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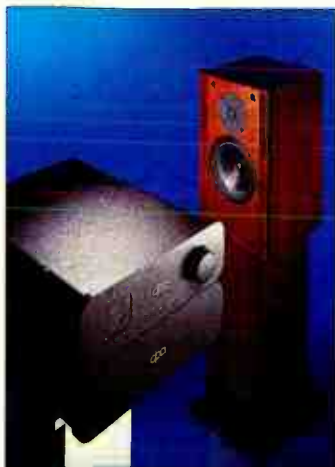
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Cover Photograph by Paul Hartley Studios 071-482 3768

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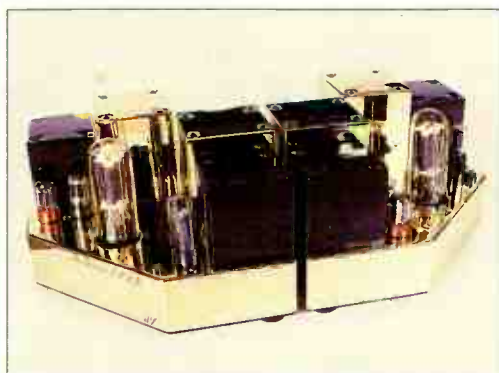
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THE HOLY GROUND

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BUDGET EQUIPMENT GUIDE

Whatever the budget, an audiophile can always feel the pinch. Our budget guide aims to ensure that even if the purse strings are tight, audiophile compromises can be struck.



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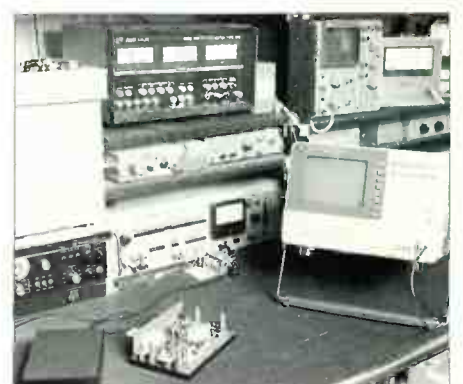


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Hi-Fi World produces the majority of reviews in-house, using our own lab facilities and listening rooms.

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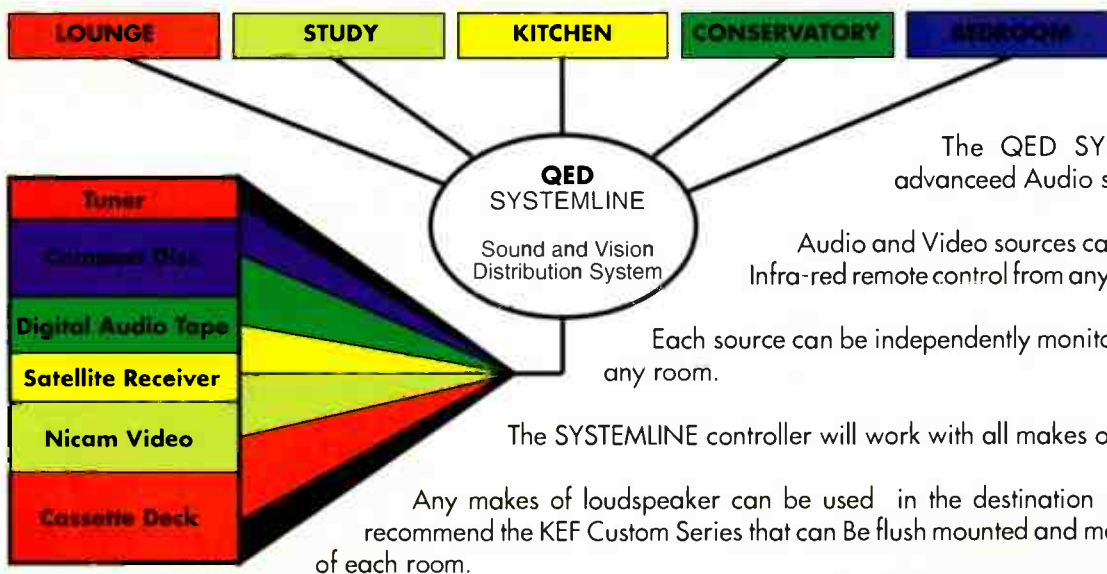
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NEW AMPLIFIERS TAKE THE STAGE

LFD Audio have just launched three new amplifiers. The MM0 Phonostage head amplifier is compatible with moving magnet or moving coil cartridges and costs £369, while the LS0 Linestage pre-amp is a zero feedback design costing £469. Finally the PA0 Powerstage costs £469. The PA0 is a MOSFET amplifier that uses a class A input and gain stage, followed by a high current class AB output stage. All three amps share the same external dimensions and have black marble effect facias.

LFD Audio, 110 Oxford Crescent, Clacton-on-Sea, Essex. CO15 3PZ. Tel: 0255 422533

ADDITIONAL BASS FOR ELECTROSTATICS

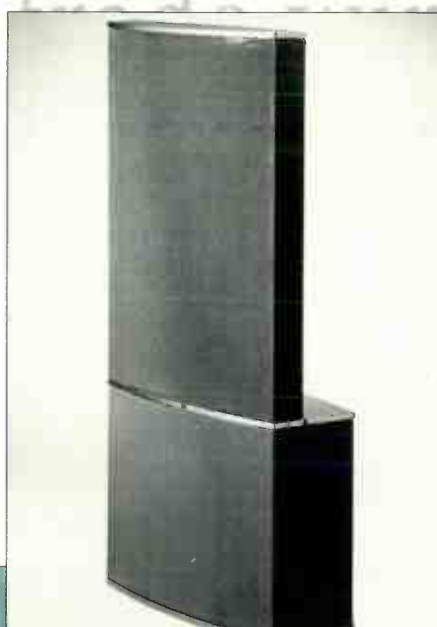
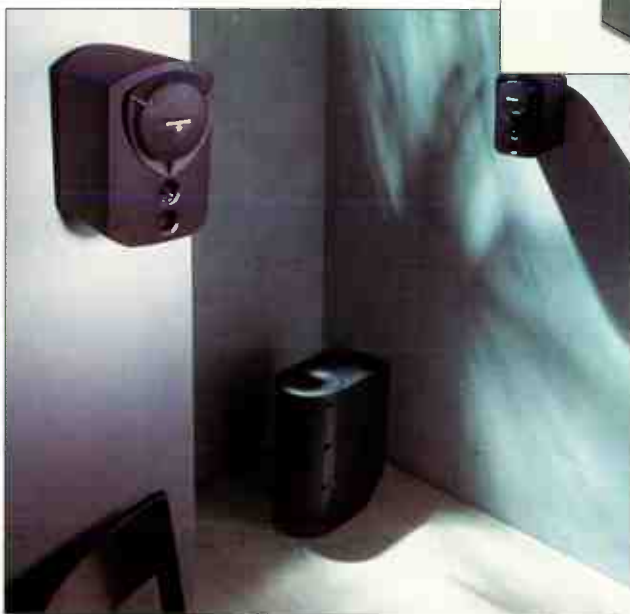
Quad have recently announced that they will be distributing the Gradient SW-63, a Finnish made subwoofer that is designed to complement the ESL-63 electrostatic loudspeakers. The SW-63 is a dipole design using two long throw 12" drivers on an open baffle. It claims to offer the same sound pressure distribution pattern as the ESL-63s. Selected Quad dealers will stock the SW-63 and the expected retail price is £1660 per pair.

Quad Electroacoustics Ltd, Huntingdon. PE18 7DB. Tel: 0480 52561

B&W'S SOLID TEAM

Rock Solid Sounds Inc, a division of B&W Loudspeakers, has launched the Team compact loudspeaker and Team Bass subwoofer. The Teams cost £129.95 a pair and are fully magnetically shielded, making them ideal for AV use. They employ a reflex loaded bass/mid-range driver. This is coupled with a fluid cooled dome tweeter which has its own in-built protection circuit. The TeamBass sub-woofer, costing £149.95, can also be used in conjunction with the Teams and claims to boost the power handling from seventy five watts to over one hundred watts.

Rock Solid Sounds Inc. Ltd, Meadow Road, Worthing. BN11 2RX. Tel: 0903 750750.





BACK TO THE BEGINNING

Goodmans Loudspeakers Limited have announced the replacement for the acclaimed Maxim 3 'speaker, but rather than call it the 4, have instead opted for the original name, the Maxim. The improvements to the Maxim include a revised bass/midrange unit and a ferro-fluid cooled metal dome tweeter. Also included in the new model are higher quality film capacitors in the crossover. The Goodmans Maxim will retail in a black ash finish for £119.95. Look out for a review in Hi-Fi Worlds next issue.

Goodmans Loudspeakers Ltd, 3 Ridgeway, Havant, Hants. PO9 1JS. Tel: 0705 492777.

GROOVEY VALVES

Groove Tubes (U.K.) have announced that they will be distributing a range of British valve amplifiers that use Groove Tube valves. Ameson-Cooper manufacture this range of amplifiers and included in the range are the twin 44 monoblocks costing £1300 a pair, the 444 pre-amplifier at £650 and the 244 phono stage for £200. Michael Amerson and Michael Cooper have produced these amplifiers by drawing on their experiences from the professional music business and claim to have transferred this expertise into high quality audiophile amplification.

Groove Tubes (U.K.) Ltd, 8 Barn Green, Bradmore, Wolverhampton. WV3 7AY. Tel: 0902 620156.



SMALL AND SWEET

Celestion have announced improvements to their bookshelf loudspeakers. The 3s, 5s and 7s now gain a Mark II suffix. The new range claims improved bass response, higher sensitivity and increased power handling. Despite these upgrades, the one thing that has not been changed is the size of the cabinet, which will remain the same as the previous models.

Celestion International Ltd, Ipswich. IP3 8JP. Tel: 0473 723131.

UPGRADED PERFORMANCE

Helius Designs have recently launched an upgraded and improved version of their Cyalene tonearm. The Cyalene 2 retails at £1395 and includes a new manufacturing technique for the tubular arm material, improved lateral bearings and counterweight designs.

Helius Designs, The White House, Aldington, Evesham, Worcs. WR11 5UB. Tel: 0386 830083.



DAC ON TOP

Audiolab's 8000DAC, which recently won an FBA award for the best British Digital Product, has been updated for '93. The upgrade includes several new improvements; the new version will cost £749.90. The

Audiolab 'Master Clock regeneration system' has been further refined and claims to virtually eliminate jitter, while a programmable logic chip reduces the complexity of the static logic circuitry. Audiolab are also offering a full upgrade service to the owners of the existing 8000DAC module for £75.00.

Cambridge Systems Technology Ltd, 26 Roman Way Industrial Estate, Godmanchester, Huntingdon, Cambs. PE18 8LN.

Tel: 0480 52521.

IN BRIEF



SPIKES AND STONES FROM SLATE AUDIO

Slate Audio have added to their range of Audiophile products with the Spikekit and Stoneset. The Spikekit allows carpet piercing spikes to be fitted to floor standing speakers, while the Stoneset is a spike fitting kit for use with stone, slate or marble. Both Kits are available for £20 including U.K. mainland postage and packaging.

Slate Audio, 47 Gemini Close, Leighton Buzzard, Beds. LU7 8UD. Tel 0525 384174

VAN DEN HUL BREAKS CONNECTION

TEAC UK Ltd recently announced that all van den Hul products will shortly be distributed by a new company: van den Hul U.K. Ltd who will be based in Maidstone, Kent. Van den Hul specialise in manufacturing high quality interconnects and loudspeaker cable and have recently launched the 'First', a non-metallic interconnect. They have decided to take advantage of relaxed trading conditions by setting up their own U.K. operation.

PINK LINK FOR LINN

The Pink Link is Pink Triangle's latest modification for the Linn Sondek LP12. These modifications include a new top plate, a low noise d.c. motor and a comprehensive battery power supply motor drive circuit. In excess of ten hours continuous use is obtainable from the battery supply, which takes fourteen hours to recharge from a fully drained state. The complete set of modifications is available for £769.00 which includes fitting and V.A.T.

Pink Triangle Projects Ltd, 4 Brunswick Villas, Camberwell, London. SE5 7RR. Tel: 071 703 5498.

VOICE FOR VINYL

Analogue Addicts, an international pressure group for lovers of the vinyl LP record, provides a comprehensive newsletter that provides details on new LP releases, recommended record stores and general news on the vinyl format. The newsletter, entitled Voice, is available by subscription and costs £10 for four issues. For more details contact:

Analogue Addicts, 22 High Street, Keighley, West Yorks. BD21 2AA.

AUDIO VISUAL ASSOCIATION

This new association, the AVA, claims to represent the interests of manufacturers and retailers of Audio Visual products and offers information, tuition and advice on every concept of Audio Visual Technology. For more information contact:

Caroline Lent, Campion House, 7 Campion Terrace, Royal Leamington Spa, Warwickshire. CV32 4SU. Tel: 0926 430933.



PERSONAL POCKET

Strike Ltd claim to have the ultimate solution for carrying a personal stereo- the Stereo Belt (presumably there are two of them). The belt is manufactured in nylon lined neoprene and is designed to snugly fit around the waist. It forms a comfortable support when jogging, cycling or just taking a stroll. The belt is available in black, emerald and purple and costs £14 including postage and packaging.

Strike Ltd, 107 Grays Inn Rd, London. WC1X 8TZ. Tel: 071 236 2789

CD PLANT GROWING IN LONDON

The Optical Disc Company (ODC) has just opened a new CD manufacturing plant at Islington, North London. This fully automated, computer controlled plant is the seventh to open in the U.K. As well as being able to produce audio CDs, the plant also has the facility to manufacturer CD-I and CD-ROM software. ODC also claim to be ecologically friendly by using waste plastic for CD cases, returning waste aluminium to the suppliers and by using fully recyclable packaging.



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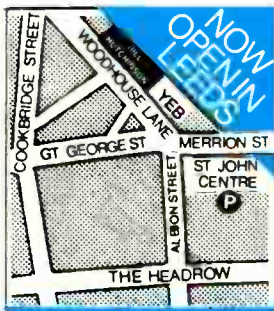
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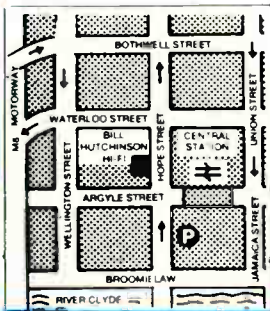
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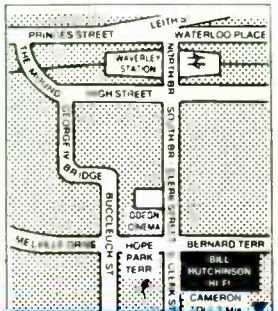
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COLD REALITY

I have read with interest the continuing debate about the various pros and cons of the old 'warmth' of LPs, against the harsh cold reality of CDs. In your April issue Noel Keywood compared a number of each medium and concluded that CD "hasn't improved fidelity one little bit." I would suggest that it is unfair to compare current analogue technology, which has been lovingly honed to its present quality over a century, to digital technology which is still very much in its infancy.

I am a child of the computer age and I firmly believe that any analogue signal can be reproduced, almost perfectly, using digital technology. I say 'almost' purely in the name of accuracy because analogue signals are continuous and digital signals, by their nature, are made up of samples. The inherent problem with digital sampling is the information missed while the previous sample is being processed and stored. As processor speed improves this problem will become increasingly irrelevant until we reach that day where the reproduced signal is exactly (almost) identical to the signal presented for sampling. Surely this is what we are trying to achieve, total transparency of

all the technical bits and pieces that have interacted with the sound between the musician playing and our listening. I would venture to say that analogue audio technology is very much nearing its peak, but as computer technology improves so will digital signal processing quality.

Finally, perhaps I could suggest a view of hi-fi for the future: Your latest music purchase is downloaded via telephone line to your Multi Mega-Byte Music Storage Centre which is humming quietly in your home. With this inconspicuous machine any track from your countless collection can be instantly recalled and reproduced perfectly. For your portable player or car, any selection can again be instantly 'downloaded' for your listening pleasure. The only problem now is: where do we put the sleeve notes?

**Donagh McInerney,
Dublin,
Republic of Ireland.**

Higher sampling-rates for CD do have potential, but go against the current 'Bible' which ensures worldwide standardisation, Philips' 'Red Book'. A number of record companies are addressing the problem from the other end, as it were,

by developing recording techniques which have 20-bit resolution throughout the recording and mastering chain. JVC demonstrated its effectiveness to me in Tokyo a while ago; more recently I've heard examples from Sony, and last month I was at a recording session with Deutsche Grammophon, who interestingly said they were pushing hard for 21-bit and thought 23-

bit was what they should be aiming for. Should we, at some stage, have 'Super CD', then the major companies will hopefully have the technology in place.

The idea of 'down-loading' music into a solid-state memory is not so far-fetched. The major Japanese companies seem to be assuming that will be the next

Letter of

STING - OR SPRING? - IN THE TAIL

Your April 1993 issue has prompted me to put type-writer to paper on the subject of the Garrard 401. I used to own one (bought fairly cheaply ex-BBC). I can confirm its excellent foot-tapping rhythmical qualities, generated I believe not only by that massive motor and the positive idler drive but also by the high-inertia platter. Not only is it fairly heavy, but if you examine it you will see that a high proportion of that mass is concentrated around the perimeter, giving a very much higher moment of inertia than a solid platter of similar mass. Mine didn't rumble much either, even though its plinth was quite simple - a sheet of 1/2" ply as a motor board suspended on 4 springs within a large ply box (with hinged ply lid).

Although my 401 did not rumble, it did have one problem I couldn't cure, which seems to me to be the true Achilles' heel of the machine, although it does not appear to have been referred to by either enthusiasts or critics. I found that the grooved rubber mat absorbed too much detail for my taste (I generally prefer felt mats) but I realised that it could not be dispensed with because it is essential to damp a massive resonance in the platter. Take

off the mat and tap the platter - it rings like a bell because of that heavy edge and the lack of radial stiffening ribs. Even with the mat in place a slight ringing can still be heard and I suspect that this was the true source of the slight wiriness and upper-treble sting noted by Eric Braithwaite, rather than the SME 312.

Once identified, this is a particularly intractable problem to deal with. Because of the tight clearances between motor and platter, nothing can be done to stiffen the latter, which would be the real solution. I tried plasticine applied around the perimeter (Loosely placed on the strobe marks) as a perimeter wave trap, with partial success but was never able to come up with a wholly satisfactory solution. If you look at a 301, you will see that its mat wraps down around the platter edges, acting as edge damping and almost certainly removing this top-end sting more effectively than can be done, on the 401. This may explain the higher reputation of the 301 - and my regret that when I bought the 401, I chose it in preference to a 301 on sale for £10 less.

What forced me to get rid of my 401 was the appearance of rumble. A little spring was the cause, and it could not be cured. A fine coiled spring pulls the idler wheel against the platter and the motor

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development, quite possibly before the end of the century. The snag I foresee, however, is that speed and convenience are likely to be the watchwords and that we will be copying our music over cable or whatever already bit-reduced via a data compression system like that invented for DCC or MiniDisc. It's memory-saving rather than a real improvement in fidelity that

appears to be exercising commercial minds most.

On the brighter side, considerable strides are being made in the development of A/D and D/A conversion chips. I heard, very recently, Kenwood's domestic CD-R machine, which included chips from Asahi Kasei with impressive results. There has been - as this player also demonstrated - some development in sampling-

rate conversion, too, e.g. from DAT to CD in this case. The link may not be obvious, but many Rock recordings include a number of conversions between different sampling rates, and the cleaner they are, the better the quality of the final recording should be.

I've been much concerned over the years about the 'warmth' of vinyl. Often, I have come to believe that this attribute belongs more to the replay systems available - especially in the Seventies and early Eighties - and wear in pressings than vinyl itself. I've been illustrating the point to friends for a while now with mint or near-mint early pressings; many are shocked at the CD-like glassiness and sometimes very sharp treble on some SAX and Capitol recordings from the Fifties, much closer to the CD re-issue than many are prepared to accept. Where analogue vinyl does score, it seems to me, is in its greater apparent depth, subtler ambience and 'wholeness'. EB

FIDELITY (IN)CREDIBILITY

Thank you for the valve amp circuit diagram and this month's article about the Garrard 401 turntable. I am delighted to see something like this back where it should be - playing music for enjoyment. It is this that I am really writing about - or to be more exact, it is about another turntable that I am writing about.

I have been the proud (and defensive) owner of a Pioneer PLC-590 direct drive turntable for a number of years now. I have always been derided by Hi-Fi enthusiast shops for a certain lack of 'fidelity-credibility' in even giving one of these things room in my lounge, let alone using it to play records! Many of the things that you say about the Garrard (with its new plinth and arm), its lack of response to feedback, 'speed', sense of rhythm, etc., could, I felt, also be applied to the Pioneer. The one thing that was lacking though was 'absolute' sound quality. I used a Goldring 1042 fitted in a Linn Basik+ running through a Mission Cyrus I on Target shelves, and

Rogers LS4as on Foundation stands. I recently upgraded to a Linn Axis with Akito and the same cartridge and the clarity of the new turntable is startling even if it is a little mild mannered. Its openness and smoothness was a revelation and so was the sheer amount of information revealed but it can't stand children moving around in the same room as itself when playing which is extremely irritating! What the Linn lacks which the Pioneer seemed to possess is, well I don't know. I just sort of loved the old thing and it seems a shame to give it away for fifty quid or so. Since reading your article I am more and more convinced that the Basic+/1042 arrangement was not a good set-up. Since I still have the old Pioneer and adore LPs do you think that a change of arm to something like the SME 312 would be worthwhile? Or cost effective? Or do I need to see a doctor?

Whilst I'm here I thought I might join in the sentiments of your letter of the month and Noel Keywood's article concerning recording formats, the record companies lack of retail sales, and the LP/CD (sort of) debate. In the old days when there was just LP, an inferior tape cassette, and a fledgling CD format one could buy a record for - well under £5 generally - and furthermore almost everyone had either a turntable or a cassette player. A few years along the road and the record companies have killed off the LP with "falling demand" and exorbitantly high prices - I hope they are satisfied, and poorer. And furthermore I hope they really come a cropper with DCC and MD.

**David Osborne,
Mirfield,
W. Yorks.**

I must admit the Pioneer has escaped me. No doubt other readers may be able to enlighten us. Of late, the record companies have indeed come croppers, with falling profits common. Unfortunately, this may rebound, since many companies' are likely to be

Continued on page 17...

The Month

pulley. One day mine broke. I tracked down the "little known parts source in Swindon" and obtained a replacement but unfortunately from that time on mine rumbled just like everyone else says theirs did. I believe that the spring must have been either slightly stiffer, or slightly tighter. Again something which does not seem to crop up in standard 401 lore, but worth knowing about.

One last tip is to look for a Rogers HG88 amplifier - they don't seem to get mentioned but offer a good-sounding untemperamental all-valve integrated amplifier.
**Alasdair Beal,
Leeds.**

Curiously, after my few words on the 401 had been published, I was with a friend who had both a 301 and a 401 motor unit and agreed with Mr Beal's diagnosis, having heard the same problem. A certain amount of platter-bashing had us wondering whether the substitution of a 301 platter for a 401 would be worthwhile. Should anyone have a pair, it might be worth trying. I certainly maintain that there is a slight degree of wiry coloration in the SME 312, but must admit that the 401 proved surprisingly unamenable to changes of mats - I tried felt, and a heavy butyl rubber one, with

practically no effect. Mr Beal, I suspect may well have tracked the 'sting' to its source.

The spring problem I also heard of after the event, as it were. On pondering what I at first thought to be a side issue, I recalled being told of much the same happening to Lenco GL75s which had a spring tensioning the idler wheel against the platter. Again, this is something worthy of investigation. The Rogers doesn't ring any bells, but I've noticed a surprising number of Cadets still in use. EB

I found your experience baffling and a bit worrying. Rumble in a 401 is curable, at least that's what all the experts tell me (and I believe them). Peter Soper of Slate Audio felt the idler wheel spring could not, on its own, introduce rumble, a view with which I agree. He suggested that some other factor was the cause. To replace the spring you had to remove the idler wheel and we both suspect that it was this action that somehow led to the appearance of rumble.

The platter does ring and this introduces some slight metallic colouration. Glueing a thin sheet of rubber to the platter underside with Evostik or Copydex may well provide a solution. Care must be taken not to foul the idler wheel or to upset balance. NK

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...continued from page 15

increasingly reluctant to finance new bands or new repertoire in the coming year. Some are already shedding relatively successful bands - as RCA have done with The Wedding Present - others more and more prone to release record-

LPs as long as demand exists and now sees black discs as supplying niche market requirements with a heavy presence within certain musical genres.

Over in the independent sector, major industry figures refuse to accept the 'vinyl is dead' myth. Speaking to record and radio company executives at

interest in this area lies as much in the increasingly absurd proliferation of formats claiming to be replacements for the LP and cassette, yet offering only improved convenience, not improved sound quality. In Kaleidoscope I was musing about possible alternatives to these new formats, one of the most intriguing being a high performance analogue medium truly worthy of acting as a replacement for LP and CD, possessing all of their individual strengths, but few of their drawbacks. It seems that such a medium could be devised using current technologies, even though the consumer electronics giants sadly wouldn't be of a mind to do such a thing I suspect. **NK**

GETTING SENSITIVE

On the need for more sensitive speakers and the impracticality of horns: if the reason for the horn's sensitivity is that it presents the room with a large area of air moving together, then why not skip the bulky horn and simply increase the number of drive units until they are moving the same amount of air directly?

On this theory, the impoverished audiophile could buy a couple of old wardrobes, damp them with sand panels and fill the doors with rows of low-power speakers from 1960's radiograms to enjoy Air Partner or Tannoy Westminster dynamics of 5 watts or so, for somewhat less than £12,000.

At the other extreme of sophistication, there is the system that Technics installed in La Scala, where the whole wall between stage and orchestra pit is covered with sealed-unit panels driven by rows of tiny coils distributed throughout the panel area. With such an enormous driving surface, excursion is minimal and I believe the whole thing is about 2 inches deep. Even so, Technics had to charter two planes to get it all from Japan to Italy. It would be interesting to know how this system is driven, how well it has worked and whether Technics are contemplating domestic versions. Perhaps they, or someone at La Scala, might respond to an editorial enquiry? **Impoverished Audiophile, Cricklewood.**

TANNOY REPLY

It is true that a large acoustic wavefront creates a sense of ease in a speaker system. Getting the wavefront is fairly difficult. Putting a number of speakers into an old solid

wardrobe can make an entertaining sound economically but really isn't the answer for the following reasons.

The purpose of a speaker cabinet is to stop the front and back radiation from the speaker cone cancelling out (they are 180 degrees out of phase). The old days of the genuine infinite baffle, open at the back and often large and sand filled, approximated to this but the bass response depends on the size of the baffle, the bigger the better! If you can accommodate a 10 foot x 12 foot sand filled baffle in your room then you are well on the way to getting somewhere in bass response. You could also mount the speaker directly in the wall, but you mustn't put a box round the back for reasons given below. People in the other room must also share your choice of music and playing levels!

Another way of creating an infinite baffle is to fold the baffle around the back of the speaker to make a simple box, the rear cone radiation is then trapped (and has to be dealt with) but cannot cancel with the front. Doing this creates another problem which is that the springiness of the air trapped in the box together with the mass of the speaker cone determines the lowest frequency that can be effectively reproduced. A large cone in a small box will not produce bass below around 90Hz. A small cone in a large box is better, but the efficiency dies as the cone area reduces. A large but heavy cone in a small box is no good either as the efficiency drops with increasing cone mass. If you look at the ratio of cone area to cabinet volume of this country's favourite mid priced speakers you will find a great deal of commonality.

Using multiple drive units in a wardrobe the ratio of all the cone areas to the total wardrobe volume has to be around the magic number. A problem with multiples also occurs because there are always drivers working at the same frequency spaced quite widely apart. This causes cancellations and weird effects in the stereo image. Restricting the wardrobe to frequencies below 200Hz will improve this as quarter wavelengths will be longer than the largest driver spacing.

The multiple approach does not fundamentally increase the efficiency as the system is still a direct radiating transducer, what we have gained by



DCC and MD, could they produce a downfall in music sales?

ings which they think will chart fast just because they sound like one that did last month. We already have a high proportion of re-issues in the catalogues; declining record company income could well mean yet more compilations, simply because they are relatively cheap to produce. **EB**

DEAD, BUT NOT LYING DOWN

I must take issue with you regarding your assertion that the survival of LP is a dead topic. Nothing could be further from the truth. Vinyl is without doubt the most healthy looking corpse I have yet encountered. Certainly it must be admitted LP has forever lost its place as a mass technology but so have valve amplifiers and since when did Hi-Fi World suggest the survival of valves is a dead topic? In this respect some hi-fi magazines have left themselves wide open to accusations of hypocrisy - not that I'm accusing anybody of course!

Before I'm accused of wearing rose tinted spectacles let me point out that I am not alone in my more upbeat assessment of LP's prospects as a specialist niche market product (rather like most equipment reviewed in Hi-Fi World).

Alain Levy, President and CEO of Polygram, returned to the subject of vinyl at a recent press conference. He stated that Polygram will continue producing

a recent conference regarding the future of BBC Radio 1, Pete Waterman Chairman of PWL International (Kylie, Jason etc) described notions of vinyl's death as "Bullshit! Thirty-two percent of every sale is on vinyl".

Independent record stores continue to experience brisk trade in LP and there are still hundreds of new releases every month. Second-hand shops report boom times in the midst of crippling recession. The same cannot be said of shops which are heavily CD orientated.

Vinyl is much more evident in countries like Germany and Japan than at any time during the last few years. I am, for example, eternally grateful to EMI/Toshiba (Japan) for recognising a market for audiophile LPs and producing ongoing batches of their awesome Blue Note releases. These stunning LPs are currently bankrupting a good number of my happy customers. Other labels like Enja and Concord Jazz are following suit.

No, vinyl is not dead. Like real hi-fi it has moved out of the mainstream. I suspect people will demand LPs long after CD has been replaced by whatever low-fi medium the electronics giants foist upon us in the future.

**Neil A. Ramsden,
The Den,
Keighley,
W. Yorks.**

I'm not aware that we have ever pronounced vinyl 'dead', nor have we ever implied it. My

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Alex Garner
Technical Director
Tannoy Ltd

SENTENCE FIRST, VERDICT AFTERWARDS?

"In all cases the solid baseboard sounds better than the old one."

This was the opening shot in Linn's reply to Kevin Harrison's excellent Letter of the Month (March '93). It seems that Linn are appointing themselves judge and jury where sound quality is concerned. Frankly, I find this kind of arrogance not only irritating, but also rather sad. Linn undoubtedly produce lots of excellent quality, well-built reliable gear with superb back-up, but they do themselves no favours with this "We'll tell you what's good for you" attitude.

I can, for example, think of at least one large car manufacturer whose declining market share is in my view down to a similarly complacent self-image. How much more impressive is the quiet, dignified approach of Mitchell, SME etc.

Quite apart from the marketing angle, isn't it inherently ludicrous to state as fact something which can never be anything but a subjective judgement?

As for myself, I know that "in all cases" my humble Rega sounds better mounted on a whoopee cushion. However, I am prepared to accept that others may prefer Medite, glass, Ikea wardrobes or a pile of back copies of Hi-Fi World.

So come off it, Linn. You're good, you might be the best, but you're still human. After all, remember what happened to Icarus.

Colin Berresford,
Billinge,
Lancs.

SAVING THE EARTH

Your response to Mr Reynolds' letter in the April issue on the subject of electrical earthing was a little misleading. Since a picture is supposed to tell a thousand words I shall attempt to explain the mysteries of Protective Multiple Earthing. PME first appeared in the 1960s, where large rural developments were becoming popular. The intention was to remove the need for maintenance of the earth continuity conductor from the home owner, and correspondingly remove the risk of the earth becoming unsafe.

Mr Reynolds correctly pointed out that with PME, in the event of a neutral breakdown, the house earth will rise to 240 volts. This is because PME involves connecting the house earth not to an external ground but to the neutral at the distribution board, this neutral being supplemented with multiple earth connectors all the way to the substation.

If the house neutral connection is broken, both the earth and neutral resistances rise, and the current flowing in the system falls to zero (the lights go out).

Since no current is now flowing, the house earth is now connected to the live via all the electrical equipment in the house that is switched on - lights, transformers, etc. - and the house earth potential will rise - up to 240 volts. As you say, at this point something is obviously wrong, since the lights have gone out, and the problem will be obvious. The danger is small, since everything is at the same potential, so no current will flow, provided no other real earth can be touched simultaneously to this floating earth.

If a separate earthing stake is added to the basic earthing system, and the wiring is solid enough, the current from the house will choose this as its new neutral if the real neutral fails. In this case, the lights may not go out, and it would be almost impossible to tell that the fault has occurred unless you attempted to move the stake.

In practice, the resistance of a simple stake in the back garden may well be too high to maintain the supply, but in any case, this situation would involve high

currents and thus would be potentially hazardous if not lethal.

It is therefore very dangerous to attempt to add any earthing point to such a system - PME was designed to be "maintenance free" with respect to the consumer, providing the internal earthing is wired correctly. Any problems beyond the distribution board are the responsibility of the electricity supply company.

If there is any doubt as to the safety of the existing earth, get a qualified electrician in to test the earthing with the proper equipment, and recommend any changes.

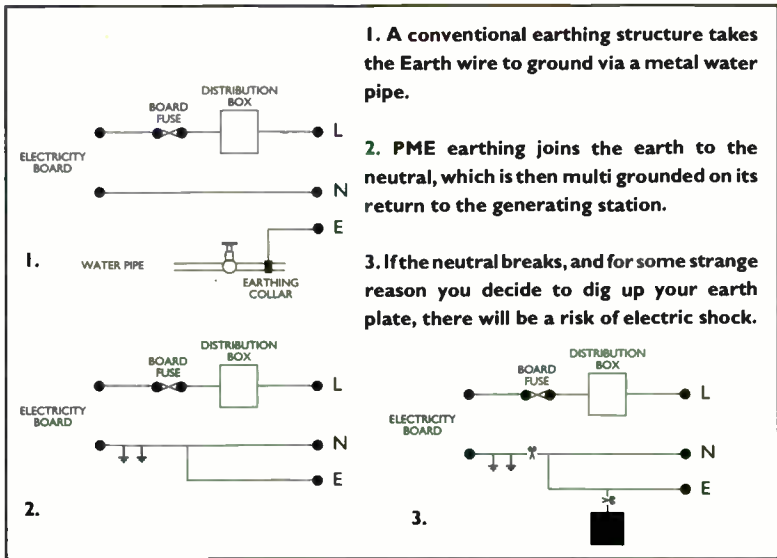
On the subject of Earth fault circuit breakers, do bear in mind that the older type Earth Leakage (ELCB) sort that are sometimes found, actually require an Earth current to cause a trip - any additional earthing on the house side of this type will prevent the trip from functioning at all.

The more common (and modern) Residual Current type (RCCB, RCD, etc) measures live and neutral current differences - these still, however, require 30mA of differential current flow to cause a trip, which is more than enough to kill someone with a less than perfect heart.

The answer is simple: NEVER to rely on these circuit breakers.

And finally, removing earthing on equipment may be useful when testing and tweaking, but do remember to fully reinstate the earth on reconnection. Leaving a loose chassis earth connection wire dangling inside the case is easy to do and is then likely to contact any of the live points in the circuit.

Also, be aware of accidentally "completing the circuit" when reaching for tools and test gear -



1. A conventional earthing structure takes the Earth wire to ground via a metal water pipe.
2. PME earthing joins the earth to the neutral, which is then multi grounded on its return to the generating station.
3. If the neutral breaks, and for some strange reason you decide to dig up your earth plate, there will be a risk of electric shock.

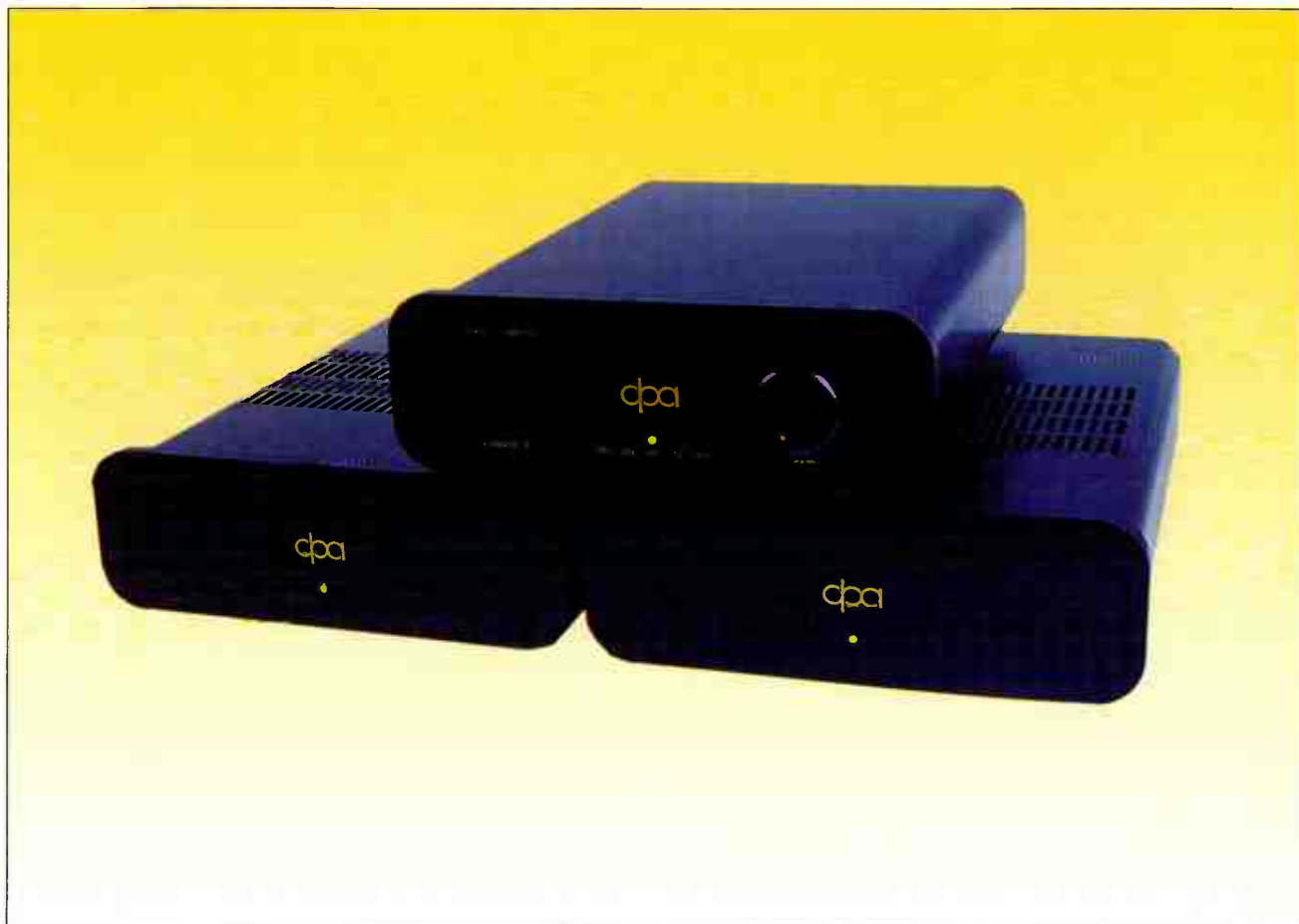
you may get much more than a "mild jolt" - your partner might be claiming on the insurance sooner than you imagined.

