serious quality, such cables may be of a much higher quality than the cables fitted inside the amplifier or loudspeaker. Manufacturers are making strides forward which can be heard through improved sound quality of the finished product, but there is still some way to go to reach the goal of matching the quality of internal wiring to that most likely to

be connected to it by the user.

Over past years I have spent many hours replacing the 'bell wire' in commercial loudspeakers with cable of much higher quality, and when doing this for customers, the improvement has been more than adequate to persuade the customer to pay not only for the wire, but also for my time working on the job.

Upgrading the internal wiring of amplifiers is also becoming popular, especially with valve amplifiers which generally contain more hard wiring. Transistor amplifiers at lower prices generally have the absolute minimum of hard wiring, so offer less scope for improvement in this area.

### Influence

But passive parts such as resistors and capacitors can have an enormous influence on the final sound quality of amplifiers and also any other piece of hi-fi equipment using them. It is easy to assume that a resistor is a resistor and no more and a capacitor is a capacitor. But in real life no electronic component behaves as the text book tells us. And the difference in behaviour between an actual component and its ideal will be heard in your hi-fi system as audible distortion far worse in its effect on music than the sine wave harmonic distortion still measured by some hi-fi reviewers.

When armed with the knowledge

in real life no electronic component behaves as the text book tells us.

of how to select components for sound quality, there is much you can do to upgrade an amplifier which is out of guarantee. Direct substitution of ordinary metal film resistors with Holco precision types can easily be achieved without problem on most amplifiers. Vishay bulk metal foil resistors can easily be placed in the same space on the circuit board despite their different size. Substituting semiconductors is not as easy. Upgrading capacitors needs care as the better capacitors are usually quite a bit larger and unlikely to fit into the same space on the printed circuit board. This is very much an area where the enthusiast has to decide how much and how far. Although there can be difficulties in upgrading some parts the end result is always rewarding and quite often changes a hi-fi amplifier into an audiophile amplifier.

Next month, the knowledge! ●



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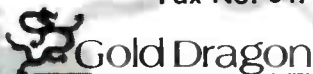
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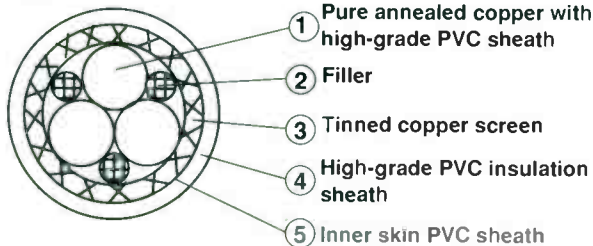
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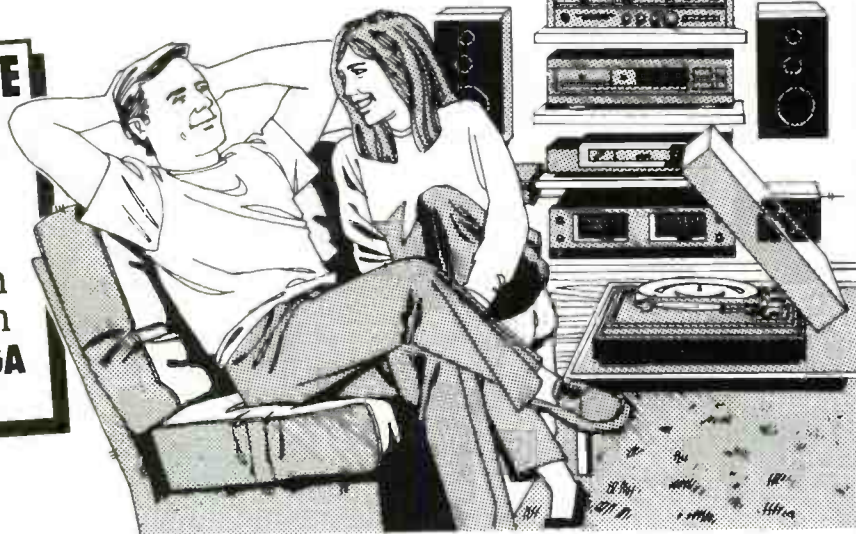
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● My system consists of a Rega Planar 3 turntable, Rega Elys cartridge, Ion Obelisk 1 amplifier and JPW Sonata loudspeakers on Sound Organisation stands connected with QED 79 strand cable. The turntable sits on a rigid coffee table.

The problem is that although I like the smooth sound of the equipment, it suffers from a heavy, boomy bass. I keep the speakers well away from the corners and off the wall.

I think a change of speakers may be the answer. But which ones? The models I had thought of were the Monitor Audio Monitor 7s, Mordaunt Short MS 3.30s or even Heybrook HBI Mk3s on HBS1 stands.

Do you think any of these may be suitable, or am I barking up the wrong tree? My room measures 12x11ft and is well furnished.

**Mark Reynard  
Filey, N.Yorks.**

Dear Mark

Before you look to the speakers, try getting the turntable on a dedicated table, like the Sound Organisation model. You make no mention of your floor, but I would hazard a guess at it being the springy wooden type. If this is the case, if it is possible, a dedicated wall shelf, such as Rega's own, would be a perfect solution.

In the meantime, check the tracking weight of the cartridge, assuming that the turntable is level. For a cartridge like the Elys, a tracking weight of around 1.6 - 1.8 grammes is about optimum, with anything over 2.0 grammes being too heavy. If the deck isn't level, the dial on the RB300 arm will not show true tracking force, so although the dial reads 1.7g, in actuality the weight could be far higher.

Also look towards improving the loudspeaker cable. Moving over to cables such as Linn K20 for example, can reap enormous benefits over your existing QED 79 strand.

Finally, check to see if your loudspeaker stands are totally rigid. If, after performing all these tasks, you still find that your sound is booming, then look at a new pair of loudspeakers. Of the loudspeakers you have mentioned, I feel that the Heybrooks would produce even more bass than the JPWs. The others would be very worthwhile auditioning. **AS**

● My system is as follows:- Systemdek turntable (possibly IV), Linn Ittok LVII tonearm and Audio Technica AT-F5 cartridge moving coil cartridge. For Compact Disc, I use a Philips CD630, to which I plan to add a Digital to Analogue Converter. This would be either an Arcam or Deltec, as they are both available locally. I am using a Musical Fidelity A100 amplifier, with AudioNote interconnect between CD and amplifier. All the equipment is sited on Appolo stands and tables.

I am using Arcam 2 plus loudspeakers, on Heybrook HBI stands, fed by bi-wired Audioquest Livewire Brown cable. It is the loudspeakers that I would like to upgrade. My room is approximately 14ft by 12ft, with a concrete floor. existing loudspeakers are about 7ft apart, firing across the room.

If possible, I would like to build upon the Arcam 2s level of detail and warmth, while improving the bass. I hope that this can happen without adding any undue treble harshness. I have a budget of around £500.

I already have a buyer lined up for the Arcam 2s, but would like to use my existing cable and stands for now. The speakers must be available in black ash, to match the room furnishings. I like the look of the Ruark Sabre's but I wonder if I could do better?

**Bob Preston  
Redhill, Hereford**

Dear Bob,

I have not spent a great deal of time with the Ruark Sabre's you mention, but my gut reaction suggests that they will improve the system's sound over the Arcam 2s. My feelings toward the Arcam 2s is that they produce a nice, but bland sound. The Sabre's are somewhat more dynamic, without being too extreme.

In addition to the Ruarks, I feel that speakers like the Epos ES14, Linn Helix, KEF Reference 101-2 and the Monitor Audio MA-700s may also be worth an audition. The Linn and Epos speakers, however, work best on their own dedicated stands, so the stands need to be changed over as soon as possible. The KEF Reference loudspeakers would also need a different stand to the Heybrook HBS1s, preferably a heavy stand like the Peter Soper Slate models. The MA-700s work well on your existing stands, even though they are a little low to work perfectly. **AS**

● My hi-fi system consists of a Roksan Xerxes turntable, Artemis tonearm, Audio Technica AT-F5 cartridge, Naim 42.5/110 amplifier which is connected by Linn K20 cable to a pair of Linn Sara 9 loudspeakers.

I find that my system sounds dull and lacks bass. I have £400 to spend and I would appreciate your advice on how to improve my system.

**Graham Davis  
(Address not supplied)**

Dear Graham,  
I am a little surprised that you find your system dull. The AT-F5 is known as quite a bright, forward cartridge and the Saras are generally dramatic sounding speakers. Aside from the turntable, or the tracking weight being improperly set, there are one or two modifications that could be made to improve the character of your system.

If the sound has recently deteriorated, get your dealer to look at the Saras as they may be in need of attention. While we are on the subject of the Saras, you make no mention as to their stands. Linn speakers are designed to work best on their own stands and the later Sara stands, those with top spikes, appear to function better than most. If the stands are recent, check that the stands are rigid and that the speakers themselves are very close to a support wall.

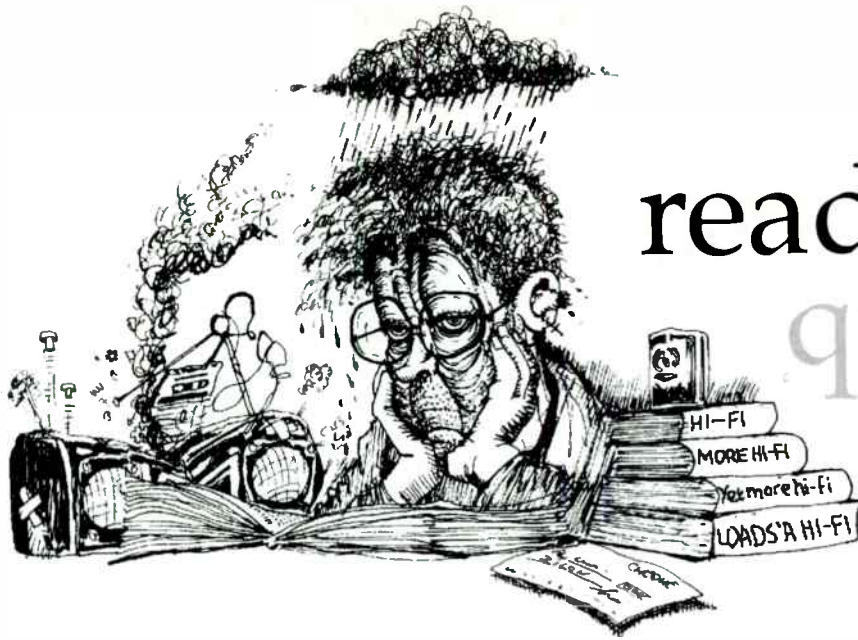
Assuming that the speakers and their stands are in order, I would look to the amplifier to help eliminate your problem. Normally, I would suggest that a Naim HI-CAP power supply would be the next upgrade, but I feel that in your case it may be a better move to have your power amplifier upgraded to NAP 140 power amplifier specification first. This should improve the grip the amplifier has over the bass, which would hopefully make the Sara's appear more lively. In addition, this update would be far cheaper than either a new NAP 140 or a HI-CAP, which are a little beyond your £400 budget. **AS**

● Recently, I purchased a Yamaha AX630/AST-S1 amplifier and speaker combination. At £450, I thought it offered a more dynamic sound than the others that I listened to.

Many hours and CDs later, I think that the combination can sometimes sound rather hard and the bass, although deep, needs more definition. Would decent stands and better speaker cable than was supplied do the trick? What are Yamaha's recommendation for positioning as they do not give instructions. My main source is a Yamaha CD4050 Compact Disc player.

I also own a Harman Kardon T35C turntable with an aging VMS20 cartridge. Is it worth getting a better car-





# readers'

## queries

tridge and if so could you recommend one to suit, or is it bin time for the old dog?

**Patrick Webb  
Kings Norton, B'Ham.**

Dear Patrick  
To answer your second question first, as you say that the cartridge is "aging", I would strongly suggest that the cartridge is changed, to prevent possible damage to records. A replacement stylus would be the obvious answer, unless the cartridge body itself has seen many years of action. Aside from the VMS20 itself, I would also suggest a cartridge which does not need a modern arm to perform at its best, like the Arcam C77. With regard to the turntable itself, as long as the deck is not being problematic, stick with it! If it appears to be time for the T35C to go to the Great Repairshop In The Sky, I would have a look at next month's turntable group test for guidance!

Moving back to your first question, the lack of definition in the bass you suggest would be ameliorated by using a good pair of stands. Without stands speakers, no matter how good, can sound indistinct and vague in the bass. Changing the cabling, however, can be a bit of a double-edged sword. It may well show up a few nasties that would otherwise be masked by your existing cables. It is worth experimenting with lengths of QED 79 strand or even going up to Linn K20 or

Naim NAC A5 cable. The positioning of these loudspeakers is not well documented, so I would suggest a little more experimentation is in order. I feel that they should be placed quite close to a load-bearing wall, which would generally appear to deepen the bass but try to find a position that you are happiest with. **AS**

● I am looking to invest in a CD player with a high quality but inexpensive amplifier and "mini" speakers. The student system that was outlined in your first issue (Marantz CD-40 compact disc player, Arcam Alpha amplifier and Mordaunt Short MS 3.10 loudspeakers) looks well worth investigating. However, just one query - I believe I am right in assuming the Marantz CD-40 does not have remote control facilities? If this is so, is the facility available on the Marantz CD-41 or the CD-50? And if so, am I right in assuming that either of these CD players would match the Arcam Alpha 2 as well as the CD40?

I am somewhat disabled, with a "gammy" leg and as such the remote control facility would be very useful.

**C.W.Burgess,  
Loughton, Essex.**

Dear Mr. Burgess,  
The Marantz CD-40 compact disc player is, in fact, supplied with a remote control unit. The remote unit is a very

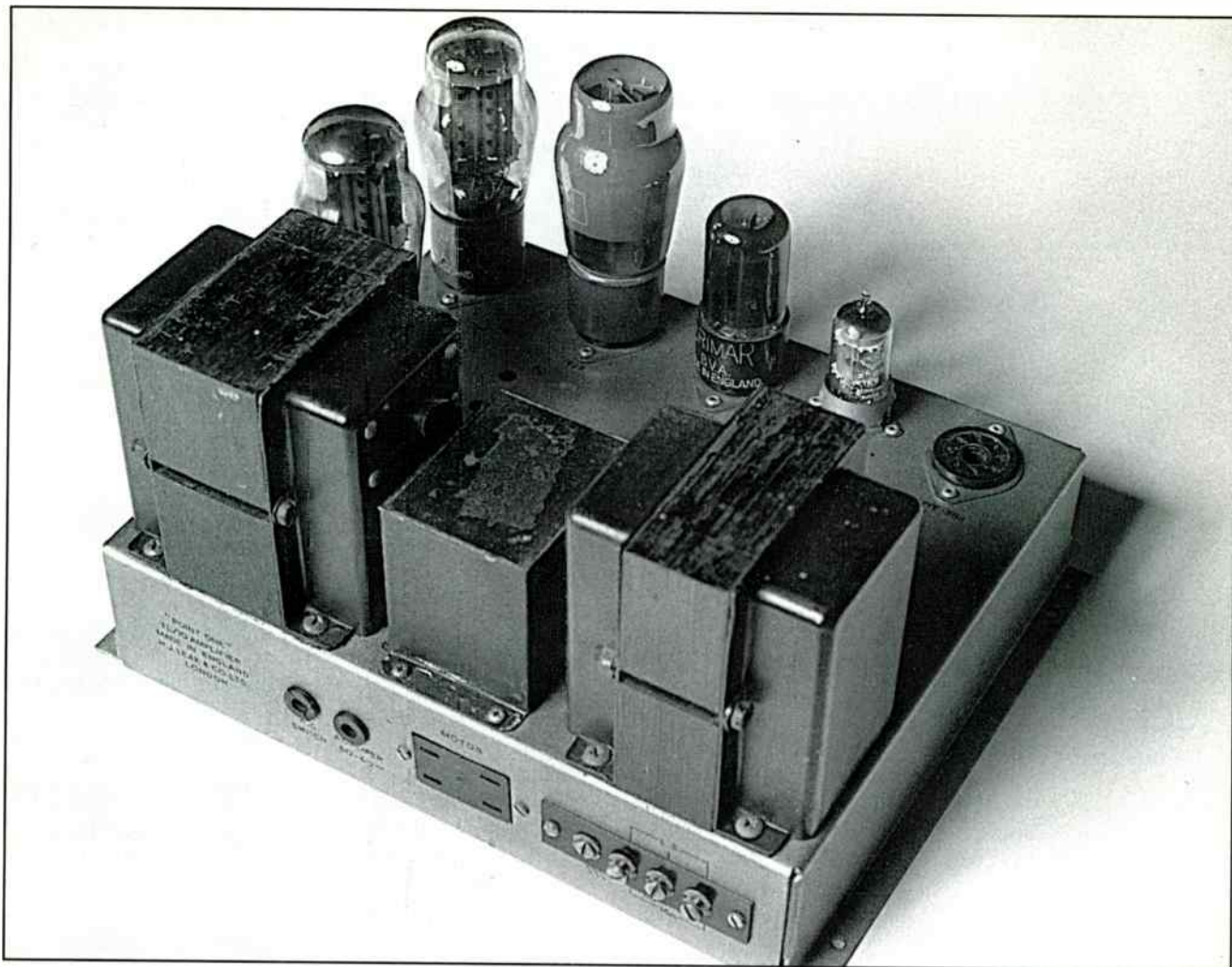
capable one, but it does not have the facility to alter the volume level. Units within the Marantz range that do have this facility start with the CD-50 and the CD-50SE.