S. G. Twynham,
Aylesbury,
Bucks.

Your description makes clear what the potential hazard of PME is and, as an idea, it seems bizarrely dangerous to me. If the neutral is broken then all earths in the house go to live potential. That you have to find a true earth to get a shock seems little consolation.

A proper earth of the conventional sort I was talking about basically introduces a belt-and-braces safety element into such a scenario that provides additional protection. It only becomes dangerous when another unusual event occurs at the same time. In this case, the neutral must be broken, household items must be working and the earth stake pulled up - all at once! Then, yes, as you say, it's goodbye. The worst feature of a proper earth in this case is that it effectively compensates for and disguises an external neutral fault. Without it, everything otherwise stops, giving clear warning to the householder of a fault. So perhaps an external earth is best not used with P.M.E.

My solution would simply be to retain the inherent safety and electrical benefits of a proper, well maintained earth, and install a current sensor and warning system in the earth line. But as you point out, where P.M.E. exists, installation of an independent earth needs careful consideration and for most people is probably best avoided. NK



Solid Statement

Amongst solid state amplifiers, DPA Digital's new 200S pre-amplifier and power amplifier make a firm statement of quality.

Dominic Baker enjoys his time with them.

DPA Digital's predecessor, Deltec, produced one of the finest, most musically detailed and technically innovative pre/power amplifiers available, the Deltec 50S combination. Rob Watts, who designed the original 50S and who is now managing director and designer for DPA Digital, has been hard at work. The £495 DSP200S and £750 DPA200S pre and power-amplifiers are less expensive, better finished and easier to use, but they will have a tough job to match the transparency and resolution of detail of the older 50S.

True to DPA's in-house style, the amplifiers are housed in heavy, graphite-grey casework with neatly rounded corners. I personally

preferred the original sand-cast front panels, with their large-radius, deep curved front panels. They had a distinctive three-dimensional appearance, but apparently so much time had to be devoted to quality control that it was an uneconomic method of manufacture and had to be abandoned. The new 200S amplifiers have a flat front panel which has enabled both quality and consistency of finish to be improved.

The pre-amplifier has just one knob on its fascia, for control of volume, behind which lies a high quality Alps potentiometer with a good life span. Input switching, balance and tape monitor (new to DPA) are all carried out by electronic switching, effected by push buttons.

Balance can be incremented in 5dB steps, but the setting is lost (or reset) when power is turned off. Since the pre-amplifier consumes very little power, it can be left on to retain these settings and that is expected by DPA. These switches have their own separate power supply to improve performance. No sign of any cost cuts here!

However, the output stage of the DSP200S uses NE5534 op-amps (ugh!) operating in compound Class A mode, rather than DPA's specially developed thick film audio hybrid, the DH-OA32. It is a bit of a shock to see this device creep into a product from a manufacturer who is normally not satisfied with standard off-the-shelf components, but Rob claims that its

inclusion was necessary in order to keep the price as competitive as possible and promises that an upmarket version, currently in the planning stages, will use his own, unique audio hybrid circuit.

As with all of DPA's products, extensive use is made of surface mount technology. Not only does this enable board sizes to be kept to a minimum and therefore signal paths as short as possible, but it reduces the amount of r.f. noise. In fact, one of Rob's key buzzwords is r.f. noise, which he blames for the lack of focus, smoothness and sweetness in other designs. To this end the chassis, envelope and front panel are constructed from thick aluminium, because it provides the best r.f. noise screening properties.

The DPA200S power amplifier is based on its obsolete predecessor. The external feedback arrangement has been taken back inside the amplifier and the power supply has been split into two independent sections, each with its own toroidal transformer. These are mounted so their external stray fields cancel, to reduce the likelihood of hum induction into surrounding circuits. The power amplifier uses the in-house designed DH-OA32 hybrid op-amps, the transformers having separate windings supplying dedicated rectification and smoothing sections for them. Extensive r.f. filtering is applied to each of the four power supplies (two for the hybrids and two for the output stage).

Monoblocks

Used in standard mode the DPA200S claims to produce sixty watts into a normal eight ohm loudspeaker load, but we measured fifty. However, a small switch on the rear panel labelled stereo/monoblock indicates that this is not the end of the story. If a second 200S is purchased a pair can be used as 200w monoblocks, hence the slightly confusing 200S name tag. This switch effectively bridges the two mono amplifiers in the stereo amp so that one is pushing and one pulling. The loudspeakers are therefore connected between the two positive, red, loudspeaker terminals. I asked for two power amplifiers so that I could investigate what a pair of 200w DPA monoblocks could sound like.

The original 50S amplifier employed an external feedback network and used XLR connectors. This made it necessary to use special DPA cables, difficult for hi-fi dealers to demonstrate - and near impossible for audiophiles to experiment with different cables. Because of these past difficulties, the 200S pre/power uses conventional phono sockets and 4mm binding posts. I found that the old system of XLRs and external feedback

made the DPAs seem uniquely sophisticated and special, but I must admit that the new configuration results in a lot less headaches.

We were fortunate enough to be able to lay our hands upon a 50S pre/

"The treble is delicately intricate where it should be, yet sharply focused and well projected with the smash of a cymbal."

power against which the 200S could be compared. Before listening I gave the 200S pre/power the recommended four days of burning in, which greatly pleased our local electricity board.

I was always aware of the quality of finish of these amplifiers. All of the switches, controls and terminals were firmly and neatly located and had a reassuringly sturdy feel to them. There were no rattles or creeks; everything had been rigidly mounted to the thick aluminium chassis and the amplifiers felt like solid blocks. This may not sound very important, but it is in conveying a feeling of quality and providing owner satisfaction.

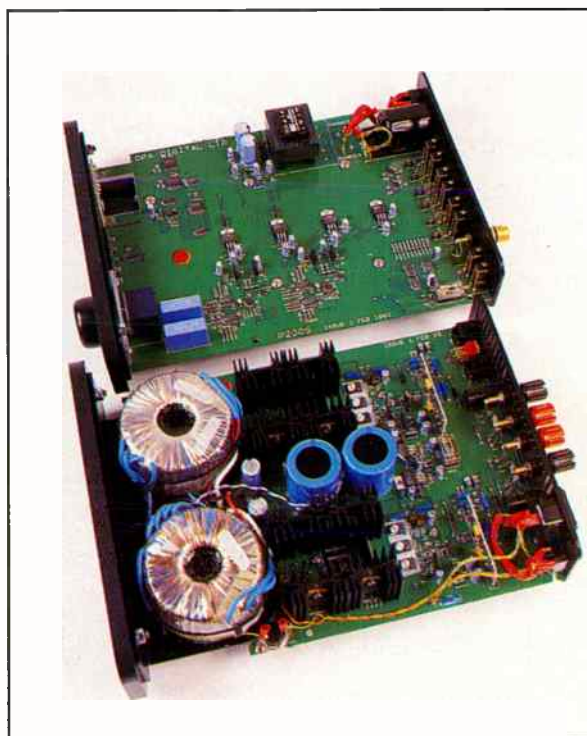
I started by using the 200S amplifiers in normal stereo mode and was instantly surprised by the strong and powerful bass performance they produced. Rob's previous amplifiers have always been on the brighter side of neutral, with a fast and detailed, but lightweight bass. The 200S power amplifier is certainly not bass-light: it puts power and conviction behind every bass note. It also had a slightly richer quality than the 50S, which sounded dry in comparison.

The DPA200S sounds notably

more powerful than it really is, due to the way it firmly grips the bass. Even on tracks which normally could sound bloated or overblown in the bass, the 200S managed to gain control and play a solid and rhythmic tune. On the Blue Aeroplanes' track 'Here it comes' the deep-bass guitar line that comes in after the first few bars is usually too strong for most systems to handle. The heavy drone muddles the rest of the presentation, making the track unlistenable. With the 200S gripping the cones, the drone was lessened and replaced with a full and powerful bass line. It wasn't perfect, but the DPA made a better attempt at controlling the situation than most others.

DPA believe r.f. noise lies behind the harsh sound from digital sources. I would tend to agree with them if it was careful attention at reducing this form of distortion that's the secret behind the sweetness and detail of the treble the 200S delivers. They are extremely smooth for transistor amplifiers, not quite so much so as the best valve amplifiers around, but certainly getting that way. The treble is delicately intricate where it should be, yet sharply focused and well projected with the smash of a cymbal, whilst remaining comfortable and enjoyable to listen to. I used a stripped down pair of Quad ESL63 electrostatics for the purpose of this review that are brutally revealing of any high frequency distortions. They go right up to 20kHz and will really hit you where it hurts with even quite mild doses of treble distortion. In this system, the DPAs performed seamlessly, bettering many amplifiers costing twice the price.

Another area where the Quads



◀ Both the pre and power amplifiers are beautifully made. Note the unique DH-OA32 hybrid op-amps standing proud at the rear of the power amp. ▶▶

Meet-Your-Maker

A reference guide on where to find Britain's manufacturers and what they make. (Some Distributors also listed).

ACOUSTIC ENERGY, 3a Alexandra Road, London W13 0NP. Tel. 081 840 6305.

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ALEMA UK LTD., 25 Montifore Road, Hove, BN3 1RD. Tel. 0273 202637.

Audion * Edison * Andersson * Audionote * Reference * JPW * Cogan Hall * Silver Sounds * Magnum Dynalab * Michell * Transfiguration * Wilson Benesch. (Trade enquiries welcome for our newly extended range).

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BANDOR, Studio II, Penfold Cottages, Penfold Lane, Holmer Green, Bucks. HP5 6XR. Tel. 0494 714058, Aluminium anodised cone drivers with only 1.8 gm moving mass giving full detail to sound covering 2/3 of the frequency spectrum.

CAMPAIGN AUDIO DESIGN, Llandudno Road, Cardiff CF3 8PG. Tel. 0222 779 401. Supplies / manufactures mailorder, high purity silver interconnects, loudspeaker cables, internal wires and bespoke mains cables. Generous two week trial period

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CONNECTIONS, 11 Archer Street, London W1V 7HG. Tel. 081 348 5676. Dealers in: Absolute, Audio note, Audioquest, Deltec, Harmonix, Kimber, Mandrake, MIT, Siltech, Symo, Van den Hul, WBT and others.

DPA DIGITAL, Unit 7, Willowbrook Technical Units, Crickhowell Road, St Mellons, Cardiff, CF3 0EF.

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EMF, 2a Bellevue Road, Friern, Barnet, N11 3ES. Tel. 081 361 6734. Manufacturer of Sequel 50w integrated amplifier and the Crystal D2A converter. Please write in for details.

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excel, is in the way they conjure up an image with the preciseness of a good pair of headphones. If something is wrong with the system in this area, the ESLs will be the first to let you know. The DPAs sailed through this test, always producing a faultless image that was precisely focused in front of me. On tracks such as The The's 'Good Moring Beautiful' it was possible to analyse the slightly crude panning of Matt Johnson's voice from speaker to speaker and follow it exactly.

Whilst I'm on the subject of vocals, the midrange performance of the 200S' is possibly one of the best you could ask for at this price level. Vocals were a little closed-in compared with the openness and projection of the 50S pre-amplifier, but against the competition the 200S is still one step ahead. The emotion of Suzanne Vegas voice, the expression and accurate tonal colour of the solo accompanying guitar were exceptional, and certainly in my opinion unrivalled by transistor amplifiers this side of the £2000 mark.

On the Simple Minds Live album recorded at Le Zenith, Paris in 1986, Jim Kerr's voice was given centre stage and it was even possible to detect the change in his voice as he

became tired towards the end of the performance. There are no studio effects to unveil on this recording and the true character of the human voice can be heard. The DPAs took advantage of this to show that they too could reveal the truth, giving a performance as real as could be expected within a domestic environment.

When I was satisfied about the performance of the DPAs in conventional stereo form, I decided to try monoblock operation, where the stereo channels are bridged. The second power amplifier had been quietly warming along side the first and was begging to be used. A quick flick of a switch and some re-wiring soon had them both up and running in 200w mode. Stereo separation improved, but not to the extent that I was expecting. In fact, the extra £750 was looking a little excessive for the relative benefits.

After further experimentation with dynamic moving coil loudspeakers I found the answer. Unless you have a particularly demanding, or insensitive pair of loudspeakers, bridged monoblock operation does not justify the extra cost. However, if the second amplifier is used to bi-amp the system and bridging is not used (i.e.

separate amps for the woofer and tweeter) the increase in control is worth every penny. With a separate power amplifier for each drive unit the amplifier/loudspeaker interface is at its most efficient. The loudspeaker snaps into line and does exactly as it is told, making for a fast, cohesive and articulate sound.

The new 200S pre/power amps are well constructed, pleasant to use and above all are a uniquely fine sounding combination. The DSP200S pre-amplifier doesn't quite match the breathtaking ability to resolve every last wisp of detail that its predecessor the DSP50S had, but then again it is considerably cheaper. The 200S power amplifier is an audiophile bargain at £750 and will find many more friends than the older and colder sounding 50S. The DSP and DPA 200S are serious audiophile products at a very affordable price of £1250. They successfully make most rivals in this part of the market seem mediocre. Britain needed a properly designed hi-fi amplifier for this part of the market, rather than yet another collection of cheap silicon chips thrown into an expensive looking case. I'm glad to see such an innovative product back on the market ●

MEASURED PERFORMANCE

The new DPA200S power amplifier has twin toroidal mains transformers, giving it separate and totally independent power supplies. It produces 50watts per channel, whether one or both channels are driven to their limit. Power supply regulation was good, but not exceptional. In the past, Rob Watts' amps (Deltec) have doubled their power when load halved; now the increase in output is more modest, rising to 72watts into a four ohm load. There was some reduction, to 64watts, in output at high frequencies. This new stereo amp is compact in its dimensions, it delivers plenty of power for ordinary use and will handle difficult loads. However, it hasn't got headbanging power, so matching speakers should be of reasonable sensitivity (greater than 86dB) if high volumes are required.

Gain above 20kHz has been rolled off, to avoid amplifying unwanted supersonic signals from digital sources. This gives a -1dB point at 28kHz and should help ensure that unwanted spurious signals from CD higher up the band, at 88.2kHz for example, do not get amplified. They could then be passed on to the speaker and possibly intermodulate within the tweeter to form in-band difference tones that can be heard (this is a form of intermodulation distortion).

Although high frequency gain has been curtailed, which in my view is a good thing to do by the way, low frequency gain has been extended to

reach down to the lower limit of CD - just. In truth the -1dB point is 10Hz but there is useful output down to 4Hz. I have found in the past, when experimenting subjectively with the lower limit needed for Celestion SL6000 subwoofers, that around 10Hz was the best compromise. Believe it or not, it is possible to perceive lower frequencies I found, but they tend to slow the sound down disproportionately and, if LP is being used, result in a lot of cone flap. But ordinary box loudspeakers don't effectively go much below 20Hz (-12dB), so a 10Hz lower limit is all that is needed, even from CDs with extended low end output (which many have, our spectrum analyses show).

There was very little noise; it measured -100dB. Channel separation was satisfactory at 70dB and d.c. output offset negligible. Sensitivity was high, since 250mV for full output is enough to match even low output cassette decks and tuners, which at worst provide around 300mV.

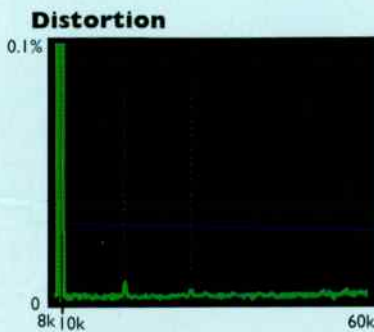
Distortion was low right across the audio band, at all power levels. Rob Watts has always used feedback, his view being that it possesses no drawbacks when applied properly. The 200S produces 0.003% distortion in the midband and 0.007% at high frequencies, our analysis of the latter showing it comprises mainly an innocuous sounding second harmonic component.

DPA Digital's new DSP200S pre-amplifier and DPA200S power amplifier

measure very well, as I have come to expect from a company using original design ideas, specialised miniature surface-mount components and their own dedicated integrated circuits. This is a highly individualistic amplifier, but not one for which I have to make excuses. It measures extremely well. **NK**

AMPLIFIER

Power	50watts
CD/tuner/aux.	
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Separation	70dB
Noise	-100dB
Distortion	0.005%
Sensitivity	250mV
dc offset	0/0mV



A trace of second harmonic distortion (0.007%)

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Yet again, amongst the myriads of loudspeakers we review, Heybrook have managed to produce one so good that it stands out clearly as a beacon of goodness amongst all those around. The Quartet, a new-ish design I have been almost reluctant to review because of my continuing regard and recommendation of the Sextet, is one of the clearest, punchiest loudspeakers I've heard for a long time, yet it's also nicely balanced and, in spite of its liveliness, subtle too.

If that sounds good, hold on - there's more! The Quartet is unusually efficient, much more so than the norm. As a result, it's the first modern loudspeaker properly suited for use with valve amplifiers, or low power, high quality solid state amplifiers. After measuring an indecently loud sound output from just one watt of input power, I had to be certain that there wasn't something funny going on.

Special Treatment

I used the Quartets with one of Britain's (and the world's) most esoteric and fabulous valve amplifiers - the single ended, 845 equipped Yoshinos from Tim de Paravicini. They deliver just 20watts flat out, yet with the Quartets at one end of the lounge and myself sitting 4metres away with a measuring microphone (B&K2230) the meter was showing massive 110dB peaks - all my ears could take. An oscilloscope demonstrated, however, that full output from the amps was only just being reached on these peaks.

So to all you Q&A writers who have been piteously asking us to recommend a loudspeaker for the Quad IIs and such like, being unearthed and dusted down all over Britain it seems, here it is. Power wise, a Quad II is poor competition to a torch bulb, yet it'll sing nicely through the Quartets.

Costing £555 in black or £575 for walnut, the Quartets are a twin-driver loudspeaker, with the common enough arrangement of bass/midrange unit crossing over to a tweeter carrying the higher frequencies. It's obvious from gently prodding the cone of the bass/mid unit that it is light, feeling almost flimsy as it deforms under gentle finger pressure.

The cabinet is a reflex design, with two rear firing ports. This feature, and the sound, militate against wall placement. Ideally, a gap of at least one foot should exist between the Quartets and a rear wall. On stands (Heybrook offer matching ones for £225 or £235 in walnut), this position gives what I would judge to be quite prominent bass. However, since I tend to go for light-ish bass, I think most people would find the balance to their liking.

Bass? Let's talk about the bass, because this is one of the less impressive areas of performance. It is large and a little tubby; I could almost feel the box expanding and contracting in sympathy with the drive unit. In spite of the measured performance, there was no lack of deep bass, if not that of a subsonic, ground shaking



The Sense of Sensitivity

In the Quartet, Heybrook have produced a loudspeaker of very high sensitivity.

Noel Keywood finds the sense behind this approach.

variety. However, small-ish boxes the size of the Quartet never go really low, so here the speaker is little different from others like it.

I found the Quartet always satisfactory, never annoying in this department. It plays bass quite vigorously by getting some weight behind low notes, but there was a

reluctance to really play fundamentals; there was a fair degree of boom...boom, without much differentiation of pitch. In other words, the box was quite resonant, smothering pitch change with its own version of events. As small speakers with bottom end power go, the Quartet wasn't too bad I felt. It is a little under-

damped in order to give the impression of bass power, my main objection to this compromise being the way it anchors bass to the spot, as it were, divorcing it from the rest of the performance. Tina Turner's 'Break Every Rule' was coped with eagerly, but not to great effect. Better than many over-damped speakers that completely fail to put power behind the striding fundamentals of this bass-led track, the Quartet nevertheless failed to meld overtones and fundamentals together to come up with a cohesive performance.

Few speakers do though, compromised these days mainly by their limited size. Generously sized cabinets and bass drivers put real power and pace behind this track; it springs off the blocks and never lets up, holding together impressively, but then you need big cabinets and big drivers optimally matched by computer and fine tuned by ear to get this sort of thing.

Energy

Enthusiastic bass gives weight to music, a property most people appreciate I believe. The Quartet has this. What it also has in abundance is superb resolution of dynamic contrasts. Here's a speaker that is lively and fast, one that can go with a performance, letting crescendos build without hindrance, yet sinking back to portray fine nuances with a delicacy that was delightful. The gentle, whispering introduction to 'Primo on the Parapet', from The Noise, had Peter Hammill sounding crisp and clear, his unsettling lyrics and carefully timed musicianship being conveyed with easy fluidity. Yet when the pace and the intensity begins to build, as Hammill likes to have it, the Quartets impose no restraint. They allow the full force of the performance to come across.

There is some slight loss of information from the upper mid-range, as the bass/midrange unit struggles to meet the tweeter. This allows the tweeter to sound a little divorced at times, but it has a pleasant enough nature, free from the sins of the metal dome, a detestable breed. Doped fabric tweeters generally give a good account of themselves, that in the Quartet seeming in good balance and quite detailed in its delivery.

I found stereo imaging to be fair, but not exceptional. Image sharpness was most compromised; the Quartet is inferior to the Sextet in this area. There was some general loss of focus and positional certainty.

The Quartet, like the Sextet, seems unusually amplifier sensitive. Possibly it is even more sensitive than the Sextet and, again, I got a bit of a rude shock in this area. Luckily for Heybrook, I happened to have an EAR834, our own Mullard 5.20 and, best of all, Yoshino passing through my hands whilst the Quartets were in use. With these valve amplifiers the Quartets absolutely sang, sounding superb. Many times I felt that they were more revealing than the Sextets, yet I found they can respond differently to partnering equipment.

For example, the Sextets and our own three-way speakers sounded fine with an

"The Quartet is one of the clearest, punchiest loudspeakers I've heard for a long time"

MEASURED PERFORMANCE

I assumed the Quartet was a chopped down version of the Sextet I am so fond of, but it isn't. The Sextet uses a ribbon tweeter, the Quartet a conventional dome tweeter. The ribbon has a lighter diaphragm than a dome, meaning it better reacts to small, fast high frequency signals, an ability that is apparent in its crystalline clear and highly detailed sound.

Perhaps aware that the ribbon of the Sextet damns modern metal domes by exposing their one-note ringing, the Quartet uses a fabric dome tweeter. These used to be more popular, until someone managed to convince the industry that metal dome tweeters were sonically acceptable, and I suspect, had an aura of attraction to buyers. A fabric dome measures just as well all the same. In the Quartet the dome tweeter takes over high up, at 5kHz, producing a characteristic dip at this frequency. Output falls off above 16kHz, never a bad thing with CD in my experience. There is a mild peaking effect around 12kHz, but the impact of this upon treble quality is best judged by listening.

The bass mid-range unit is strong in its output across the mid-band, which is likely to aid the forward projection of images - vocalists in particular. Low frequencies extend down to 80Hz (-6dB) before falling away. It's a higher value than that of some competitive reflexes, but a bass peak suggests that the unit is under-damped, in order to give a good impression of bass. The Quartet is best used close, but not against a rear wall, to bring up lower bass.

Like so many twin-driver, bass reflex enclosures the Quartet has a mid-range hump in its impedance plot, but it is gentle and there is little fall in value at high frequencies due to the crossover. Twin humps below 200Hz are characteristic of reflex loading, but the minima around them are approximately 6ohms, which is high enough over a narrow band not to be too taxing. Impedance measured 10ohms overall, a high figure typical of conservatively designed British loudspeakers.

The surprise here is that even with this high impedance figure, which in most cases prevents a speaker accepting power and reduces its sensitivity, the Quartet is enormously sensitive. If this sounds like a

Audiolab 8000 pre-amp and monoblock power amplifiers. They both sounded even better when driven by Yoshino, providing high volume wasn't expected. Yet the Quartets sounded unhappy with the Audiolab amplifiers, they flew with Yoshino and the other valve amplifiers, apparently better able to reveal their strengths. This is an awkward complication of course, one that raises many questions. The whys and wherefores could consume a lot of paper. Better perhaps for me to say simply that the Quartets are a fine loudspeaker, fast and lively and relatively accurate. They are very exciting and also very revealing, but watch out for amplifier matching. Valve amplifier owners will delight in their sensitivity and the way they bring out the best in the breed ●

contradiction, it isn't, so much as part of the inter-related difficulties of loudspeakers and their matching to amplifiers. The means by which a loudspeaker can have high impedance and high sensitivity is through efficient conversion of electrical to acoustical energy. Currently, it is a rare property, but I suspect it might come back into vogue, as people discover a host of benefits.

In this area the Quartet achieves something special by current standards. Producing no less than 89dB sound pressure level for one nominal watt (2.84V) of input, it goes 3dB louder than other speakers at any particular volume control setting. That's quite a lot louder - and no extra stress is placed on the partnering amplifier. So the Quartet is a very easy load and it goes loud readily. It's an obvious contender for use with valve amps., as well as solid state designs.

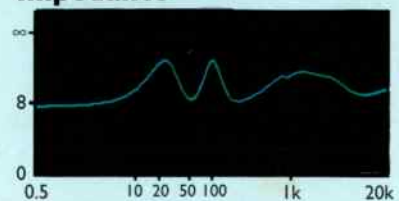
The Quartet is well engineered in all areas and it is especially sensitive, meaning it can be used with high quality, low power amplifiers. **NK**

Frequency Response



Treble falls off above 16kHz which should bring a smooth sound to CD.

Impedance



High overall impedance means that the Quartets will not demand excessive amplifier current.

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Record players

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

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Loudspeakers

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

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Leading Light

Noel Keywood listens to Tim de Paravicini's single-ended alternative to push-pull, the £25,000 Yoshino valve amplifier.

Yoshino is a fabulous experience. Don't view this amplifier as a commercial product; a £25,000 price tag discourages that. Yoshino has been created to show what a particular, esoteric approach to hi-fi has to offer when taken to its ultimate. It also tilts at the current lone occupancy of top spot in this field of Hiroyasu Kondo, founder of Audio Note in Japan and creator of the famed Ongaku valve amplifier.

I've heard Ongaku and walked away in disbelief; Yoshino showed me I wasn't confused or mislead about what I heard. It's Tim de Paravicini's demonstration of his mastery in valve design, a mastery not readily challenged worldwide. Yoshino is Britain's answer to Japan's Ongaku. Since Tim used to live in Japan, where he designed valve amplifiers for Lux, perhaps this isn't so curious a situation; Yoshino is his wife's name.

Simplicity

This amplifier embodies a concept that is difficult to appreciate: it is an indulgence in fearsomely difficult audio engineering to produce an amplifier of ultimate simplicity. It is a complete antithesis - deliberately so - of the modern solid state amplifier. It's even visibly simple: that single giant valve does nearly all of the work; a few underlings scattered around it help out, providing some pre-amplification and final drive.

Contrast this with transistor amps, which must be complex to work well. They employ galaxies of tiny transistors and myriads of solid state diodic junctions to get amplification, around which heavy correction signals must be applied to make the sound acceptable.

With Yoshino, what you see is what you listen to - it's as simple as



that. And what you see is one giant 845 valve whose bright emitter heater glows as strongly as a light bulb.

That's the heart of the amplifier, out on display in full glory, complete with black cross-shaped carbon anode capable of dissipating 100watts of power, fine filament grid and long, spring-tensioned heaters.

That long, clear glass bulb gives a wonderful view of the 845's internal anatomy, a feature of valves that seems to possess some mysteriously elemental appeal to people. I bundle this in with our apparent need to satisfy certain sensual demands: you can believe what you see; the hidden can quickly arouse suspicion and mistrust. Sight and touch are senses that must be pandered too; they can't

be denied. The reassuring sight of that 845 I've noticed, appeals to everyone. It isn't just that it looks attractive in its own right, like a Conran house lamp for example, but that it reveals and explains the mystery of electronic amplification, bringing tangible appeal to the process.

The 845 runs bright and very hot; it's a hard working, high power version of the famed 211 triode, developed by General Electric of the U.S.A. in 1919. It's a fearsome beast, this one: waves of heat, a blisteringly hot glass bulb, a giant four pin valve base of Victorian design and - most

dangerously of all - an anode tension requirement of no less than 1,000volts. They all help to make the 845 a dangerous brute, one happily ignored in favour of more amenable replacements.

But Yoshino's 845 is there out of necessity, not because of some masochistic desire by Tim to use one of the most frightening themionic emitters ever produced. No, Yoshino seeks to explore the potential of the simplest and most basic amplifying schemes we know: single-ended working. This is the core design rationale of Yoshino, the essence of its being. The 845 does a good job in drawing attention to the amplifier, but it is the way in which it does its job

invented: push-pull working. And boy, the persons who perfected push-pull must have been pretty excited about the benefits of their idea. Push-pull is so good at overcoming the problems of single-ended, that it has reigned ever since. Every valve and transistor amplifier, almost without exception, uses push-pull, where one device pushes current whilst the other pulls it, meaning there are always two output devices acting in unison. Wherever there's an amplifier, in a radio large or small, in a Walkman, in a hi-fi amplifier and in numerous other applications, push-pull lurks. Electronically, it's a push-pull world. Single-ended? - madness!

So what is it that has induced Tim de Paravicini to take on the impossi-

audio signal into push-pull working. So there's no phase splitter, no imbalance errors and no likelihood of these errors affecting sound quality. In this amplifier the paraphernalia of push-pull has been totally expunged. That's what single-ended is all about: deep simplicity in the basic amplifying circuit.

What it brings to sound quality is fascinating and, for me, staggering. Yoshino reveals atmosphere and detail like no other amplifier and, returning to a highly regarded solid-state unit, I realise it also strips away the muddle, hardness and apparent distortions of the transistor. Contributor Richard Kelly described this amplifier as having a "walk-in sound", a full, enveloping presentation that not only fully reveals recorded ambiances - or the lack of them - but highlights by full reconstruction the natural acoustics that may exist within

"Yoshino seeks to explore the potential of the simplest and most basic amplifying scheme we know: single-ended working."



that is really important. I've heard 211s and a lot of other valves in various circuit arrangements; the lure of Yoshino to me wasn't its 845, but what Ongaku had suggested circuit purity and simplicity could bring to sound reproduction. For there are precious few single-ended amplifiers in this world, fewer still with significant power output.

Put simply, single-ended working uses just one valve to drive the loudspeaker, via a transformer. Simple it may be, but it turns out to be surprisingly difficult and impractical too for power outputs much above a few watts. Long, long ago, by whom I don't know, an obviously superior alternative way of doing things was

ble problems and awesome limitations of single-ended working, an archaic and now

moribund way of building an amplifier? What can single-ended bring to hi-fi reproduction - if anything at all?

Only the most elemental circuit simplicity. It brings nothing to measured performance, nothing to cost and nothing to practicality. To make the 845 deliver just 20watts of audio power, each monoblock must use four massive transformers. An all-welded, heavy-duty steel chassis holds them, giving an all-up weight of around 32kgs (70lbs or 5stones). That's the weight of a lot of steel, packed tightly onto a chassis 345mm square, from which a diagonal has been removed.

Less obvious are the benefits: Yoshino uses just four amplifying devices and it doesn't manipulate the

recordings. Take, for example, the differences between two recordings that are impressive in their own right: 'Billy Austin' from Steve Earl's The Hard Way album, and 'Sugar Mama' from John Lee Hooker's Boom, Boom album. Apart from being superb songs and performances, here you've got solo close-mic'd vocals, for effect, with minimal backing. The quality of each is dramatic, but it's obvious with Yoshino that Steve Earl has a good microphone and a studio acoustic behind him, with the guitar miked up separately to give vivid, cutting chords. All the components of this recording were beautifully identified, put into place, and given full revelation.

Similar but not the same, Sugar Mama has Hooker in a bar-room, or what passes for one. The enveloping atmosphere seems tangible; here's a room that Yoshino will reconstruct, here's the "walk-in" sound. It's totally captivating, so much so that observations about tonal balance, bass quality and such like seem largely irrelevant. Sitting in a bar room listening to John Lee Hooker isn't going to have anyone questioning the sound of his strings, for example, and whether

"Yoshino reveals atmosphere and detail like no other amplifier"

they're too sharp on the ear. But it is only as an amplifier approaches this degree of naturalness, with its deeply involving sense of reality, that such questions become superfluous.

Revealing

When I first listened to Yoshino however, other facets of its character struck me most strongly. Playing LP I noticed that disc surface noise was more strongly conveyed and transient 'ticks' seared out of the speakers with the strength and incision you'd expect from a box of Semtex Rice Krispies. This is Yoshino I was later to learn: brutally revealing. However, I had to wonder whether, by some mechanism push-pull manages to suppress or partially cancel these out-of-phase components within a music signal, since one of the apparent benefits of push-pull is cancellation of what are known as common-mode signals.

The phase splitter of a push-pull amp should retain phase relationships - at least, that's the opinion of one or two people I have questioned about this to date. But I can't help remaining

suspicious all the same. Single-ended working, as used in Yoshino seems able to reveal so much more than push-pull - or was it just because fewer amplifying devices are used?

This type of revelation wasn't off putting; I didn't find that LP became unusable for example. It was part of the amplifiers general aura - it had a level of insight and an ability to reveal that is unmatched by solid-state and valve amplifiers alike. It also has a dark inter-transient silence, free from grain and hash. Oh how painfully obvious this was when I swapped back to a highly regarded solid-state amplifier with the Heybrook Quartets; what a din, what a one-dimensional racket. And the distortion I hadn't noticed before. Ugh!

Yoshino stayed long enough to convince me that nothing better exists. Now it's off to New York, leaving me to contemplate re-adjustment back to life and listening in a push-pull world. It's a fabulous amplifier, gorgeously involving, comfortable to listen to, revealing and natural. Yet again, it seems that the

unquestioned complexities of modern amplifiers are more illusory than real. Yoshino is hugely expensive and esoteric beyond belief, or common sense perhaps, but as a demonstrator of what could be, it does a dramatic job ●

Ongaku and now Yoshino have done their job: I must have a single-ended amplifier! So should you. There's only one answer to this - Hi-Fi World will just have to find a way to make one available that is practically and financially acceptable. A single-ended valve amplifier, in kit form, is being planned!

We have a strategy that we believe will be successful in achieving this aim. Exactly what it is we hope to be able to reveal soon, hopefully in a future DIY Supplement, free with every other issue of Hi-Fi World. Well, how else can I get decent amplifier? NK

MEASURED PERFORMANCE

The measured performance of Yoshino strongly underlines the reason why any engineer would think twice before commercialising such a beast. Each monoblock is enormous, a Stonehenge of transformers, illuminated by the imposing glow of a monolithic 845 valve, yet for all this, power output measured just 20watts. And at this output, set by visible waveform clipping on an oscilloscope, distortion was rising fast through 4%. It's a performance easily bettered by most valve amplifiers, let alone solid state designs, making the technology seem crude and open to question.

The only mitigating factor - and not an unimportant one - is the fact that up to around 12watts or so, most of the distortion is second harmonic in nature. This type of distortion is totally benign; only in large quantities (above 3% or so) can it be detected as changing the timbral quality of music, lightening it slightly. Second harmonic distortion doesn't sound harsh or gritty, or at all unpleasant. Nor does it add to or enhance music in any way, as some sceptics believe.

Although Yoshino demonstrates to me just how superb valve amplifiers can sound, I'm not one to believe that there is any magic way in which such an amplifier can avoid the subjective consequences of non-linear distortions. Ultimately, pushed above 20watts it will simply cease to deliver a clean sound; obvious muddle sets in. It must be operated within its limits and I'm sure anyone that could and would want to buy it (like me!) would be

able to make sure it did so. With a sensitive speaker of around 90dB (that is, 90dB sound pressure level from 2.8V, or one nominal watt of input), this isn't much of a limitation. With the Heybrook Quartets I used, average music level was around a few watts, impinging around 1% second harmonic distortion onto the music. That's acceptable I feel. Perhaps - just perhaps - the darker, warmer sound of this amplifier is in part due to distortions; it's difficult to be certain.

Tim told me it is very difficult to make output transformers for an amplifier like this reach 20kHz, a point reinforced by the fact that Yoshino just made it to this upper threshold, measuring -1.3dB to be precise. Above 20kHz, output fell away smoothly, except for a small blip at 50kHz. Again, it's a satisfactory performance, and the transformers produced no more distortion at high frequencies than in the midband - unusual for a valve amplifier.

As if all this wasn't enough, sensitivity was low at 0.9V input for 20watts output, meaning pre-amplification is needed; a passive pre-amplifier cannot be used. Hiss was very low, but the bright emitter heaters unavoidably inject a little hum, which measured -77dB. In use it was barely audible.

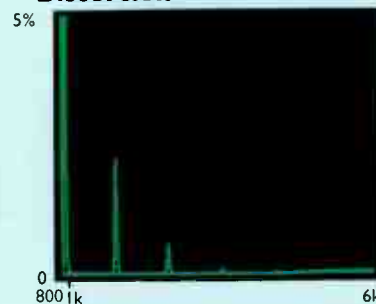
The measured performance of Yoshino shows why its design and construction is an act of belief, not cold logic. All the same, in all the standard parameters used to assess an amplifier, ones that don't convincingly exceed demonstrating basic functionality, Yoshino still manages to keep just within

acceptable bounds. With 1,000volts flowing beneath architectural quantities of laminated steel, to produce just 20watts of power, it's not difficult to see why the transistor was invented. All the same, the sound of Yoshino shows why it shouldn't have been. **NK**

TEST RESULTS

Power	20watts	
Frequency response	12Hz-18.5kHz	
Noise		
hiss	-100dB	
hum	-77dB	
Distortion (20W)	1k	10k
1W	0.8	0.8%
20W	3.5%	4%
Sensitivity	0.9V	

Distortion



Second harmonic distortion of 2% at 12 watts output.



The Pye Mozart is an early example of a single-ended design.

SINGLE-ENDED -

It Makes No Sense At All!

Just two amplifiers in the world use single-ended working for real hi-fi:

Ongaku and Yoshino. Both cost more than £20,000.

What is single-ended working? Noel Keywood explains.

Single-ended and push-pull working are graphic terms coined in the early days of radio. They describe basic amplifier output stage arrangements. First came single ended operation, but it was fast replaced by push-pull and, these days, nearly all amplifiers use the latter method of driving a loudspeaker, because it is by far the cleverest.