If it is convenient, I would be hesitant in using the remote volume control as, in most circumstances, it can seriously degrade the Compact Disc player's sound quality. This is due to the signal being diverted through a generally poor amplifier circuit within the player itself. In your case, I appreciate that this is a major inconvenience, but one must also accept that the remote volume amplifier is quite a compromise.

All these units, along with many other Compact Disc players manufactured by Marantz's competitors, would nestle happily in the warm sound produced by the Arcam Alpha amplifier. **AS**

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# the Leak TL/10 power amplifier

**Richard Kelly finds a pair of Leak  
TL/10 valve power amplifiers -  
slightly the worse for wear.**

**Mike Solomons renovates them  
and recalls their history. Richard  
describes their sound.**

The Leak TL/10 mono valve power amplifier was the lowest powered in a family of models and remained so until the company launched a transistorised design, the Stereo 30. During their valve era, Leak went from strength to strength, as more powerful models were produced. Although the TL (short for Triple Loop feedback) amplifiers became increasingly powerful, they all exceeded Harold Leak's standard of excellence; distortion at the rated output was below 0.1%. This figure may not seem impressive when compared with modern amplifiers, but it set the standard by which others were judged at the time. It is interesting to note that Quad and Radford literature also quoted similar distortion levels.

In spite of its lower model number, the TL/10 succeeded the early Leak TL/12 and TL/25 power amplifiers. From his experience with these units, Harold Leak decided a domestic power amplifier of ten watts costing less than the considerable forty two guineas (forty two pounds and forty two shillings, or £44.10 in all) of the TL/12 could be made. This was the reasoning behind the TL/10 and explains why it is less powerful than earlier models: it was meant to be much cheaper to make. Introduced in 1952, it sold in large quantities as a result.

## Music Power

Although nominally of ten watts output, this refers to music power. With a steady sine wave test tone, as commonly used today, the TL/10 does not produce its apparent rated output. So don't feel cheated if a second hand TL/10 delivers less than ten sine wave watts when tested - they never did!

So how good are TL/10s today? Hi-Fi World brought a pair of good looking TL/10 amplifiers to me, mentioning that they might require some attention. They did! Overhaul was rather hampered by the fact that they had apparently been out of use for a long time. They had no mains leads, and one of the output valves had been substituted by an unsuitable but similar looking device. If you don't know about such things, it might be wise to take this as an example of what may await you when buying fifties valve amplifiers: it is not for those who want an 'instant hi-fi valve amplifier'. I fitted mains leads, replaced the missing output valve, then went through basic checks, to see if it would be safe to connect them up to the mains.

Electronic equipment that has been in store, unused for a long time (over two years for valve equipment, five years for transistor), has a considerable chance of failure shortly after first being switched on. This is



for a number of reasons, including capacitors that can overheat, and problems that can arise from penetration by moisture. I have devised a simple routine that can reduce this risk, and which I used with these units. It is included here separately (see box).

### Revival

The TL/10s worked after the revival routine, but not very well. There is a school of thought that recommends replacement of all capacitors and resistors in an old unit, purely on the grounds that they are old. This is an expensive procedure of dubious merit, I feel. I prefer to identify and replace only those components that have failed. This latter procedure is not only less expensive, it usually results in a more reliable repair. After all, if a component is still functioning correctly after twenty five years, it has stood the test of time. It also makes sense to disturb the circuitry as little as possible.

The measured performance of these amplifiers did not appear to match the original published specification, but as I have already pointed out, this is because Leak quoted music power. The sound of our samples broke up badly above eight watts and distortion did not fall to the rated 0.1% until power was reduced to only two watts. The frequency response, however, was level for the whole useful part of the audio range, dipping to -3dB up at 30kHz (much, no doubt, to the relief of any passing bats).

The output power limitation of ours may also have been compounded by mismatched valves, deterioration in components and the output transformers, so it was just as well that we did not waste money on a complete set of new resistors and capacitors. With replacement of the transformers being rather expensive, I went no further with the repairs.

The TL/10 amplifiers offer a good potential for reliability and a particularly level audio frequency response, but the levels of output power and distortion may no longer meet original specifications. Nevertheless, this doesn't necessarily mean that such amplifiers are either useless or incapable of providing plenty of entertainment, at a very reasonable cost, providing expensive repairs are not needed. Whilst it is not unheard of, transformer failure in valve amplifiers is unusual, especially in the later Leak valve units.

### Favourites

My own favourite Leak amplifiers are the TL/12+ and its stereo version, the Stereo 20. I rarely see, but would love to own, some of the larger units, for example the TL/50 and Stereo 60.

These offer the same high standard of reliability, but with more modern output power levels.

Do not underestimate the full significance of the old fashioned concept of reliability. Nowadays, 'reliability' is a term with various connotations. The modern 'reliable' amplifier will work well for five to ten years, but rarely for more than fifteen. After this period, the unit is usually beyond economic repair, fit only for the rubbish bin. On the other hand, a life in excess of thirty years of reliable operation is not unusual for Leak amplifiers (with little need for servicing or repair); a standard notably matched by Quad, but by few others. This is value for money!

Whilst considering the Leak range of power amplifiers, we must not forget the need for a preamplifier. Leak manufactured a range of preamps. for use with their power amplifiers, which derived power through a special connecting lead from the power amplifier. The various models are divided into the Point One and Varislope control unit series (with the later models also available in stereo).

Probably the ultimate system of the era would comprise the Varislope Stereo II, with a Troughline stereo tuner, (see review in May 1991 Hi-Fi World), and a pair of the TL range of amplifiers (or a single Leak Stereo unit). Although excellent for their time, I increasingly find that my customers have opted for the added facilities found on more modern transistor control units (the versatile Quad 44 is my personal favourite). So there are two alternatives available to us - either a complete valve Leak system, or, by using a more modern preamplifier, a transistor and valve hybrid system that gains from the strengths of both valve and transistor technology; the choice is yours.

Whatever your choice, you will not be disappointed by a well set up Leak system. They were amongst the finest of their era - they are still very hard to beat today ●

*(See our letters page about the Leak Troughline tuner)*

*The writer, Mike Solomons, has been servicing high quality modern and vintage hi-fi equipment for twenty three years, specialising in the main UK brands from an early stage. His company, London Sound, based in Harrow, North London, still concentrates on these products, and can be reached on 081-868 9222.*

*In the Midlands Leak can be repaired by: Electronic Colour Services, 32 North Lane, Headingley, Leeds LS6 3HE. Telephone: 0532 782185.*

## ROUTINE REVIVAL OF ELECTRONIC EQUIPMENT THAT HAS BEEN STORED FOR A LONG TIME

by Mike Solomons

(Editors note: The following routine is a sensible one to adopt when using old items for the first time. It does not "revive" duff components, nor necessarily reconstitute capacitors or electrolytes, so please do not think it is a magic technique for making a dead amplifier get up and walk!

I should also add that safer and more comprehensive techniques - like isolation of a power supply and slow run up with a Variac are commonly used by repair engineers. The above technique is for those who intend to switch on an old unit themselves, but who have no expert knowledge or test equipment. Ideally, you should leave someone with knowledge to do this, as it does pose some risks.

My I add finally that for safety you should make sure earths are connected, you should not grip metalwork - and be prepared to switch off quickly.)

- 1) Check visually and replace obviously defective parts (especially note condition of the mains lead). Ensure that the correct mains fuse is used.
- 2) Wire up as though for normal use.
- 3) Wearing glasses (I have known small components to explode, though this is rare), switch on for 30 seconds. Switch off.
- 4) Go away, make and drink a cup of coffee (the coffee is optional, the interval of about 5 minutes is not. This five minute gap is to allow overheated components to stabilise, and for warmth to dissipate moisture).
- 5) Switch on for one minute, briefly check performance, switch off and note any signs of overheating. If severe, rectify the fault before proceeding further.
- 6) Another coffee break of 5 minutes.
- 7) Repeat the procedure by testing for five minutes, ten minutes, and then thirty minutes, remembering to allow at least five minutes between each test.
- 8) If it works well after the thirty minute test, leave switched off for at least twelve hours, then use normally. However, if faults show up, the unit will still require repair.

This routine is not foolproof, but it is easy and not expensive (depending on your choice of coffee). I have found it useful over the years, yet have never seen it recommended elsewhere - so keep this issue of Hi-Fi World for future reference ●

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\* DM20 Masterpiece Gold on demonstration at these dealers

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HFW 6/91

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The vexed question of hi-fi insurance has been much on my mind recently, not least because some little toe-rag took a crowbar to my car recently, and while I was savouring the delights afforded by the Bristol Hi-Fi Show, he was savouring a fair quantity of my possessions, FOC!

Fortunately they're insured. And by what is a fairly novel policy, although one that is, I suspect, going to become increasingly common. It's called Homeshield 2 and is supplied by Royal Insurance. It was introduced in October 1990 and is designed to cover houses, their contents or both; in this instance we're only interested in the contents. So far it's pretty standard stuff, as every insurance company offers this kind of cover. What sets Homeshield 2 apart is the way in which premiums are calculated. Most policies depend on you totting up the value of your possessions and then charge you accordingly. Not this one. Homeshield 2 has "No Sum Insured", or to put it in plain English, the size of your premiums is dependent of the value of your property.

take a £20,000 system and 4000 records at a replacement cost of £10 apiece minimum and you've got sixty grand at X pounds per thousand just for the hi-fi!

In fact, the cost is calculated from the age, type and size of your house, whether you own or rent it and its location. The only specific items and valuations required are on pieces of jewellery or precious metals valued at over £1000. I don't know about you, but in our case that amounts to a single object, and as a result, the entire proposal form took about five minutes to complete.

From here, you then select which level of cover you require (the three options are imaginatively titled Bronze, Silver and Gold) and your broker tells you how much it will cost. Now I live in the sticks rather than an inner city crime blackspot and on a risk scale of 1 to 9, our address rated a 2. I guess the Outer Hebrides and Mull are around the one mark. Back came the quote - Gold Cover for £12 a month. This gives me protection for all my

possessions anywhere in this country (or abroad if for less than a year) against any form of loss or damage, accidental or otherwise. There are detailed exceptions to do with such things as domestic strife and pets, but they are far from severe.

### A Month of Sundays

By now, the advantages to the hi-fi enthusiast should be clear. In fact the advantages to anyone with expensive tastes. If I had a conventional policy it would take me a month of Sundays to list all my hi-fi. What's more, take a £20,000 system and 4000 records at a replacement cost of £10 apiece minimum and you've got sixty grand at X pounds per thousand just for the hi-fi! This ignores clothes, furniture and all the other bits and pieces which make life bearable. Okay, that's an extreme case, but the point still holds good for someone using an Linn LP12, Naim 42/110 and Kans. Because the premiums are based on a national average, the unwritten assumption is that you have a Japanese midi system.

So, a sound economical prospect, but there are additional advantages. If I change or upgrade a unit, I don't have to tell my insurance company. I don't have to worry about lending or transporting bits and pieces about. I get maximum protection for minimum hassle in the kind of simple arrangement that insurance companies have a problem wriggling out of.

Unfortunately, it's almost too good to be true and can create a false sense of security. The policy is indeed, just as good as it seems, but a few warnings are worthwhile. In the unfortunate instance that you do need to make a claim, the insurance company will require proof of ownership of the items involved. If it's a case of the gardener accidentally watering your valve amp through an open window that isn't a problem, but in a case of theft or more particularly fire, it could be.

Say for the sake of argument, your record collection is destroyed in a fire, could you provide an accurate list of its contents? If your house burnt down could you list all your clothes? What about the contents of your loft? You begin to see the problem.

### Unusual Items

In most cases where the claim involves "unusual" items like expensive hi-fi, you'll probably end up dealing with a loss adjuster. Loss adjusters are independent assessors who are paid a percentage of the final settlement by the insurance company. On the whole they are fairly sympathetic and make a report recommending appropriate action. Although this report isn't binding, it will generally be accepted. As a result, if you can make the loss adjusters' job easy, it will stand you in good stead.

Thus it is a good idea, for your own protection, to compile lists of your



# burglar-proofing!

**Always sure of himself, Boy Gregory discusses the merits and pitfalls of insuring your hi-fi.**

possessions, especially those you value, and keep them in a fire-proof box, along with any receipts etc.. These will generally be accepted as proof of ownership. They will go a long way to ensuring that you receive full and proper compensation. It may well seem like a dire prospect but consider me. I've embarked on cataloguing 4000 albums. Anyone with more has my sympathy.

Given this important caveat, I'm pleased to see that insuring your hi-fi against fate and forces, malicious or accidental, is becoming both easier and cheaper. As a stand alone policy, Homeshield 2 is unique, although I believe that contents insurance from building societies in conjunction with a mortgage is sometimes arranged along similar lines. If your hi-fi isn't insured, it should be, and the policy you choose is going to have a dramatic effect on the probation you receive and what it costs you. Take the necessary steps, and one day you'll be glad you did ●

**Don't bother to waste time searching for specialist audio accessories. We are looking carefully for you and, where necessary, are even having them made to fulfill our quality requirements.**

## KONTAK Contact Cleaning Fluid

Left alone, mechanical contacts tarnish. Oxidation occurs and other airborne agents - especially in smoke filled rooms - also combine to form surface deposits. The effect often becomes serious enough over a period of time even to make self wiping contacts go intermittent. Mechanical contacts can deteriorate unless cleaned.

Hi-fi signals are, by their nature, very prone to degradation from this phenomenon - and there are myriads of contacts that slowly tarnish in any system.

Kontak is a unique and

## NAGAOKA Anti-Static Record Sleeves

Nagaoka specialise in pickup cartridges and record accessories. They are recognised experts in this field, producing very high quality products in the way Japanese companies do. Their translucent, plastic record sleeves are treated to be immune to static build up. You can clearly see the entire disc surface through them, so labels or even picture discs can be recognised instantly. Lack of dust attraction makes for a clean sleeve and helps keep records pristine. Nagaoka's sleeves come in packs of fifty. We suggest you get a pack, have a good record cleaning

Use carefully to keep your pickup cartridge stylus and cantilever clean.

**NAGAOKA STYLUS CLEANING KIT Price: £2.50**

## NAGAOKA CD Cleaning Kit

I have tested a variety of CD cleaning devices (the editor writes), including the cogs and wheel types, using a Cambridge Audio CD-1 dropout counter to measure errors and detect improvement. Of all the kits, this one from Nagaoka gave the best results. It better removes sticky deposits (like jam!), whereas the machines do not. So again, it might not look so complex as some, but it is very effective. We recommend it from testing and personal trial.

**NAGAOKA CD CLEANING KIT Price: £10.50**

# HI-FI WORLD SPECIAL AUDIO ACCESSORIES

## RECORD STORAGE CUBE

Here's the record storage cube so many people have asked for. It has been designed to hold roughly one hundred LPs, having an internal width of 37cms. Internal height is 32.5cms and depth 32cms. The cubes can be stacked or placed alongside each other, in a line. They offer useful storage for a variety of household goods.

Strongly made from 20mm MDF, the panels are machined to have strong side joints. We have specified an expensive two-part paint finish, with a textured acrylic top coat in black. High tensile machine screws with cross heads are supplied, plus instructions. All holes are pre-drilled; simply bolt the panels together.

The cube is delivered in a flat pack.

**RECORD STORAGE CUBE Price: £42**

effective two part cleaning solution that removes contaminants from electrical connectors of all sorts. It is applied with the pipe cleaners supplied. Clear instructions list the most sensitive contacts that need treatment in a hi-fi system, but others not in the signal path, such as fuses, should not be ignored. Make sure equipment is turned off and unplugged from the mains of course, before cleaning any contacts - mains related or otherwise.

The dirt that Kontak removes is clearly visible on the pipe cleaners, demonstrating just what degree of contamination contacts have reached and what Kontak is achieving. Those who use it, including the staff of Hi-Fi World, find this two part cleaning solution very effective. After application, the sound of a system regains its original life, sparkle and vigour. You will be surprised at the difference Kontak makes.