Single-ended working is simple and intuitively obvious; it's also full of limitations. As the diagram shows (see next page), one output device controls current through the load (loudspeaker). In practice, the system is inefficient, because half of the

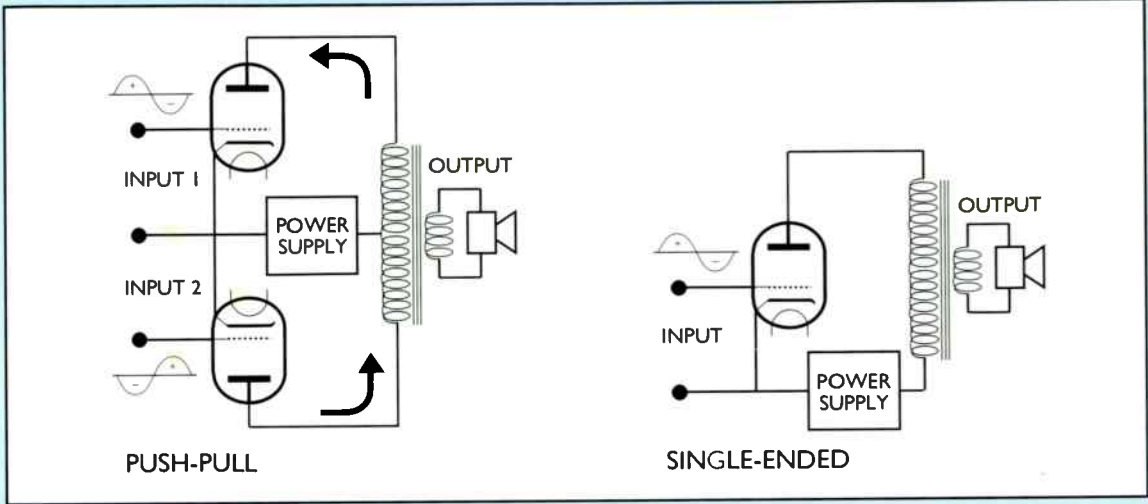
maximum current needed is drawn even when there is no signal. This makes the output device, transistor or valve, run hot and it is unacceptable for battery powered amplifiers. This is Class A bias; Class B is not possible with single-ended working.

Push-pull - strangely - seems to be a system that is blessed with apparent perfection. It possesses every advantage possible and few apparent theoretical disadvantages. So its effectiveness has never been questioned; it is the de facto way of doing things nowadays. With push-pull, as the title suggests, one device pushes current through the load whilst the

other pulls it. If both push and pull at the same time, through the negative and positive half cycles, then again we have Class A working. However, under this condition distortion cancels out and drive ability (50% efficiency) becomes much greater than for single-ended working (35% efficiency). So Class A with a push-pull amplifier gives more power than Class A from a single ended amplifier, and it gives less distortion as well.

A further benefit of push-pull lies in the fact that working conditions can be adjusted to achieve greater efficiencies and power outputs by making one device of the pair push

HOW SINGLE-ENDED AND PUSH-PULL WORK



The purpose of an amplifier's output device, in this case a power valve, is to turn the d.c. provided by the power supply into an exact replica of the amplified music signal applied to the control grid input. The device acts as a tap; a small force acts upon a large electricity flow, controlling it so that the large flow mimics the small one in variation, whilst possessing more power.

The large flow passes through the loudspeaker, which turns its variations into sound. With single-ended working, one output device (or a pair, or more) regulates the flow through the loudspeaker. With push-pull, two devices push and pull the current together. If, say, both can push strongly, but neither can pull so well, because one of the pair is always

pushing their performances will balance. In this situation, with single-ended you would get a strong push, but a weak pull, giving an unbalanced performance and distortion. Push-pull circuits must receive two inputs from a phase splitter, giving exactly contrary instructions: push to one valve, pull to the other. Single-ended doesn't need this complication.

on negative half cycles whilst the other rests. On positive half cycles, their roles are reversed; the negative pusher takes a break. This is very efficient, the devices run cool yet oodles of power can be delivered. This is known as Class B working. Trouble is, where one hands over its work load to the other, at zero crossing, there's invariably a slight mismatch, the result being crossover distortion, which has a very nasty sound.

For the purpose of this little piece however, which is to explain what single-ended means, Class B push-pull I'm going to ignore, even though - horror of horrors - it is sometimes used with valves just so that enormous power outputs can be obtained and quoted.

Push-Pull

So much for the generalities. Now let's look at why push-pull (Class A) is commonly used with valves, whilst single-ended Class A is confined to lower power outputs. All of the d.c. current supplying the valve in single-ended passes through the output transformer, magnetising it. To accept this, plus the signal current, the transformer core must be made large. As power output goes up, so does the core size, until at high powers - above 10watts or so - the transformer starts to become massive.

This drawback joins all the others to produce a formidable array of

reasons not to use single-ended working. Yoshino uses a massive 100watt dissipation 845 output valve feeding an enormous output transformer constructed from finest quality grain orientated silicon steel just to produce 20watts of output power. Even as nutty audiophilia goes - that's madness!

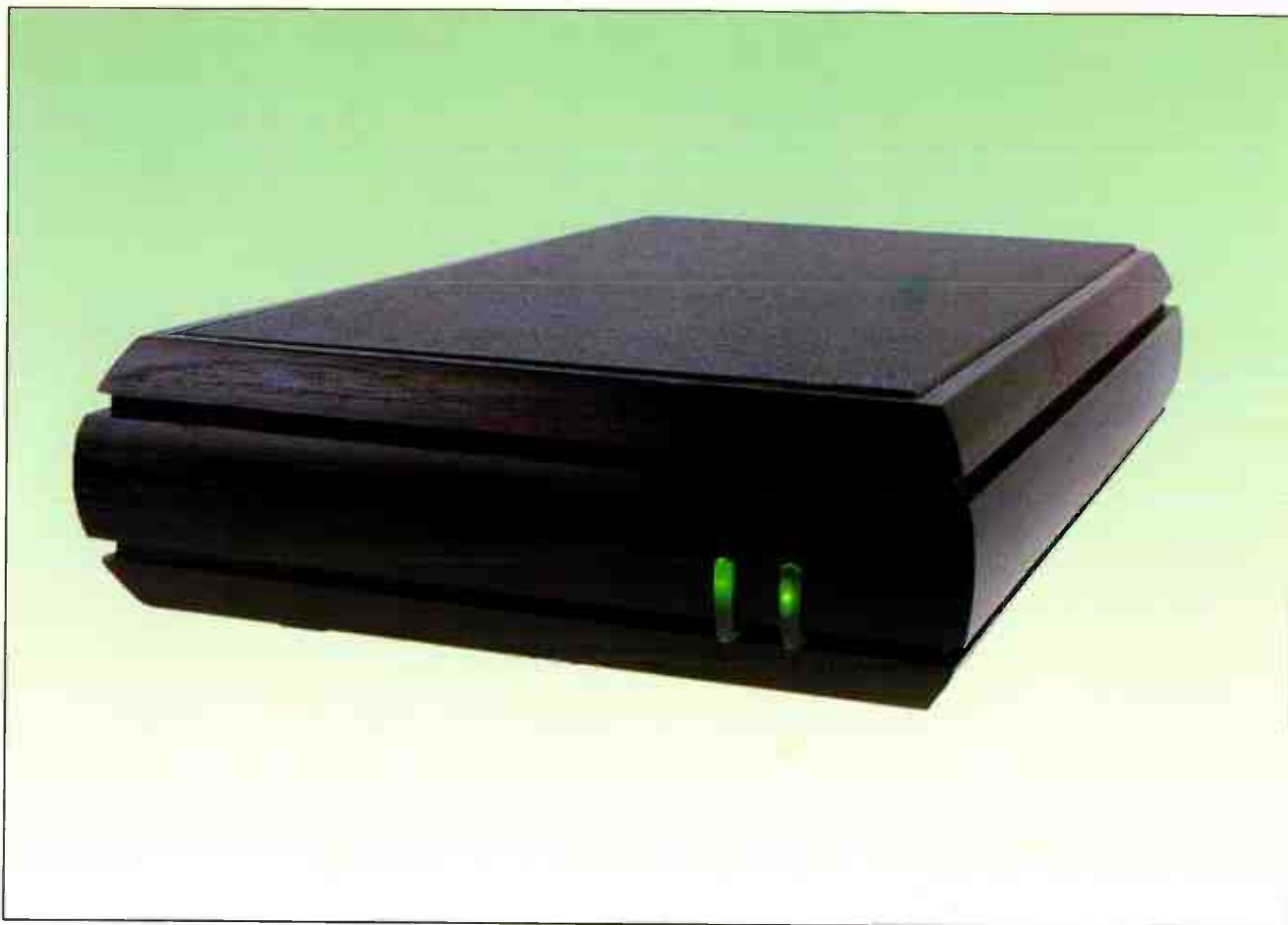
With push-pull, the magnetisation produced by the d.c. current to one valve cancels out the magnetisation caused by the current to the other, so the core doesn't have to be made to accept a huge magnetic flux. So push-pull working with valves results in a smaller output transformer, as well as more power and less distortion. It also cancels out power supply hum, so less power supply smoothing is needed, saving expense. Against this single-ended just makes no sense, which is why it is all but never considered.

But! There's always somebody on this populous planet of ours who's attracted to and has tried the impossible, like skiing down Everest for example. Enter Hiroyasu Kondo of Audionote in Japan. He believes totally in Zen like simplicity and has taken to building low power single-ended amplifiers, of which Ongaku is the best known. Since it costs around £35,000, this is hardly surprising. When the Ongaku turned up in my home, for just a few precious minutes, it seemed to be magic. Yoshino confirmed my suspicion: single-ended working is magical. But why?

At present no-one seems to know. Kondo quotes simplicity as the reason, Richard Brice thinks it may be to do with imbalance problems in the phase-splitter needed for push-pull and I have grave suspicions about the cancellation mechanism that exists in push-pull circuits: could it be cancelling some of the music?. In outline theory the answer seems to be No, but still I wonder about this possibility. Tim de Paravicini believes that at low signal levels, a single-ended amplifier is more linear electrically and magnetically than a push-pull design and that it is the low level performance that really matters, not performance at peak output.

Atmospheric

Whatever, the reasons for single-ended working sounding the way it does, deeply atmospheric, super smooth and so completely liquid and natural that it doesn't seem for one moment that electronic amplification could be at work, remains open to speculation. Single-ended working is, however, the ultimate in circuit simplicity, even if the practical problems in applying it are a little awesome. And single-ended working can be used with transistors, by the way. Tim de Paravicini has, of course, constructed a transistor Yoshino just to make the point. It may be the only serious solid state single-ended amplifier in the world. Perhaps soon, it will be joined by others ●



Out of the Ordinal

Pink Triangle's second digital product, the Ordinal, uses Philips'

DAC-7 chip rather than their own discrete 1-bit DAC.

Noel Keywood finds this convertor out of the ordinary.

Ordinal follows Pink Triangle's Da Capo Compact Disc digital convertor in being a highly individual product, crafted by a turntable manufacturer used to designing product in-house and not averse to the notion of tweaking. So Ordinal isn't the usual conglomeration of chips, served up in a metal box. It comes with its own tweakiness built-in, it is upgradeable and best of all, it has the sort of superb performance that is the prerogative of knowledgeable in-house design.

Priced at £695, Ordinal is less expensive than Da Capo and it lacks Pink's own unique one-bit convertor. Philips' high quality DAC-7 chip is used instead, fed from a Philips SAA-7350 which generates the one-bit code. Well implemented, this gives

Ordinal a superb measured performance I found, plus fine sound quality. But how it sounds can be changed - this is the tweaky bit. "Many people like to have some influence over the products they use and since we couldn't easily decide which sound we should offer, fitting an exchangeable digital filter seemed like a good idea. It also means that the convertor isn't made obsolete by the arrival of a new and more advanced filter chip. With Philips due to introduce the SAA-1307 filter we were aware that Ordinal should be able to accommodate it" Arthur Khoubessarian of Pink Triangle told me. Ordinal is an upgradeable convertor and although changing a digital filter sounds daunting, in this case it comes packaged in a metal can that plugged

into the main circuit board. So in practice this turns out to be a simple task.

The difficulty facing Pink Triangle over filter choice was an apparent contradiction between specification and sound. An eighteen-bit Yamaha filter gave a sound they, as turntable addicts, preferred. A better specified twenty-bit Burr Brown filter should, according to the specs, have given a better performance, but in practice it didn't they felt. "Investigating this, we found their internal architectures were different" Arthur told me. "The Yamaha chip generated a thirty-two bit word internally, which it truncated to eighteen-bit. The Burr Brown produced a twenty-four bit word internally, truncating it to twenty-bit. So we felt that our ears had been

right; we'd preferred the sound with the best resolution. But we did find later that some people do prefer the twenty-bit filter and that it does sound better with certain discs, so it's available as an option".

Ordinal measures 350mms deep, 225mm wide and 80mm high, being decorated by their characteristic curved wooden side cheeks. A metal top cover lifts off to reveal a neat and densely packed circuit board on which hoards of miniature surface-mount components reside. It is very well built, but the finish is a sombre black. Two translucent push-buttons control power and provide standby mode. A lock light is also fitted. Our sample had a BNC digital input socket; if a phono socket is required an adaptor must be used. An optical input can be specified as an option.

I connected Ordinal to a Philips CDM-9 transport mechanism, courtesy of Sugden, and ran it through a special Tim de Paravicini designed 300B valve amplifier planned as a DIY feature for our August issue Supplement. Hung on the end were our own three-way loudspeakers and Heybrook Sextets. An Audiolab 8000C pre-amplifier and 8000M monoblock power amplifiers were also used to represent good solid state amplification.

Contrasting

After a spell with Sugden's pin-sharp and well defined SDT-1 CD player, the Ordinal with its eighteen-bit Yamaha filter came as a complete contrast. I guessed from a few moments listening that some of the gentleness of its treble came from a rolled off high frequency output, something measurement confirmed. Equally apparent within a short period of listening was an unusually strong ability to reveal and resolve instrumental textures and, through this, the skill of certain artists. Yet again, the fine recording quality and musicianship displayed on John Lee Hooker's recent Boom Boom album provided me with a sufficiently pure musical source to assess some of the Ordinal's properties. Small details like the way guitar notes were drawn out, bent and modulated by Hooker struck me. I'd not noticed before just how much Hooker works his guitar when he plays; he's an old Blues master who understates his playing, but the richness of his skills are there, and they were finely revealed by Ordinal. With other convertors I've been more aware of the overall picture than the expertise that embellishes his delivery. Tortuous note bending and modulation, his wheezing, muttered comments from his backing musicians; they all became

apparent from Ordinal. Why hadn't I heard this before, I wondered? Yet at the same time, with the eighteen-bit filter this convertor has a soft and gentle delivery: it's a presentational balance that usually makes detail less apparent, rather than more so.

Hearing reverberations and echoes

"Ordinal displayed a lack of harshness and a soft purity in its upper midband and treble regions that to date I haven't encountered from CD"

behind Hooker, becoming aware of their existence and decay, I noticed how dark the background seemed to be. Ordinal is an unusually clean sounding convertor; a veil of grain and hash seems to have been stripped away from CD reproduction. I don't mean 'clean' in the bright, shiny sense here, so much as softly pure. Pink Triangle have gone to great lengths to minimise RF noise and jitter; is this the reason for Ordinal's purity?

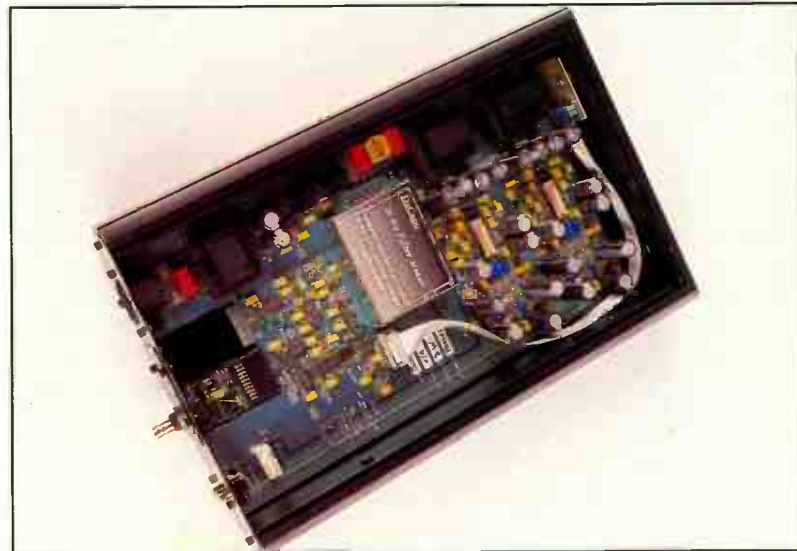
Perhaps as a direct result of Ordinal's gentle treble with the eighteen-bit filter, I found The Lemon Trees complex arrangements and harmonies a little less well differentiated and separated than the Sugden SDT-1 CD player would have it, but the Sugden has a treble lift, so it offers a sound diametrically opposed to that of the Ordinal. Generally though, I noticed that more dense instrumental arrangements seemed smoothed by this convertor, if not smothered. With Compact Disc this is not usually a problem, since as a medium it veers toward harshness and commonly

needs a restraining influence.

I turned to the twenty-bit filter to better clarify the Beatles like harmonies behind The Lemon Trees 'Love the Sun' (with delightfully similarities to 'Here Comes the Sun'). There was better apparent vocal resolution and a small but useful increase in treble clarity I felt. Down at low frequencies this filter added some weight and cohesion to bass transients too. Steve Earle's 'Copperhead Road' opened with rolling thunder from the drums. I've never heard this deliberately menacing intro crash and rumble so strongly, yet at the same time I was aware that the closely miked plucked steel strings had a purity and even a sweetness unresolved by other convertors.

Yet again, Ordinal displayed a lack of harshness and a soft purity in its upper midband and treble regions that to date I haven't encountered from CD. It also delivers powerful bass. Its fundamental strengths were retained by the twenty-bit filter - the sound isn't radically different. It gives more positively stated treble and bass, providing a bigger and faster sound, one I would have thought was a little less characterful and more in line with general expectations than that of the eighteen-bit unit. Partnering equipment may well affect final choice though; eighteen-bit could well suit solid-state systems. The 300B valve amplifier I used is ultra-smooth, even by valve standards, so it doesn't need a smoothed source.

Ordinal is a convertor so smooth and free from the hash and hardness of CD, at present it stands alone in my experience. It's a superbly designed product in every area, of far higher calibre than most convertors available. At present I can easily rate this as one of the best convertors available at any price ●



◀ Pink Triangle have opted to use surface mount devices in the Ordinal. Not only does this make for a neat layout, but signal paths and r.f. noise are reduced.

MEASURED PERFORMANCE

Ordinal comes with two filters: one eighteen-bit, one twenty-bit, and each has its own frequency response. The eighteen-bit module rolls down upper treble, as the response analysis shows, resulting in a soft, smooth sound. Yet in spite of the roll down, the upper limit is higher than usual for CD, measuring 21.2kHz. The extra extension is slight



The Ordinal comes with the option of 18 or 20 bit filters.

however, since the twenty-bit filter reaches 21kHz exactly, like most CD players. It rolls off more rapidly above that frequency though, hence its slightly lower bandwidth figure. I'm not suggesting that this will directly affect the sound; an extra 200Hz will make no difference at this frequency. The flatter characteristic up to 21kHz, shown in the analysis, will result in the twenty-bit filter giving a little more top end and a slightly brighter sound. It could also display other benefits, or perhaps drawbacks - only listening can tell.

Like Da Capo, Ordinal is very linear. Its distortion figures were amongst the lowest I have measured to date. At high levels, there was no distortion at all, only noise, but this sort of performance is not uncommon. At -30dB there was again little distortion, level measuring 0.006% from the eighteen-bit and twenty-bit filters.

Down at low levels this convertor remained more linear than most. For example, at -60dB it produced just 0.38% distortion. With a -90dB dithered test signal, distortion was so low as to be hidden by dither noise. I stripped this away using a technique known as synchronous time averaging, to reveal just 2% second harmonic distortion, as low a result as possible.

These low distortion figures were the main reason Ordinal returned one of the best dynamic range figures ever. At 110.5dB it even beats the best Japanese players and convertors, from giants like Sony for example. Pink Triangle join DPA Digital in producing ultra well engineered, low distortion convertors, replete with surface mount technology.

Channel separation was extraordinarily high at better than 110dB right across the audio band, but output was also extraordinarily high at 2.75volts, no less than +3dB higher than that of players delivering exactly 2volts, as set by Philips' standard.

I was surprised to measure a little more noise on the output than is occasionally the case from CD, but at -101dB this was low enough not to compromise performance.

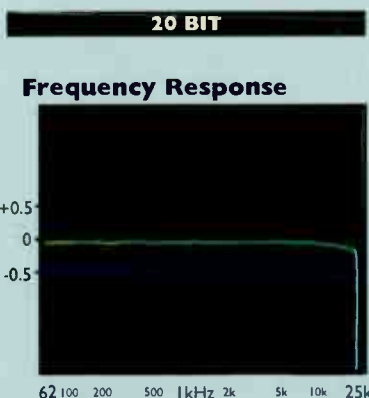
I wasn't surprised, in light of the superb measured results in other areas, that Ordinal produced absolutely no spurious output above 21kHz. It is a 'clean' output convertor, as it were.

Ordinal is a superb piece of digital engineering. There's no doubt that Pink

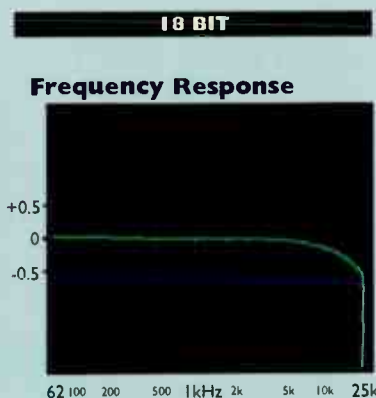
Triangle have got the CD art mastered. Too few British companies design so much themselves, with such good results. Around the world these days, most companies effectively stuff chips into boxes, copying the application note that comes supplied with the things. It is always refreshing to see original design work, especially when the results are as successful as this.

TEST RESULTS - 18 BIT

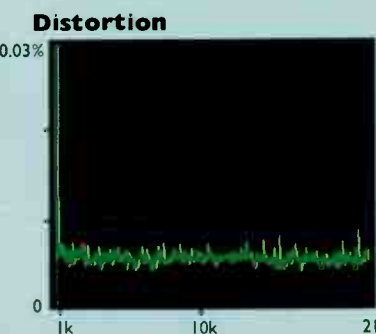
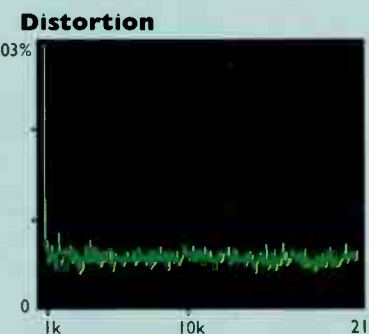
Frequency response	3Hz-21.2kHz	
Distortion %		
-6dB	0.004	0.004
-30dB	0.006	0.006
-60dB	0.38	0.38
-90 30	30	
-90dB dithered	2	2.2
Separation dB	left	right
1kHz	120	116
10kHz	113	112
Noise	-101dB	
with emphasis	-101dB	
Dynamic range	110.5dB	
Output	2.75V	



The 20 bit filter has a flatter response than the 18 bit.



The 18 bit filter rolls off early which with result in a softer sound that some may prefer.



Distortion figures for both the 18 and 20 bit filters are near identical. The 20 bit shows a small amount of 2nd harmonic distortion which in practice is innocuous.



Fighting Formats

Both Philips and Sony have produced new mediums to replace the Compact Cassette. Jonathan Jordan investigates their efforts to secure success.

"War. What war?" Sony and Philips are keen to play down any notion of a battle between them. In fact they are now clashing directly on and off the High Street with their proposed replacements for the Compact Cassette. Daggers are drawn and both have prepared for a bloody fight to ensure their product wins. No doubt both companies remember only too well when they clashed over the Betamax and Video 2000 video formats, only to lose to a technically poorer rival with more extensive software support.

Now that CD is firmly entrenched and cassette sales are in decline, Philips and Sony want to replace this newly-ailing format, with Digital Compact Cassette (DCC) and MiniDisc (MD) respectively. They aim to replace the conventional cassette in the home, the car and on the move, because the portable and mobile market for audio is the largest. In 1990, 88% of cassette player sales were units with mobility; this is also an area where CD has failed to penetrate heavily, research shows.

Both companies have identified this latent consumer need: CD quality sound on a recordable format,

coupled with added features that make access between tracks easier than that of cassette. They feel that the option of total portability is also required.

THE BACKGROUND

Philips own the Polygram record group, Sony likewise own several record companies including CBS, Epic and Columbia. Their market research suggests the portable market is in particular need of a new format to revitalise the slump in sales of the pre-recorded cassette.

Both DCC and MD claim a massive improvement in sound quality over the average conventional cassette and offer more gadgetry and search features. Needless to say, they are both going to cost more money, for the recorders and tapes, than the product they aim to replace. Pre-recorded titles in the new formats are available in major record retailers at around £13.49, much more than that of conventional cassettes and on a par with CD.

Record companies, however, are always keen to continually chirp 'sound quality does not come cheap!' Regardless of which format it is, they are doubtless pleased that a digital

format to replace cassette will enable them to raise their profit margins to that of CD.

FLEXIBILITY

Both Sony and Philips claim that the big selling point of these new mediums is their flexibility, as they can also be used for digital recording giving the option of high quality 'home recording'. This however, runs directly against the commercial interests and requirements of the record companies - including those they own, since it will encourage home taping. The fact that blank media cost considerably more than a conventional cassette is possibly due to pricing agreements reached with the record companies, partly to discourage the home taper - identified as someone looking to save money.

A blank ninety-minute Philips DCC tape currently costs around £5.50. It uses a slightly higher grade plastic in its shell construction than that of a conventional cassette and it has a protective metal tape guard, but the actual tape inside is very similar to chrome video cassette tape. Considering a chrome cassette costs around £2 for ninety-minutes (C90), the 275% price hike seems unjustifiable.

A blank, seventy-minute Sony MiniDisc costs around £9. It uses new magneto-optical technology on a small disc enclosed in a protective plastic case (or 'caddy') that resembles a small computer diskette. Manufacturing costs of MiniDiscs are a closely guarded secret but a Sony source who wished not to be named suggested that they were lower than those of a DCC.

It seems that both developers are loading the price of blanks quite openly, to avoid hostility from the record companies and to discourage home taping. This is anti-competitive. History suggests it will be bad news for the consumer.

In a nutshell, the new offerings will cost more for both their pre-recorded and blank software, offer reproduction that by the manufacturers own admission is not as good as CD, from entry level machines costing over £500. Why should someone want to buy one, especially with pennies tight in a recession? What are the unique selling points? Why bother to switch from cassette tape at all? These questions and many more are just a sample of those voiced in our reader's letters, so we asked Philips and Sony for their views and opinions on the matter.

PHILIPS

Philips are no strangers to innovation. Their ongoing research and development programs produced the Compact Cassette, then CD, but Philips have never had the chance to become complacent: the failure of Video 2000 and LaserVision taught them that a product does not only have to be technically good, but also wanted by the consumer.

Philips have joined forces with the Japanese Matsushita Corporation, owners of JVC, Technics and Panasonic, to launch DCC worldwide. The managing director of Philips, Wim Wielens, anticipates 1 million player sales by October 1993 and his counterpart at Technics thinks that he will sell half a million units throughout 1993.

Philips have cleverly made their DCC players able to play analogue cassettes, believing this 'backward' compatibility will make the transition from one format to the other painless. No previously purchased software is rendered useless and new titles and new blank tapes only have to be purchased as the need arises.

Philips have co-operated heavily with their subsidiary record company Polygram on the launch, and with other independent and supportive record companies. Four hundred pre-recorded titles, with many more to follow, are claimed to be readily available. Doubtless the failure of Video 2000 and Laservision were

partly due to the lack of available pre-recorded titles, so Philips see software support as crucial to the success of DCC.

The only recorders currently available are non-portable component and midi-units, but they plan to launch mobile units for in-car and personal use by August. This strategy is in keeping with both their launch of conventional cassette and CD, where the expensive home units came before less expensive mobile units. Backwards compatibility, Philips believe, will guarantee the success of the product. Philips are aware that it will not be a quick process, but one that will take several years.

SONY

Sony see MiniDisc as their answer to the perceived market need for a dual purpose, high quality recordable format that will suit the portable market. Sony have taken note of the decline in Compact Cassette sales and now believe that the consumer - particularly the young consumer - is crying out for a new, technologically

"the consumer - particularly the young consumer - is crying out for a new, technologically advanced, high quality medium"

advanced, high quality medium. Asked where they saw their main market, a spokeswoman for Sony (UK) cited portable music products and said that their product will appeal to "the Nintendo generation!"

Sony obviously feel that they can build on the vast success of the Walkman and are producing around 45,000 MD units a month for worldwide sale. Like Philips, they see the conventional cassette as old news, but feel that an improved cassette will not be good enough. They say that the stretching, wear and tearing characteristics of cassette will result in the consumer opting for their new product, which is free of such weaknesses.

Asked about MD's selling points, Sony replied: "It is . . . a disc, digital, recordable, shock resistant for ten seconds, portable, has quick random access and extensive industry backing". In their view, MD's future potential "is only as limited as the imagination. It's revolutionary - not

evolutionary".

Sony is confident that its format will succeed and they claim to have roughly 250 titles available, although not all of these could be purchased in any major High Street retailer. Like Philips, Sony Music own several record companies including Epic, Columbia and CBS, who are understandably backing Sony MiniDisc, but not the DCC format.

The portable range of playback only and playback/record machines are the only MD units available at present, but the launch of home 'console' units, in-car units and 'ghetto blaster' mobiles are set to follow in the next few months. Sony are only too keen to dismiss Philips DCC format, claiming it was a product for the 1980s, not the 1990s. Sony do not see their new format clashing with CD, as they feel that MD is for portables and CD for the home.

THE WAR

Sony want to succeed with their format and to this end they are making DCC seem as unattractive as possible by heavily marketing MD and trying to undermine DCC's success. The record companies under each respective banner refuse to produce titles on the other's format so the already modest spread of title choice is further reduced.

Although Sony claim that tape is a format that suffers from many faults and claim to have market research information to substantiate this claim, they still are producing and marketing DAT recorders and players. Their cheapest home unit with playback and recording options costs £400, which undercuts the cost of DCC players. Sony also aim to launch a new range of budget DAT machines later this year which will doubtlessly also affect DCC sales. But is this just a coincidence?

Such head-on competition is not just limited to Britain. In Japan Sony have produced a DAT personal stereo for around £300 that undercuts any proposed DCC unit in price, sound quality and physical size. Is this re-marketing of DAT a worthwhile venture or is it simply aimed at compromising DCC sales and sowing the seeds of confusion and doubt in buyers minds?

When asked about their views on tape, Sony stated that the long term future was with disc markets, but an immediate requirement for tape did exist. Sony said that their continuation with DAT was not aimed at the mass market, but at the audiophile. The phrase Sony kept slipping in was that "although the immediate recordable market may be tape based, the future is disc: MiniDisc". The company made millions with their cassette portable

The new Audiolab 8000T Tuner



The Audiolab product range:

8000A Integrated amplifier

8000C Pre-amplifier

8000P Stereo power amplifier

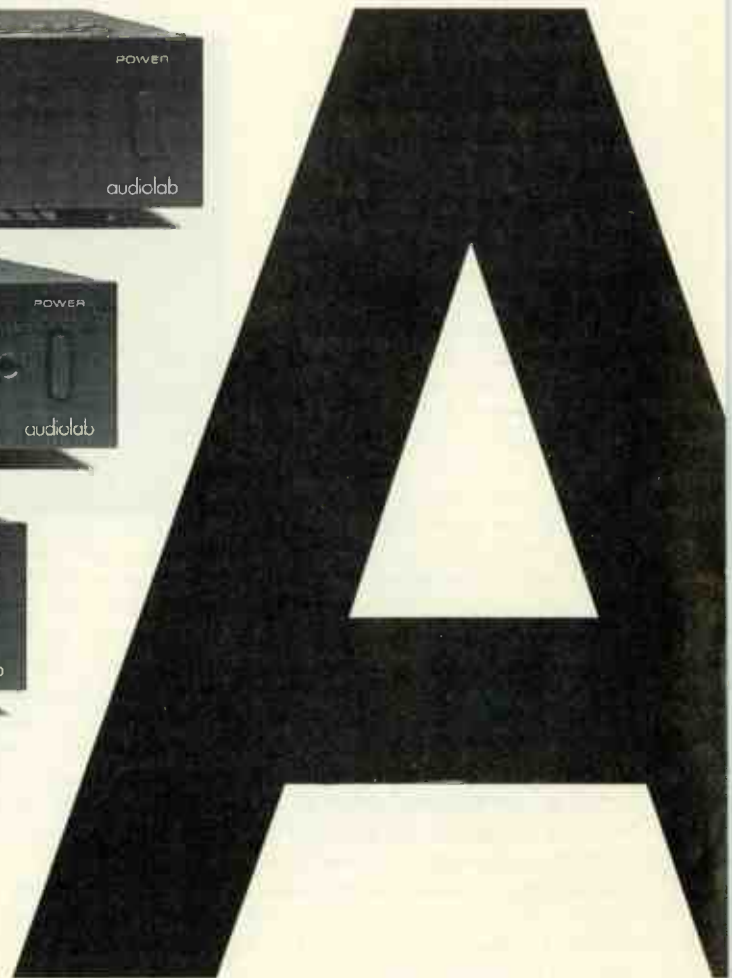
8000T FM/AM tuner

8000M Monobloc power amplifier

8000DAC digital-analogue convertor

Winner of '92 *What Hi-Fi?* award for "Best CD upgrade"

Winner of '92 *Audiophile* award for excellence



AUDIOLAB

Cambridge Systems Technology Limited 26 Roman Way Industrial Estate Godmanchester, Huntingdon Cambs PE18 8LN. Tel 0480 52521

range, the Walkman, and are not prepared to turn their back on tape just yet it seems. They claim that they are out-selling DCC formats, but is this echoed by the retailers?

Philips' reply to Sony's comment stressed their less aggressive stance. They term their product 'evolutionary', with no need to throw away old software. This, they believe, will ensure their new product's full success. They feel that DCC has the added features needed, including faster track access and durability. The backwards compatibility of DCC makes it a very easy transition, and the development and availability of an 18-bit DCC player by Philips' subsidiary, Marantz, claims a further improvement over conventional tape quality.

The marketing strategy of Philips is in line with CD's launch, where the expensive home unit came first, followed by less expensive units and portables. They feel that the move from Compact Cassette to DCC will be over a couple of years and that as more products become available, DCC will succeed. They state their current range is selling well, and claim the DCC900 is one of the best selling cassette units in the five hundred pounds and above category. However they decline to enter into specifics as to how many actual units have been sold.

Philips feel the notion of any 'war' will confuse the consumer and create a general mistrust of electronics companies that will have a negative effect.

THE MARKETPLACE

It's still early days, but what is the truth about DCC and MD sales? What do the retailers, whose living depends on selling these products, feel about the two new formats?

I approached various hi-fi retailers to gain their feedback on this issue and each painted a different picture.

The Dixons Store Group (DSG) have backed both DCC and MD, but Philips report that DCC availability has recently increased from 42 DSG outlets to 281, which would indicate that DCC is selling well.

A large London-based retailer stated that DCC has been comfortably out-selling both MD and DAT formats. They said that the backwards compatibility of DCC was its major selling point and that this ability had been well received by the consumer.

A southern Home-Counties retailer suggested that DAT was out-performing DCC, and that MD was well behind both. They added that pre-recorded software was difficult to obtain for both new formats and this was creating a reluctance to purchase either of them.

One retailer said that DCC was selling well, but since launch only one

MD unit had been sold.

Several hi-fi retailers said that they would not stock either as they felt that there was no need to further confuse the consumer!

Another reported MD doing well, while he had only sold one DCC unit.

These sales variations give both Philips and Sony the leeway to cite a certain retailer as proof that their format is succeeding. This, however, does little to ease the consumers uncertainty over which format, if any, to choose on the basis of real success.

Covent Garden records were an influential retailer during the launch of CD and they stated that their combined DCC and MD unit sales were just under two dozen units so far, with MD just ahead of DCC. However, their managing director, Howard Woo, observed that the two formats were attracting different customers. He felt that the MD buyer was what he termed a "gadget buyer" who regarded it (MD) as a fashion accessory.

He added that the typical DCC buyer was "a medium mature person who is looking to archive his CD and LP collection". Sales information suggested that pre-recorded title sales for both formats were roughly equal at below fifty albums but blank DCC sales had passed two hundred while blank MD was just over one hundred. This suggests that perhaps Mr Woo's appraisal of his customers is correct.

THE OUTCOME?

Without audited sales figures for each format it is perhaps too early to ascertain who might be the winner of this war. Either both will find their own niches, or perhaps both will fail. The reference Sony made to the Nintendo generation may become more apparent and important soon. It

is currently rumoured that Nintendo and Sony will join forces to employ MD disc technology in a new range of computer games for the next generation. Perhaps this will be Sony's niche.

Philips' DCC is an evolutionary product, an upgrade and an improvement on the average conventional cassette player. Its appeal is that it embraces the old product, meaning less redundancy is involved. Philips can gradually phase out Compact Cassette in their midi-systems, in the car and with personal stereos and replace it with DCC. The only change this will bring is that recording will only be possible on the new cassette. Playback will be unaffected.

But what of the war? By luck or judgement, Philips still have cards to play in the form of car stereos, portables and personal stereos. Sony have yet to produce a serious audiophile MD home unit.

The continual bickering may result in consumer confusion causing the new formats to nose dive into oblivion. Philips and Sony deny that there is any conflict between them, but their record companies are striking the first blows by denying consumers free choice between DCC and MD software.

The consumer should be able to make the choice over which format, if any, they want - not the record companies. This process could take many years, but until Sony Music and Polygram give people free choice with pre-recorded software, hardware decisions may remain postponed.

Unless they change their stance, their only success may be in persuading consumers, sick of hollow rhetoric, to turn their backs on the whole business and spend their money elsewhere ●



Conventional Compact Cassette (top left) is under pressure from the Digital Compact Cassette (bottom left) and MiniDisc (bottom right). DAT is used mainly for professional recording applications.

Why B&W gave the name 'Aura' to their range of electronics I don't know, but when an item comes with a high-gloss chrome fascia like the CD50 Compact Disc player, it certainly exudes an aura of elegance. It's a good deal lower-slung than its contemporaries too, thanks to the slim-line Philips CDM-9 mechanism.

Adding to the svelte appearance is a distinct paucity of buttons: four small round ones next to the drawer provide Open/Close, Play, Pause and Forward Skip. That's just enough to cope if the battery in the remote - which handles programming and track selection - goes flat, but it's a bit sparse. The remote has the other usual functions, though in a quirk of the microprocessor control system, the numerical keypad can't be used to

That quirk is one I came to terms with; but the lack of a full instruction manual was irritating. I first saw a prototype nearly eight months ago and the operating basics of the player and the circuitry is essentially standard Philips, so I would have thought a full booklet shouldn't have taken so long to produce. When a player costs £450 (fifty pounds less in plain black) and a colour photocopy only costs a quid at the Xerox centre round my corner...

Paper penny-pinching hasn't spread to the innards, however. Though the main circuit board is Philips, and bears some resemblance both physically and sonically to the 600 series, it's been adapted.

According to Jason Greenslade, Aura's development engineer, Philips' analogue output stage has been replaced by Burr Brown chips, with

involvement. Bass lines were sluggish, apparently lagging a little behind the beat, and defocused. With the best will in the world, for the first day I would never have described the Aura as dynamic. Next day it improved - and I switched references from Sugden's SDT-1 transport, also CDM-9, and multibit SDA-1 DAC to a Micromega CD2, which is CDM-9 Pro, and Bitstream Duo Pro converter.