**KONTAK Price: £21.20**

session and replace all the old inner sleeves with these new, spotless ones.

**NAGAOKA LP SLEEVES Price: £7.50**

## NAGAOKA Rolling Record Cleaner

The big drawback with most record cleaners is that they fail to lift dirt effectively off the record. Brushes pick up fluff, but they also redistribute fine dust around the grooves, causing noise to build up. Nagaoka's rolling record cleaner actually lifts dirt from the bottom of the groove - even fine dust! This is the only way we know to properly dry clean a record.

**NAGAOKA ROLLING RECORD CLEANER Price: £10.20**

## NAGAOKA Stylus Cleaner

Here's another simple but effective cleaning kit from Nagaoka. It consists of a stylus brush and cleaning solution.

## STILTON Gold Plated 4mm Plugs

Gold is, chemically, one of the least active metals. It resists corrosion well as a result. Gold is also highly conductive. These are both excellent properties for electrical contacts, which is why all the best switches have gold plated contacts. Look at the nickel plated surface of most 4mm loudspeaker plugs and you'll see it is dirty. Try cleaning it and you'll prove it is dirty.

We suggest you consider using our gold plated 4mm loudspeaker plugs instead. They stay free of contamination longer and ensure an excellent electrical connection is made. To maximise their potential, they solder to the speaker cables, eliminating the additional metal contact made by clamp screws. Heat shrink sleeving is provided, plus conventional plug caps. You will need a soldering iron to connect these; a dealer should be able to do the job in minutes.

**STILTON PLUGS Price: £8.00**

## THE GREEN PEN

Straight from Japan, where they can get seriously nutty about hi-fi, comes THE LASAWAY GREEN PEN. Manufactured by an offshoot of one of Japan's largest engineering companies, this pen is designed to improve the light distribution from the laser



of a Compact Disc player. By reducing optical interference, it produces a purer reflected signal from the disc surface. This in turn improves faithfulness of the optical signal and results in better sound quality.

When red laser light hits the silvered reflective surface of a disc, some of it scatters and is reflected back off the disc edges, causing optical interference. Because green is at the opposite end of the light spectrum to red, an opaque green coating best absorbs this light.

The LASAWAY GREEN PEN provides such a green coat and has been formulated to be harmless to the plastic of the disc. It is carefully applied to the outside and inside edges, but not to the reflective face of course. I have tested this (the editor writes) and personally feel that Lasaway's claims are justified. We were careful not to adjust volume, but individual images - like singers became denser sounding and louder too. It was as if the images were focussed and strengthened. There was an enriching process to be heard as well. More information was coming from the performers and instruments. I was pleasantly surprised by the LASAWAY GREEN PEN, because I am slightly sceptical about such products. This one worked.

**LASAWAY GREEN PEN**  
£7.00

## AUDIO TECHNICA CD Lens Cleaner

Here's a product for smokers in particular. However, seeing the peculiar haze that coats the inside of my windows after a few weeks - and I don't smoke - suggests to me that non-smokers are included. It is a laser lens cleaner for your CD player, beautifully made by Audio Technica. Contained in the pack is a disc with fine brushes on it, plus cleaning fluid. Each brush takes one drop of fluid, then the disc is inserted and played. These brushes gently clean the laser lens, removing oil, grime, dust and other airborne deposits like nicotine (ugh!). Audio Technica recommend use every month or so (just watch your windows!).

**CD LENS CLEANER**  
Price: £15.30

## AUDIO TECHNICA Cassette Deck Head Cleaner

We've seen the automatic cassette head/capstan cleaners - those natty little cassettes with all the wheels and cogs inside. Trouble is, Nakamichi tell us they do not recommend such gadgets are used with their cassette decks. I own a Nakamichi ZX-9 (the editor writes), which is used for tape testing, as a reference and such like. This poses a dilemma, over which there has been much discussion on the magazine. If I am not prepared to use one, then should we sell one?

The truth is that they are fine for simple two head decks, but are best not used with more complex and delicate precision mechanisms found on a Nakamichi. The dilemma is resolved by Audio Technica's cassette head cleaner system. Using good, old fashioned manual techniques with cleaning buds and a carefully formulated cleaning solution that will not harm the rubber of pinch rollers, this little kit works wonders. Heads are cleaned with light pressure and plenty of care. Use of disposable pads means dirt isn't retained, to possibly cause damage by scratching. This kit might not look so natty, but that isn't our concern. We feel obliged to make an informed decision about products on your behalf: our choice is this cleaning kit.

**AUDIO TECHNICA  
CASSETTE DECK HEAD  
CLEANER** Price: £7.25

## AUDIO TECHNICA Electronic Stylus Cleaner

Scared of damaging your stylus when cleaning it? Try this amazing little device - an electronic stylus cleaner that vibrates grunge right off the tip! Powered by a small AA battery, it's a doddle to use and safe too. Just rest the stylus on its high speed vibrating brush.

**AUDIO TECHNICA  
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- \_\_\_ NAGAOKA Stylus Cleaner ..... £2.50 each
- \_\_\_ NAGAOKA CD Cleaning Kit ..... £10.50 each
- \_\_\_ STILTON Gold Plated 4mm Plugs ..... £8.00 per set
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**Two birthdays, and several relationships. Conifer have commemorated the seventieth year of Malcolm Arnold with premiere recordings of his two most recent symphonies —and with state-of-the-art orchestral sound. The Chamber Orchestra of Europe has celebrated its tenth birthday with, among others, Johann Sebastian Bach. Bach, of course, was 'rediscovered' by Mendelssohn and Schumann. Brahms was a great ally of Schumann (as well as having a fondness for his wife). Like it or not, Mendelssohn and, through him, Bach underpinned the Anglican choral tradition in Victorian England which produced Stainer's 'Crucifixion' and, meanwhile, Brahms influenced just about every late 19th century aspiring symphonist, including the Swede, Hugo Alfvén. See what I mean about relationships?**

peter  
herring



**HUGO ALFVEN**  
Symphony No2  
Swedish Radio Symphony  
Orchestra  
Conductor: Yevgeny Svetlanov  
MUSICA SVECIAE MSCD627 (DDD/65.00)

● Born in Stockholm in 1872, Hugo Alfvén fulfilled the romantic 19th century notion of the 'artist'. He became a competent lecturer and a fine writer, and in his adolescence was divided between a life in painting or music. It was the latter that won through and when, at the age of 16, he was admitted to the Swedish Conservatory, he was already a violinist with the Royal Orchestra.

Composition followed, with a first symphony performed in 1897. A second followed two years later, its premiere conducted by perhaps the best-known of Swedish composers, Wilhelm Stenhammer, and it was this work which firmly established Alfvén as a composer of some stature. It is not difficult to see an affinity with Berlioz's 'Episode from the Life of an Artist', his *Symphonie Fantastique*; indeed, like Berlioz and the *Dies Irae* chant, Alfvén also bases his finale on a 'death theme', in this case an old chorale tune.

There are also, inevitably, echoes of Brahms and, in the opening movement, Tchaikovsky in more carefree mood, but the sombre intensity of the second movement is strikingly original, as is the demonic gallop of the third, with its anguished pleas from the woodwind. Right through to the prelude and double-fugue of the finale, the tension - and the argument - are tautly sustained. The work may lack the imagination of Berlioz, or the richness of Brahms but fully displays Alfvén's craftsmanship and individual voice. No mere dilettante Romanticism, this.

The recording comes as part of a huge recorded anthology of Swedish music, administered by the country's Academy of Music and financed by government grant (the sort of thing that doesn't happen here any longer!). While played with enthusiasm and conviction, the playing lacks some polish: strings are thin in the top registers, for instance, and the brass has a grainy quality, although this may be induced by a recording which, although spacious, wants for presence.



**JOHANNES BRAHMS**  
Cello Sonata in E minor Op38;  
Cello Sonata in F  
Major Op99  
Claude Starck, cello; Christoph  
Eschenbach, piano  
CLAVES CD 50-9005 (DDD/58.35)

● This is one of those recordings whose presentation is so unobtrusive and natural, it is possible to become wholly oblivious to the loudspeakers which are creating the illusion. Here, both piano and cello are full toned and well-focused, with the kind of parity of balance that is usually as much down to good musicianship as good microphone balancing. And, as can happen with the more intimate kind of recording, the acoustic integrates well with that of a normal-sized living room.