A re-adjustment of perspectives back to bitstream had me enjoying - and forgiving - the Aura more, but it never did quite overcome its somewhat lackadaisical approach to timing. Nor, even some days later, could it dispel a niggling impression that it held its dynamic range on a leash. One sniff at the lamp-post of real power playing like John Scofield's raging guitar on

An Aura of Elegance

The Aura CD-50 has been a long time in the making.

Eric Braithwaite determines whether it was worth the wait.

programme in tracks: you have to use the Track Skip buttons. Back on the machine itself, what looks like an On/Off switch left of the logo is actually a standby control; once it's plugged into the mains the CD50 is powered up.

This is the only right-handed CD player I know. Every other player I can think of has either a central drawer or places it on the left. There's no reason why it should be so, but it gives the CD50 a slightly eccentric look. Inserting a CD in the 'wrong' end is mildly disconcerting at first, like picking up an Arabic book and finding it opens back-to-front.

Rubycon polarised electrolytic capacitors. If this is going to achieve anything, it's going to be a smooth, but not bland sound. Listening suggested for one reason or another that the aim hadn't unequivocally been achieved. From memory, the Philips 600 series players had good detail, strong bass and decent dynamics, though they were less strong in portraying fine detail. The Aura improves on the basics in some areas, but not all.

The Aura takes a while to warm up and take on a more winning way. Frankly, the first few hours with it were, well, lacking in interest and

What We Do and it seemed to shy away from the Doberman persona it needed to take on, turning more in the direction of the poodle parlour.

This sounds damning, but the fact remains I did keep listening. It didn't lapse so far in the lapdog direction that Scofield became a cuddly toy - I listened all the way through the CD. Some of what the CD50 does it does extremely well. It has a degree of refined elegance which presents chamber music, soloists or a singer like Rory Block with a clear, polished air and even a fair degree of airiness to boot. Maybe not all the guitar licks, or

MEASURED PERFORMANCE

Filter ripple was a feature of Philips early digital filter and convertor chip combinations. The comment this ripple attracted made Philips remove it from later chips. Its appearance in this player suggested I was testing a product embodying an old technology, not universally well received in its day and now replaced. It came as no surprise to find a Philips SAA7321 GP Bitstream chip clinging spider-like to the underside of the circuit board, together with a web of miniature surface mount components. The board looks very much like a Philips item, with bare copper cladding on the top side, surface mount on the underside and broken edges. The presence of good quality Burr Brown chips was indicative of Aura's involvement though; these aren't normally found accompanying Philips chips. The SAA7321 was a replacement for

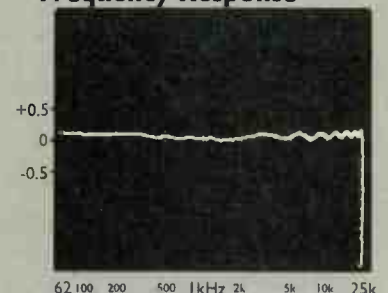
the first ever Bitstream chip, the SAA7320. It was meant to cure idle pattern noise, but was itself noisy and prone to distortion. The distortion pattern and levels produced by the Aura show this; note the multiple distortion spikes in our analysis. With Bitstream, there should be no spikes at all. Distortion measured 0.06% at typical average music level (-30dB). Current Bitstream manages one third this, around 0.02%

Subjectively, the improvement doesn't reflect this difference; Bitstream players don't sound three times smoother for example, so conversely the Aura doesn't sound three times worse because of the distortion it produces. However, in practice, digital distortion at this level introduces a general coarsening of the sound; a loss of smoothness and purity; a little bit of dirtiness.

At low levels early digital convertors were especially weak. Some couldn't even resolve low levels on one channel. The

Aura avoids this sort of thing, thankfully, but 46% distortion at -90dB is a performance as bad as modern players, and around 30% distortion with a dithered -90dB signal is one of the worst low level performances I have ever measured. A worst case result of 10% is

Frequency Response



Characteristic h.f. ripple of the Philips 7321 DAC chip.



the fuzz pedal of Scofield came over, but I had to turn to my much more expensive references to check what was not being fully transmitted. If I hadn't known the finer intimate details were there in the first place I wouldn't have missed them.

To give an example, Rostropovich's cello in the Panufnik cello concerto was splendidly big and warm and rounded; the side drums had the sharp thwack and thunk in attack the engineers at Abbey Road had worked on recording. A vocalist's intonation was well portrayed, and so was an acoustic guitarist's fingering. Even acoustic ambience - usually flat and curtailed in all but the most expensively engineered bitstream applications - was more than acceptable.

But it's only ninety per cent of the whole, presented with enough guile and an aura of pleasantness for the omissions to pass by unremarked at first. Turn to the Micromega or the Sugden, however, and the last orchestral chords of the Panufnik are fierce, abrupt Stravinskian climax; go

back to the Aura and the piece just ends, with a puzzling tameness. Pick a piece of heavy Rock, and Chris Connelly's Phenobarb Bambalam, which should be fierce and raw, sounded loose and untogether. Peter Gabriel's 'Red Rain', much better produced, was much more effective, but Costello's Juliet Letters just didn't come together tightly enough to be convincing, sounding a little sloppy.

Comatose

A key to this series of fits and starts - one CD sounding full of life, another slightly comatose - probably lies in a couple of tonal anomalies. There's a gritty quality to the treble which coarsens and thins some voices - straining Costello's falsettos through a wire mesh - diminishing the tonal colour of orchestral violins and making soprano sax sound plastic. Equally, the lower end fades away like an old soldier: the Aura was as clean and tight as the exceptional Duo Pro as far as it went, but the latter went deeper, firmer. Using the Duo Pro linked to

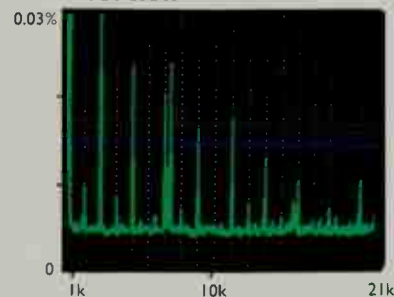
the Aura's electrical digital output retained that benefit, but the graininess of the treble remained, albeit a little diminished. The player's timing and cohesion improved too, though never achieving the solidity and grip of the Sugden transport (which uses the same mechanism but different circuitry and servos) through the same DAC.

On the plus side the Aura has a well-defined, broad soundstage that was nearly up to the quality of the references, which is a remarkable achievement for a four-hundred pound player. The Aura was well up in the ranks for imaging quality, too, nearly as stable, focused and real-world as the two-box players. It's a moot point as to whether the final result justifies the price. To turn metaphorical, it isn't ordinary enough to be a flat 'at just disguised as a topper, but it doesn't quite have the quality of a Jermyn Street bowler. Like trying on a hat, you'll have to try your own range of CDs to see whether it suits. It's not an off-the-peg purchase, but one that needs consideration ●

the norm, and even the better budget players - such as those from Sony - manage less than 2% these days. I'm afraid that puts a damning perspective on the Aura.

The CD-50 produces little high frequency distortion, but some spurious products against the sampling rate are

Distortion



Around three times the distortion of current Bitstream players.

present on its output. It is reasonably free of unwanted products above 21 kHz, but the old Philips '7321 chip produces more noise than is common at -96dB.

Largely as a result of the distortion produced at -60dB, dynamic range was poor, measuring 100dB by the EIAJ method. Modern players manage 105-110dB, so again the Aura suffers as a result of its dated technology.

The CD-50 uses a Philips Bitstream chip, the SAA7321, that is two generations out of date. It was replaced by the '7323, which was itself replaced by the '7350, two years ago now. Had Aura used two 7321s in 'push-pull' to cancel common mode distortions, an option available to them, performance of the CD-50 might have looked a little more encouraging. As it stands though, the CD-50 is a little too 'cost effective' in its engineering to be technically impressive. **NK**

TEST RESULTS

Frequency response 4Hz-20.9kHz

Distortion (%)		
-6dB	0.006	0.006
-30dB	0.07	0.06
-60dB	1.2	1.1
-90	44	46
-90dB dithered	0.15	0.1

Separation (dB)	left	right
1kHz	104	99
10kHz	93	100

Noise 96dB
with emphasis 98dB

Dynamic range 100dB
Output 1.97V



The Art of the Loudspeaker

Jonathan Jordan tries to hide four pairs of loudspeakers within his listening room, and concentrate on the music.

We all know someone who is not an audiophile - the kind of person who sees a pair of loudspeakers and quickly comments upon how ugly they are, or how much space they take up. There seems to be no way to convince them that good sound quality is worth the intrusion, but that, unfortunately perhaps, one property excludes the other.

Or does it? There are alternatives to the conventional box loudspeaker that - maybe - can keep both the music lover and the budding interior designer happy. The subject of this comparison test is indeed loudspeakers that may appeal to the gaggle of complaining friends, wives or even husbands.

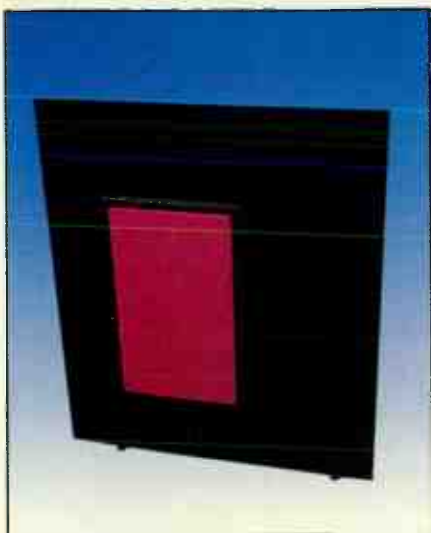
The concept of satellite and subwoofers is one solution to the problem of intrusion, that is steadily becoming more popular amongst the advocates of 'invisible sound'. We looked at this in our May '93

comparison test. However, there are many ways to skin a cat. The 'speakers in our group test this month all solve the problem in their own individual ways. Some tackle the problem by occupying the absolute minimum of space, the appeal of others is simply that they are different. Some can be hung on the wall or snugly against it without intruding into precious living space, others make good pot plant stands.

Deviation from the norm produces some fairly different looking - and sounding - loudspeakers. But are alternatives to the time honoured and traditional concept of a wooden box with multiple drivers acceptable? After all, since most 'speakers seem to be either floor standing or stand mounted boxes, there must be some good reason behind their popularity. Or is it just that manufacturers are so unimaginative that they haven't seen the need to develop alternatives?

Equally, does the box have to be square? Can other shapes work? These questions and more were dying to be answered, so a small selection of the best deviants we could find were lined up against the wall and analysed for all they had to offer in terms of style, size and - naturally - sound quality.

The 'speakers on test vary between £200 and £590, and are all designed to blend in or stylistically contrast with their surroundings. Furthermore, although they are all different, none of them can be considered a joke as all managed to give the well used phrase, "a certain je ne sais quoi", new meaning. I felt all had such special individual appeals, testing them couldn't become just an exercise in making audiophile judgements. Allowances for the tastes and compromises that others might be prepared to make in finding an unintrusive loudspeaker for the home were needed.



JAMO GRAPHIC

The Jamo Graphic is aptly named. It takes the form of a square panel finished in gloss black. On one side of the panel is a small enclosure containing two drive units. A small soft-domed fabric tweeter works in conjunction with a reflex loaded bass/mid-range unit that forms a miniature rectangle on the panel. To enhance this panel a choice of three brightly coloured grilles are provided. Luminous pink, a deep royal blue or a grass green are provided and all contrast well with the gloss black body of the 'speaker.

The Jamo is manufactured in Denmark and costs £349.99. The whole unit is approximately four inches deep and a complete set of accessories allow the Graphics to be wall mounted, or alternatively stood on shelves by means of their own black metal supports. The connections to the unit are on the rear panel. A single set of gold plated binding posts is fitted which will receive either bare wires or the commonly used 4mm banana plugs.

The Jamos not only impressed me with their excellent styling and mounting options, but after a prolonged running in period, with their sound as well. They instantly conveyed a warm atmosphere that allowed very fluid reproduction of the music. There was ample speed, coupled with an adequate coverage of a good portion of the frequency spectrum.

The bass response was not overwhelming, but the Jamos were not able to portray bass instrumentation clearly, however, what they did cover they managed to do with a certain style. Vocals were clear and precise, but I felt that there was something missing across the upper midrange frequencies, introducing some slight softness to the sound. Further up, there was a slightly bright and thin reproduction of the upper components of the music.

For 'speakers placed hard against a wall, the Graphics managed to convey an impressive soundstage. It had plenty of width and height, bringing a good sense of scale to music. They also had plenty of

depth - I closed my eyes and forgot that the wall upon which they were mounted was actually there. Imaging was not their strongest forté, but musicians were roughly located in space to some degree.

I found these 'speakers could cope with power well, although Jamo's own rating of sixty watts continuous power struck me initially as being a little optimistic. Practical listening tests, however, showed me that they were able to approach this figure. The first signs of overload appeared when the bass unit bottomed out, as would be expected. Only if they were cruelly driven did distortion from the upper mid and high frequency ranges creep in.

The Jamo Graphics are a good alternative to the standard box. Not only are they pleasing to the eye, but their performance with music was serious enough, the necessary audiophile appeal being built in. They are not excessively powerful but, should you be short of pictures to mount on your wall, consider the Graphics. You never know, but perhaps you could even convince the more gullible that they were modern art, or at least certainly something other than a loudspeaker, just as Jamo intend.



JORDAN WATTS CLASSIC JH 400

The £590 Jordan Watts Classic JH 400 remind me of something I recall from geometry lessons: a parallelogram is what I think it was called. Although box-like in that they have four sides, a top and bottom panel, the slanted panels of this speaker make them look distinctive. This isn't the only point of interest, however. They have just one full-range, metal cone drive unit.

Although the JH 400's cabinet is made of MDF, they are finished in an attractive high gloss black, of the type you would find on a grand piano. The single set of terminal connections are gold plated, accommodating bare wire or 4mm plugs. They add a nice touch to a very well finished product.

As the name suggests, the Classic JH 400s are designed mainly for classical music, but I used a broad spectrum of music to reveal their strengths and weakness. My first impression of them was that they produced particularly well

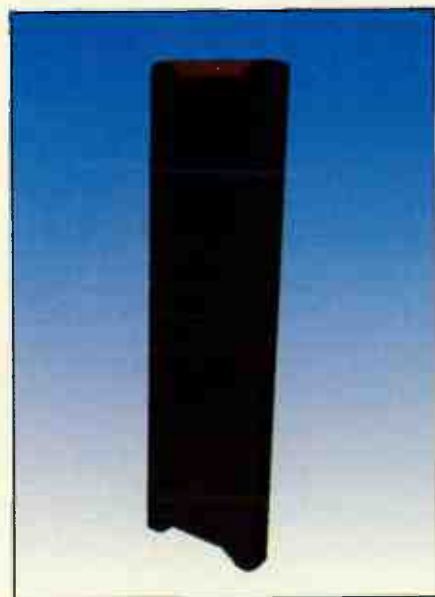
focused images that had good depth. Their distribution of sound was sufficiently generous to reach differing seating positions, so all were well served.

Simon Mayer's *The Mandolin Album* gave the '400s a chance to display their excellent imagery and harmony as they shone across the mid range. Low frequencies were not as well provided for, showing the single unit could only convey light detail in the lower part of the spectrum.

The JH 400S evoke atmosphere and create a pleasant musical environment, but if the music becomes demanding in the high or low ranges non-linearities creep in. As the single driver is only four inches across, extended bass reproduction was obviously going to be a problem. It is only possible to move so much air with a drive unit of this size. Rock music containing both high treble energy and quite heavy bass caused the JH 400s performance to collapse. The high frequencies lost definition and the bass would bottom out and distort even at moderate volume levels. The Classic JH 400s are certainly not suited to heavy rock.

Returning the JH 400s to classical music gave them a chance to do their best. Performances sounded precise, disturbed only on occasion by heavy orchestral 'crashing and banging.'

In summary, these unique loudspeakers will appeal to those who listen to light classical orchestral music and to the instrumental listener who wishes to generate imagery and depth in their choice of music. The '400s have other attributes, including excellent styling. Both musically and aesthetically they are different, but their lucid performance across the midrange, convincing sound stage depth and sense of atmosphere could only compliment a large classical music collection if high volumes are never used.



SEQUENCE MODEL 30

The designers at Sequence aimed to produce a thin loudspeaker that could be

wall mounted. The result was the Model 30 which stands at 86cm tall, 25cm wide and just under 7cm deep. It costs £199.95, making them a viable and affordable alternative to box-loudspeakers. When actually handling the speakers nothing about their appearance suggests that they have been made to meet a budget. The varnished wood end cheeks are well finished and the single set of binding posts are gold plated screw terminals. Finally, the body of the speaker is covered in a quality cloth grille that can be obtained in several different colours.

The 'speakers have recently been adopted by Revox for their 'Evolution' lifestyle systems, so they have been given further exposure. The aim of the designers was to produce a full sounding quality loudspeaker that occupied less space and intrusion than traditional types.

Initially the '30s greeted me with a wide and active sound. I found them sweet in the treble, but they can sound a touch over bright. Even after running in the bass sounded a little light, which detracted from the atmosphere that they generated. The bass response was, however, quite fast and detailed, which made up for this fact somewhat. Each note of the bass was clearly discernible from the other, which helped to improve my listening enjoyment.

The midrange was very clear and flowing, helping them reproduce the speed and tempo of even the most demanding music. The upper midrange occasionally sounded a little disjointed and transients could cause slight difficulty, but other than this the Sequence Model 30s managed to relay the musicality and content of most musical selections quite well.

The arena of sound was not especially expansive, but the 30s are true hi-fi speakers, managing to bring depth and width to the sound stage. Their imaging was not especially precise, but individual instruments were at least confined to a general area. As long as the volume was not set to be excessive, the 'speakers rarely distorted and managed to cope with crescendos well. Sitting back and listening to them was no chore.

The Sequence 30s are a well engineered 'speaker. The dimensions of the drive unit inhibit extended bass reproduction but they do convey a good level of musicality and hi-fi reproduction for the price. These speakers intrude little into a room, offering a generous sound for their size and price. The Sequences also win the accolade of being the most uncoloured and unlimited of the 'speakers in this test and whatever the listening agenda, they could always turn in a realistic result.

SRG DESIGN CLI

SRG are a small, independent company attempting to produce a loudspeaker able to blend easily with interior decor, as opposed to clashing with it. The CLIs are manufactured from MDF and they are octagonal in shape. This, they told me,

improves the bass response and reduces resonance in the cabinets. They are available in a number of standard finishes but a finish of your choice can be applied to order.

The CLIs supplied to us came with a satin white finish upon which was stencilled a decorative ivy pattern. This particular finish retails for £487.63, however a plain finish costs £417.13. The CLIs are equipped with a set of hinged doors which open up to reveal an curved reflector. Both the drive units bounce their sound off this, radiating over a broad horizontal axis. The six and a half inch glass fibre bass /midrange unit shoots vertically up into the reflector unit, while the tweeter unit is inclined at about forty degrees from the horizontal. A single pair of input binding posts are located at the base of the speaker column.

The appearance of these 'speakers was certainly different: with their small doors closed they blended with other furniture and gave no indication of being anything related to hi-fi. Unfortunately, once the doors were opened and the music turned on this impression continued. The first thing that the CLIs offered was a very alternative sound to that normally offered by loudspeaker manufacturers.

The sound was wide and transparent, and equally the dispersion was sufficiently wide; I found I could sit almost anywhere within the room and still receive a mild stereophonic effect. The down side of this was that the CLIs offered a hazy and inconsistent imaging performance. When the listening choice only contained a few instruments they were separated in a hazy manner, but with orchestral instrumentation the image was further destroyed.

The sound is hard to describe, it was so completely different from the normal experience. The bass was hollow sounding and lacking in atmosphere, but equally there was a strong degree of colouration and a one-note effect. The midrange was probably the most acceptable area of their performance but any excursions into the upper mid band gave very odd, muffled results.



In particular, guitar strings sounded vague and certain vocalists sounded as if they were performing with a very bad case of laryngitis. The CLIs also seemed to suffer from a resonance problem, particularly in the lower midband, and the whole room frequently hummed in a disconcerting way. Subjectively, they didn't have a very wide frequency range and I felt that portions of the music were being missed.

The power handling of the CLIs was also poor, adding to their weaknesses. The CLI loudspeakers succeeded in being very different, both in appearance and in sound quality. Should a total deviation from the norm be required, these 'speakers have a lot to offer. However, they are probably best regarded as furniture that produces sound rather than as speakers that resemble furniture.

CONCLUSION

Each 'speaker in this report fills, or attempts to fill, a niche strongly related to the tastes of the designer. If they accord with your own, then the speaker will have appeal, at least on aesthetic grounds. But undoubtedly some 'speakers managed the cross fertilization of looks and sound better than others, which introduces a further criterion of assessment.

The SRG Design CLI loudspeakers were most striking. Their column type structure and doors to cover the reflector acted as an effective disguise, but their success at blending in would depend upon room decor. Their sound quality did not reach even modest standards and although they successfully exhibited wide dispersion, an audiophile would probably have difficulty living with these speakers. As far as high fidelity goes, I felt there was little compromise in its favour.

The Jordan Watts were at the other extreme; they excel at midrange imaging. Their appearance, although attractive, was perhaps not sufficiently distinctive and different to compensate for the areas where they did not perform so well.

The Jamo Graphics were also the result of a compromise, but I felt that they more successfully balanced appearance with performance. These loudspeakers possessed a balanced and even sound that also contained quite a few references to established hi-fi traditions. They also looked good on the wall; I particularly liked the different coloured grills and they provided nothing but aural intrusion into my home.

The Sequence Model 30s however, seem to meet all requirements, especially value for money. They can be hung on the wall or stood on their stands. Furthermore, they give a respectable result right across the musical spectrum. These speaker might lack bass when compared to equivalently priced box models, but they do display an attractive degree of musicality. In a world full of compromises, the Sequence 30s exhibited the fewest of this group ●

JAMO GRAPHIC

Jamo's Graphic loudspeakers are designed to be mounted on a wall which will assist the bass level. They reach down well for their modest size, having a lower -5dB limit of 80Hz. From here up to 800Hz or so, all is fine but then things start to go wrong. There is a large suck-out from 1kHz to 3kHz, after which the treble rises rapidly to a peak at 16kHz before falling off. This is almost certainly due to poor crossover engineering, the mid rolling off too early and the tweeter coming in too late, leaving a gap.

The Graphics present quite an easy load to an amplifier. They have a highish sensitivity of 87dB, an overall impedance of 9Ω and a reasonably smooth impedance curve.

With a little more attention to their engineering the Jamo Graphics could turn in a more balanced and smooth sound. However, as they stand you may find a chunk of the music missing, DB

JORDAN WATTS JH400

The frequency response of the JH 400s extends down to 63Hz (-6dB), quite a low figure for such a small enclosure. There is a rise in mid-range output around 1kHz which will push vocals forward a bit, a small suck-out at 3kHz which will remove a little bit of treble information. At the right is a peak at 10kHz, due to a cone resonance, probably in the region of the dust cap at the cone's centre.

The impedance curve is a classic one, typical of a dynamic drive unit in a sealed box. There's one peak at around 80Hz which is the point of bass resonance. Above this rising voice coil inductance causes the impedance plot to rise steadily up to 20kHz. Overall impedance measured exactly 8Ω, even though d.c. resistance measures 5Ω. The speaker is a very easy amplifier load, but it isn't especially sensitive, producing 85dB sound pressure level for one nominal watt of input (2.84V). A speaker that is insensitive encourages volume winding, yet the small cone would be unable to take too great a power input, so the JH 400 needs to be treated with due consideration. NK

SEQUENCE 30

The Sequence are the only speakers in this test to have a flat frequency response. There is a mild peak at 6.3kHz, where the ear is most sensitive, but this should result in a bright and detailed sound, rather than a harsh one. Through the critical midband the response is level and even natured which will give the Sequence a smooth presentation. Bass is a little light, being -5dB down at 100Hz, but the measurements were taken in free space so in practice there will be some reinforcement from the walls and/or floor.

The overall impedance is high at 14Ω and the impedance curve very smooth, both factors making these speakers an easy load. However, they will not go particularly loud due to their average (85dB) sensitivity figure.

The Sequence have been cleverly engineered and measure well, despite being designed as a visually pleasing loudspeaker rather than the normal square box. DB

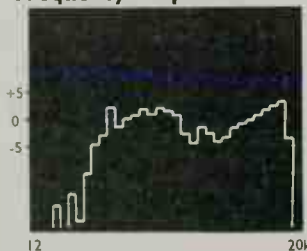
SRG CLI

The frequency response of the SRG CLIs leaves an awful lot to be desired. The treble peaks, but then rolls off early which will result in a hard but dull presentation and the 8dB lift centred around 250Hz was audible with pink noise as a hollow, wooden whistle. To suggest that these loudspeakers are going to sound coloured would be an understatement. Below this 250Hz peak the bass is flat, but low in level which will make the speaker sound light and thin.

Overall impedance was high at 9.5Ω as was sensitivity, 90dB at 1m for a 2.8volt input, making the SRGs easy to drive to high volume levels. The impedance curve is a little different from the norm. It is lumpy, but the absence of sharp rises or falls indicates little reactance in the characteristic, again making for an easy amplifier load.

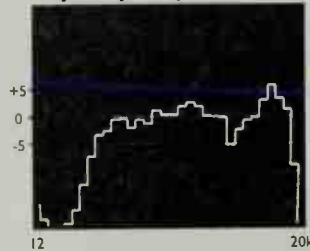
Sadly, the SRGs appear to have been designed with appearance more in mind than objective performance. Any speaker that relies upon sound reflection will always exhibit a lumpy response, due to resonances and selective absorption, a predictable problem here. The bass chamber was resonant too. DB

Frequency Response



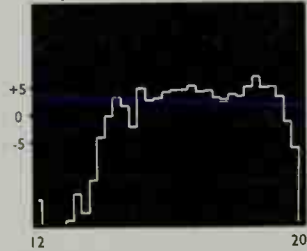
Large midrange suck-out and rising treble are not the most appealing traits but subjectively the Jamos did well.

Frequency Response



Despite using a single, full range drive unit the Classic JH400s have good treble extension.

Frequency Response



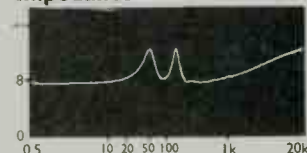
The Sequence Model 30s have the flattest frequency response of the group.

Frequency Response



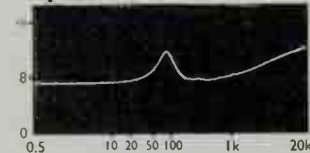
SRG Design's CLI has problems. The frequency response is anything but flat.

Impedance



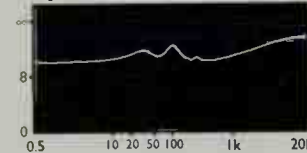
Overall impedance measured 9Ω with above average sensitivity, so they should be easy to drive.

Impedance



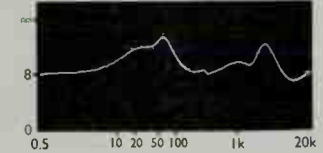
An 8Ω overall impedance and average sensitivity make the JH 400s a relatively easy load.

Impedance



Extremely smooth impedance curve indicates a mainly resistive load.

Impedance



The impedance curve is a little lumpy, but high sensitivity and 9.5Ω overall impedance make them an easy load.



Anchoring the Air Waves

Eric Braithwaite finds a welcome surprise in the form of Harman Kardon's TU9400 tuner

To celebrate thirty years in the business Harman Kardon put a list of maxims by founder Sidney Haman into the box of their £299 TU9400 tuner.

"Perfection can always be improved" reads one, and if Harman - or anybody else - can improve on this tuner then Sidney had it right. It makes spending twice as much on a tuner elsewhere a matter not for second thoughts but for thirds - or even fourths.

Approaching the Reference

I spent a good deal of time switching between my Quad FM4 and the Harman and while there was a difference, I'd be surprised if the average listener would find anything of substance missing to be miffed about. That was even more surprising considering it fed an Argo/Hera (more than twice the price) a pair of Sentec monoblocks from Sweden (four times the price) and a pair of ESL63s (lots of times the price!). I didn't regret the substitution except when listening to Classic FM whose

transmission was distractingly hissier and afflicted with a warble where the continuity announcer's mic is supposed to be. Be warned, however; I have a big six-element aerial: you'll need something similar, but it won't be wasted.

Conditions weren't right for me to pick up an interesting Dutch R 'n' B station on 93, nor France Musique - not even a whiff of either in the ether - but the 'Seek' function which stops at listenable transmissions worked well, neatly avoiding shadows and dodgy stations. In practice, selectivity was good enough to repel intruding pirates even in the tightly packed London FM band. Tuning was much less gratifying on AM, acceptable transmissions using the supplied aerial being relatively few and far between, with BBC 648 being near-intolerable, afflicted with birdies and some foreign gibbering. Where I live it should be clearer, though Capital Gold had good presence, unmuddied, though obviously compressed with a trace of bathroom acoustic. Do they play their old seven inch singles on a Dansette?

I couldn't resist dipping into the new Virgin station. If it is for the over-thirties, like Branson said at the launch, then I must be younger than I thought, but leaving the content aside the curious sound balance they were using resulted in a very acidic and bitter sound. Clearly that was their fault, not the tuner's as a quick trawl through the band confirmed.

Sticking with the Rock music, but on FM, guitar riffs ripped with plenty of vigour, though with a slightly sharp, slightly jangly top end compared to the more even FM4. Vocals were projected forward, but not obtrusively. Rhythms were lively enough to party by, though definition at the bottom end had a trifling haze to it. Nonetheless, the bass was deep: I took a few minutes of Kiss FM's heavy stuff before I abandoned the all-too-obviously over-eq'd bass, feeling well battered. If you want thrash, the H-K will certainly whip up the right degree of flagellant frenzy.

In the gentler pastures of Jazz FM, bass lines on a Harry Connick Jr track were delightfully easy to follow,

though a little loose at bottom. It's only discernible in concentrated listening, so it's not in the least a minus point; but there is a trace akin to mild compression at the top end too. Both ends are just that bit softer than the drier middle frequencies. I wouldn't complain at this price, though, for while the inner detail is also less clean-cut than that of upper crust tuners, they cost a good deal more.

Tonal colour was extremely good, though trying some opera on Radio 3 suggested that vocal textures in the chorus were a little muddy, baritone announcers also sounding thicker in tone than was entirely truthful. Violin tone, too, was harder than the reference, with less discrimination, something that affected cymbals, which tended to blur. Despite a softer focus, with images also not perfectly clearly outlined, the effect is far from unpleasant, lending a warmth and impression of scale to orchestral music.

Even piano, the trickiest instrument of all, came over extremely well, with Gerald Northrop Moore's review of a variety of Kreislerianas so obviously distinguishable in both performance and technical quality I had no difficulty

forming my own judgement as to which CD I would buy. The 9400 was in fact so good that I disagreed about a "sluggish" Kempff recording, recognising with an ease that surprised me a muddy tonal quality in the recording - I checked with my LP copy afterwards - which tends to make the performance sound even more dull than it really is. You can't ask for better analytical quality in a tuner than that.

With the Proms season coming up, the Harman would tempt me to listen to the lot at home - and I only live a twenty-minute walk from the Albert Hall, so the temptress has to be attractive. While I'm thinking about it, it would certainly be a very good source for taping the concerts. The pilot-tone breakthrough (see Measured Performance) didn't disturb a couple of hours' taping on metal tape, using a Nakamichi with its MPX filter switched out.

The facilities look fairly basic for a three hundred pound tuner these days. Twenty four presets are

allocated in banks of eight - a shift key switches between banks A, B and C which are indicated on the display - any of which will programme an FM or Medium Wave station; there's no Long Wave. The other controls on the uncluttered fascia are straightforward: Up/Down tuning - a small red plus sign lights to show which direction - FM/AM selector and Hi-Blend switch for cleaning up weak stereo transmissions. It's a foible of mine, but I prefer a mono option. The display is equally uncluttered, with a flag showing when a station is properly tuned in, which functions are accessed and a simple but accurate five bar signal strength meter.

Taking Centre Stage

It's the sound that matters; bells and whistles can wait, although I could have done without the latter on Classic FM and some stations on Medium Wave. For sound quality the TU9400 is beaten by Quad's 66FM and Audiolab's 8000T among the latest arrivals, but both are double the price. In its own range this tuner can take centre stage, bow to applause and walk away with a big bouquet for its excellent performance ●

"Even piano, the trickiest instrument of all, came over extremely well"

MEASURED PERFORMANCE

A slight rise upward at the high frequency end of the response trace indicates the Harman Kardon TU9400 will have a slightly lighter presentation than many rivals and it could also seem a little more detailed. The usual dive downward in frequency response above 15kHz, caused by the 19kHz MPX notch filter, is absent, so I wasn't surprised to measure some pilot tone on the output, albeit at a reasonably low level of -50dB. This will only be of consequence when taping, but at -50dB level is not high enough to block Dolby action, so I don't envisage a problem here unless very high recording levels are used, and even then the subjective effects would hardly be discernible. Most good recorders have MPX filters too.

Channel separation on stereo was wide at 40dB in the midband and 38dB at high frequencies, a good performance. There was a little more mono-channel distortion than usual at 0.6%, but it was purely second harmonic in nature and innocuous in consequence. The difference (stereo) channel measured well, so distortion overall was reasonably low at 0.33%. Although even budget tuners commonly manage 0.1% these days, I still wouldn't expect the Harman to suffer subjectively.

Noise level is a good way to judge tuner quality nowadays, since it is dependent upon the quality of the chips used internally. At -67dB hiss level, the TU9400 is unimpressive. Budget types

commonly manage -72dB; quality models -78dB. Slight hiss will be audible during Radio 3 type silences, irrespective of the aerial used.

Curiously, the tuner mutes below 10µV and the muting cannot be defeated (there's no mono button). As this is a very low signal level stations are so noisy as to be unusable for entertainment purposes, but it does mean that the Harman is not suited to long distance work, even though its sensitivity was very high. It also stopped me being able to apply more than a 60dB signal difference in selectivity tests, so the true selectivity was not measurable. It appears adequate however.

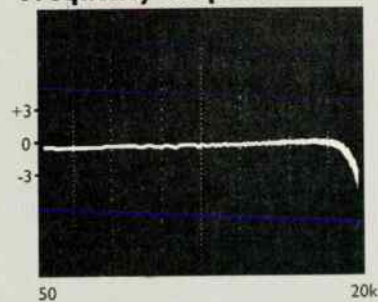
Tuners used to give around 300mV output, a value that recently has moved up to 500mV or so. The TU-9400 gives no less than 2.5V, or five times as much! It'll work with passive preamps well.

The TU9400 measures well in most areas. There are some curiosities - and a little hiss - but I don't believe they'll be of significance in practice. It is a competent tuner. **NK**

TUNER TEST RESULTS

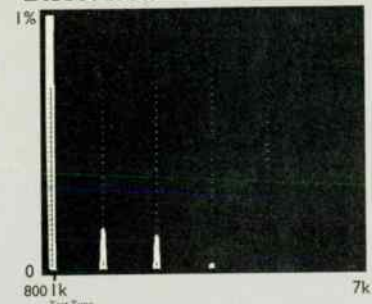
Frequency response	4Hz-15kHz
Stereo separation	38dB
Distortion (50% mod.)	0.33%
Hiss (CCIR)	-67dB
Signal for minimum hiss	0.63mV
Selectivity (at 0.4MHz)	>60dB
Sensitivity	
mono	N/A
stereo	25µV
signal strength meter	none

Frequency Response

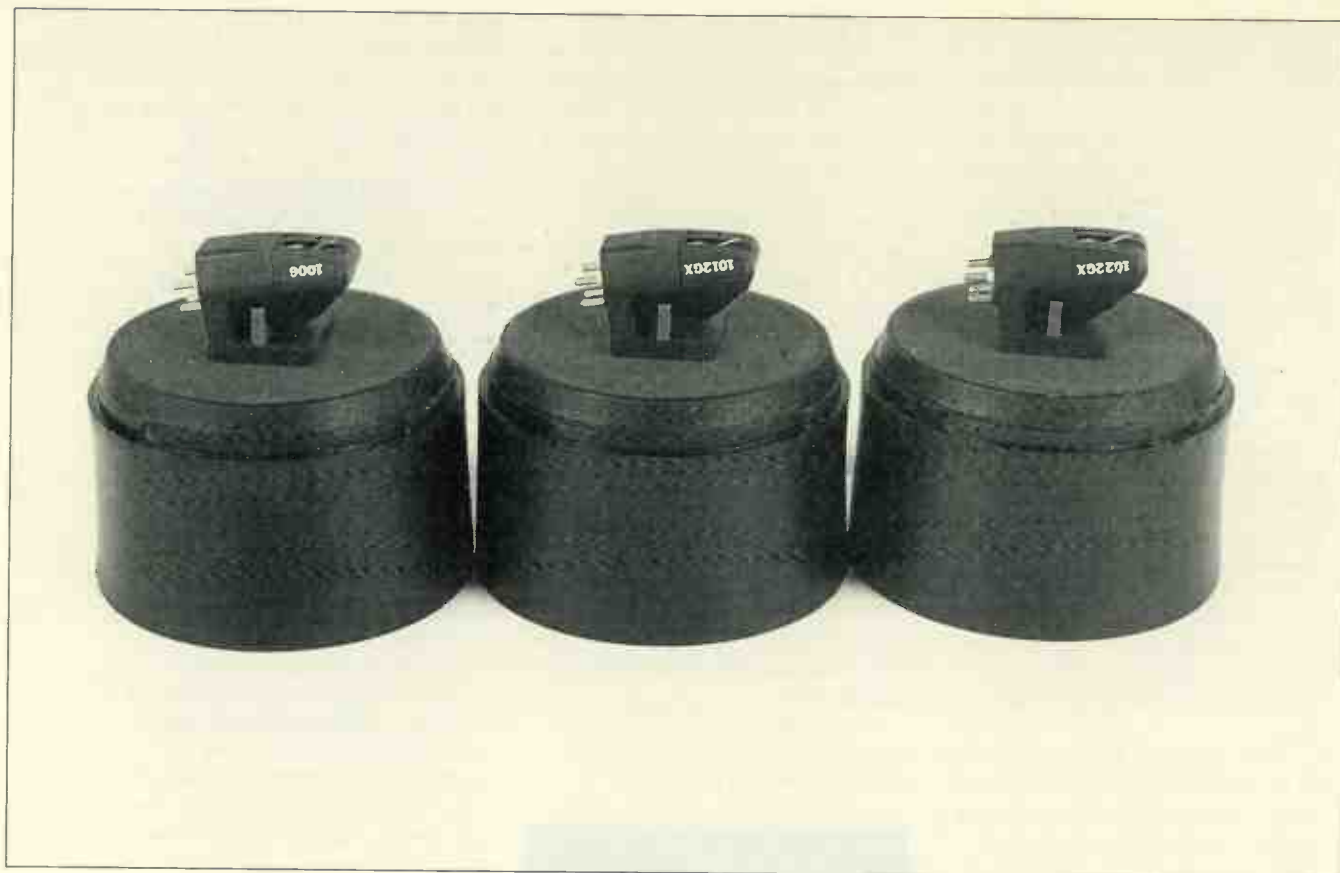


Well extended response.

Distortion



A little more distortion than the best modern tuners, but not enough to effect the TU9400 subjectively.



Goldrush

Eric Braithwaite eagerly listens to Goldring's new cartridges

If Thorens are flying the flag for vinyl in Germany, Goldring in Bury St Edmunds aren't about to bury it in Britain, either. At a time when many people probably think a cartridge is something to do with Sega, Goldring have brought out one new moving-magnet cartridge and upgraded two others.

The new one is the 1006, at £44.95; next step up in price is the 1012 GX at £59.95

and one rung beyond is the 1022 GX at £79.95. What has happened, effectively, is that the latter two are essentially the 1020 and 1040 'repositioned'. The 1012 GX has a Gyger II stylus, which was attached originally to the model one rung above; the 1022 GX is fitted with a Gyger I which has previously been the stylus fitted to Goldring's moving-coils. The 1006 has an 'ordinary' elliptical stylus.

All three share Goldring's distinctively bulbous Pocan body, which, I must say makes fitting Allen bolts through the top-plate a wee bit tricky for those with less than slim or nimble fingers. Still, it's only reviewers who have to swap cartridges every few hours; everybody else can

"the Goldrings are a joy to use"

afford the time to count to ten to recover their temper after fumbling and dropping a small dark nut onto a large dark carpet.

Apart from that, the Goldrings are a joy to use, the slightly upturned snout of the body giving a good clear sight of the stylus for both accurate alignment and cueing. Each diamond, given a quick scrutiny under a stylus microscope, looked well-shaped and neatly glued to the

cantilever. All three cartridges were used with the Thorens TD280 MkIV, but also in my standard SMEIV mounted on a Gyrodec with Michell power supply. All were used with the recommended loading, 47kohm and 200pF. Fortunately, this is pretty standard as far as the vast

majority of amplifiers' disc stages are concerned.

Of the three, it was - perhaps inevitably - the cheapest 1006 which was least satisfactory. That's

not as damning as it sounds, because the other two could fairly be described as excellent. Maybe, moving up the grades, the leap in quality was just that bit greater than expected. Particularly, the Thorens TD280 in failing to make the most of its best points brought its weaker ones to the fore.

Both the budget turntable and the more exotic one failed to upset any of the

"It's the 1012 GX which is the bargain of the bunch"

Goldrings while tracking: their ability in this respect is very good indeed. The 1006 was no slouch either. Nor did it betray its relative cheapness compared to the others except in possessing a slightly more forward characteristic than its more expensive brethren and a somewhat harder, coarser grain to the treble. In common with the other two, it held up well in the imagery stakes; individual soloists appearing in broad brush-strokes, taking up a little more of their fair share of stage-width, but producing a good wide spread between - but not beyond - the speakers. The impression of depth was tinged with a degree of artifice - just a couple of layers rather than walk-in space, but at under fifty pounds, more than acceptable.

There's a Goldring family sound to all three of these cartridges. A clear, clean, extremely detailed mid-range puts them well ahead of most of the competition, with a full, round, slightly warm bass. It's a sheer delight to hear bass guitar with muscle and strength, and in the case of a double-bass; real, credible body-resonance. Here, the 1006 gave the impression of being drier, with less bloom than the two more expensive ones. It's lovely to hear - from a relatively cheap cartridge - solid kettle drums and good overall instrumental tone, even if violins and vocals had a tendency towards a hard monochrome sheen instead of vivid colour.

Moving up the scale, it was clear that even fifteen pounds extra brings more than commensurate benefits. Mainly, these show in a broader tonal colour, especially

"A clear, clean, extremely detailed mid-range puts them well ahead of most of the competition"

in the strings, though violins were still thinner than lower instruments and the brass sections still generalised brass rather than always distinctly separating trumpets from trombones. There was an element of brashness here, but one that adds an exciting edge rather than brutalising a performance. The overall focus, however, was tighter, sharper and clearer. With almost every record, there was a feeling of involvement and emotion. Bass freaks might still find the Goldring bass less defined, a little more unfocused than they might like, but it's firm enough and controlled enough for most.

Moving up another twenty pounds to the 1022 GX and there's little of an immediately apparent improvement. With this one we're mobilising the forces of

increased subtlety. All the same trade-marks are equally evident - an element of the forward mid-range of the basic model with the broader tonal colour of the 1012 GX and splendidly rounded bass. What there was in addition, however, was that extra degree of dynamic range and speed throughout, which more clearly delineates instruments of the same kind, and the individual idiosyncrasies of players and singers. Here, listening to Rachmaninov's Symphonic Dances, there was just that extra degree of resolution that brought out the side drum discreetly tapping away behind the weight of the strings, the sense that the xylophone was in more realistic proportion to the rest of the percussion.

The cleaner transients - though these are crystalline enough even in the 1006 - add to a good holistic picture. All three particularly enjoy tracking electric guitars, giving them a perkiness and sparkle even if it was a trifle artificially emphatic, which will endear them to Rock lovers. It's unusual for a cartridge family to define itself so clearly in discrete steps like this almost exactly in terms of quality of sound for price; for my money, however, it's the 1012 GX which is the bargain of the bunch. And, as a bonus, each one comes neatly packaged, with a mounting kit of hex-bolts and nuts, spanner and hex-key which is worth a couple of pounds of anybody's pocket money, for free ●

MEASURED PERFORMANCE

Once upon a time, budget cartridges had big, chunky styli, mounted on a rondel so that accumulated fluff and dust had no effect; tracking remained unperturbed. They tracked at 2.5gms or thereabouts to bulldoze through surface debris. Nowadays, even budget cartridges like the new 1006 come with a standardised tracking force of 1.7gms - a perfect median value in my view - and oodles of tracking ability. The rondel has gone, lowering tip mass to give good high frequency tracking. The 1006 cleared 20cms/sec lateral groove velocity in the midband (1kHz), which is as far as most models go. At 300Hz, where hinge compliance determines performance, the new Goldring again performed well clearing 60µm peak amplitude, one notch below the best. So the 1006 has plenty of tracking ability. It stays in the groove well, even under arduous conditions, meaning it will not inflict groove damage due to mistracking.

To get reasonable disc clearance from a short cantilever, vertical tracking angle has been set high at around 30 degrees. This increases distortion on vertical modulation, which mainly affects left and right images. I measured 5% on vertical modulation, a poor result. However, on lateral modulation, which contributes most to the stereo stage, a low figure of 0.7% was returned, giving an average

value of 2.8% overall. That's quite good for a budget cartridge that cannot track too closely to the record surface and may have to work in a heavy arm.

Channel separation was mediocre at 23dB, but output high at 6mV for 5cms/sec rms. This is a good cartridge for amps with insensitive or noisy disc stages; a good thing as a budget cartridge will invariably be used with a budget amp.

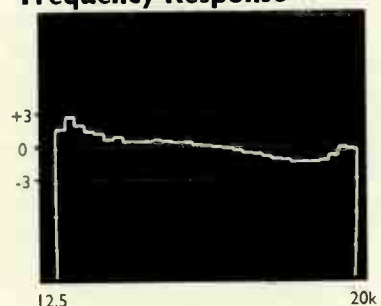
Frequency response, seen in the third-octave analysis, shows the usual Goldring trait of mid-range dip followed by some controlled rise in the upper treble. This is attributable to generator losses, but can be partially compensated for by increasing amplifier load capacitance to 200pF or so. Going any further than this rolls off upper treble, so the 1006 is best not loaded heavily. Goldrings do have the warm sound balance associated with such a frequency response.

The 1006 measures well in most respects, but like so many budget cartridges it has a high vertical tracking angle for good disc surface clearance, which adds to distortion. Being mostly second harmonic, it doesn't greatly affect matters subjectively however. The sound will be warm in balance, and should complement the budget systems for which it was intended. **NK**

TEST RESULTS

Frequency response (2dB)	20Hz-20kHz
Separation (1kHz)	23dB
Distortion (45µm, 300Hz)	
lateral	0.7%
vertical	5%
Tracking ability	
300Hz	63µm
1kHz	20cms/sec rms
Vertical tracking angle	30 degrees
Output (5cms/sec rms)	6mV
Channel balance error	0.4dB

Frequency Response



Mid-range dip, followed by treble rise.

Cure your frustrations! Get the sort of sound you've always wanted, but have never quite been able to find in its full glory. Do it yourself.

Designing and building hi-fi can be enjoyable and rewarding. It could well be the only way of getting what you want at a price you can afford. Why? In many areas, British hi-fi companies seem to be running out of ideas; serving up increasingly lack-lustre products, following now well tried patterns that guarantee only ease of manufacture and low production costs. There are more manufacturers than ever and even the recession didn't kill off hopeful newcomers, but all the same there seems to be precious little innovation around at present.



Reflections from Noel Keywood kaleidoscope

For example, how many more twin-driver loudspeakers do we need? What's the difference between them all? In truth differences are small. Yet still they get churned out, one new model after another, with little but hype to differentiate them.

As ossification sets in and differences between products grow smaller, the salesmen whose livelihood it is to move these things out of the factory get more desperate in their sales tactics. Unfortunately, we see a little too much of the raw side of this. These days, if I dare question the novelty or ability of the square box with two drivers sitting in front of me, I'm liable to receive a robust reply that'll border on the suggestion that, because I've failed to appreciate its wonders, I'm less than competent in what I do and I really don't know what I'm talking about.

Having been designing, building, listening and writing about hi-fi all my life, I don't find this sort of implication very flattering, especially from a salesman with little in the way of either qualifications or experience. But that's the way it is at present: tough. Toughness isn't the answer though; fresh ideas, innovation and worthy new products provide the only solution, not strong arm sales tactics.

British hi-fi manufacturers struggled out of a parlous position in the mid-Seventies when it looked as if the Japanese

giants would overwhelm them. They were led by Linn and Naim who shouted hard, but had something to shout about. The boom of the Eighties, from around 1984-89 put enough money into the industry's coffers for expansion, allowing product ranges to be built up and factories re-equipped.

This relatively prosperous period (in retrospect!) attracted newcomers, expanding the number of UK companies. Although figures show that in turnover, UK hi-fi manufacturers don't amount to a hill of beans against the Sonys of this world, there's still plenty of them - and the number seems to me to be steadily increasing all the time.

All this should have brought us innovation and variety, but these days we seem to be getting more mediocrity, served with increasingly strong doses of hype and obfuscation. Whether it is solely due to the recession, which has made people increasingly desperate to build simple products and move them at high prices, or whether it is due to the onset of management fatigue or delusion after the start up/success phase of a company, which seems to be about ten to fifteen years, I don't know. Whatever, there are some worrying trends, becoming increasingly obvious to us through our DIY activities.

Long ago some wag coined the perjorative but not inaccurate term "box stuffers" for many

British loudspeaker manufacturers. It was for those who bought in drive units and, sometimes with little care or ability, screwed them into a box and sent them out. In the shops, the quality of the cabinet veneer might swing a sale, so a living could be made like this. Now it seems that many manufacturers are using the same approach with CD players, buying in all the electronics, adding a few bells and whistles, putting it into a distinctive box of course, before sending it out of the door.

Reliable but Boring

There are advantages and disadvantages to this practice. We get consistency and the promise of reliability, from a product that at heart is very well researched by the chip manufacturer - always a large corporation. We also get steady technological advance, again courtesy of the big chip manufacturers and their research departments. But there are some obvious and not-so-obvious drawbacks too.

Manufacturers who choose to pursue this easy path abdicate all responsibility toward advancing the art; they become box-stuffers. Some do the job well, others take advantage, over pricing products that contain cheap parts, often meant for budget audio usage, rather than true hi-fi. This is a worrying trend.

Copycat

The other drawback, which concerns me here, is that as manufacturers flock sheep-like from one chip to another, usually in response to price/ease of application criteria, rather than sound quality, we are seeing products grow increasingly alike.

Wherever copying occurs, it's in response to a dearth of new ideas. This happens as much in publishing as it does in hi-fi manufacturing. Someone has a good idea, so everyone else rushes in and copies it. The result is before us in goodly measure: products that are all much the same internally, hawked by salesmen increasingly desperate to find and talk up differences that are usually superficial. Imitating for us and the chip manufacturers is the fact that often the chips used are not even the best available; they're usually the cheapest and the simplest to employ. That makes the sales hype sound even more hollow to me.

I can't easily start to name names, because the roll-call would be too long and the reaction too acrimonious. Put it like this: 99% of British manufac-

turers (but 100% of Japanese manufacturers) use cheap silicon chips as amplifiers, far and away the most popular being the NE5534, costing around 35p. Who doesn't? Rob Watts at DPA Digital designed his own dedicated audio chip, the DH-OA32 - that's pretty innovative. Tim de Paravicini designs everything himself, from the ground up. Pink Triangle are forging a independent path with the Da Capo convertor and, soon, the Ordinal. Tannoy are experimenting open mindedly and doing very nicely. Naim remain determinedly up-market and research orientated to boot. These are some of the best of British - companies where innovation and engineering ability remain paramount, where innovation hasn't been replaced by vacuous hype. They prove that genuine innovation is possible, even if it is becoming increasingly rare.

The Way Forward

DIY could well alter this trend toward uniformity and mediocrity, by setting example. A lot of kit designers are imaginative and will likely open up new avenues of popularity. We are championing a return to sensitive loudspeakers; I hope it will make many manufacturers seriously consider their advantages. Other kit companies are marketing niche products that could well swell to mainstream status, valve amplifiers are already in this category. Seeing a demand for such products, and also being presented with new ideas or just revived old ones, may well be just the stimulus needed to induce some companies to be a little bolder and more innovative.

DIY encourages a more involving and informed view of hi-fi. It brings people into an enjoyable hobby, a leisure pastime as its called these days, equipping them with real knowledge, instead of the flimsy hype put out by many manufacturers and passed on by journalists who know no better.

Hi-fi can and should be an enjoyment, not just a commercial buying exercise. I hope in our Case, the DIY bug will lead us into exploring some interesting avenues. For example, after hearing Yoshino, reviewed in this issue, I'm desperate to have a single-ended amplifier, but I can't afford to buy one. So very soon we'll be offering a range of single-ended designs for you to build - and they won't be unaffordable. If you want something - do it yourself! It's a great way of getting rid of those audio frustrations ●

Surely the most charismatic tycoon since the age of Henry Ford and Howard Hughes, Richard Branson has a way of changing the face of businesses he espouses. He challenged the patriarchy of the major record companies, then the hegemony of the major airlines and won in both instances. Now this capitalist swash-buckler has left a glove in Auntie's face with a challenge to the BBC's dominion of the airwaves. The launch of Virgin's new radio station Virgin 1215 is just the beginning, it heralds a Branson-style campaign for an overhaul of radio frequency allocations.

Unfair

Branson believes the present system of allocation is unfair meaning, as it does, that his own new station is confined to broadcasting on the medium-wave band in AM because of the BBC's virtual monopoly of the national VHF FM channels. (The only exception being Classic FM.) Branson has said that he is prepared to wage a "sustained campaign for fair allocation of frequencies". His widely publicised, dotty suggestion that Radio 4 could swap its national VHF channels with his national MF network, though no doubt a carefully crafted publicity stunt, obeys a widely accepted and apparently faultless logic. The argument runs that since Radio 4 is almost exclusively a speech-based service, which does not require good audio quality, it would be suited to an AM service. Whereas Virgin 1215's classic rock programme would benefit from the better audio quality afforded by FM transmission.

Not surprisingly, the BBC don't agree with him and are set to defend vigorously any attempt to wrest away any of their precious VHF wavelengths. Branson, who cannot seriously believe that the BBC will ever surrender its VHF Radio 4 service, has cleverly provoked the debate of whether it is desirable that the BBC controls 70% of the available VHF frequency allocations. My own view is that it is not, and that we shall see a carve-up of the FM band in the next few years.

But the scope of this debate should be widened still more. There should be a complete government-led review, not only of our present use of the VHF waveband but, of our use of the medium-wave band as well. Branson's dissatisfaction with his frequency allocation reveals the way in which medium-wave has been allowed to become

regarded as radio's stagnant backwater. And not surprisingly either, since most of the receivable signals on the MW band sound as if they have been recorded on a telephone answering machine!

The shame is, there is no necessity for this, it is due to a combination of disinterest, prejudice and self-fulfilling pessimism. AM radio in America sounds just fine - and most stations broadcast in stereo! When I was at the National Association of Broadcasters in Las Vegas in April I listened to an experimental stereo AM test transmission on medium-wave



to the quality of the received programme. . . . The preferred BBC practice is to equip transmitters with low-pass filters at the modulation input that have a slightly rising response between 1kHz and 4.5kHz and then a fairly rapid cut above 5kHz. This has been found to give a modest benefit in adjacent-channel interference with no perceptible degradation of sound quality on average receivers."

You can bet that those filters are still there at the transmitters, across the output of Mr Branson's digital quality, computer-controlled radio station. In audio quality terms, they make a

recorded message

Left by Richard Brice

and was invited, along with other visitors, to compare the result with an FM broadcast signal. It was very hard to tell the difference. It is true that the situation in the USA is different because the medium-wave band is less congested and is controlled by one authority. Nevertheless, the system proved that there is nothing inevitably "lo-fi" about AM broadcasting.

The demonstration reminded me of some experiments I performed some years ago, in the days when Radio 3 were transmitting on Virgin's new frequency of 1215kHz. The main purpose of my experimental work was to see if I could improve the quality of AM long-wave and medium wave reception by experimenting with different types of receiver design. I started by generally improving detection linearity and local oscillator purity in a superhet design and then moved on to other types of receiver; the homodyne, the direct conversion set and the TRF.

All my work proved interesting. Certainly I convinced myself that the superheterodyne receiver is no longer a suitable design in today's overcrowded waveband - especially at night since it is more prone than other types to adjacent channel interference and whistles unless exceptional care is taken with local oscillator and mixer circuits. But with each small improve-

ment I made I became increasingly convinced that the broadcast signal itself was of appallingly low-quality. In the end I set up my own low-power medium-wave radio station at about 1300 kHz where I re-broadcast a received FM mono Radio 3 signal using a high-quality AM modulator and r. f. signal generator. My own "Radio 3" was now right next door to the BBC signal at 1215kHz so I could easily tune and re-tune between the two.

The comparison proved very interesting. The BBC's signal was heavily compressed and very highly modulated causing distortion in all but the very best demodulation circuitry. Furthermore, compared with my own signal, the BBC's broadcast was response tailored with excessive bass and presence-band boost and very severe h.f. roll-off. Further research uncovered that this was not due to any fault in the BBC's equipment. Rather it was their policy:

"*Another operational measure being adopted by a number of broadcasters, including the BBC, is the limitation of the modulation frequency bandwidth of m.f. and l.f. transmissions. The principle of this is that the sidebands corresponding to modulation frequencies above about 5kHz are so heavily attenuated in present-day receivers that they do not contribute significantly

mockery of the signal even before it's left the transmitter mast. The BBC's intentions are laudable enough but the whole practice revolves around the interpretation of the phrase "average receivers". What incentive have manufacturers to improve receiver design if the transmitted signal is engineered around battery operated portables with 3 inch loudspeakers and about 5% crossover distortion due to underbiased output stages.

I wish Richard Branson luck in his campaign for fair frequency allocations but I hope in the resulting shake-up of radio broadcasting is an enlightened review of the old AM wavebands. There is no technical reason why medium-wave stations should not be able to provide listenable, medium-quality stereo radio. MF even has some propagation advantages over VHF broadcasting, meaning that it is more easily received on portables and cars at and near ground level which is, after all, where most people drive their cars and listen to their radios! In the meantime Virgin might consider investing some money in electronics research and development to improve AM transmission quality and receiver design ●

* *The Future of Medium and Long Wave broadcasting* J.G. Spencer (BBC Research Department) *Wireless World* August 1974

Since Gilbert Briggs put Yorkshire on the hi-fi map by starting a loudspeaker company in Wharfedale, the county has been home to numerous manufacturers known for their canny Northern business sense. Castle are part of this tradition. The company was founded in 1974 by an ex-Wharfedale engineer. The York loudspeaker adds to a range of six 'speakers that Castle Acoustics now produce. Designed as a stand mounter, the York aims to cater for all musical tastes and its basic price is £349.90.

These speakers greet you with a striking real-wood veneer. The sample we tested was finished in rich looking Mahogany, and this finish or Ash are available at the standard price. A wide range of other veneers including Teak, Oak, Yew and Rosewood are available for ten or twenty percent extra. The underlying construction of the cabinet is from sturdy MDF and detail such as twin gold plated binding posts show that from woodwork to wiring, the Yorks exude good workmanship.

Like many other box loudspeakers in this price range the Yorks are a two-way reflex design. Their twin ports are in this instance mounted on the front baffle, directly below the bass/mid-range unit. The advantage of this orientation is that the speakers can be placed right up close to a rear wall without the function of the ports being disturbed. Black cloth grilles are firmly mounted on the front baffles covering both drive units and reflex ports to leave Yorks with a tidy appearance.

Loss of Focus

The grilles have a major influence on the sound quality of the 'speakers due to the sound absorbent material packed around the tweeter unit. Part of the reason for this is to narrow the dispersion of the tweeter, preventing unwanted reflections from the walls and floor which would otherwise interfere with the imaging. Removing the grilles causes a loss of focus and a vagueness in the placement of musicians. So it's advisable to keep the grilles in place, although this does result in a very slight blunting of the high frequency content. The screw terminal binding posts accept banana plugs or bare wire and the crossover design facilitates bi-wiring. Each drive unit has a protection circuit which saves the cone from overload.

A classic example of the difference running-in can make was exhibited by the Yorks. Over a weekend their bass response changed radically from sounding tight, compressed and thin to becoming fulsome and big.

The Yorks are best mounted on stands three to four inches clear of a



FIRM FORTRESS

Castle Acoustics' York loudspeaker faces a musical onslaught under Jonathan Jordan's direction.

rear wall. Although the dispersion characteristic of the tweeter is tamed by the grilles, as previously mentioned, the dispersion is still reasonably wide. When positioning the 'speakers it isn't necessary to apply any toe in and mounting the Castles square to the wall gives the best results.

These greeted me with plenty of good bass and a very pure and flat mid-range. The early Fleetwood Mac track 'Need Your Love So Bad' was well presented with clear and tight vocal definition. Other components, such as the careful detail of the guitar accompaniment were pure; the flat mid-range did not colour or distort either Peter Green's guitar work or his vocals.

The midrange performed well and

most vocalists were given the chance to demonstrate the contours and individual qualities of their voices without any molestation. The mid-range could not be termed slow or heavy, nor could it be expressed at the other extreme as racy and fast, but it placed itself in-between as a relaxed and confident performer that takes its time, but delivers the goods in full.

The only problem I could level at the midrange was that if a deep male vocalist was accompanied by a female vocalist singing a good few octaves higher the two would not interact convincingly. Certain tracks by Leonard Cohen with Jennifer Wames' backing vocals highlighted this, their respective vocals did not harmonically

blend, but mildly interfered with each other.

The bass response of the Yorks was comfortably forceful, but not overwhelming. The bass guitar content of some of Suzanne Vega's new album, 99.9 F, was not reproduced with total accuracy, but plenty of drive was placed behind each note. The Yorks steered well clear of one note bass, but they could not manage to detail each note of the bass guitar with quite the same precision and tight resolution of a large unit in a sealed box.

The bass could also sound very 'box like' with some musical choices. The introduction to David Bowie's 'Changes' had the bass drum pictured as wooden and hard. However, when the next couple of bars introduced Bowie's vocals the Yorks suddenly seemed inspired and they managed to generate far more feeling, building a strong sense of sonic drama.

Resolution

The high frequency response of the Castles was satisfying; they ensured that each cymbal and the velocity with which it was hit was precisely detailed. Content such as the snap of a snare drum also remained free from any effects such as muffling; overall the treble was clean and clear with good focus and projection. The dome tweeter unit used does miss certain details, such as the ringing of a cymbal gradually dying, but is certainly better than many tweeters I've come across. This is not a major hindrance as the high frequency response of the speakers is still commendably accurate and detailed.

The Yorks work best when the music is planted firmly in the mid-range. Middle to high range transients pose no difficulty for the Yorks, showing that good drive units have been employed. The response from low to mid-range was not so fluid and a haunting snatch of resonant distortion can creep into the lower mid-range, but the Yorks recover in next-to-no-time and are quickly singing sweetly again. Prolonged low frequency content can induce slight suffering; for example a sustained bass guitar note at the end of one track had a ringing effect that hummed up and down in volume.

The Yorks are melodic performers that exhibit good power handling capabilities. They will give out plenty of volume for modest power input levels. In addition, the level of performance is very consistent at various volume settings. Whether operated at low or high levels, these still seem able to convey most of the musical information.

The Yorks have good focus and this adds to the enjoyable soundstage and the quality of the image they

convey. From differing listening positions to the right and left of the 'hot-seat' these speakers performed well, maintaining their depth of field.

"vocalists were given the chance to demonstrate the contours and individual qualities of their voices without any molestation."

The soundstage was quite large and wide, but a particularly gratifying feature of the speaker was soundstage height.

Although I was pleased with the imaging quality of the Yorks, they weren't as precise as the best. Instruments were placed separately within the soundstage, but these speakers don't exhibit pin point accuracy, making the exact location of each instrument a little hard to pin down.

The Yorks are a well bred and very well made loudspeaker. They have the sort of broad appeal that would allow them to work successfully with many different systems, even if they do not offer quite the level of detail and imaging that some other speakers in their price range can muster. I believe their solid approach, coupled with a mild character will provide prolonged listening enjoyment ●

MEASURED PERFORMANCE

Capable of making their own drive units, Castle possess more speaker know how than many realise. Founded by an ex-Wharfedale engineer in 1973, they have consistently turned out well engineered loudspeakers, possessing a very high standard of finish. However, Castle have yet to set the world alight.

The York is a conventional two-way design that uses reflex loading for the bass/mid-range unit. Above this driver sits a dome tweeter. Even at the expanded vertical resolution we use in frequency response measurement, the York displays an unusually flat frequency response over a good vertical listening range. The third-octave analysis is unusually flat from 16kHz right down to 80Hz, bearing in mind that peaks and dips are inevitable at low frequencies due to the room in which we measure. Castle's know how and experience show through in this respect. The low frequency roll off point (-6dB) measured around 55Hz in our room.

A flat frequency response means a reasonably even tonal balance will be provided. It doesn't mean a speaker will necessarily meet approval, because there are so many other important factors to consider when judging a design as a whole. It is a good sign though. The absence of suck-outs and peaks in particular, which produce a wide variety of peculiar effects, is important to basic accuracy.

The impedance plot is typical of the breed. It possess a mid-range peak due to rising coil inductance in the bass/mid-range unit, before the loading of the crossover and tweeter curtail this trend. Down at low frequencies, below 100Hz, there are the twin peaks characteristic of reflex loading. Below 10Hz the impedance falls, as usual, to the d.c. coil resistance value of 6ohms. With pink

noise, which approximates music, the overall impedance value measured 10ohms, a high figure as far as any amplifier is concerned. It means the York will be a reasonably easy load, although the steepness of the peaks suggests reactance will be present at low frequencies. Amplifiers can usually handle this, however.

High impedance does make an amplifier undemanding in one sense, but it also means a lot of volts need to be swung for high volumes. The Yorks measured quite well here, producing a healthy 86.5dB sound pressure level for one nominal watt (2.84V) of input. This means they'll go loud without an enormously powerful amplifier being required.

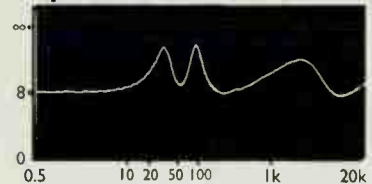
The Yorks are good all-rounders, displaying a particularly flat frequency response characteristic. Castle know how to engineer a loudspeaker; here's a good example of their ability. **NK**

Frequency Response



A well engineered frequency response.

Impedance



High overall impedance makes the Yorks an easy load.

I have long been interested in the complexities of electrostatic loudspeakers. In fact, ever since reading Ronald Wagner's book entitled 'Electrostatic Loudspeaker Design and Construction' within which he describes in detail how to actually build your own pair* and even gives a circuit diagram of a valve amplifier producing the several Kilovolts necessary for direct coupled operation, have I been fascinated by 'statics'. My interest has recently been re-kindled thanks to Quad, or rather to Noel who lent me his pair of ESL63s.

Before I rant on about the reasons why I am now seriously considering a bank loan, let me explain a little about the principles behind electrostatics. As with amplifiers there are two different types of operation that an electrostatic can use, single-ended or push-pull. A single ended electrostatic uses a fixed plate and a moveable diaphragm. A polarising d.c. voltage is applied between the two and after some time the diaphragm will settle to a static position. If an a.c. audio signal is now applied to the plate, the diaphragm will move in sympathy with the signal due to electrostatic attraction and propulsion.

Distortion

This is the least common form of electrostatic loudspeaker due to the non-linearity with which it will reproduce audio signals. Distortion is created because the diaphragm movement is not centred around its static position. As the diaphragm moves away from the plate the electrostatic force is reduced and as it moves closer the force is increased. Therefore the single-ended electrostatic can pull harder than it can push.

The most common form of electrostatic is the push-pull. This uses two plates, one either side of the diaphragm. The audio signal is applied across these plates so that when one is positive, the other is equally negative. While the diaphragm is being pushed away from one plate it is being pulled towards the other. This results in a more efficient 'speaker and one which has very low distortion. Quad's ESL63s fed with 45watts of full range signal will not exceed 1%

distortion, which is lower than that of conventional moving coil loudspeakers.

The diaphragm has to be thin, lightweight and charge-conductive which presents quite a problem in itself. Quad's ESL63s use a form of industrial cling film for the diaphragm which is then coated with a surface layer of conductive 'paint'. It is stretched tight to form a 'drum skin'. The plates either side are basically large, perforated circuit boards. The charge on the plates has to be evenly distributed across the surface, so ideally the plates would be solid sheets. But, to allow any

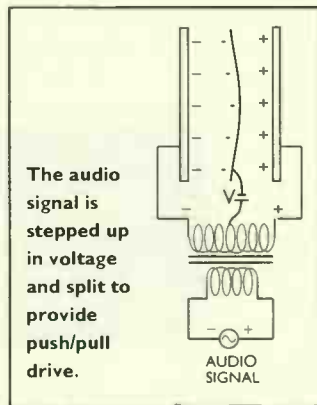


Dominic Baker

dB on the level

music to pass through them, hundreds of tiny holes have to be made across the surface of the plates.

However, Quad apply a few clever ideas of their own which make the ESL63s unique. The most influential of these being the way the audio signal is applied. The base of the '63s houses two transformers, one provides power to develop the few kilovolts of bias voltage



that polarises the plates, and another to step-up the audio signal and converts it into a push-pull drive signal. It is the way this push-pull audio signal is applied that makes them so special.

If you have ever seen a stripped down Quad ESL63 it is possible to see the way the large plates are divided up into

concentric driving circles. The signal is applied directly to the centre ring first and then to the successive outer rings via a tapped delay network. This very cleverly produces a curved wave front; the centre of the loudspeaker sends out the signal first, followed 20µs later by the second ring, and so on through six separate segments. This curved wave front accurately mimics an ideal point source, hence their legendary imaging properties.

The ESL63s that I have been using over the last week or so have had two modifications made to them. The '63s as supplied from Quad come with grilles attached. From the diaphragm outwards the sound wave has to travel through the holes in the plate, a cling film dust cover, a perforated aluminium sheet and finally a layer of grille cloth. As you might expect they sound a little muffled as standard. By carefully removing the cloth grille and the aluminium gauze the true strengths of the Quads are revealed. The difference is quite spectacular. They sound far more open and detailed and they really start to breathe. Martin Colloms, one of our contributors has noted that removing the thin film dust cover further improves these aspects. However, this is not

advisable because it would then be possible for dust to pass through the holes in the plates, causing the 'speakers to arc between the plate and the diaphragm.

The second modification involves hanging thick felt curtains about 4inches behind the rear face. Many people wrongly believe that the reason for the '63s open and spacious sound stage is that they radiate from the rear in a dipole like fashion. By hanging a thick curtain behind the ESLs, any energy that would normally radiate from the rear of the 'speakers and reflect from the rear wall to cause destructive

reflections, is absorbed. The result is a sharper image, with improved focus.

As I mentioned earlier, I have had the pleasure of listening to these extraordinary loudspeakers for about a week or so and I have enjoyed every moment of it so far. If you are lucky enough even to consider such a purchase, I would strongly recommend that you listen to the ESL63s. It takes a few hours to adjust to their rather different presentation, but from there on you're hooked. I've certainly become a Quad '63 convert.

Unfortunately, Noel has popped round to have a quick listen and is now considering taking them back for his own use. As far as I can see, my only option will be to lock the door and deny him entry, at least until I have had a chance to run them with Celestion's SL-6000 dipole subwoofers. But that will have to be a whole new story.

* We know what you're thinking - "Why don't I build a pair, it must be easy". This book is a rare U.S. import. I bought mine when it suddenly and briefly appeared at the Modern Book Co, Praed Street, London. Tel: 071-402-9176

Here I am, new to the hi-fi industry and all it has to offer. I find myself in what appears to be predominantly male territory, hence my referring to everyone herein as 'he'. If I offend our women readers - either of you - I apologise in advance.

Hi-fi? ... love it ... or leave it. These appear to be the alternatives. A third alternative, if you'll pardon the grammar, comprises all those people lodged somewhere in between these harsh extremities. They should be the main focus of everyone in the industry.

At one end of the spectrum we have Sir Looney - the hi-fi enthusiast with a drooling capacity to flood the pair of Yoshino valve amps he deliriously reaches out for, all the while contemplating the second mortgage he'll need as part of their down payment. (murder could be a viable option; with two less mouths to feed it should be easier to manage and maybe their mother won't even notice). He is the true enthusiast, born with a silver interconnect in his mouth and blue blood running

"He will inevitably pair up with a woman named Val Vamp and have 2.4 minisystems"

through his cables. He will inevitably pair up with a woman named Val Vamp and have 2.4 minisystems. Hi-fi is his world, and music is his fuel. He knows what he likes (and he likes what he ruddy well sees).

I've met several enthusiasts at the hi-fi shows. Let's face it they're easy to spot and Penta, for one, was full of them. I went to Penta just days after joining the merry folk here at Hi-Fi World, and I was in awe of these beings with their own special language and "Don't be a Bod, update to a Quad" stickers on their anoraks. Although I do respect the enthusiasts' views and opinions, this respect is tempered by my lack of 'hi-fi know-how' and I

Tongue in



TWEAK

By Caroline Knott

(You can 'phone her on 071 266 0969, but don't blame us if she makes you book an advertisement for the privilege!)

therefore find them difficult to relate to.

At the other end of the spectrum we have non-enthusiasts - the hoi polloi as it were. They really couldn't give a damn so long as it plays and, more importantly, blends in with the pine and pastel furnishings of their des res, purchased when the recession was just a thing of the future. Yuppies whom, in their heyday, had nothing better to do with their wad than squander it on the first thing they could find (in the short time allotted between yelling "buy..buy..no sell..sell...run that one past me again and THEN we'll do lunch"). These people are not keen to update their system as they don't feel there is any need to. What they have now was considered 'the best money could buy' when they had money. All this was several years ago however.

So what about the middle men (and women)? I may be a relatively new arrival to this industry, but, I couldn't help noticing that there appears to be a distinct lack of people like myself, a non-enthusiast - but by no means a Hooray Henrietta; a second time buyer - but by no means an

audiophile.

Confused yet? Me too. If you think you know what I'm trying to say, please write in and let me know, because I'm now completely lost. Seriously though - and it is. We need to know where others like myself are hiding. We can all get together and have a party, perhaps buy a new hi-fi. You're all out there ... somewhere. Too proud to admit you actually know very little about hi-fi and that you find a few of the tweakier dealers just a tad intimidating? That's understandable, but let us not forget about the majority of dealers who are altogether more approachable. They're knocking about somewhere and are all too willing to help the likes of us in betweeners. As my old Grandad used to say "Seek and ye shall find". But he scuttled off and now we can't find him!

At G-Mex I was introduced to a manufacturer, quite prominent in the industry, although a stranger to myself. I was told only his name and then the two of us were left propping up the bar at the Holiday Inn, nursing the pregnant pause that hung between us. "So you know a bit about hi-fi then?" I stum-

bled. "Not much, I'm just here for the booze really" he said. We then proceeded to have the most bizarre conversation about different lagers, hotel decor, and heavy metal rock bands. I was rather pleased with myself until later, when being quizzed by my enthused colleagues about his advertising plan from now until 1995. "What's his budget, how much did you sell?" they asked. Visibly ashen to find he was 'an important person' and a might stunned at the ill-timed revelation of his stature, I merely replied 'all will be revealed' and then skulked off in search of the nearest exit.

What would be revealed? That I'd found out Mr Manufacturer nicked hotel soaps, had seen Deep Purple at Knebworth back in '74 and that we shared the same dream of one day owning a Suzuki GSXR motorbike!

Well, I'd like to think that I have learnt from this initially nightmare-ish situation. My preconceptions of the manufacturer/enthusiast were misconceptions and these, like my prejudiced attitude towards

"I am a firm believer that if you don't know what someone is talking about, pretend you do, but don't put your foot in it"

buffs crumbled. Besides, he later booked a series of 4-colour Double Page Spreads. My 'sales technique' was probably a breath of fresh air (I like to think).

I am a firm believer that if you don't know what someone is talking about, pretend you do, but don't put your foot in it. That is my reason for this informal and certainly non-technical column - putting my foot in it. Feet are easier to use than pens - and inky toenails pass as latest fashion to hi fi buffs, most of whom wouldn't recognise a Gucci rucksack even if it dropped on their heads ●

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EAR/ROGERS COMPETITION

This competition had the postman straining with endless excellent entries, but alas, only two prizes were on offer! Various entries provided excellent suggestions, including a reference to the "EAR-Roger-ness zones" However, after lengthy judging the winner of the Esoteric Audio Research 834 integrated valve amplifier and Rogers Studio 3 'speakers was Mr M Scott of Southampton, who composed the most poetic tie-breaker. Congratulations also go to the runner up, Colin Beresford of Billinge, who will be taking delivery of a pair of Studio 3's. Finally, many thanks to the unsuccessful entrants who provided hours of amusing reading. Please keep trying.

DPA COMPETITION DELIVERY

The winner of the DPA competition, Steven Bell, gratefully received the prize of a TI transport and Bigger Bit Converter, complete with a length of White Slink interconnect. Steven, a scientific editor at the Royal Greenwich Observatory, said that he was looking forward to seeing how this excellent upgrade would perform with his existing system

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Roy Clarke has declared his home a transistor-free zone. Well, almost. There's a Kenwood KX-5010 cassette recorder lurking almost at floor level and a Quad 44 pre-amp used to re-equalise with its unique tone controls those older mono vinyl recordings which were recorded before the stereo RIAA standard. Apart from those two, this is definitely a valve safe haven. Even the Compact Disc player, a Luxman D107u, has a pair of bottles glowing behind a tiny window on the fascia.