All this would count for nothing, though, if the performances were uncompetitive in what is a fairly competitive field. It's pleasing to report, therefore, that both players meet the challenges of these sonatas head-on, with playing of spontaneity and rapt intensity. This is not music for the cautious, detached approach. Brahms well-understood the emotional range of the cello; you could say he knew how to make it sing, and how evident that is in the hypnotic *Adagio affettuoso* of Op. 99. This work with its martial *Allegro passionato* and lyrical finale so typical of Brahms, dates from 1886, twenty years after the Op. 38 work which, despite its flaws, forges a link with the Cello Sonatas of Beethoven.

Little is heard of Christoph Eschenbach these days, so it is good to be reminded just how fine a pianist he is. His partner, Claude Starck, principal cellist of the Zurich Tonhalle Orchestra and a pupil of Pierre Fournier, plays with great warmth and richness and, to his credit, knows the point when expressive insight becomes self-indulgence. Together, they offer Brahms interpretation of the highest order.

The CD booklet is interesting for containing a remarkable photograph of the composer which I have never encountered. Smiling, perched on a chintz armchair, Brahms is surrounded by shelf-upon-shelf of scores and editions. The location is presumably Vienna, but it's a pity nothing is said about the source of the picture.





**GUSTAV MAHLER**  
Lieder und Gesänge aus der Jugendzeit  
Roland Hermann, baritone;  
Geoffrey Parsons, piano  
CLAVES CD50-9011 (ADD/53.33)

● Gustav Mahler wrote songs and symphonies, and understanding the latter almost always involves reference to the former. Song sowed the seeds of his musical inspiration, which was then spiced with a unique mixture of the sublime and the banal. Many of the ideas explored on a grand scale in the symphonies have their origins in the early song-cycles, most notably the settings of German folk-poetry in *Das Knaben Wunderhorn*. This was the source for several of the fourteen *Lieder und Gesänge aus der Jugendzeit* ('Songs and Airs from Days of Youth') which were published between 1885 and 1890 and appear on this valuable Claves issue.

Even though *Fruhlingmorgen*, for example, shows the evident influence of Schumann, there is no doubting the individuality of Mahler's style. In *Hans und Grethe* there is an early appearance of the Austrian *Ländler* style which he was to use so effectively in a number of the symphonies. *Revelge* and *Der Tambour'sell*, which may already be familiar from the orchestral cycle of *Wunderhorn* songs, are typical of his obsession with the military march, an obsession which dated from a childhood spent living near to a barracks. The drummer-boy of *Der Tambour'sell*, condemned to die on the gallows, has more than once been suggested as Mahler's psychological alter-ego.

Although the merits of this recording are unquestionable, its provenance is curious. It was produced by John Willan and engineered by Christopher Parker for EMI back in 1974/5 (hence the ADD status) yet only seems to have seen the light of day since Claves acquired the rights. No matter: Geoffrey Parsons proves, as usual, a superlative accompanist and I enjoyed the combination of freshness and power that characterises Roland Hermann's voice. The Mahler discography is not only supplemented, but enhanced.

## RECORD OF THE MONTH

**In their eagerness to pigeon-hole, some commentators have elected to classify Malcolm Arnold, seventy this year, as a 'light composer'. Certainly, Arnold has written some extremely fine lighter music, as befits someone with a gift for melody rare in recent decades. His sets of English, Scottish and Cornish Dances are sheer delight; he won an Oscar for his score for 'Bridge on the River Kwai'; and anyone who begins a composing career with a work called 'Beckus the Dandiprat' simply has to have a sense of humour. But there is also a serious side to Malcolm Arnold's music, and a darker one for that matter, as Conifer's premiere recordings of his Seventh and Eighth Symphonies bear witness.**

**MALCOLM ARNOLD**  
**Symphony No7 Op113;**  
**Symphony No8 Op121**  
**Royal Philharmonic Orchestra;**  
**conductor, Vernon Handley**  
CONIFER CDCF177 (DDD/64.36)

● The Seventh Symphony has had to wait eighteen years for this first recording, the Eighth thirteen years, which seems extraordinary for a composer of Malcolm Arnold's stature and - dare one say it without any disparagement being inferred - accessibility. He was born in Northampton in 1921, studied violin and trumpet, gained a Royal College of Music scholarship and played trumpet with the London Philharmonic. Perhaps it was that experience which helped develop his fine ear for orchestration, first evident in 'Beckus the Dandiprat' which he wrote in 1943. That was followed by a Horn Concerto in 1945, a Symphony for Strings in 1946, a Clarinet Concerto two years later and, in 1950, the first of his eight completed symphonies. A ninth is scheduled to be ready for performance this year. Among his best-known lighter works, apart from those already mentioned are the overture 'Tam O'Shanter' and the Symphony for Brass. Then there is the magnificent 'Peterloo Overture'.

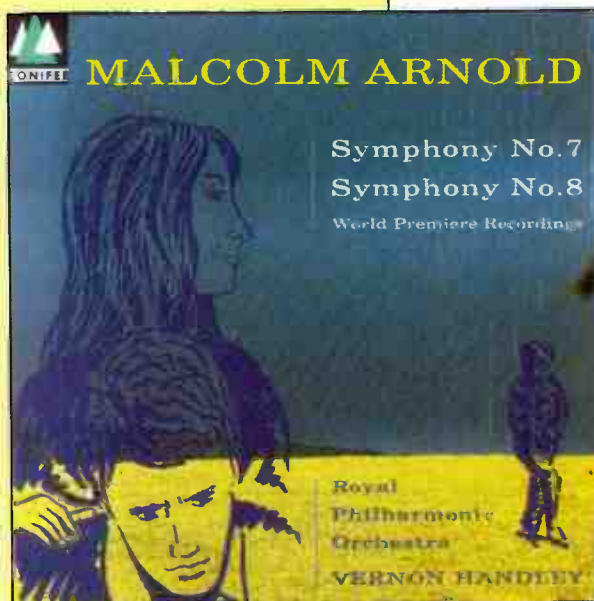
Malcolm Arnold's concertos are well-represented on another, much-acclaimed Conifer recording which appeared last year; now they have tackled these two demanding symphonies. In both, his gift for orchestral colour - and effect (witness the Mahlerian cowbell in No7) - are to the fore. Yet one of the less-lauded aspects of Arnold's music - its economy and keen sense of structure - is also evident.

The composer dedicated the Seventh to his children and each is loosely portrayed in each of the three movements, in apparently uncompromising fashion. The first movement, for example, opens with a theme whose crooked gait mixes jocularly with a certain menace. In the central section there is great poignancy, and do I detect echoes of Walton here and there?

The solo trombone dominates a melancholy second movement, characterised by a long, strange section for untuned percussion. The sleeve-note suggests it may evoke the inner world of the composer's autistic son. In the finale, Arnold mimics the music of some of his other son's favourite performers, the Irish group, The Chieftains, and very effective it is too. An Irish marching tune, lifted by the composer (but presumably without any significance) from his music for the film 'The Reckoning', plays an important role in the opening movement of the Eighth. The slow movement has a notably haunted quality, with poignant wind solos and in sharp contrast, the finale is a whirlwind *Vivace*.

Both symphonies seem intensely personal, uncompromising and highly-concentrated statements but, like all the best music, it does not yield everything after only one or two hearings.

As in so much British music, Vernon Handley proves the ideal interpreter, and what playing he elicits from the RPO. The recording, produced by Andrew Keener and engineered by Tryggvye Tryggvason at London's Henry Wood Hall, is first-rate.



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**JOHANN SEBASTIAN BACH**  
Oboe Concertos in F Major  
BWV1053; in D minor BWV1059;  
in A Major BWV1055  
The Chamber Orchestra of  
Europe; Douglas Boyd, soloist and  
conductor  
DG 429 225-2 (DDD/45.56)

● With its bright, lively performances, rhythmic crispness and delectable timbres, there could hardly be a better way for the Chamber Orchestra of Europe to celebrate its first ten years than this recital of three Bach 'reconstructions'. Though he enriched the instrument with much solo writing in Passions and Cantatas, no score for a concerto for oboe by Bach has survived. Yet it is known that the fourteen harpsichord concertos that we do have are all arrangements of earlier works, as was common practice in the period, and it seems inconceivable that Bach would have wholly overlooked the oboe in his concertante compositions.

All three movements of the F major BWV1053, including the plaintive and beautiful Siciliano, were also reworked as part of two church cantatas, Nos 49 and 169. It emerges equally successfully transcribed as an oboe concerto, as does its companion, in terms of style and musical expression, the A Major BWV1055. The D minor BWV1059 required a little more in the way of scholarly guesswork, but the nine concerted bars that Bach did leave are immediately identifiable as the Sinfonia from part one of Cantata No 35. If, as is suspected, this was part of a lost concerto, then its compass points strongly to the oboe as the solo instrument. The Sinfonia of part two supplies the concluding Presto, while the middle movement acknowledges a theory of American Bach scholar, Joshua Rifkin, and employs the Sinfonia from Cantata No 156.

Scholarship aside, it is the playing of the CoE's principal oboe, Douglas Boyd, and his colleagues which makes this recording so pleasurable. It is undemanding and sunny, without being shallow, and well-recorded in the chamber music hall of the Berlin Philharmonie, where the CoE is resident orchestra. Here's to another ten years' music-making by this remarkably fine pan-European ensemble.

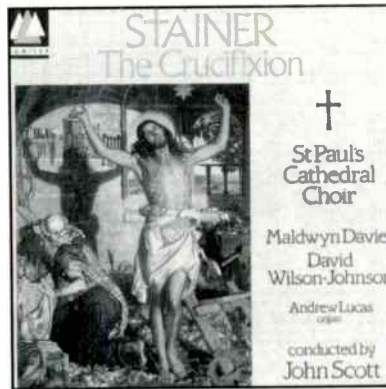


**JOHANNES BRAHMS  
FELIX MENDELSSOHN  
ROBERT SCHUMANN**  
Piano works  
Annette Servadei, piano  
IMP CLASSICS PCD949 (DDD/67.14)

● A generous recital which offers a good overview of the piano writing of these three German Romantics, the prodigiously-gifted Mendelssohn, the angst-ridden Schumann, and Brahms, musical and spiritual heir of the Viennese Classical tradition. And, as you would expect, there is a world of difference between them.

Everyone knows Mendelssohn's 'Spring Song' (if you don't know the title, you'll know the tune) and familiarity seems to breed a matter-of-fact performance here. Annette Servadei is much more imaginative in her two selections from the gems of the 'Songs Without Words', and I enjoyed her playing of the early 'Rondo Capriccioso' and the charming 'Kinderstucke' of 1847, the year of Mendelssohn's death.

But it is the Schumann that brings out the true responsiveness and subtle colouring of Annette Servadei's playing. How well she captures his capricious moods, from the eeriness of 'Vogel aus Prophet' ('Bird as Prophet'), to the violence of the 'Phantasiestanz' ('Fantastic Dance') and the wistfulness of the C Major Arabesque Op 18. This music, she seems to have decided, is quite capable of speaking for itself and the absence of unnecessary bravura is refreshing. The Brahms is also well-chosen, with three of the Intermezzi, short pieces into which Brahms poured so much of his inner self, two of the Op 39 Waltzes and the Rhapsody Op 79 No 2, a rousing performance of which concludes this recital. The recording seems to have captured the Steinway sound in St John's, Smith Square, pretty faithfully.



**JOHN STAINER**  
The Crucifixion  
**JOHN GOSS**  
O Saviour of the World  
Maldwyn Davies, tenor; David  
Wilson-Johnson, bass; St Paul's  
Cathedral Choir; St Paul's  
Cathedral Special Service Choir;  
Andrew Lucas, organ; conductor,  
John Scott  
CONIFER CCFL93 (DDD/76.58)

● That pillar of the English choral society repertoire in a superlative new recording from St Paul's Cathedral. It is easy to view Stainer's 'Crucifixion' as the embodiment of cloying, lachrymose Victorian piety and, true, it draws much on the dire effect Mendelssohn had on English choral music after 1840. However, its sincerity and craftsmanship lift 'The Crucifixion' well above the pot-boilers that emerged in the wake of Mendelssohn's oratorios 'St Paul' and 'Elijah'. The very fact that it remains an integral part of music-making around the country during Holy Week proves its enduring quality, even if out-of-step with today's more Byzantine approach to sacred music.

Sir John Stainer was organist of St Paul's when he wrote this magnum opus in 1887. He had succeeded Sir John Goss, composer of the Easter anthem which opens this recording. Stainer went on to become a leading figure in British musical administration, but 'The Crucifixion' was destined to be the high-watermark of his composing career. While performances are still common, recordings are rare and a new one was long overdue. Its qualities are many and the splendid clarity and vigour of the singing more than offsets the inevitably lugubrious nature of the work. There are some noble melodies to be savoured here. Equally impressive is the way the recording team of Mark Brown and Antony Howell have 'controlled' the difficult St Paul's acoustic without losing the atmosphere so vital to music like this. Perhaps the inheritors of Stainer's musical legacy at the cathedral will force a few opinions of his achievement to be revised.

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**Rules were made to be broken and so we see Paquito D'Rivera bringing contemporary jazz into the space normally reserved for rock and pop reviews. This unprecedented deed was perpetrated solely because one of Steward's favourite discoveries guests on the album.**

# malcolm steward



## RECORD OF THE MONTH

**PAQUITO D'RIVERA  
& ARTURO SANDOVAL  
Reunion**  
MESSIDOR 15805-1

★ Let me begin by telling you where I stand with regard to Jazz music. Firstly, I'm no buff or aficionado. I'm not even a fan of any particular style within the genre, be it trad, bebop, rebop, swing, free: if it's well played and it moves me, then I enjoy it. I guess you could say that I know what I like. I also know what I don't like, and that tends to include trumpet players in general, and music that owes any strong allegiance to Latin influences. So it might seem strange that I've chosen to enthuse about this album which is heavily reliant upon both elements. If this prologue demonstrates anything, hopefully it will be that generalising about music can be dangerous: you can miss a lot of potentially enjoyable music through

dismissing it out of blind prejudice.

The trumpeter in question is a Cuban professor of music and life-long fan of Dizzy Gillespie, Arturo Sandoval. Never heard of him? Neither had I until I discovered him quite by accident a couple of years ago. I was working late at night and a television was playing quietly to itself in the room behind me. I had registered subconsciously that there was a programme about Jazz being broadcast but I was concentrating on the computer in front of me. However, a band came on that I couldn't ignore and I turned to see the trumpeter who was playing so exuberantly and hitting notes so high and so low, and so exquisitely, that I could no longer attend to my work. It was Sandoval. The following day I managed to pick up two of his albums locally and from then on I was hooked by his flamboyant, tasteful style.

On the sleeve notes to his album "No Problem", Jack Massarick noted that: "The great jazz trumpeters - the brassmen that other brassmen regard with awe - are a breed apart, not always widely recognised but nevertheless established members of a select circle... Another uncanny thing is that although it may take the critics years to catch up with them, other trumpeters always seem to get the message early". Referring to these giants - Dizzy Gillespie, Wynton Marsalis, Maynard Ferguson, John Faddis, Woody Shaw - he remarks that "Arturo Sandoval scares them all to death". Why? Massarick continues that listening to the Cuban player you will hear "the soaring, superbly confident sound of a trumpeter in his prime and at the very top of his game, making what is probably the hardest instrument in Jazz sound as effortlessly enjoyable to play as the gods intended it to be". Hyperbole? Not for a moment.

Sandoval's playing takes the instrument to the edge of its performance, both in terms of range and speed. He extracts notes from the instrument that I've not heard many other players reach, like a triple high C - at least not with the same authority or purity of tone. And no matter how quickly he rattles out the notes - and his speed can be truly devastating - he never gives the feeling of being rushed: he always sounds assured and in control. This, it has been suggested, comes from his years of studying Classical music which has run parallel to his work in Jazz. He is also an accomplished pianist, vocalist and percussionist.

"Reunion" sees him playing once more with Cuban reed player Paquito D'Rivera with whom he was a member of both the Orquesta Cubana de Musica Moderna and Irakere before the latter's defection whilst on a tour of Spain. Sandoval later became an exile too. The album was recorded in Germany shortly after Paquito had suffered a serious accident. He continued through the sessions until the recording was completed, after which he was immediately hospitalised. It takes reading the sleeve notes to discover this - the evidence of his playing doesn't suggest

anything other than his being on top form.

From start to finish the album consists of fiery musicianship which even in its quietest moments is inspiring and sensational. Each member of the band makes a valuable contribution to the music's success and plays with fine accord and sympathy. Some of the rhythmic devices fall slightly uneasily on the European ear at first but once you've locked onto that torrid Latin groove, everything slots perfectly into place. The music is lyrical and highly melodic; witness Fareed Haque's crypto-classical acoustic guitar work on the introduction to "Latin American Suite" on side two, or D'Rivera and Sandoval's joyous exposition of the theme to the title track.