Though the all-valve CD player has yet to be invented, the Luxman's pair add just enough of that temperate softness to CD to have Roy Clarke over the moon with it. "It just suits me down to the ground; I'll not part with it until it literally falls to pieces."

Mentioning the word transistor is not exactly red-rag-to-a-bull stuff, but Roy takes on the kind of expression someone who's just pulled off a world record ride on a Lotus Superbike might wear if you asked how he'd feel riding a penny-farthing in the next race. Yes, he'd had a brief flirtation with solid-state amps: the NAD 3020, an Arcam A60, in a way, classics of their type. But the valve bug bit.

So, the system is practically all valve; a Croft Mega pre-amplifier and power supply and - at the time I was there - a Leak TL20 power amplifier. It's been rebuilt; but everything has been neatly replaced with current equivalents rather than higher-grade or freaky components. It's not that Roy is a stranger to up-graded classics - he uses a pair of Lindley modified Leak TL10s and Quad IIs as

Reader's System

Roy Clarke is an audiophile with a fetish for valves, even his CD player has a tube output stage.

Eric Braithwaite visits.

well, when the fancy strikes him - but let him explain why himself. The idea of rebuilding a classic germinated after a spell of dissatisfaction and a meeting with Peter Lindley.

Unhappy with solid-state, his first valve experience was with a Beard P35. It hadn't the big, full bass or overall warmth he was anticipating. "I didn't like it at all; to be honest, it was probably in the wrong system for it at the time. I was using a Sondek with a Decca Gold, and it just didn't work." But it started him on the track, looking for a match to a Croft pre-amp. An attempt to purchase a Croft Series 4 didn't come about, there was too long a wait. But Clarke must be one of the very few to have gone the whole hog and installed that tricky beast, an output-

transformerless valve power amplifier. Sparing no expense, it was the Croft OTL, no less. This didn't suit either.

"It sounded fine on dem at Radletts, but when I lived with it, it only had some of what I wanted: a very clear mid-range and deep bass, but it was too cold and analytical in between. I couldn't get on with it. I spent a lot of time and money trying to build a system - various systems - around it, but nothing worked." Since he liked early recordings, he scouted round for older equipment. "A Rogers Cadet just blew my mind. A friend bought a pair of Leak TL10s - I remember laughing at him, but they sounded brilliant. I bought a pair of Leak TL10s for a hundred and fifty quid, put them in the system - they sounded great."





Just a small selection of Roy's prized collection.

Discovering Peter Lindley's painstaking and extremely attractive modifications he decided it was the Leaks that were going to be the chosen amplifiers. "I decided on a pair of Leak TL10s, Lindley-ised, and that would be it for ever more. I sent them off, which cost me more than I like to think about, but when they came back, they sounded brilliant. From then on, I just went crazy: RCAs, Quads . . . All the old valve amps just sounded so good." He'd turned into a collector.

Certainly, the Lindley finish turns the modified amplifiers into works of art, the Leak with Art Deco logo, blue paint and wooden end cheeks; the Quad II with newly burnished bronze colouring. It was having both marques refurbished that had Roy thinking about doing it himself. It was a Leak TL20 - the one currently residing in his system - that he rebuilt himself. "It's easy - if you're an electrician - to do a one-to-one replacement of components in one of the Quads or Leaks. The difference between the Leaks and the Quads is ambience, I think. The Quads are a little bit more deep in the bass, the Leaks are more open."

"Everyone uses Holco resistors and so on when they rebuild, but these are carbon, like the originals. They're not as bright. Lindley did a beautiful job, but some of the character changed. Some of the really deep depth and some of the soundstaging of the originals had gone, though technically they were much better. He doesn't change the circuit, but he alters the power supply and the smoothing a bit. I thought perhaps he was overdoing it a bit, and he's chopped it down since." Later, talking through some of the recordings he was playing, it dawned on me that one after the other was recorded in the simple miking valve heyday of the Fifties. "The closest approach to the original sound", in this instance, is the reproduction of the warm enveloping ambience with which the simpler techniques of that decade imbued the grooves. With floor-standing ProAc Studio Towers firing down the length of the eighteen-foot listening

room, Dinah Washington was big-hearted and warm, planted on the carpet almost as though the room had turned into a club. "I love the equipment," Roy said, "but I love the music, more".

It wasn't just valve amplifiers that moved in and out of the listening room until Roy finally

acquired some of the sound he was seeking. Early on, he used loudspeakers from two now defunct, but once respected names. He had praise for both: Chartwell was one, who were

"the system is practically all valve"

very much in the BBC mould, like Spendor or Harbeth, and were absorbed by Rogers. "The Chartwells stayed with me longer than anything - five years, it would be." Celef was another, a name few people now remember, but were responsible for some small but fine-sounding 'bookshelf' designs. Roy had a pair of Celef 2s; "a great little speaker."

Before turning to ProAc, he even tried the extraordinary Sonus Faber Elektors. Extraordinary because they can produce fine detail and the cabinets are both beautifully made and eccentric. "The problem was they needed more than the average valve amp to drive them." Certainly, their more natural partners are usually the big American beefcakes rather than the ten or twenty watts of British vintage. By contrast, the ProAcs are highly efficient. "You can put almost any valve amp with them; even a little single-ended thing like the Pye Mozart (with all of nine watts!) will drive 'em."

Listening to Arthur Alexander's 'In the Middle of it All', really did bring the strengths of the system to the fore. "It might not be a good recording, but it's alive," Roy said; "if only you could find a

real club with that atmosphere." I had to agree: I'd pay for lifetime membership on the spot. Warm, enveloping, inviting. "The stroke of a velvet glove on the side of your neck," said one of his friends who joined the listening session. "It makes you believe you're hearing the sort of gig you'd like to be at. Listening to Art Tatum, well, I went out and bought a saxophone. It cost three or four weeks' wages - but then I realised I never would play like him!"

If the system were used only for playing R n' B I wouldn't have been surprised. It fits like an elbow-length glove. "I'm a sucker for organ - as long as it's full of valves." It turned out Roy, an electrician by trade, had even sneaked a couple of bottles into a jukebox while repairing it . . . Even the Disney radios up on the top of the record and CD shelves turned out to be wirelasses, complete with Thirties valves inside them. Wonderful - but there was a wonderland behind the door of what will soon be a nursery.

If no system is entirely perfect for every kind of music, why not change it to suit, as and when? Hence the re-built Quad IIs, the Lindley Leaks and more, polished and shining behind that door. Here was a pair of RCA New Orthophonic power amplifiers, rarely seen, but which Roy rates very highly. "I think they're wonderful; they'll be the next item for collectors, I'm sure. Apart from anything else, the transformers are so big and so well made." Here too was a Leak Stereo 20, even a near-mint Rogers Cadet along with a large Luxman Monarch integrated. That is something of a rare beast; and his was in perfect condition, looking much more modern than it really was, resembling a cross between an Audio Research and a Copland. I'd missed, by about a week, another landmark name. Roy had been



Roy is one of the few lucky owners of the aptly named "Spacedeck" from Nottingham Analogue.

trying out a Radford ST-15. Laying all these pristine examples on the carpet would have made a chapter in a 'Ten Most Famous Valve Names' book. As it was, spread out in a fan they made an impressive display. And a real surprise: what I thought were two Pye Mozart

"very broad, very spacious with air around the players that could be bottled and sold to owners of lesser hi-fi"

control units, but turned out to be Mozart integrated amplifiers, astoundingly small. They were also, said Roy, despite being somewhat coloured, astoundingly good, with bass - like the separates I had for a period - packing a real wallop.

He even had an original instruction book for them. In fact, his casual reading goes back forty years: it's not many people whose coffee table is stacked with issues of *Wireless World* from way back instead of the *Sunday Times* magazine. Although there was a Garrard 401 to be seen in a corner, historicism has stayed within practical limits. Vinyl is played on a Nottingham Analogue Spacedeck. Not surprisingly, Roy is a fan of Decca

cartridges for their speed and attack. "I had a Linn, with a Mission arm - I loved it, but I couldn't use a Decca on it." Mind you, he's still experimenting: a Denon DL-304 had just been replaced with a Shure VST-V in the search for what he called "the feel of the old Hammersmith Palais."

I had an inkling by now of what that would be, but it was demonstrated by Jimmie Launceford. As Roy said, you could see the mirror-globe spinning in front of your very ears. It was like being transported back to the set of *They Shoot Horses Don't They* or Jack Trevor Story's forlorn Irish ballroom. And the system boogied, too: very broad, very spacious with air around the players that could be bottled and sold to owners of lesser hi-fi. It had nothing to do with the bottles of Bud we were soaking up as well as the atmosphere, but everything to do with the other kind of bottle. Somehow, Amos Milburn's 'One Scotch, One Bourbon, One Beer' had to be the song that brought the night to its close.

We'd been listening mostly to early Rock R n' B and mainstream Jazz. Was this representative of his fairly sizeable record collection? "No, it just seems to fit the mood better. I like almost everything, except for avant-garde Jazz and the stuff you get in the charts now." Is that because it's a valve-based system?

"No; I'll give you an example. When I had the first system, six, seven years ago, I bought three Simply Red albums. They sounded very dynamic, clear, very good. As I upgraded my system they sounded the same. Some of the older recordings I have from the Fifties, well, the better the system became, the better they got.

People now don't know what live

music really sounds like. We've all been to gigs and thought a legendary band or singer wasn't very good. I can't pretend something's good when it isn't. Billie



The beautifully restored Leak TL20 stereo.

Holiday - she's a pet hate; you listen to the later recordings, she's off-key, cracked. There is a poignancy about that kind of thing, but you hear her dragging, the band holding her up. But when you go into Tower Records, you see these young girls in Doc Martens - and what are they buying? These Billie Holiday CDs. To me, they're not listening with their ears, but to what they've read. I lean to 'good-time' music; that's what the system's optimised for. And, of course, anything recorded using valves."

"The sound should be like

a good piece of gossip," said his fellow-in-arms. "you should say, 'Hey, that's interesting.'" Coincidentally, our attention was taken by a good piece of gossip: graunchy playing on a Decca CD of the Billy Strayhorn Quartet playing 'Cue for Saxophone'. "That's a 1959 recording, and that bassist is so real. It's right out there in the room." And indeed, so it was. "Yes, of course there are ones that aren't well recorded, but it's good music; what do you do? You shouldn't dismiss them and say 'That sounds terrible, I won't play that on my ultra-

modern system!'"

The power amplifiers might come in stereo pairs, but we agreed about the high quality of many mono recordings, too. Like me, Roy is a fan of the early Capitol Jazz discs. We played a couple: in this system, it would be near-impossible to convince someone who didn't know that they weren't listening to stereo. "Mono's unfussy; that's a 1950 recording, but it's all there. It's very well recorded. What we want nowadays is an all-valve studio. Transistor time-wasters not required!"

We'd considered cables, briefly, Roy muttering imprecations about the cost, even though the current loudspeaker cable is van den Hul at a not inconsiderable amount a metre. "The biggest cable upgrade was going from bell-wire, right at the beginning, to 79-strand.

After that, the degree of improvement gets smaller and smaller." It occurred to look for tweaks, there being a faint glimmer of a triangle of foil on a mains plug. Yes, he had tried Peter Belt's treatments. No, they weren't in place any longer; that foil catching the light



Roy changes from the Leak Stereo 20 to the RCA New Orthophonic power amplifiers.

was the last remains. "The best upgrade is a good strong lager!" said his friend.

"Longevity of listening, that's why I'm into valves," said the collector. The session was supposed only to have lasted a couple of hours; it was into the early hours when I put the key in my own door. It was a couple of hours later when I awoke from a dream about a shiny old Leak. I think collectorship is catching. Why aren't shops that sell New Orthophonic amplifiers, KT66s and carbon resistors open at three in the morning? ●

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We build a kit turntable from Origin Live.

Review of a circuit board (PCB) layout CAD package.

- and enough to whet even the most impractical hi-fi enthusiasts appetite.

MOTH REPLACEMENT

I would like some advice on tonearms. My system consists of a Systemdek IIX900AP with Moth arm and Goldring 1012 cartridge partnered by a Mission Cyrus 2 amplifier and Cyrus 780 speakers. I am very happy with my hi-fi which gives a very natural sound.

A friend who happens to be a hi-fi buff insists, however, I could improve the sound either by investing in a moving-coil cartridge or alternatively upgrading the tonearm for a more expensive model, at the very least a Rega RB300 or Roksan Tabriz arm.

But considering I'd have to try and sell the Moth arm, would such an expense be justifiable in terms of sound improvement (which I already think is excellent) or just be money ill-spent?

**J. R. Leese,
Brighouse,
W. Yorkshire.**



The Systemdek IIX900 is such a good basic turntable, that upgrading the tonearm is certainly worthwhile.

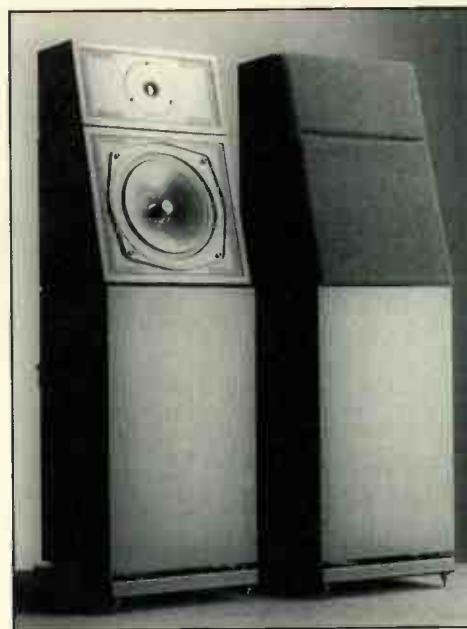
I think you've answered your own question. If you're happy, why change? However, better prospects are certainly within your grasp. The only thing you have to do is decide whether you want to spend the cash. I hear, in the background, a heavenly chorus of dealers saying "Yes, please"!

The Systemdek is such a good basic turntable that in a way it's a pity to waste it. While the Moth/RB250 is probably the best basic arm around, enough can be gained from upgrading it to make the exercise worthwhile. Given

the rest of your system I would suggest an RB300; the Moth should fetch fifty pounds on the second-hand market, somewhat less if you find a dealer who is willing to accept it as a trade-in. It will accept cartridges well beyond its own price bracket; I've found the Ortofon moving-coils generally a good match, more so for the '300 than the '250. I think you may be surprised at the improvement obtainable for a relatively affordable outlay. I once, foolishly, lent a friend an Ortofon MC10 for a Rega 300 - purely temporarily. That was two years ago and she won't hand it back. **EB**

GETTING RID OF GRAIN

I would like your advice as to my next upgrade step for my hi-fi system. It currently comprises an LP12, Naim Aro, Koetsu Black, Pink Link power supply and mods, powered by NAC72, Hi-Cap, Nap 140,



Naim's SBLs are an ideal upgrade for a Naim amplification system.

- 2 Acquire a Mana mini table for power supply of turntable and
- 3 Look at changing to a more expensive moving coil cartridge and
- 4 Perhaps at a later date acquire bigger speakers, e.g. Naim SBLs.

**John Gray,
Silverstream,
Upper Hutt,
New Zealand.**

I would certainly suggest trying the NAP250, given the set-up you have, but with the definite aim in mind of going for the SBLs, which I think will do what you want. I doubt whether a Mana table under the power supply will make an appreciable enough difference in current circumstances. Providing your Koetsu's cantilever and generator are in good condition, I would also suggest having it re-tipped. **EB**

CD FATIGUE

My current system comprises Thorens TD166 MkII fitted with a decoupled Grace 707 arm and Supex SD900 Mk2 moving coil cartridge (Garrott Bros retipped) and Tiffany connectors to the pre-amp; NAD 3020A amp, but using only the preamp; NAD 2153 power amp. Interconnects between these two are Monster Interlink 300. Marantz CD52 Compact Disc - also using Monster Interlink 300 interconnect to pre-amp; B&W Matrix 1 loudspeakers using Monster speaker cable and a

pair of Stax SR5 electrostatic headphones. The pre and power amp are left on twenty four hours a day.

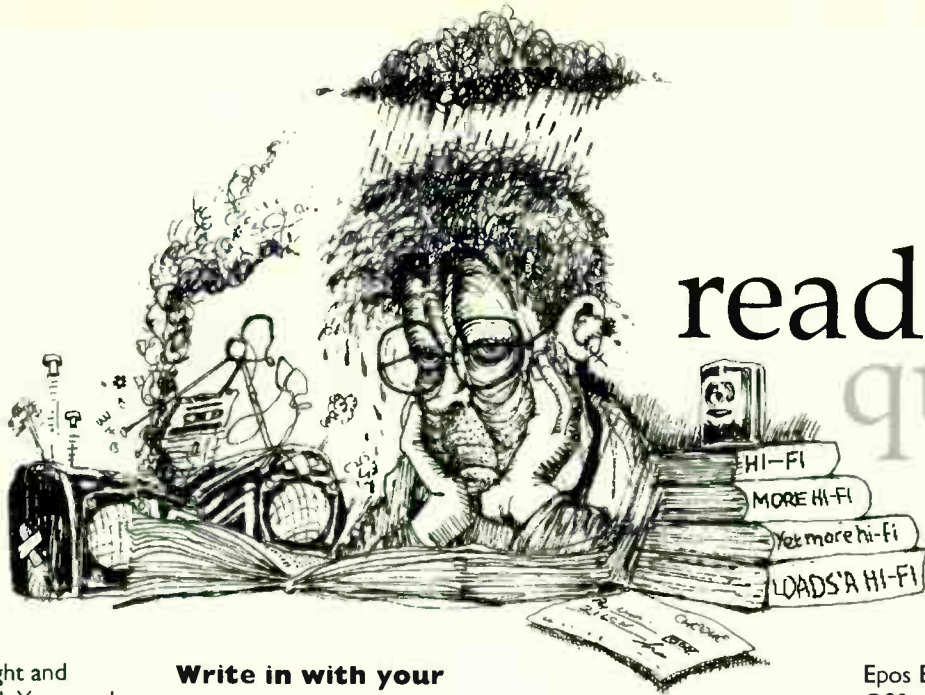
My problem is that I don't enjoy listening to the CD player through the headphones - very bright and fatiguing. The same can be said for listening to the speakers using the CD, but listening to the turntable through the speakers or headphones is

fine.

Could you recommend some interconnects and speaker cable to produce a more listenable sound, preferably in the mid-price range? I would also like you to recommend an upgrade for the arm and in particular the cartridge, as I still enjoy listening to analogue. If you have any other recommendations as to the system as a whole I would be very grateful. **Graham Wirth,
Melbourne,
Australia.**

I think we have a definite problem here, in that I strongly suspect you have become used to a particular kind of sound from the Thorens/Grace/Supex and expect CD to emulate it. I'm not convinced that trying to tailor sound via interconnects is at all a good idea, bearing in mind that while it might be possible, the eventual expense might well have been better employed upgrading the amplifier and CD player. As we've learnt from other Aussie readers, Australian prices can be very different from those in the UK, but I would suggest you listen to the 'Legato Link' Pioneer players or their standard brethren, the PD7700 or 8700. Alternatively, Furukawa interconnect sounds a good bet - but a change of CD player is probably cheaper! **EB**

Your Stax SR5 headphones



readers' queries

are light and bright and analytical, I recall. You need a super-smooth CD player, as Eric recommends, to avoid being overwhelmed by the harshness of CD. In addition to the Pioneers Eric recommends, you could also consider a Philips CD850II, which might be less expensive than an Arcam Alpha Plus, another possibility. **NK**

OLD LEAK

My system comprises a Michell Gyrodec with Michell Power Supply, Rega RB300 arm with RATA RP70 Van den Hul stylus, Arcam Alpha analogue tuner, Audiolab 8000A amp (new), F52T35P speaker cable and a pair of Leak 600 speakers (twenty years old).

At the moment I want to



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change the cartridge as RATA no longer do the VdH stylus. We like an open, detailed and musical sound with depth. Would the Ortofon MC15, Roksan Corus Black, Shure VST-V, Goldring Elite or Denon DL304 be suitable? We would like an opinion before committing up to £200 to the wrong item. We tried a friend's Audio-Technica OC-5 and didn't like it at all. It was much too forward and the treble was very harsh and difficult to listen to for any length of time.

We are also hoping to buy a second-hand pair of ProAc Super Towers. Will these be compatible with the rest? If the second-hand buy does not come off we will have about £500 to spend on some new ones. What would you recommend? The room size is 22ft x 11 1/2 ft - the speakers are centrally placed on the long wall, as that is the only way they can be sited.

**Harry Ross,
Bodmin,
Cornwall.**

The difficulty with recommending a new cartridge is that, not knowing the Leak 600 loudspeakers it is hard to say how much of the sound of a particular cartridge is coming through. If you buy the ProAc Supertowers - there is no reason why these should not be compatible with the rest of your equipment - you could find yourself disliking the sound of a new cartridge which you were happy with before.

Still, since the way you describe the AT-OC5 sounds about right in this arm/turntable combination, we can probably take a risk. I've always found Ortofons seem to suit the Michell/Rega combination and the high-output moving-coil MC15 Super does very well. It is one that has to be allowed to grow on you - a friend initially found it a little too bright after a cartridge with a warmer top - but within a week was very admiring of its detail, clarity and speed.

If you prefer almost equal detail, but a smoother overall sound, I would suggest the Goldring. The Shure, although it has all the moving coil strengths I admire, plus amazing tracking ability, I would have doubts about. It tracks best at a low force, which in my experience of RB300s is not the best thing to arrange. Also, the VST-V is, thanks to the exchange rates, a relatively more expensive proposition in this country.

If the sale doesn't come off, other speakers around the same price are Rogers LS6a/2,

Epos ES14, KEF's Q60 or Q80, or Tannoy 611s, in a kind of ascending order of difference in sound style from the ProAc's. I'd be chary of suggesting others, since all these can be used near a rear wall which is required if they are to be placed along the longer wall. If you can, try to hear them in situ first. **EB**

I do remember the sound of the Leak 600, even though it predates my involvement in hi-fi (if not in life!). Although good in their time, they are outclassed now and should go. The Supertowers should be compatible with your Audiolab amps, which is very neutral and capable. **NK**

KARIK QUESTION

I am writing to you as I would like some advice as to upgrading my system, which comprises a Linn LP12/Ittok LVIII/K9 and Naim 72/140, Ruark Sabres and NAC4 cable.

I still enjoy listening to records (have about 200) but am aware that LPs will not be available for much longer.

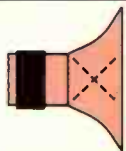
So, should I still consider looking for, say, a Lingo/Ekos/Troika, or should I go for a good digital machine instead?

As for CD, I am interested in listening to the Karik and CDI.

What in your opinion would suit my system best? Should I expect a drop in sound quality by tuning to CD front-end? I can't find Mana Acoustic tables in this country.

Finally, as I am interested in purchasing some items in your Mail Order section, I wonder if

Continued on page 69...



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Continued from page 67

I can apply, and if we still have to pay customs duty.
Massimo Bruscolini, Rome, Italy.

I've always thought that there should be a stage at which one should call a halt to upgrades to one's vinyl system. (I can hear the howls from Glasgow from here!). Before the lynching party catches the next Shuttle to Heathrow, I ought to explain that I mean in terms of cost of the hardware relative to the value of the LP collection. I have to admit my own LP playing system at the moment comes out on the calculator at around £3,500 - but I have a couple of thousand LPs, so at their minimum second-hand value I'm keeping pace.

When the value of the hardware overtakes that of the software, my advice would be either 'Stop' or 'Buy more LPs' I think you are at the point where I would advise 'Stop'. With one exception: improve on your K9. (See our March issue.) A Goldring 1042 offers a large, fullsome sound with superb high frequency detailing and transient speed; a Sumiko Blue Point gives a brighter balance, but less precision.

I'd advise the CD player was changed. Given your system, of the two you mention I would go for the CDI as the better potential match sonically. Alternatively, if there is a Sugden dealer in Italy, do try the SDT-1; and I would recommend the Micromega CD2/Duo Pro combination as a different-sounding but viable contender; it is bright but enormously analytical. At this level, you should experience no drop in sound quality, though you may well experience a difference which is not the same thing.

Mana Acoustics do not currently have a distributor in Italy, but if you would like to contact them at their address in the U.K. they would be happy to help:

Mana Acoustics,
59 Jubilee Close,
Pinner,
Middlesex
HA5 3TB.

As to buying by Mail Order, anyone can apply! Now we're

all in the Single Market together there should be no problem at all with Customs Duties. However, this does not apply to Eastern European countries or North America, where import duties may well be levied. **EB**

CANADIAN SOUNDSTAGE

I've been picking up your magazine over the last few months and have been very



The Micromega CD 2/Duo Pro is one of the best digital sources available.

impressed with the quality of your publication. I was hoping to get an objective view on how I might improve my system, which consists of the following:

- Philips 880 CD player
- Micromega Microdac D/A convertor
- Straight Wire Encore Interconnect
- Audiolab 8000A Integrated amp
- Vandersteen 2CE speakers, bi-wired
- Kimber Cable 8TC speaker wire

I should add that here in Vancouver I was able to get the speaker new for £800 - \$C1600.

My listening room is quite unusual - I've enclosed a diagram. Roughly 16x24ft with a cathedral ceiling which goes from 20ft high to 8ft high (where I sit) over the 24ft span. Adjacent and open to the right speaker (my right from the listening chair) is a 12ftx12ft arena with an 8ft ceiling. Hardwood floors and ceilings have been dramatically 'softened' with two couches, throw rugs, tapestries and lined drapes behind and two the immediate left of the listening area.

Large orchestral works, organ music and the like sound very lifelike due to the quite large room size. Occasionally, the sound can be a tad too bright (Hard? Brittle? Sounds like a wine-taster's vocabulary!) especially at high volumes - 11 or 12 o'clock on the Audiolab dial. I have been considering turning the 8000A into just a pre-amp and getting the Audiolab 8000P power amp.

My question is - will this first

This situation is a difficult one. Your room is large and as you seem to find, it needs a lot of power. This raises the problem of finding both amplifier and loudspeakers capable of working at high levels without strain. The Vandersteens are insensitive too, so it isn't surprising that your Audiolab is running out of steam, as you suspect. It's replacement is necessary.

An Audiolab 8000P would go usefully louder, delivering 144watts into 8ohms, the impedance of the Vandersteens. The Bryston and Sugden are likely to be marginal in their ability to cope; I'd suggest caution and a home demo.

Having changed the amplifier, you may then find the loudspeakers showing signs of strain. If so, you could try auditioning KEF 105/3s, since they suit your tastes. We found the Vandersteens pleasant, but a trifle vague. The KEFs would offer a tidier sound and go very loud. **NK**

THIN AND UNINVOLVING

My present system consists of LP12/Lingo, Ittok LVIII, Sumiko Blue Point, Trampolinn, Mana

get me 3dB more volume without noticeable sound quality improvement? I mostly listen to acoustic Jazz. I'd like a deeper soundstage, deeper, more defined bass and smoother highs. Money is a factor, which is why an inexpensive adjustment to the 8000A, turning it into a pre-amp, is so appealing. I'm also considering the new Bryston 3A (125W amp and pre combo, as well as the Sugden (100W) combo. I used to have Musical Fidelity MC4 speakers which I liked quite a lot, but moving to our new home with a much larger listening room drove me to the Vandersteens, which I really enjoy. The MC4s sounded a bit ragged at high volumes; the 2CEs seem ideally suited to a very large, somewhat lively room.

Alan Podadowski, Roberts Creek, British Columbia, Canada.



KEF's 105/3s should easily fill a large room.

Reference Table, Pioneer A-400, Linn Index IIs on Ku-Stone stands, with K-400 speaker cable; two separate mains spurs are fitted, one for the amplifier, one for the turntable. Room size is 15x12ft, speakers four inches away from the wall, tilted in at five degrees, firing

down the length of the room.

My problem is, I'm just not happy with the sound of my system. The sound is thin, lacks body, lacks punch, is cold, no image, uninvolved. Just does not sound natural. I suspect the problem is my amplifier and speakers. Is the Pioneer good enough for the LP12? Also, is the Blue Point a good match for the Ittok?

Amplifiers I have considered are Naim, Audiolab, Audio Innovations. I want an amplifier that will satisfy me; it must have a good phono stage, good moving-coil input and built to last. If the speakers are the problem, can you please recommend speakers for the Pioneer A-400 as a match for my system, so I can go back to listening to music. My budget is £1000.

**C. J. Smith,
Manchester.**

It's surprising that your system should sound so cold as to be upsetting. The A-400 is unlikely to be the culprit in this matter, since it has large bass and sweet treble, not matching the description "thin, lacking in body, uninvolved". The Sumiko Blue Point in the LVIII arm, in conjunction with the Index IIs are primarily responsible. I also suspect other factors are coming into play, namely that your room may be sparsely furnished and you might be averse to the sort of analytical, but bright, sound that others like.

You'll find the warmth and full body of Goldring's excellent 1042 cartridge, together with its high degree of detailing, will provide an altogether more amenable balance.

If this doesn't bring about the degree of change you are seeking, then I suggest you try KEF 101/2s or B&W 805's, both of which are full bodied yet have smooth treble. It might seem contradictory if I suggest that in conjunction with the A-400, both might sound bloated, so do be careful. I suspect, however, that your system sounds cold because of an X factor you don't mention, in which case choosing items with 'warmth' could well provide the compensation you are looking for. **NK**

HOOKED ON ANTIQUES

Music is to me a very enjoyable hobby and I just happen to have discovered the virtues of real hi-fi. I never considered buying expensive equipment until I came across a lovely Quad II/22/FM2 combination. At first, being hooked on antiques, I was charmed by the looks of the thing, not to mention the beautifully-shaped KT66s and GZ32s.

But yet, the best was still to come. The sound was warm and detailed and above all never tiring (actually it is so relaxing that I am now finding the days too short!). Plus, I mustn't forget the stereo. That

few modern decks such as the Rega or the Systemdek, I would like to expose my view on those products. To tell you the truth, I am sure they sound quite good, but find the build quality of modern turntables rather light, which is a bit disappointing.

I heard a lot about older models like the Garrard 301 and 401 or the original Thorens 160. Would these be a good bet? How about using modern cartridges with them? I mainly listen to West Coast Jazz, Chet Baker being among my favourites.

**Hugh Gabriel
Address withheld by
request.**



Goldring's 1042 moving magnet cartridge offers a big, warm and highly detailed sound.

was a true revelation to me. One has really to listen to monoblocks to understand the meaning of the word.

That said, I think I ought to explain my problem. The Quads have given me so much listening pleasure over the last three months that I feel I should thank them one way or another. Believe it or not, I am still using my Sony APM 10ES speakers. Although they sound O.K., I think the Quads would benefit greatly from a new pair of speakers. I have in mind the Richard Allan RA8, but I am prepared to go for second-hand if it is worth it. Also, I should mention that my listening room is of modest size, and this is equally true for my bank account.

Secondly, I now feel like rediscovering my LP collection. I am not in a hurry for a turntable, but having seen a

Sometimes people accuse hi-fi 'buffs', like us at this end of the pen, of being infatuated with the hardware and, by implication I suspect, oblivious to the music. It's always nice to be reassured that music lovers who are exposed to hi-fi also find it increases their listening pleasure. I'm sure that's what happened to me once upon a time, but it was so long ago, I can't remember!

Anyway, I'm pleased that you are getting so much pleasure from the music, because that's surely the sign of a good hi-fi system. Valve amps can offer a wonderful relief from solid state hardness and the Quad 22/1Is, which I once owned as well, are as sweet as you could wish. The big problem you face is their lack of power; mine could barely make 12watts and they had to go in

the end because of this limitation.

Believe it or not, there are no valve-amp compatible loudspeakers on the market and we have spent time discussing this with Andrew Jones, Senior Engineer at KEF. He said it would be possible to make an ultra-efficient loudspeaker and they are looking into this possibility. In the meantime, the best loudspeaker for valve amplifiers I have come across to date is the new Heybrook Quartet. It is very sensitive at 89dB sound pressure level for one watt input, and with an overall impedance of 9ohms is also suited to 8ohms tap on the output transformer of valve amplifiers. Having a highly detailed and 'fast' sound, it could well be what you are looking for.

You should be in a hurry for a good turntable, because it will be a revelation. And a Garrard 301 or 401 will do nicely if you can find one in good condition and then mount it on an appropriate plinth. There are now two available of sufficient mass and density to do this under-rated turntable justice: the Maxplank from Martin Bastin (tel: 0902-751861) and a beautiful marble plinth from Peter Soper of Slate Audio (tel: 0525-384174). Use a Rega RB300 arm, or a modern SME if your wallet will take the strain. I would direct you to Goldring cartridges which, these days, easily outperform the competition in my view.

If the cost/hassle of getting an old Garrard working becomes too much, then don't ignore a Rega or a Systemdek (with RB300 arm). They're fine turntables. The Systemdek with acrylic platter I find very neutral in the mid-band; it's a delight. **NK**

GARRARD TO CD

I am writing to you in the hope that you may be able to offer me some advice regarding upgrading my hi-fi system. The room is approx 19ft x 13ft and the equipment is positioned as per the attached diagram and consists of the following: 1. Garrard 401 turntable mounted on a custom made plinth fitted with "MICRO" shock absorbing feet (plinth approx 1975 vintage) fitted with a SME 3009 series 2 arm and AKG P8ES cartridge in an



Slate Audio's Green Monster marble plinth for the Garrard 401.

ADC magnesium headshell (turntable mat is not the original but a felt replacement).
 2. Naim NAC 72 preamp and NA 250 power amp plus Hi-Cap power supply.
 3. Naim SBL loudspeakers.
 4. Interconnects are SME to the preamp and Naim elsewhere.
 5. Turntable and amplifiers fitted on a Target three shelf table.

My preference in music is basically Classical with some melodic Pop as well (Whitney Houston/ Eric Clapton /Lloyd Webber etc.)

The sound of my present system is good, especially since I have mounted the speakers on concrete plinths set into the suspended floor (this has tightened the bass considerably).

I would like to:

A. Upgrade the turntable (I auditioned my setup against various Linn units approx 2 years ago and found the sound very similar to LP12/Akito/K9 and only appreciably bettered by the LP12/Lingo/Ekos/Troika combination). Initially I thought of having the turntable overhauled (although bearings/ rumble etc. show no audible deterioration from new) and fitting a new cartridge (new styli seem to be unavailable for the AKG and I have never been happy with the mechanical fixing into the shell) but compatibility with modern top quality cartridges seems to be a problem with the old SME so that I am now considering changing the arm to a Series IV or 309 SME and would appreciate your recommendation on these plus a suitable cartridge.

B. Purchase a good quality Compact Disc player or

transport/DAC (as records are now getting very difficult to obtain). So far I have auditioned the following (unfortunately not all together): Micromega CD3 with Microdac/Duo BS/AVI DACs and AVI CD player at home in my system. (Preference was CD3 with Duo BS, the AVI systems having an annoying buzz when in standby mode).
 2. Naim CDS and CDI players, Meridian 200/263, Roksan transport/DAC/power supply, Linn/Numerik & Arcam systems. The preference in this case was the CDS (although the price is out of my range) closely followed by the CDI.

The Linn I found too "laid back" and the ROKSAN much too "aggressive" while the Meridian was a bit bass light and tended to get muddled on very demanding pieces.

I would appreciate your comments on these plus any other suggestions you may have (one possibility I had considered was the Micromega transport with the QED Digit and then upgrading the DAC in a couple of years when extra funds are available).

My total budget for the above is approx £2500.

**D. H. Lines,
Benfleet,
Essex.**

Your turntable set-up is far below par for the quality of the subsequent items and it does need upgrading. Also, bear in mind that cartridges wear out, slowly losing their clarity. The only difficulty is in deciding where to spend money and why.

The Garrard should be kept, but both the arm and cartridge should be replaced.

The most cost effective solution is to go for a Rega RB300 arm, to which I would fit my favourite moving magnet cartridge, the Goldring 1042. A modern S.M.E. arm would of course be preferable, but also more expensive.

You may well like to consider a scheme of ours, just coming to fruition, of which this is the first tentative mention. We have proposed to S.M.E. that they produce a Garrard 401 Celebration pickup arm, based on a current design, and they have agreed it would be very fitting. A fax from Brazil fluttered onto the floor the other day, giving us necessary clearance for use of the name, so it looks like we have the go-ahead. By the time you read this, the project will hopefully be well advanced. So how about a dedicated S.M.E.?

Sadly, mainstream material now appears mostly on CD alone, so it is unrealistic for us to advise you stay with LP I feel. There are no CD players that really sound like analogue, so you'll have to accept the culture shock. We agree with your choice of CD player from amongst the ones you have auditioned, but others spring to mind. Everyone - including myself - is surprisingly impressed by the build quality and sound of Sugden products. Eric is currently using the Sugden transport and SDI convertor as a reference player and Dominic was most impressed with the quality of the AU 41 C&P pre and power amplifiers.

They inject more body into the sound than is common, whilst remaining detailed and precise. Try an audition them as well, since they fit into your budget nicely, giving enough leeway to allow you to get superb results from both mediums. **NK**

HORN KIT

When finances allow, I intend to have a Leak Troughline fitted with a new decoder, like the Tim De Paravicini unit, and realigned, but Radlett also do a new decoder; how does this compare? Also, if I am going to do the above, would it be worthwhile (cost!) to have a full overhaul with new caps resistors etc.?

Though I am very happy

with my IPL SL3's, I have a nagging urge to build a pair of Horns. I keep being drawn back to the April '91 edition and your Horn Kit, though I am aware that the driver and cabinets are no longer available. So I was wondering if I could purchase the plans for the above. I believe the Seas CA21 REX/DD 8" unit (93 dB sen) and fabric dome tweeter would provide an excellent alternative.

If you do not have any plans would it be possible to get in touch with any of your readers who made the kits, or, even better, could I contact Bill Webb for the above. I would also be interested to know whether the mouth could be repositioned to the bottom of the cabinet to use the floor as a substitute flair to broaden (lower)the bass response and reduce any sudden pressure drop at the discontinuity and therefore any harmful back reflections.

**R.B. Lewis,
Tenby,
Dyfed,
Wales**

We spoke to Radlett Audio (tel: 0923-856497) about this, since they deal with both decoders you mention. For Tim's hybrid valve/silicon chip unit, you must ensure the Troughline is in good working order first and properly aligned. The same applies to Graham Tricker's silicon-chip unit, but Graham will arrange repair/alignment as necessary. However, repairing and aligning a Troughline can cost £50-£100, a charge that has to be made quite separately from decoder cost and fitment, so do be aware of possible difficulties and costs. The sort of full overhaul you mention would be prohibitively expensive I suspect, since rebuilding is a time consuming process, but the power supply capacitors would be replaced as a matter of course, since they are in nearly all cases faulty.

The horn kit is unavailable from us, but you can 'phone Bill Webb, the designer, at 081-985-0945 and he may be able to help. Alternatively, The Loudspeaker Co. (tel: 0625-500507) now has a horn loudspeaker kit that sells for £745 (it's 40in high x 14in wide x 20in deep). **NK**

The Music Pages

Edited by
Jonathan Jordan

Malcolm Steward

This month Doctor Steward prescribes an extra heavy dose of the blues with a small injection of funk to enliven tired limbs.

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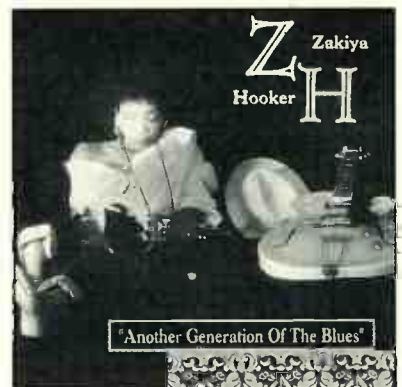
**MAURICE JOHN VAUGHN
In The Shadow Of The City**
ALLIGATOR (through TOPIC) ALCD 4813

● A couple of years ago, I elbowed my way to the front of the stage at Kingston Mines, Chicago's hottest blues club, to get a closer look at what the guitarist leading the band was doing to make his blonde Gibson sing so sweetly. After the hour-long set I retired to the bar and found myself standing next to the man in question, Maurice John Vaughn. We chatted for a while and during the conversation he surprised me by saying that he'd started playing tenor sax but switched to guitar when session work for horn players had dried up. Before going back on stage he handed me a copy of his 1988 album *Generic Blues*, which I assumed would serve thereafter as a memento of a fine gig by an artist of whom I'd probably never hear again. Although Chicago is home to some seriously dangerous players, most sadly never make a record - even less the big time - despite their talent.

I was therefore surprised and delighted when Topic Records, who

handle the Alligator Records catalogue in the UK, sent me this disc. *In The Shadow Of The City* is a not-to-be-missed sample of contemporary Chicago blues for those who haven't been fortunate enough to spend a few hot, sweaty, smoky wee small hours sardined inside Kingston Mines or Buddy Guy's. Vaughn's music is steeped in the blues, but bang up to date for the 'nineties: the rhythms seethe with sassy funkiness, the melodies have an impassioned sweet-soulfulness, while the whole has a street-wise edge and realism.

Every one of the twelve cuts on this album, whether it's the slow burning 'I Want To Be Your Spy', the rousing boogie woogie of 'Small Town Baby' or the sensual grind of 'Blood Red Sky', has that indefinably infectious groove that has you feeling loose-limbed and euphoric from the moment it hits you when you step out of the cab outside Kingston Mines. If you can't make your way to 2548 North Halsted, this CD will give you a taste of the fine music you're missing.



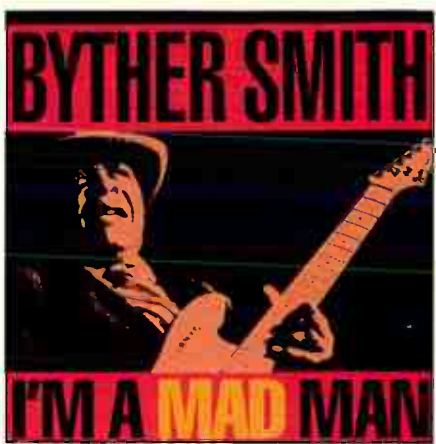
ZAKIYA HOOKER
Another Generation Of The Blues
SILVERTONE ORE CD526

● Singer Zakiya (born Vera Lee) Hooker is the daughter of living blues legend, John Lee Hooker who, completists will want to know, guests on two of this album's tracks. It's no surprise that having grown up surrounded by the blues - she remembers players of the stature of Muddy Waters, Jimmy Reed and B. B. King calling at the house to jam with dad - she's continuing the family business. Her music isn't, however, fixed in the traditional vein; she brings to the established discipline a wealth

of contemporary diversity and embellishment.

The arrangements on Another Generation of The Blues are fleshed out with synthesised and wah wah guitar, alongside the customary acoustic, electric and slide instruments. The Fat Lip Horns and a bevy of backing singers further make for a bigger band sound than you'll find on most blues albums. Zakiya's vocal delivery and boundary-crossing approach to the music also provide powerful modernising influences, although the blues never dips far below the surface. The acoustic guitar-backed 'Hang On For A While' and the duet with John Lee, 'Mean Mean World' with its references to Shopping For my Tombstone, would satisfy the most hardened twelve-bar purist. Her animated version of Ray Charles' Funny (But I Still Love You) demonstrates that the lady can also hack it when the mood shifts toward jazz. Her vocal register changes, but her ability to express emotions stays as convincing as it is on the more abrasive numbers.

John Lee Hooker fans will find this CD interesting if only because it shows that a daughter can follow in her famous father's footsteps. There's no doubt that Zakiya has inherited the familial sensitivity for a blues song. Other music fans will enjoy it simply because this woman really knows how to sing.



BYTHER SMITH
I'm A Mad Man
BULLSEYE BLUES CD BB9527

● Writing in the liner notes to this release Mark Lipscomb remarks "Days you got those killing blues, put this record on. There don't seem to be too many real blues artists any more, and that makes this a record to cherish." I'm not about to disagree with that sentiment, especially if Byther Smith is half as mean as his playing suggests he might be. This man can turn a guitar into a lethal weapon. Listen to the CD's title track where Byther intones "...bom evil, I'm gonna destroy this world... blow up the sun and set this world on fire... I'm a mad man." Something in his voice and the

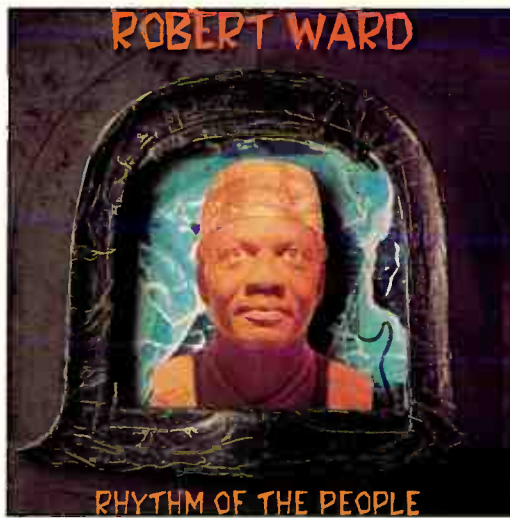
menace in his guitar playing suggests that he's not kidding! The track that follows, 'Get Outta My Way', is equally intense even if its subject matter is more down to earth (get out of my way, boy, I'm talking to your wife).

This is an album for blues fans who want in-your-face music with all its rough edges and raw energy intact. Byther's kiloVolt guitar and nuclear-powered voice don't bow to politeness or demands for sweet, sanitised versions of the blues. His stinging guitar sound and attacking playing on I Got So Much Love could strip the paint from your walls. The Studio Six, Memphis recording preserves the music's drive and vigour beautifully, especially the top end, which lets the lead guitar cut like a surgeon's knife.

To quote Mark Lipscomb again, this time on the subject of blues becoming commodified: "Instead of music that grabs reality by the shirt front and holds it tighter than Jacob held God, we're going to be attacked by musical zombies doddering around under the spell of bad academic juju." Fans of unadulterated blues need not worry. The zombie killer has arrived and his name is Byther Smith. Those who want to clean up the blues should get outta his way, 'cos he and his guitar are as mad as hell.

RECORD OF THE MONTH

ROBERT WARD
Rhythm Of The People
BLACK TOP CD BT-1088



● I extend my sincere thanks to Hammond Scott of Black Top Records: he was responsible for rediscovering guitarist-singer-songwriter Robert Ward, who had been hibernating in deepest Georgia since the 'seventies. He brought him to the attention of the record buying public with the damn near perfect album, Fear No Evil (Black Top BT-1063) in 1991. That disc quickly became a never-out-of-reach favourite for me, but it now has some stiff competition. Ward's frighteningly funk-ed-up new release, Rhythm of the People, could stay even closer to the CD player than its predecessor.

Robert Ward is a soul man in the true sense of the word, carrying on, although with a contemporary tinge, the traditions of genuine Stax-Volt type soul; his music retains that era's hard edged, impossible-to-

resist rhythmic urgency. Witness the new CD's opening tracks, 'A Good Man' and 'The Real Deal'; the first is furiously up-tempo while the second has a gentler swing, but both have a groove that cuts straight to your dancing nerve.

Ward is tasty guitarist and part of the appeal his playing holds for me - ignoring the dismissive ease with which he trips out delightfully fluid single string runs - is the distinctive

sound he wrings from his Stratocaster. The ubiquitous Fender's inherent character is evident, but the Magnatone amp he puts it through adds an unusually rich and seductive quality to the instrument's tippy voice.

Thirteen tracks are included on Rhythm of the People and there's not one that you could call a filler; each is a gem. Current daytime favourites are the upbeat boogie tunes: 'A Good Man', 'All Proud Races', 'I Do What I Want' and the sublimely charged version of 'What A Friend We Have In Jesus' - check

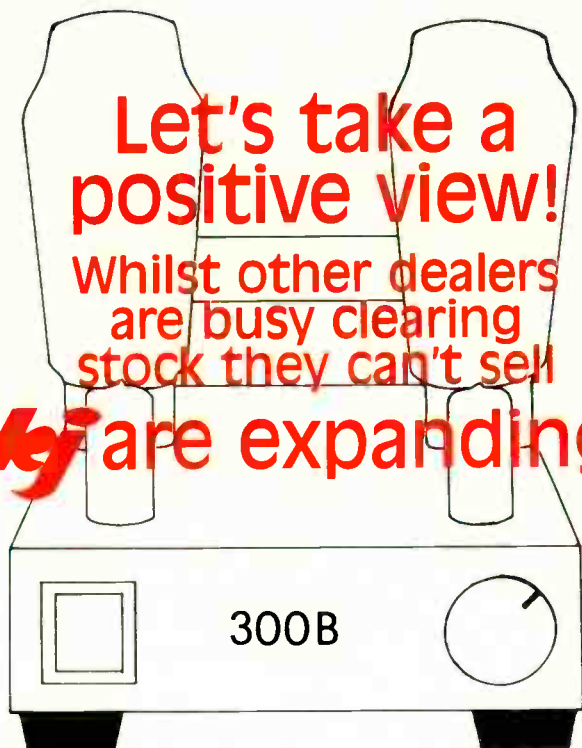
that guitar intro! However, late night sees me turning to tracks such as 'Children Of The World', 'Some Things' and 'I Found A Love.'

Day or night, this disc never strays far from the CD player. I just hope that Robert Ward stays equally close to the Black Top studio; he must have accumulated a wealth of material over the two decades during which he went "missing" and I dearly want to hear all of it!

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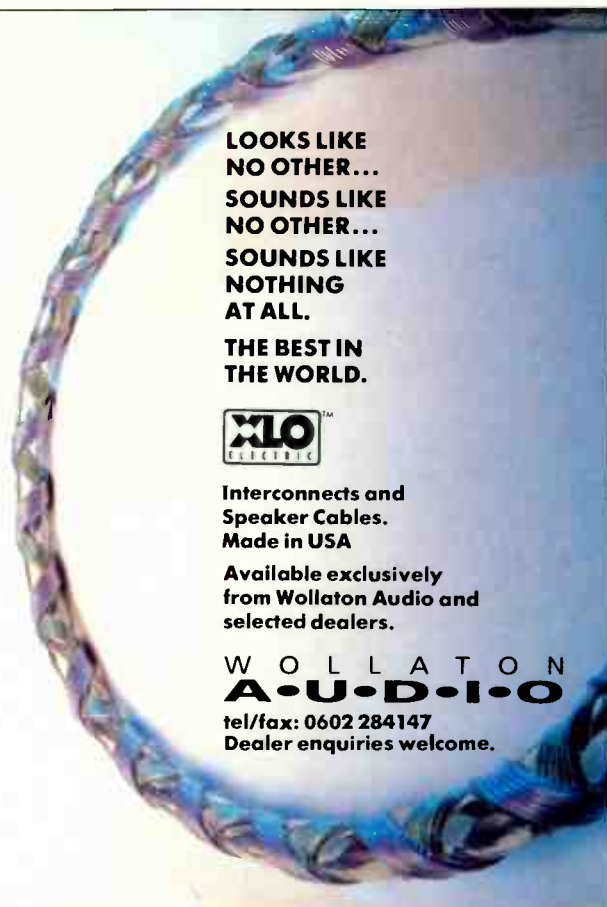
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MARY BLACK The Holy Ground

GRAPEVINE (Preview Cassette)

● Mary Black has performed a minor miracle: her voice persuaded hi-fi's scribes, for whom consensus is anathema, to join hands and sing her praises. She united the opinions of frequently fiercely opposed critics, with diverse musical preferences that stretch from Penderecki to Pearl Jam. What's more remarkable is that her bewitching influence even made me fly to Dublin, just to catch her playing on her home turf, breaking my commitment to never travelling outside London for a gig.

That concert was one of the best I've seen, although the set included a large amount of material I hadn't heard before, suggesting that a new album was in the offing. Speaking to her later confirmed that a new release was imminent and I came away with a

pre-release cassette, upon which this sneak preview is based.

If a soul exists who has so far resisted this girl's magic then 'The Holy Ground' is guaranteed to win him over. The Irish Times, not known for the accommodating nature of its reviews, wrote about her concert with enthusiasm that ranged from barely disguised to brazen. And Dublin's 98FM, a radio station that plays nothing but 'classic' songs, has been broadcasting tracks from the album before it has gone on sale!

Since the last disc the band line-up has changed, with a new drummer, Londoner Dave Early and keyboardist, Frank Gallagher replacing Noel Bridgeman and Eleanor McEvoy. But the music hasn't suffered in the least. Mary's voice is in its finest fettle and something in it suggests that she happened across a new mantra before making this disc; she sounds so relaxed and natural she could have

Malcolm Steward couldn't resist the lure of Mary Black performing live in Dublin - he also managed to sneak away with a preview of her new album

been recorded while singing around her house rather than in a studio environment. This ease manifests itself as an intimacy and sensual communication that's apparent even on a lowly cassette.

The album includes predominantly new material from the talented coterie of writers, including Noel Brazil and Thom Moore, that has previously provided her with outstanding, memorable material. One of the four songs here by the consistently stimulating Brazil, 'The Loving Time' been sliding past the heads on my Nakamichi with increasing regularity since I first played it. It provides another instance of this particular writer's artistry, Declan Sinnott's sensitive arrangements and production, and Mary's voice at its most persuasive combining to hit an emotional high point with unflinching accuracy.

'Docklands' another Brazil song, also proves rewarding but for a different reason: if, like me, you worry about line-up changes affecting a band's efficacy this powerful, oiled-to-perfection performance will put your mind at rest. Here you have a slickness that Steely Dan would give their last tub of Vaseline to match. For raw emotional force try the Sandy Denny cover, 'One Way Donkey Ride': don't pass up the chance to hear this number live.

If the CD lives up to the promise of the preview tape, which suggests that it will be in the killer quality league, I predict that you're going to see Mary Black's name occupying as many column inches as it did when the hi-fi fraternity first discovered No Frontiers.

Classical

Peter Herring

Individuals and instruments dominate this month: cellos and cellists; pianos and pianists; flutes and flautists. We have Richard Goode and Frau Schumann and - the ne plus ultra of authenticity - Handel's very own harpsichord

RECORD OF THE MONTH

The memory of certain concerts stays with you forever. I think of hearing Gunter Wand conducting Bruckner's Eighth at last year's Proms; of Solti directing Beethoven's *Missa Solemnis*; of Boult in Vaughan Williams and Abbado in Mahler; of a Pollini recital at the Festival Hall in 1992; of hearing the Britten Quartet in Beethoven's Op 130 in a candlelit Suffolk church a few years back; of listening to the Tallis Scholars for the first time, back in 1978, in the perfect acoustics of Merton College Chapel; and of enjoying Olivier Messiaen's improvisations on the organ of the Trinite church in Paris, after the regular Sunday morning Mass. To that list, I must add the recital by the American pianist, Richard Goode, at the Wigmore Hall a couple of years or so back. He had been preceded by a formidable reputation and no one could have been disappointed. This was revelatory Beethoven playing. I am sure I was not alone in feeling I was hearing some very familiar sonatas for the first time. Richard Goode had evidently approached these works with a mind clear of preconceptions and hidebound convention. Not that his playing was eccentric in the manner of a Glenn Gould; it simply had directness, integrity and understanding combined with confidence and a power to communicate. Unfortunately, Richard Goode makes very few recordings, assuming that everything issued in the United States is also released here. So

the appearance of two Schubert sonatas on the Elektra Nonesuch label was cause for the kind of anticipation generally aroused by only a handful of performers (well, perhaps even two handfuls). Great Beethoven interpreters do also master the rather different idiom of the Schubert sonatas (I think of Schnabel, Kempff, Brendel and Pollini) but it is not always the case. How good was Goode going to be?



FRANZ SCHUBERT
Piano Sonata in A minor
Op42 D845/Piano Sonata in
D Major Op53 D850
Richard Goode, piano
ELEKTRA NONESUCH 9 79271-2
(DDD/74.14)

● His last six years saw Schubert increasingly occupied with instrumental music, especially the piano sonata. Beginning with the A Major D784 of 1822, he produced a series of masterpieces that culminated in the great trilogy of D958, D959 and D960 - music worthy to stand alongside that of his older contemporary and fellow resident of Vienna, Beethoven. Not that Schubert had all that much contact with Beethoven - they mixed in very different circles. He was, though, well aware of Beethoven's music, and somewhat daunted by it. Yet he also knew that within him he had the capacity to produce music of similar stature, certainly in the fields of chamber and piano music. Which he most assuredly did; in the former, with the later string quartets, the piano trios and, above all, the sublime String Quintet D956, and in the latter with bravura works such as the *Wanderer Fantasy* and with the last seven of his piano sonatas.

With Beethoven's death in 1827, the thirty-year-old Schubert, who had previously displayed little ambition other than to write music for himself

and his friends, seems to have become aware of a greater destiny. He made plans to take counterpoint lessons the following year, in order to improve his composing technique. Tragically, death ensured he never took them.

Though it was impossible for Schubert not to be influenced in some way by the way Beethoven had used the quartet and sonata as vehicles for his ideas, he had too many ideas of his own to become a mere imitator; the piano sonatas are pure Schubert, not ersatz Beethoven.

Yet, as with so much of Schubert's instrumental music, they were to remain largely unknown to generations of pianists. The last three were not published until ten years after the composer's death, but at least the two recorded here went into print during his lifetime.

The A minor dates from May 1825, the D Major from that same summer. In both, Schubert's genius appears in all its astonishing originality, with a richness of melodic invention, a subtlety of harmony and with a confidence which allowed him to challenge the usual structural disciplines. The opening movement of the A minor luxuriates in an abundance of themes and

a wealth of tone colouring; its scherzo is a brilliant fusion of asymmetrical phrases, in sharp contrast to the melancholy feel of the first movement and the lyricism of the andante. Yet there is a marvellous unity to the work, something which Richard Goode is very conscious of in his reading of the sonata.

The D Major work opens with an allegro vivace tautly constructed from march-like themes. Its exuberant virtuosity makes great demands on the player, with its unison passages of ceaseless movement interspersed with leaps and hand-crossings. The opening melody of the second movement, with its gentle rhythm and poignant harmony, is one of Schubert's most beautiful, while the scherzo is very Viennese in character, its waltz-like character alternating between sadness and gaiety. The concluding rondo is also Schubert at his most beguiling.

Richard Goode offers deeply considered performances of both sonatas, where a technical mastery goes hand-in-hand with a subjective understanding; he paints in the detail but never loses sight of the whole canvas. And his feel for rhythm and colour is impeccable. This is Schubert playing of the highest order, and is beautifully recorded (at the American Academy and Institute of Arts and Letters in New York). As with Goode's Beethoven, this disc seems destined for classic status.

**Handel's 1720 harpsichord
Handel Suites 1-5**
Martin Souter
Bate Collection, Oxford.

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GEORG FRIDERIC HANDEL
Harpichord Suites No1 in A Major; No2 in F Major; No3 in D minor; No4 in E minor; No5 in E Major
Martin Souter, harpsichord
ISIS RECORDS CD003 (DDD/78.51)

● Performances do not come more authentic than this. Not only is the harpsichord used in this recording of Handel's time, it is almost certainly Handel's own, the instrument which appears in Mercier's famous portrait (which is reproduced in the accompanying booklet). Built for Handel around 1720, it was a recent bequeath to the Bate Collection, which is part of the faculty of music at Oxford University. In fact, this is very much an Oxford affair, being issued on the Isis Records label and being engineered by Oxford hi-fi dealer and audio commentator, Geoffrey Horn. There is also a Cambridge input, however: well, Cambridge-shire- in the shape of Quad Electroacoustics, now the oldest, privately owned British hi-fi company. Following in the footsteps of Linn, Technics, Sony, B&W and others, Quad has become involved in the soft-as well as the hardware of sound reproduction. Quad has sponsored two recordings on the Isis label, the other of organ music (to be reviewed next month).

The Bate Collection has long housed the most comprehensive array of European woodwind, brass and percussion instruments in this country and has recently expanded its collection of early keyboard instruments. No doubt this William Smith harpsichord is surely the jewel. Despite its age, it is evidently in first-class condition and sounds quite splendid. Other historic harpsichords in the Collection are to be recorded by Isis Records in due course- a series to look forward to.

The five harpsichord suites date

from 1720 and were among Handel's first compositions after he had settled in England. It is as if he wanted to display his wide-ranging genius to the full for, apart from their melodic invention and technical complexity, the suites display a mastery of styles: the Italianate, the French, the German and the English. Much is

left to the performer in the matter of rhythmic detail and ornamentation. The result is music rich in variety and vitality. Most famous among the suites is No5 which gained the sobriquet 'The Harmonious Blacksmith' through its imitation of the sound of hammer and anvil. Throughout, though, this is music to enjoy for its colour, melody and dazzling dexterity- one of the high watermarks of Baroque instrumental music.

Martin Souter, who studied in Oxford (all this recording lacks is Inspector Morse!), plays with great freshness and vitality. His rhythmic judgement is faultless and his use of ornamentation shows a keen musical taste. Above all, it is the spirit and exuberance of his playing, along with his fine appreciation of the instrument's colours and contrasts, which makes this recording so enjoyable and satisfying. It is also very well recorded, capturing all the brilliance of the instrument but without the fatiguing over-brightness that afflicts many harpsichord recordings. Like the instrument itself, something of a jewel, this.

PAUL HINDEMITH
Violin Concerto*/Symphonic Metamorphoses on themes of Carl Maria von Weber*/
Symphony: ' Mathis der Maler'§

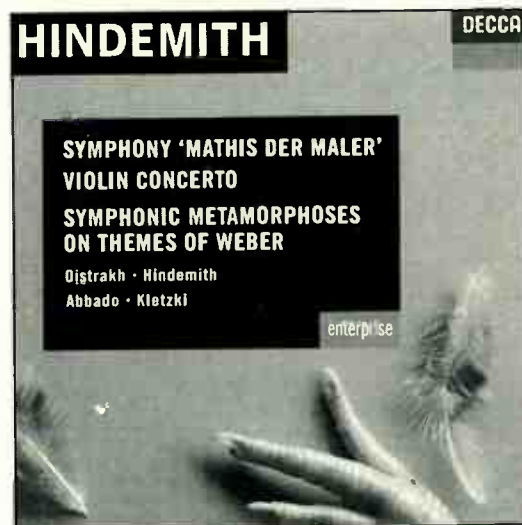
David Oistrakh, violin*; London Symphony Orchestra**;
L'Orchestre de la Suisse Romande§;
conductors, Paul Hindemith*,
Claudio Abbado*, Paul Kletzki§
DECCA ENTERPRISE 433 081-2
(ADD/76.49)

● As an introduction to Hindemith's orchestral music, this Decca mid-price re-issue could hardly be bettered, combining as it does three outstanding interpretations recorded in the 'sixties. It remains a measure of David

Oistrakh's playing that he was able, in this recording of the Violin Concerto, to demonstrate the lyrical and emotional intensity of a work which had previously been regarded as well-crafted by drily academic. Oistrakh's expressive insight, his beauty of phrasing, coupled to the composer's passionate direction of the orchestra show just how wide-of-the-mark that judgement was. The concerto is surely as fine an example of romantic expression, contained within the disciplines of classical form, that has been composed this century.

In terms of sound, this new remastering has both its plus and minus points. The breadth and depth of the sound-stage is opened out, with sonorous brass and lower strings. The soloist is projected to the fore, but the scale of the sound prevents the orchestra from being swamped. But there is an edge and a thinness to the upper strings which seems emphasised in the CD transfer. However, this is of little consequence in a performance that is both inspired and revelatory.

The 'programmatic' symphony, *Mathis der Maler*, is one of Hindemith's finest works. It is derived from his opera of the same name, which concerns itself with the struggles of the painter, Matthias Grunewald, creator of the moving and disturbing Isenheim altarpiece.



Classical

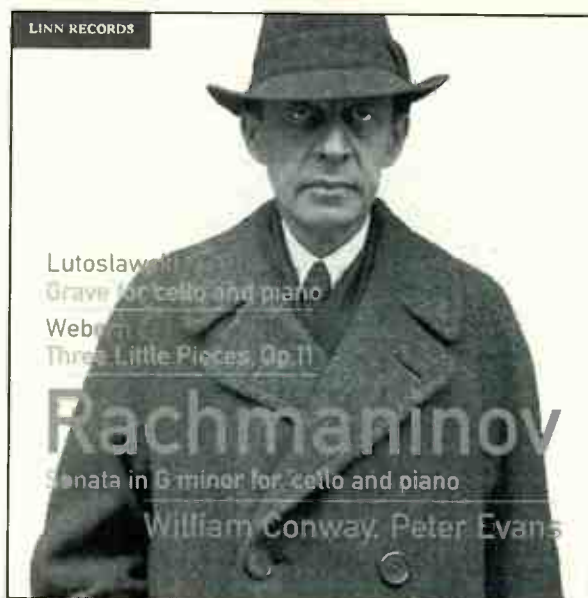


Grunewald lived and worked under a repressive fifteenth century regime, facing much the same artistic dilemma that confronted Hindemith and his fellow German artists during the 'thirties. The parallel was not lost on audiences hearing the work following its successful premiere under Furtwangler in Berlin in 1934; it was not lost on the Nazis either- they banned all performance of Hindemith's music.

Kleztki's is a fine and sympathetic performance of *Mathis der Maler*, perhaps not as profound as Karajan's for HMV or as dramatic as Blomstedt, also for Decca, but very satisfying nonetheless.

Completing this excellent-value Hindemith collection is Abbado's classic 1968 account of the *Symphonic Metamorphoses*, which Hindemith wrote while in exile in the United States in 1943. It is an exuberant orchestral showpiece which firmly nails the notion of Hindemith being a dull, humourless composer. The themes he employs come from Weber's *Eight Pieces for piano duet* of 1815-19, and - in the case of the scherzo - from the incidental music which Weber wrote for Schiller's translation of Gozzi's play, *Turandot*, later adopted to its lasting fame by Puccini.

Abbado is scrupulous in following Hindemith's markings, especially in terms of dynamics, and deftly points the colours of the orchestral texture. Graced with a superlative Kingsway Hall recording, this account of the *Symphonic Metamorphoses* has never been bettered. This is a definite addition for the library shelf.



WITOLD LUTOSLAWSKI
Grave for cello and piano
SERGEI RACHMANINOV
Sonata in G minor for cello and piano
ANTON WEBERN
Three Little Pieces Op11
 William Conway, cello; Peter Evans, Piano
LINN RECORDS CKD009 (DDD/49.10)

● A striking choice of repertoire: ostensibly, three twentieth century works for cello and piano, but with Rachmaninov's richly romantic cello sonata light years apart from the terse utterances of Anton Webern. All credit, though, to these two Scottish musicians (both, among other things, members of the very fine Hebridean Ensemble) for such a bold selection.

The extraordinary thing is that of the rather short playing time the Rachmaninov occupies over forty minutes. It is without much doubt the finest of his few chamber works, very much in the vein of the *Second Piano Concerto* in its use of lush harmonies and richly lyrical themes. As you would expect with Rachmaninov, the piano shares the spotlight with the cello and considerable technical demands are made of both players. Undaunted by these, Messrs Conway

and Evans produce a notable performance, idiomatic and sensitive, and brimming with passionate involvement.

The Rachmaninov may be the most substantial work here but, despite their brevity, neither of the others can be classed as makeweights. The Lutoslawski is a very fine piece that, in its six-minute-or-so span nevertheless

manages to explore the full range of the cello. It was dedicated to the memory of a friend of the composer, an expert on Debussy, hence the direct quote from Debussy's *Pelleas et Melisande*. William Conway's playing here is spellbinding, and his sound is beautifully caught by the recording.

As well as being a leading disciple of dodecaphonic (twelve-note) serialism, Anton Webern also took expressionistic brevity to its limit, distilling music into its absolute essentials. The *Three Little Pieces Op11*, last just under two-and-a-half minutes, with one just ten bars long. Yet, as in the Lutoslawski, there is still a remarkable diversity of sonorities to be savoured, with startling contrasts.

Without underestimating Peter Evans's contribution here, the recital is more a showcase for the considerable talents of cellist, William Conway. This recording was made in St George's, Brandon Hill, Bristol with engineer, Philip Hobbs, and producer, Andrew Keener. It offers great presence and fidelity, both in terms of balance and instrumental tone. If you enjoy the cello repertoire, this can but enhance your collection, both in terms of the works played, and how they're played.

Classical



CLARA SCHUMANN
Sonata in G minor/Romanze in B minor/Impromptu in E Major/Romanze in A minor/Deuxieme Schero Scherzo Op14/Prelude in F minor/Soirees Musicales Op6/Etude in A flat Major/March in E flat Major
 Jozef de Beenhouwer, piano
PARTRIDGE 1129-2 (DDD/73.42)

● I will confess precious little acquaintance with the music of Clara Schumann until the welcome and enlightening arrival of this issue from the Dutch Partridge label. Though not a revelation of neglected genius, it nevertheless showed Clara to be both a competent and confident composer, not wanting for inspiration, and worthy of greater status than that which history has assigned her: that of the object of her husband, Robert Schumann's undying affections.

Inevitably, there are many echoes of Robert Schumann's style in the pieces here, but there is also an unmistakable individuality and an ear for melody. The Belgian pianist, Jozef de Beenhouwer, opens his recital with the very fine Sonata which Clara completed in early 1842. It is difficult to believe that the work has only recently been published in its entirety, although the insidiously memorable scherzo did appear in the Quatre Pieces Fugitives Op15.

Equally impressive are the two Scherzi Op10 and Op14, both of which make formidable demands on the player, and the E Major Impromptu is sheer delight and reminiscent in style to Mendelssohn's Songs Without Words.

Clara, like her husband, seems to have been inspired by the Rhineland scenery that they encountered when they moved to Dusseldorf. The two lovely Romances in A minor and B minor date from this period. The A

minor work, however, remained unpublished for many years, finally appearing as a supplement in- of all places -the British magazine, 'Girl's Own Paper' in 1891, where it was prefaced with a dedication to the Schumanns' friend, Johannes Brahms.

The recital is prefaced by one of Clara's earliest pieces, the Etude in A flat Major and concludes with her very last composition, a March

written in 1879 to be played at the golden wedding of two close friends. It was originally for piano four-hands but she later made a version for two hands. Close listening will reveal that the work uses two quotations from compositions by her late husband.

Jozef de Beenhouwer proves a first-rate interpreter of Clara Schumann's music, fully up to its not inconsiderable technical demands, and very much in sympathy with its moods. The recording is all you could want and Partridge are to be congratulated on their enterprise. One for the specialist collector perhaps, but I doubt any lover of piano music will be disappointed by this volume. It has certainly given me the taste for more.

'WALKING IN THE AIR': 21 FAVOURITES FOR FLUTE
 Kenneth Smith, flute; Paul Rhodes, piano
ASV CDWHL2072 (DDD/76.56)

● The third of these showcases for the artistry of flautist, Kenneth Smith, breaks with the previous two issues by arranging all manner of popular pieces from far and wide, everything from List's Liebestraum to a fantasy on Bizet's Carmen (and good fun it is, too!). His earlier recitals -Summer Music and Folk and Fantasy--had been entirely devoted to British music for flute, but he doesn't neglect the home-grown here, despite casting his net around Europe. The disc opens with an enchanting arrangement of Howard

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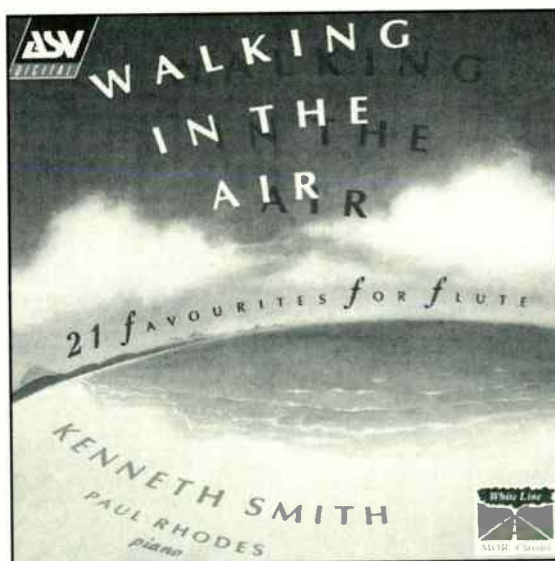
classical record reviews

Blake's 'Walking in the Air', the theme to Raymond Briggs's cartoon fantasy, 'The Snowman', and also includes Elgar's lovely salon piece, Salut d'Amour and the Skye Boat Song.

Like the last, most of the themes here will be familiar, if not these arrangements. Both players get to display their dexterity in the Flight of the Bumblebee and Chopin's Minuette Waltz, but it is by no means all flashing fingerwork. Offenbach's Barcarolle proves most beguiling, as does Traumerei (Dreaming) from Schumann's Kinderszenen (Scenes from Childhood). Debussy's Clair de Lune adapts beautifully for the flute, as does Last Spring from Grieg's Elegaic Melodies, and the Meditation from Massenet's Thais.

As already mentioned, Messrs Smith and Rhodes end boldly with a dashing fantasy on themes from Carmen- not as dazzling as Sarasate's for violin, but still capturing the spicy flavours of the original.

As with his previous recitals, the attraction of Kenneth Smith's playing is that it is never just a display of technique, impressive but unassuming. It is more the colours he evokes, the sound-painting which emerges with



the notes, all the time bringing an individual character and mood even to such well-known pieces as those here. And Paul Rhodes once again proves an ideal collaborator.

Both instruments are well-recorded, but at a high level so you may have to tame the volume control a little to avoid overloading the inputs!



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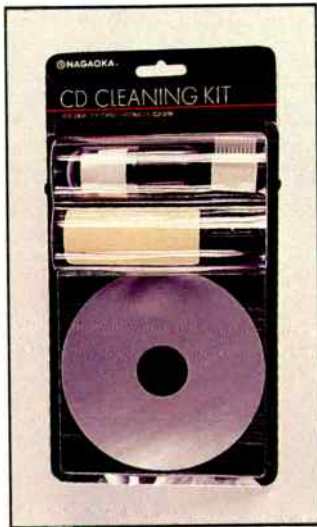
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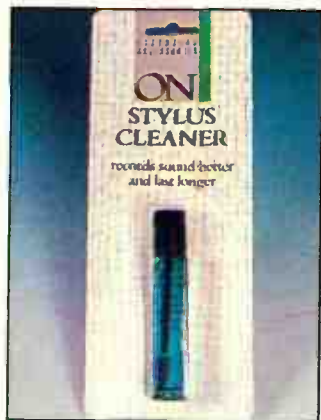
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Record storage cubes



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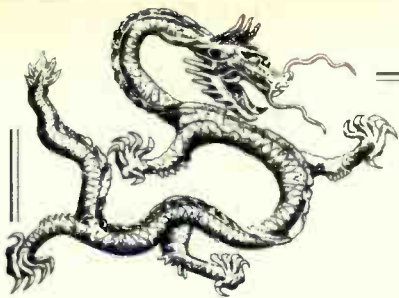
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TOTAL



Terje Rypdal's and former collaborator Jan Garbarek's new albums are explored, while Airtu Moreira's new band moves into Supergroup territory

Simon Hopkins

Jazz

Terje Rypdal
Q.E.D.

ECM

**TERJE RYPDAL
Q.E.D.
ECM 513374-2**

● The issues raised by, and the problems encountered in fusing jazz improvisation with classical composition go back to Ellington at the very least. From there on out there's been a great, if publicly overlooked tradition of classical-jazz hybridizing: from Gil Evans' arrangements for Mile Davis, through the Modern Jazz Quartet's work and the Gunther Schuller's whole Third Stream theorizing, right up to John Zorn's current application of Cagean techniques to real time

improvising. Also Anthony Braxton's use of graphic scores give a knowing nod in the direction of both Stockhausen and Ligeti. The point is this: in 1993, there's no reason for a piece like the one in question, scored for chamber orchestra and improvising electric guitar, to shock. But I defy all but the most broad-minded of jazz listeners and critics, not to feel at least moderately confronted by the Norwegian guitarist Terje Rypdal's *Q.E.D.*, Opus 52.

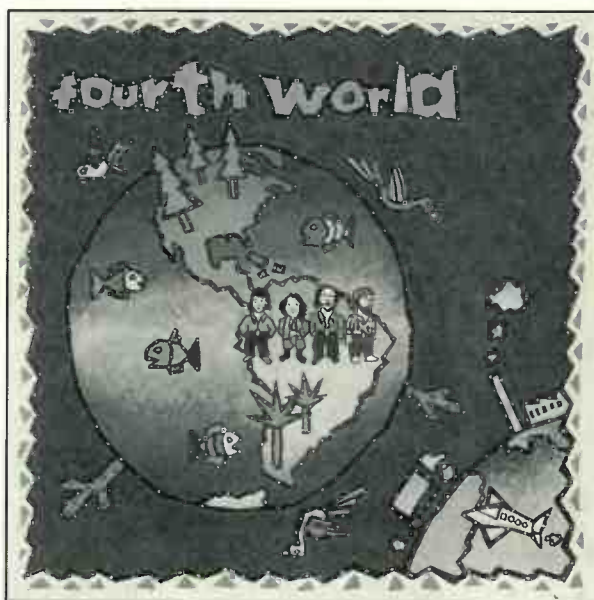
Rypdal isn't new to stirring things up. Emerging from a fledgling Scandinavian rock scene in the mid 1960s, armed to the teeth with every guitar lick from The Shadows to Hendrix, he soon fell under the spell of Coltrane (a natural enough, if lamentably rare extension of an enquiring musical mind already obsessed with rock's intensity). He was launched headlong into one of the most celebrated jazz-rock careers of the 1970s. Alongside fellow Scandinavian 'jazzers' like tenor and soprano saxophonist Jan Garbarek, drummer Edward Vesala, bassist Arild Andersen and so on, he created a sound so stark, ascetic gothic even, that only its heavy emphasis on strident rhythms and explorative improvisation provided any sort of link to American jazz. Certainly, any sort of Broadway show tune chord changes or be-bop phraseology remained resolutely beyond his vocabulary.