If ever there was music designed specifically to lift your spirits and make you feel good, this is it. And if you're an ambitious musician this record will either inspire you to greater heights or make you want to give up and become a chartered accountant.

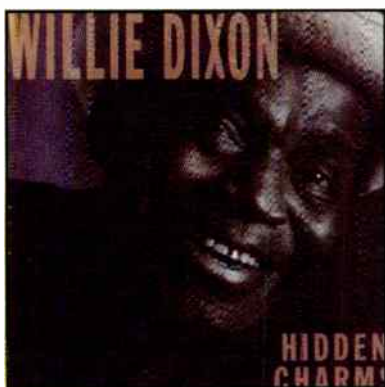


**PAUL BRADY  
Trick Or Treat**  
FONTANA 848 454-2

● When I first received this disc I mentally categorised it as 'pleasant', then decided that I wasn't too interested in it. I noticed a deep, punchy bass line on one or two tracks and made another mental note that the disc might prove useful for equipment reviewing purposes once in a while. And so it was pulled down off the shelf a few times. On each occasion it stayed on longer and longer and it grew more attractive to me. I wouldn't consider it a favourite disc - it's a little too 'nice' for my tastes - but it has qualities that I admire, and it's a fine example of the smoothly polished soft rock genre.

There's a hint of Steely Dan about it, more in terms of the presentation than the material, and scrutiny of the credits shows that Gary Katz who was responsible for the slick sound of their albums also produced Brady's disc. Add to this some highly respected session players and guests and you have the recipe for a successful attack on the savings of sophisticated thirty-somethings - except those like myself, of course. As a bonus for silver disc enthusiasts this is also one of the best-sounding Compact Discs I've encountered recently.





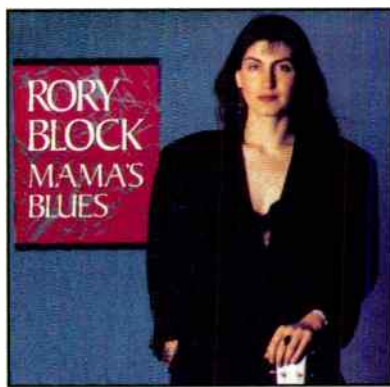
**WILLIE DIXON**  
**Hidden Charms**  
 SILVERTONE RECORDS ORECD 515

● Willie Dixon was born on the first of July, 1915. In 1937 he moved to Chicago. A year later he became the city's Golden Gloves boxing champion. Then he started playing washtub bass, and eventually graduated to the guitar. Prior to the move to Chicago he wrote poetry and sang in the local church. During the fifties his composing became more prolific and he wrote a multitude of classic blues songs, many of which were covered by the early rock'n'roll bands upon whom his music exerted considerable influence. Look through the track listings on sixties and seventies albums by the likes of The Rolling Stones, Yardbirds, and Led Zeppelin, and you'll spot many of his songs: "Little Red Rooster", "You Shook Me", "I Can't Quit You Baby". The list goes on and on. He was also a dominant force in moulding the Chicago blues sound of artists like Muddy Waters and Howlin' Wolf in the days of the revered Chess Records label.

Despite the profound impression his music made, his own recording career never ascended any great heights. During the fifties he sold many songs for a pittance and lost out on large amounts of ensuing royalty payments. Surprisingly, however, he remains active in music, still playing the blues as evinced by this album, released in his seventy-fifth year. Produced by T Bone Burnett, the recording was made 'live' in the studio. This a fine recording which offers listeners the chance to hear authentic urban blues played by one who is deservedly a living legend.

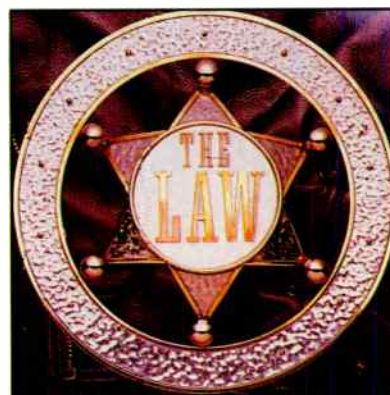
**RORY BLOCK**  
**Mama's Blues**  
 MUNCH RECORDS NETCD 22

● Rory Block has been featured on these pages before: a track from her "Turning Point" album was included on the free Compact Disc given away with our first issue and the album itself was subsequently reviewed as a Record of the Month. "Mama's Blues" has a sparser, more rootsy feel than "Turning Point" and brings Rory's guitar playing and voice more to the fore. It also presents an acutely focused snapshot of her passion for the blues music of the genre's founders. In her introductory notes she explains how she learnt to play the blues from records having been



drawn to it at the tender age of fourteen. In her next year she ran away from home and wound up sitting at the feet of Son House, the man who claims to have taught her idol, Robert Johnson how to play the guitar. He found it strange that a teenage white girl from New York City could have such a passion for the blues.

That passion has rewarded her with a successful career whose latest manifestation is this album, the acoustic guitar tracks for which were recorded live in a New York church: don't let the sound of a freight train rumbling noisily by at the opening of the first song take you by surprise. Apparently this happened regularly but on this occasion it has an eerie effect on Rory, who was starting to play a Robert Johnson song, and so she and producer, Ron Bach decided that it was fitting and proper to leave it on tape. I think that her playing will surprise listeners more than the train surprised her.

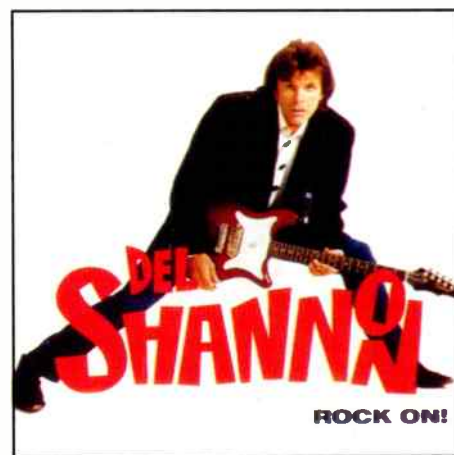


**THE LAW**  
**The Law**  
 ATLANTIC 7567-82195-1

● The Law is Kenny Jones and Paul Rodgers. Jones has drummed with the Small Faces, the Faces under Rod Stewart, and latterly with The Who, after Keith Moon's death. Rodgers was the distinctive and distinguished voice which led Free, Bad Company, and most recently The Firm, which saw him in partnership with Led Zeppelin's Jimmy Page. Both members have kept company with and earned the respect of many of the greatest names in Rock music. This eponymous album demonstrates why.

Jones and Rodgers grew up when Rock's primary influence was still the music of black America, blues and soul, both of which styles then revolved

around heartfelt sentiments and emotions. (In the case of Soul music we're talking about the likes of Otis Redding, not the schmaltzy pap of most contemporary exponents.) Those influences remain evident on this album. It's no-nonsense rock'n'roll throughout, characterised by Jones' skillful powerhouse drumming and Rodgers' potent, impassioned singing. The music is more polished than that of old but there's enough raw energy breaking through to make it triumphant. Listen to "Tough Love" to see where Rodgers' vocal style came from and why it influenced so many singers who came after him. He's still got one of the best and most intensely effective voices you'll hear. One of the best voices in the Rock cosmos, in fact.



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● "Rock On!" is the last new Del Shannon album you'll be able to buy; sadly the singer-songwriter committed suicide last year, bringing to an end a fruitful career, albeit one which hadn't kept him in the public eye after his early hits like "Hats Off To Larry", "Runaway" (which reached number one in England) and "Keep Searchin".

The record is a brilliant testament to the man's talent as both a singer and writer of brilliant, pure and unadulterated pop. Listen to the magnificence of "Walk Away", the incandescent optimism of "Are You Lovin' Me Too", and the compelling melodrama of "Lost In A Memory". All the tracks demonstrate that there was far more to Shannon's voice than its most obvious element, the famous Herculean falsetto. Not that this should be ignored: if you think Frankie Valli - whose three octave range was the Four Seasons' trademark - could hit high notes, take a listen to Shannon on "Walk Away".

The album was recorded in California, with Jeff Lynne (ELO) and Mike Campbell (Tom Petty's Heartbreakers) producing. Lynne and Tom Petty finished the album after Shannon's death.

It's truly a shame that 51 year old Shannon didn't hold onto life the way he's seen clutching his cherry red Epiphone guitar in the photographs on the CD liner.

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