But the language of contemporary composition definitely didn't. The sleeve notes to *Q.E.D.* (as ever, a superbly elucidating text by Steve Lake) list over twenty major works, not necessarily recorded, that the guitarist has written to include some element of extemporising. In total, the Rypdal oeuvre its way to numbering at least fifty, and this alone gives a pretty good idea of just how seriously the guitarist has grappled with "art" music.

Q.E.D. is a five movement piece for electric guitar, with instrumental contributions from the flute, clarinet, bassoon, two french horns, two cellos, bass and gran cassa (a large drum with a monstrous, deep resonating sound). Rypdal happily uses whatever compositional tools that come to hand: Darmstadt-inspired serialism,

Cagean chance operations (including a cracking backwards guitar passage, which, again, the sleeve notes see as a tribute as much to Hendrix and the Beatles as to Cage and Wolff), Debussian orchestration - but the overall tone of the piece is one of Scandinavian late Romanticism. A sort of 'Mingus-meets-Sibelius-meets-Hendrix.' Or, indeed, meets Rypdal.

For, among all the precise, dense composition, is some of the best guitar I've heard Rypdal play in yonks. Forays into guitar synthesis aside, Rypdal's always had a great sound. Your basic Stratocaster and cranked-up Marshall, all awash with reverb and echo and whatever other weird and wonderful effects come to hand. But his sound on *Q.E.D.*, and the ferocity of his playing therein go way beyond his work with his most recent group The Chasers, harking right back to the arid sound of such seminal 1970s work as "Odyssey" and "Whenever I Seem To Be Far Away". All in all, this is essential listening.



**FOURTH WORLD
Fourth World
B&W MUSIC BW030**

● In his sleeve notes to last year's *The Other Side of This*, a pure percussion opus by Brazilian master drummer Airtu Moreira, Mickey Hart (drummer with The Grateful Dead and all-round percussion enthusiast) describes Airtu as having "literally created the role of percussionist in the West". You might be sceptical of accepting this at face value. There is, however, no denying that Airtu's twenty-odd year career in jazz that spans from his emergence in Mile Davis' excoriating electric jazz outfits, through Chick Corea's prog-rockist (and, in its later stages at least, pretty risible) *Return to Forever*, right up to his current pan-global fusion, has

provided some of the most consistently remarkable, and what's more, utterly enjoyable percussion work in the music's recent history.

Fourth World, who made a somewhat lack-lustre debut on Ronnie Scott's Jazz House label last year, is his latest group. His wife and long time collaborator Flora Purim is on vocals; the largely unknown former Hugh Masakela sideman, Jose Neto on guitar (a custom nylon-strung electric jobbie which doubles as bass; and multi-instrumentalist Gary Meek, the band's only non-Brazilian, on flute, alto and tenor saxophones and synthesizer.

As you'd no doubt gather from the group's name and song titles like "Esperanza", the music the group lay down - most of it composed by sundry band members, is a sort of eclecticist world music-jazz collision, with third world rhythms married to light-jazz and fusion chord changes. All of it is a fine platform for some pretty fiery improvising! Not that this is ground-breaking stuff as both Airtio and his missus have been heavily involved in just this sort of accessible, hybridized music for most of their careers. And the playing of both Meek and Neto, while both undoubtedly skilled and highly spirited, still doesn't touch the intensity that you'd want from players jamming over Airtio's restless clattering. The smattering of songs, with their earnest lyrics like "Now take me back to Africa/When the fathers and the sons/Get together" might not be to everyone's taste.

Regardless, if you enjoy sheer musical high jinx, musician's revelling in their consummate ability and if you don't want your cross-cultural collaborations too cut-and-paste, then Fourth World could well be the supergroup for you.

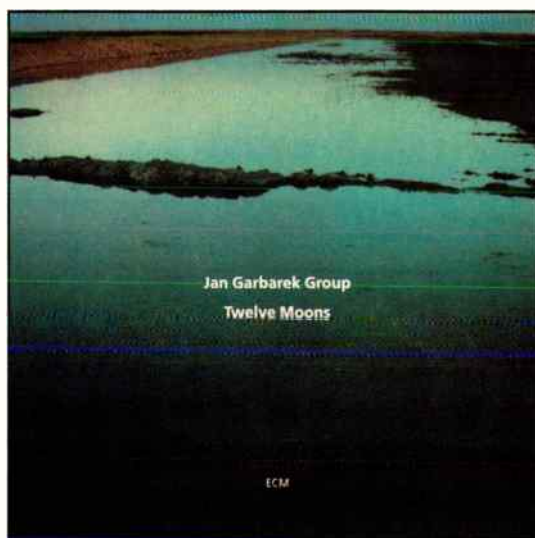
JAN GARBAREK GROUP Twelve Moons

ECM 519500-2

● Once a collaborator with Rypdal, fellow Norwegian tenor and soprano saxophonist, flautist, sometime percussionist and composer Jan Garbarek has become one of Europe's most popular jazz musicians, even if that term jazz should be tempered with myriad qualifications. Not that it's always been so. As recent re-issues of classic early 1970s material, with the likes of Rypdal and George Russell, his early playing was as much inspired by avant garde extremists like Albert Ayler, or Ornette Coleman as much as Coltrane- and sufficiently on-the-edge to keep him well away from general appeal. But from the mid 70s onwards, doubtlessly inspired immensely by collaborations with Keith

Jarrett. Also his long standing association with ECM prime mover, producer and svengali Manfred Eicher, allowed him to develop a style of composition and playing which ably fused jazz improvising with Eastern European and Scandinavian folk melodies and Oriental rhythms. The result, while always one step ahead of the anodyne New Age of so many followers, has been hugely well received by audiences and critics alike.

Two recent strands of his world music tendencies are brought together on 'Twelve Moons'. In 1988 he recorded the stunning 'Rosenfole' with vocalist Agnes Buen Gamas, a traditional singer from southern Norway. The album was a collection of Medieval Norwegian songs arranged by Garbarek and played by him on a variety of saxophones, synthesizers and percussion. Barely observed by the jazz press (and naturally ignored by the wider world of music criticism in general), *Rosenfole* is an absolute gem, a must for anyone remotely interested in



musical multi-culture. Then in 1981, on Garbarek's group album 'I Took Up The Runes', he covered the stirring 5/4 protest rock song 'Gula Gula' by Mari Boine Persen, a fiery young singer and former teacher from Lapland (or, more politically correctly, Sameland).

Last year, as part of the Barbican's extensive Scandinavian arts festival, Garbarek performed live in London with both singers, alongside his usual recent group that comprises of keyboardist Rainer Brüninghaus and electric double bassist Eberhard Weber. This group was augmented live by the extraordinary percussionist Marilyn Mazur, and on 'Twelve Moons' this entire group is joined by French-Brazilian drummer (and Peter Gabriel sideman) Manu Katché. Katché is a regular collaborator of Garbarek's, going as far back as 'The Runes'.

This album is in many ways a summation of all that this group does live, bringing together old standards like Jim Pepper's wonderful 'Witchi Tai To' and re-worked material from 'The Runes', with a new, long suite for a TV documentary. Garbarek's own arrangements of traditional Norwegian folk music feature and even a piece by Grieg. The group's playing is naturally flawless, but even as a committed fan (or perhaps because of that) I felt some major disappointments with the album. For a start, Gamas and Mari Boine are only featured on two tracks each, subsequently little of the promise of last year's Barbican concert has been delivered. Garbarek himself is pretty subdued too; his playing in the past has been characterised by immense power, with mammoth over-blowing, resulting in piercing, impossibly high register squalling, and this even in relatively consonant contexts. But you get little of this on 'Twelve Moons' as Garbarek paints almost overly-discreet splashes over his arrangements and

compositions. And I remain sceptical about the contributions of both Katché and Brüninghaus. The latter is undoubtedly a fine pianist, but both he and Garbarek seem insistent on using the most tedious, overly clinical synth' sounds which do little to bring out the inherent earthiness that lies somewhere in the heart of this music. As for Katché, I find his drumming overly precise, basically a bit too rockist for this music, which is especially shown up in

the light of Mazur's frantic, explorative clattering. Even the contributions of Eberhard Weber, one of recent jazz's most innovative double bassist (who's even been afforded extensive solo space on previous Garbarek albums) are kept on too tight a leash.

All in all, Garbarek completists will definitely want this, but I can think of numerous better jumping-on points for newcomers to Garbarek's huge canon of work. I just hope that he continues to record (and hopefully more extensively) with these wonderful singers.

Jazz

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Continued on next page . . .

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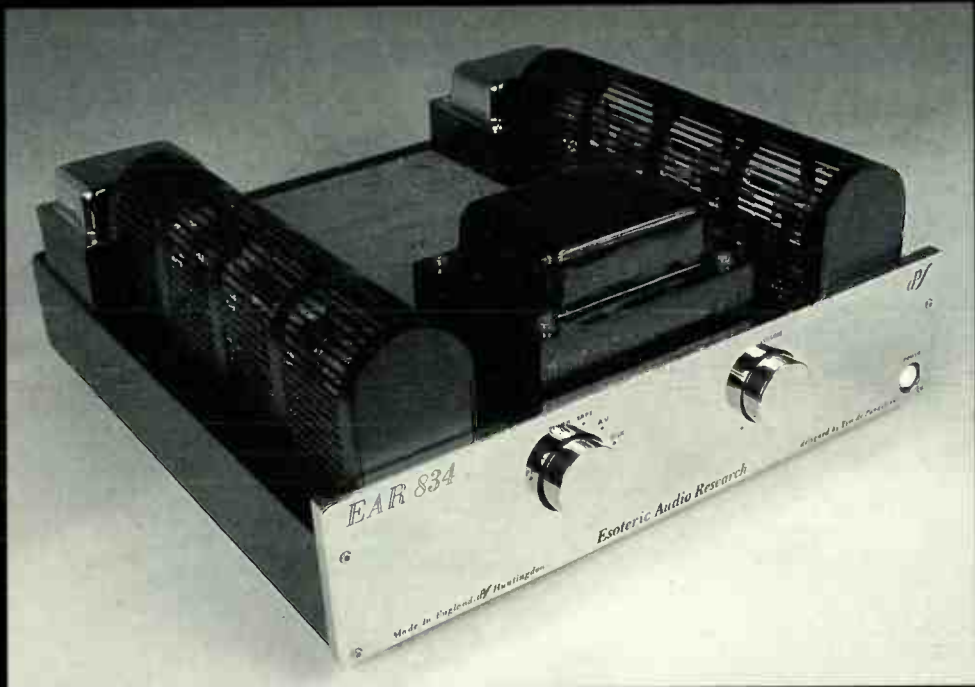
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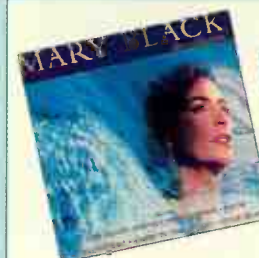
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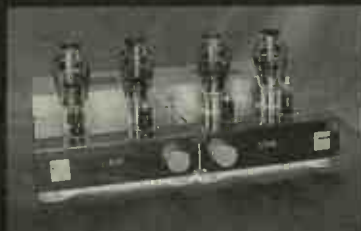
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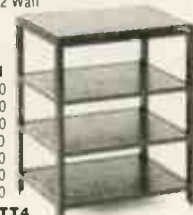


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	Height (exc. spikes)	Number of shelves	Distance between	Price
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B2	480mm	2	380mm	£ 90.00
B3	455mm	3	155mm	£110.00
B4	645mm	4	155mm	£130.00
B5	840mm	5	155mm	£150.00
B5a	840mm	5	200(21/110/2)	£150.00



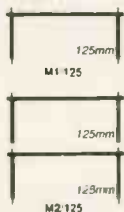
B5

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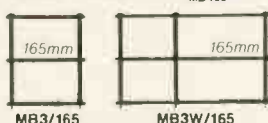
SHELF UNITS

Type No.	Distance between	Single Shelf Price	Single Shelf Glass	Type No.	Double Shelf Price	Double Shelf Glass
M1/90	90mm	£38.00	£50.00	M2/90	£70.00	£90.00
M1/125	125mm	£38.00	£50.00	M2/125	£70.00	£90.00
M1/165	165mm	£38.00	£50.00	M2/165	£70.00	£90.00



BASE UNITS

Type No.	Distance between	Wood Shelves	Glass Shelves
MB3/125	125mm	£100.00	£130.00
MB3/165	165mm	£100.00	£130.00
MB3W/165	165mm	£160.00	—



TR SPEAKER STANDS

Medium mass double pillar stands supplied with adjustable spiked feet and top spikes. Can be sand or shot filled

	Height	Top Plate (W x D mm)	Price
TR30	300mm	240 x 240	£ 55.00
TR40	400mm	190 x 190	£ 55.00
TR50	500mm	160 x 160	£ 55.00
TR60	600mm	150 x 150	£ 55.00



TR50

HS SPEAKER STANDS

Medium mass single pillar stands supplied with adjustable spiked feet and top spikes. Can be sand or shot filled

All base plates 250 x 305mm (W x D)

	Height (exc. spikes)	Top Plate (W x D mm)	Price
HS8	200mm	240 x 240	£ 67.00
HS12	300mm	240 x 240	£ 67.00
HS16	410mm	200 x 200	£ 68.00*
HS20	510mm	165 x 190	£ 68.00*
HS24	610mm	165 x 190	£ 72.00*
HS28	710mm	160 x 160	£ 72.00



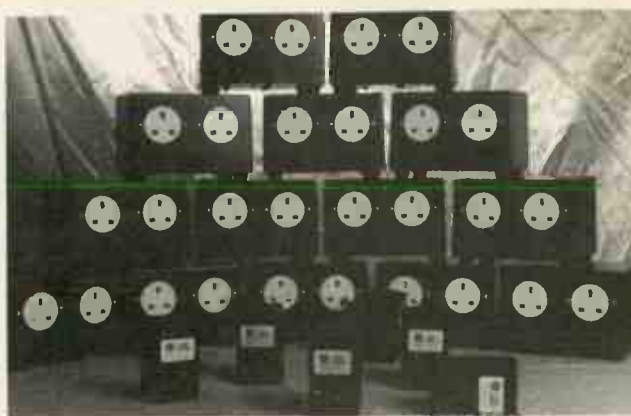
HS16

*Asterisked models can be supplied with Tannoy 600 series mounting top plate for £4 extra — please state speaker model No. when ordering



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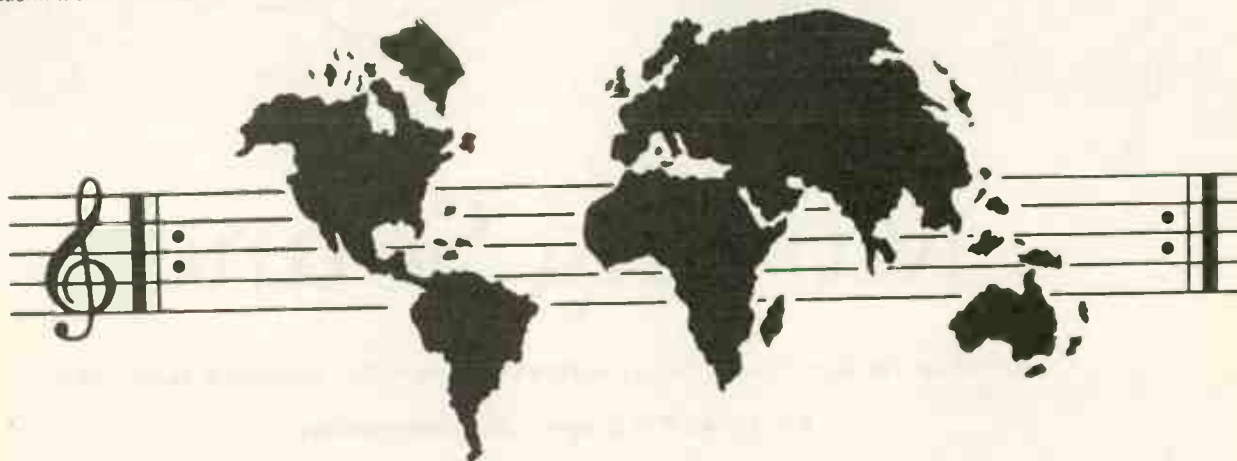
Canada - At a price well below many DACs of similar sound quality it offers real value for money in addition to its sonic refinement.

Germany - D/A converters from the Sugden stable have established themselves on a solid platform within the hi-fi scene.

SDT-I CD Player

Canada - The combination of excellent transport and high-quality parts make the Sugden a very relaxed and easy player to listen to, with no digital edge.

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Singapore - The Sugden A25B will not fail to please in the way it presents the music. It is therefore, highly recommended.

Canada - The quality of sound produced by this amplifier is exemplary.

Australia - We are hard pressed to think of an amplifier quite so musical. A delight to the ear.

France - The general transparency of sound and the punch delivered by the amplifier are really astonishing.

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U.S.A. - In terms of sound quality the A48 is a revelation. More than any other integrated amplifier in my experience. The Sugden imbues music with a warmth and body that is quite addictive.

U.K. - Coherent and musical, the Sugden A48B is on the warm side of neutral, well suited for those who like the valve sound.

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Canada - Cold, out of its packing carton, the Sugden instantly sounded better than great. During the next few hours of operation, the unit literally blossomed and developed the sort of sound closely akin to a live performance.

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Moving Sound

Jonathan Jordan roams the countryside with the Technics SL-XP550 portable CD player as a companion.

MiniDisc and DCC lay claim to be the portable products of the future but, for those of us with ever growing CD collections and insufficient time to make home recordings, a portable CD player conveniently provides music when on the move. The Technics SL-XP550 is designed with the go anywhere, do anything outlook in mind. To this end it is manufactured in a robust polycarbonate case that was designed to withstand the temperature extremities that could range from a hot car in summer to a student's residence in winter!

The cost of the player is £219.95 complete with a wide range of accessories and boasts a MASH one bit D/A convertor and Digital Signal Processing (DSP) features. The unit is also fully compatible for home use. Not only is an a.c. mains adaptor and phono connection lead provided, but also a remote control handset with remote sensor which plugs into the side of the player. Finally two AA sized re-chargeable batteries are

included (the unit is also fully compatible with standard batteries).

Technics supply in-ear headphones, the type I normally abhor - however I am pleased to say that these particular ones were a great deal more comfortable than others I have experienced. The general construction of the the player was encouraging, being slim, lightweight and rugged. I also liked the way it had been contoured, the absence of any sharp corners made it visually attractive and comfortable in the palm of my hand. The controls were quite well placed although, like most portable units, they could be a touch fiddly to use. Inserting a CD was easy and a light touch on the Play button set the disc in motion.

I secretly hoped that the Technics could provide me with an escape from the reality of a crowded train at rush hour - and I'm glad to say that it wasn't a disappointment. The sound was a little bland, slightly lacking in ambience and atmosphere, but this mobile player did have an inherent

degree of musicality that it readily relayed. Jann Arden's 'Time for Mercy' CD was portrayed well and the Technics seemed able to cope with her powerful, meaningful voice and the range of instrumental accompaniment that consisted of everything from bass guitar to harmonica.

Neither the player, nor headphones did themselves any justice at high volume levels. Difficulties tracking the mid to high frequency transients were highlighted and the bass content struck me as being very hollow. However, if the volume is turned down slightly, not only do you lessen the chance of upsetting those without headphones, but the sound quality improves vastly.

The amount of detail contained in the music is something the player did seem to be able to cope with and is perhaps the ultimate advantage that CD portables possess over similarly priced cassette units. Random access between the tracks was slow in comparison with full size players but in this instance it was adequate. The

DSP modes gave the music a sound that was not totally 'headphone orientated' and the other functions allowed the bass to be 'beefed up'. Classical music is often a grey area for mobiles but the Technics gave an overall performance that really added to my listening pleasure.

The failures of CD portables are generally quoted (increasingly by the proponents of DCC and MiniDisc) as being their lack of resistance to knocks or movements. The SL-XP550 did well on this score as it could happily be inverted and shaken moderately, but any sudden jerk or knock caused the unit to 'jump' and a delay of roughly one second ensued before the music would continue.

Technics have installed a 'hold' switch which locks the lid shut and by-passes all the controls. This is a particularly useful inclusion as it stops any of the buttons being operated accidentally, while it is in your pocket, for example.

On the move the Technics is well suited to walking or car, train or even plane journeys. However, the player would not survive as a jogging partner; the brief bit of exercise I indulged in (running for a tube) caused it to jump repeatedly.

At Home

Taking the Technics home and hooking it up to my hi-fi was a very simple operation. I had to connect a mains supply, the line out jack and the remote-control sensor. Once this was done the player was ready to take the place of a home-based CD player. Connecting it to the mains causes the control keys to light up. It also has a pop-up, green, back lit LCD display that flicks up at the touch of a button to about thirty degrees from the horizontal. This, although being a touch gimmicky, allows easier reading of the display from a distance or from below the plane of the player. The remote control matches the main functions of play, skip and search and includes a light, but perhaps most importantly has an output level control which allows remote volume operation in the absence of a remote controlled amplifier.

The Technics' performance as a component player was not, as too many portable CD players can be, totally incompatible with the notion of true hi-fi. The player certainly produced a good deal of music for its size and at no stage during my listening session did I feel that it was an unpleasant companion. Setting it to work on various Classical pieces I was pleased to see how it managed to give a full and meaningful rendition of the music. Rachmaninov's Piano Concerto No.2 was well balanced with the '550 managing to extract and successfully interpolate most of the orchestral instrumentation. Coupled

with this was the good level of balance it obtained between orchestral effects and individual instruments. The only audible discomfort was the brass; this section of the orchestra always sounded slightly under strain.

The low frequency reproduction of the '550 was abundant with power, at the expense of control in the bass notes. These notes seemed to be slightly loose and occasionally lazy. Certain pipe organ pieces were not detailed to absolute finesse but the player did manage to control these sections with an above average degree of competency. With Rock music, lack of tight definition in the bass was once again apparent, but the Technics always demonstrated a speedy, rolling and musical rendition.

The player produced a good and accurate midrange response - whatever the listening agenda. For a player of its size this was impressive. The upper mid and high frequency detail was slightly blunted and certain percussionists such as Airta Moreira, seemed to have the ringing and rasps removed from their cymbals and snares. Midrange to high transients were not tracked perfectly, however its performance was not far removed from certain full size separates in a similar price range.

The player also managed to produce a moderate soundstage. Although the sound of the player could never be described as expansive, it did manage to produce a degree of depth and width that did most music justice. Likewise the instrumental imaging was good and the Technics managed to produce credible results time and time again.

The player did not evoke excessive atmosphere, nor did it strongly convey individual character to each type of music. Its strengths were that it managed to relay the coherent and crucial content of all the music it reproduced, maybe without flair, but certainly with plenty of effort. Furthermore, it does not prejudice against any musical choices. Stand-at-home units of similar price will probably give your musical collection more character and definition - but few mobile units can match this level of performance.

Flexibility

If you are not tied down to one location, or find a stand-at-home unit inflexible, consider the Technics SL-XP550. Its price is considerably more than an average cassette based mobile and certain other CD mobiles, but equally so is its performance on the move, or at home. Flexibility is what this player aims to offer, and this it achieves. This player will not disgrace a home hi-fi system, and it can really provide a welcome relief to the pressures of any journey ●

MEASURED PERFORMANCE

Technics' little CD player comes with the acronym MASH inscribed on its case. It's not an invitation to stomp on the thing, so much as an abbreviation for the low-bit bitstream processing system they use to lessen distortion, developed by the Japanese NHK broadcasting authority.

Does it work? The answer is a firm Yes. The SL-XP550 produces much less distortion than the Aura CD50 CD player also tested in this issue and by any standard, it measures well in this area, meaning it will sound smooth and free from coarseness.

Helping it sound smooth is a degree of treble roll-off not normally found in full size CD players, limiting the -1dB bandwidth to 15kHz, instead of the usual 21kHz for CD. This may well suit headphones, but for home use, connected up to a system, the 'XP550 is going to sound warm and possibly a little dull in comparison to full size machines.

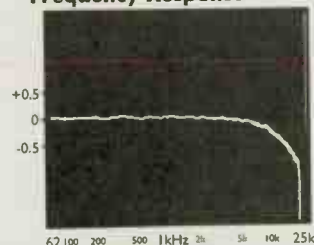
Noise was low at -105dB, so although battery powered, this little player bears no penalty as a result of it, except for an output half that of full size machines, or 1V maximum.

The Technics SL-XP550 measures well and is suited to its purpose. Falling treble and low output will be noticed if it is connected up to a home system, but with headphones neither is a problem. It's a well engineered player. **NK**

TEST RESULTS

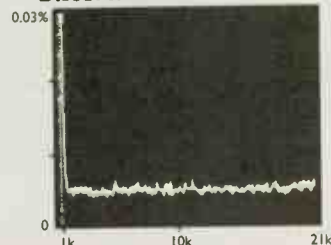
Frequency response	4Hz-15kHz
Distortion	
-6dB	0.007%
-30dB	0.006%
-60dB	0.8%
-90	20%
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Frequency Response



Treble rolls off early

Distortion



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HI-FI WORLD JULY 1993

World Radio History

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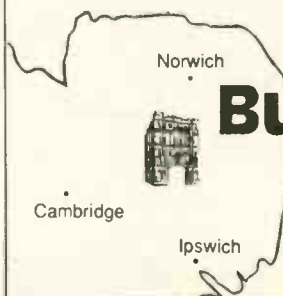
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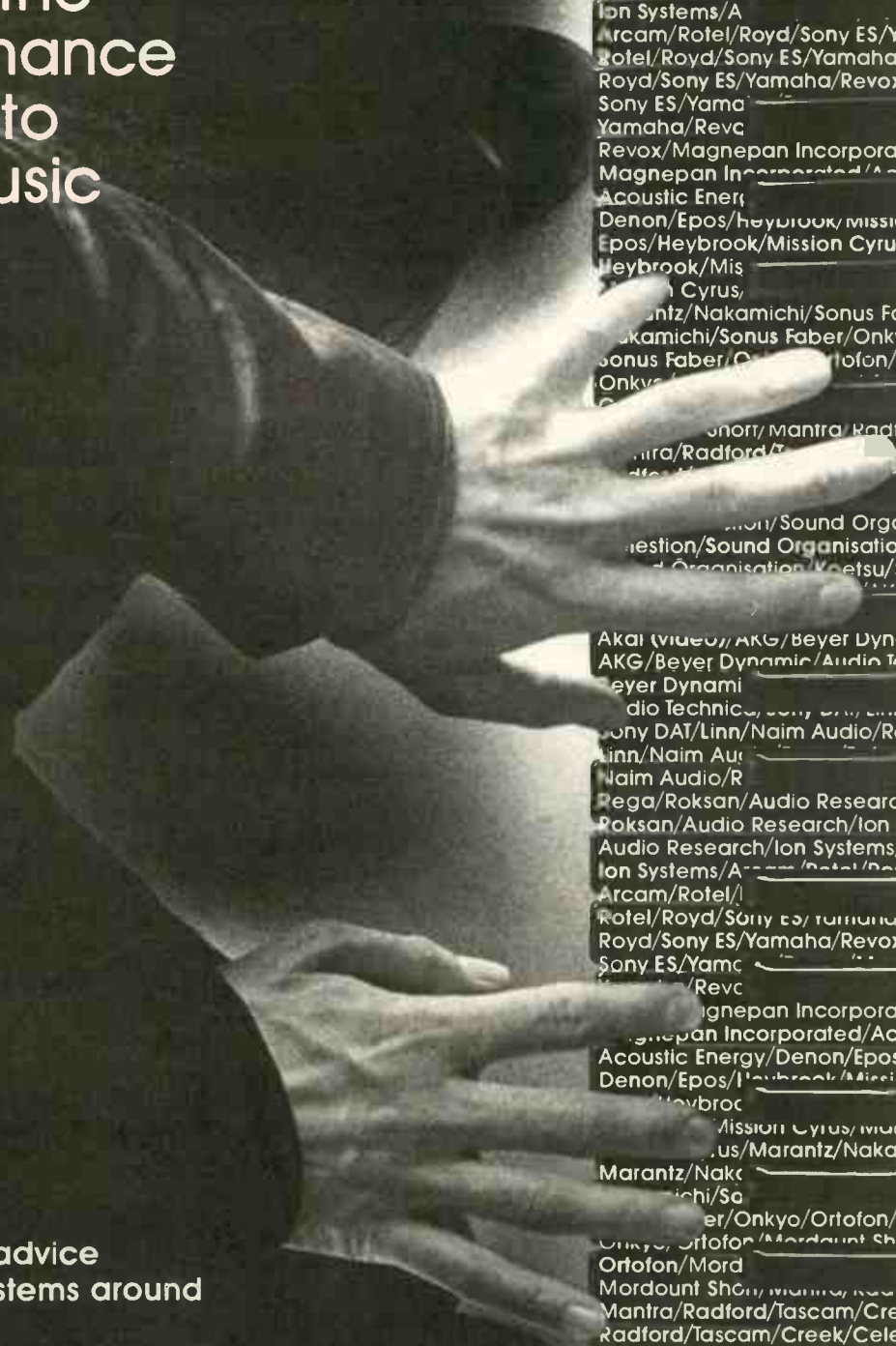


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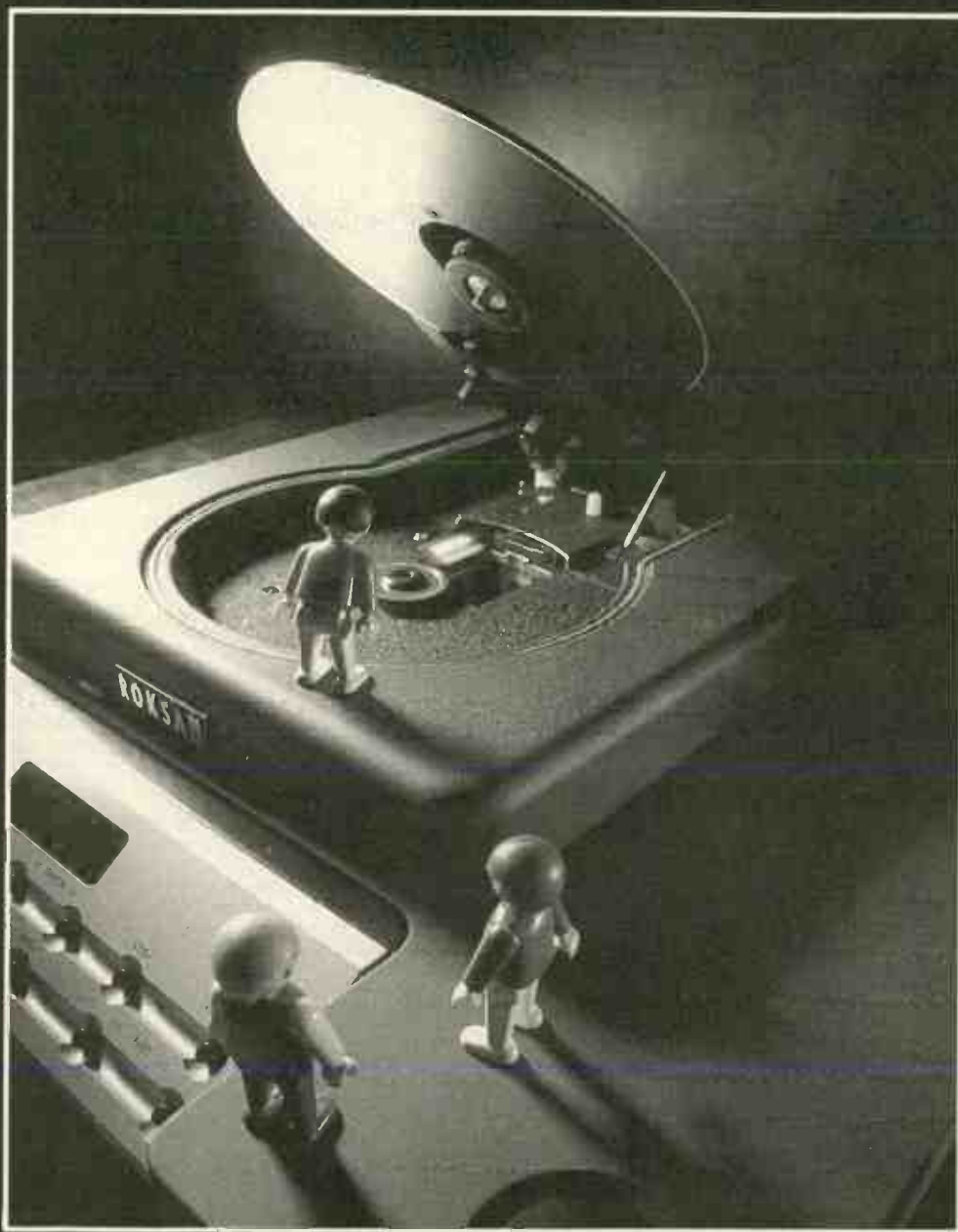
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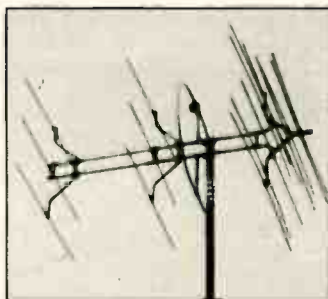
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WHY A HI-FI TUNER NEEDS A GOOD AERIAL

For best sound quality, a hi-fi tuner must have a strong signal of around 1mV minimum.

The question is: how do you get it?

INDOOR AERIALS

Simple pin-up wire types (dipoles) only provide enough signal within a few miles of a transmitter. Otherwise they are noisy and prone to receiving multipath signals that produce distortion.

We've tested powered indoor aerials and expensive hi-tech designs costing up to £50 and find they give no more signal than simple, horizontal dipoles, either of the wire type or of rigid aluminium. Their only benefit is smaller size. It is better to buy a rigid aluminium dipole and mount it high, upstairs on a wardrobe, at the top of a stairwell, or similar.

LOFT AERIALS

Loft aerials have the advantage of height and, if there are many elements, gain as well, so they provide a stronger signal than a simple dipole indoor aerial. In areas of reasonably high signal strength - which usually means within ten miles or so from a transmitter, a loft aerial may be satisfactory.

Usually with three elements, a director rod (short), reflector rod (long) and dipole element in between, loft aerials are also directional; they must be pointed toward the transmitter. They reject interference and reflected signals better than dipoles, giving a cleaner signal to the tuner.

The best mounting position is high up in the V of the roof, away from metal objects like water tanks. A long downlead will be needed, preferably of good quality to minimise signal loss.

BALCONY & WALL MOUNTING AERIALS

Balconies in blocks of flats have the advantage of height, giving a much stronger signal. However, the balcony should face the transmitter for good results.

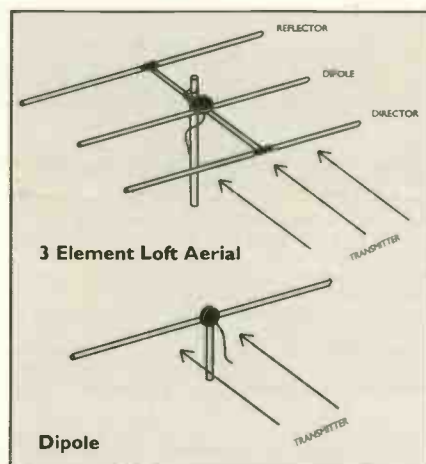
It is often possible, if a little difficult, to wall-mount an aerial on a stub mast outside a window, but you may need consent to do so. Hanging out of a window can be dangerous, so consider using a professional installer. And make sure the wall faces toward the transmitter of course.

OUTDOOR AERIALS

In most locations, only an outdoor aerial will give a signal strong enough and clean enough (i.e. free from interference and multipath reflections) to provide true hi-fidelity from a good tuner. Benefits are height (the higher the better), crucial for

obtaining a strong signal free of reflections, and number of elements, which determine both gain and directionality.

Multi-element aerials are used in areas of medium to weak signal strength, meaning up to around forty miles from a transmitter. Any further away is judged as a 'fringe' area and will demand even more elements.



ALL-ROUND AERIALS AND WHIPS

Whip aerials, vertical dipoles and all-round aerials (curved horizontal dipoles) provide less signal than a simple, indoor dipole (i.e. negative gain). They are suitable only for areas of high signal strength.

Although whips and curved dipoles offer all-round reception, this means they provide little rejection of reflections, interference and distant stations. They are not especially suitable for hi-fi use.

AERIAL AMPLIFIERS AND ROTATORS

Aerial amplifiers are useful only at the masthead to overcome losses in a very long downlead. They are also used to provide enough signal for distribution around a house.

These roles apart, amplifiers boost noise and rubbish from an aerial by the same amount they boost wanted stations, giving no gain in quality, even though the signal strength meter of a tuner might go up. Not recommended.

Rotators are used to swing a directional aerial around, to receive more stations. A simpler solution is to have two aerials pointing in different directions, with their outputs duplexed together or, for more signal but less convenience, twin

downleads with an aerial switch at the bottom.

ATTENUATORS

When it's necessary to use a directional aerial to cut down reflections from tower blocks, but the aerial then gives too much signal (i.e. more than 10mV), an in-line attenuator can be used to prevent tuner overload.

AERIAL INSTALLERS

The best and overriding reason for using an installer is personal safety; roof work is very dangerous. Installers are also very quick and well equipped; DIY may take the large part of a day. Local installers should know about area-specific problems, the location of repeat and fill-in transmitters, and such like - all matters that are likely to be a mystery to most people.

Finally, good installers should have a Field Strength Meter that not only enables them to see whether an aerial is giving the required result, but can prove this to the satisfaction of the customer. Around 1mV is wanted, meaning powerful stations will come in higher (say 3-5mV) but weak ones a bit lower (0.3-1mV). If for no other reason, knowing that the aerial works properly is enough reason for using an installer.

Discuss this matter with them first though. In some areas, it may be impossible to obtain such a strong signal, no matter what aerial is used; get a variety of opinions if necessary.

CONFEDERATION OF AERIAL INDUSTRIES

The CAI has a countrywide list of aerial installers who are members that abide by the rules below.

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Hi-Fi World's revamped, comprehensive, selection of preferred products out of those we have reviewed in the last eighteen months, with the issue in which the test appeared.

COMPACT DISC PLAYERS

SONY CDP-497	£160	Superb starter CD. Packed with facilities.	Aug 92
DENON DCD 890	£269.99	Exciting and forceful sounding player, but slightly characterful sound.	Nov 92
MISSION DADS	£300	Bitstream based player. Very even handed, with solid bass. Some lack of spaciousness.	May 9
ROTEL RCD-965BX	£300	Bitstream based player. Calm, open and sophisticated performer.	Oct 91
ARCAM ALPHA +	£420	Offers a warm, full-bodied sound with a big, rich bass.	May 91
CREEK CD60	£500	16-bit player. Excellent rhythmic properties and a superb bass performance.	Apr 92
CARY CAD-85S	£900	16-bit Rotel player, with Cary-designed valve output stage. Packed with ambience and musicality.	Feb 92
MICROMEGA SOLO	£1350	Distinctive transport; very light and musical, but with a deep, well controlled bass.	May 92
NAIM CDI	£1598	Single box, 16-bit player. Close to the two box CDS, very disc dependent, has vital tingle factor.	Apr 92
TEAC X-1	£2300	Superb 20-bit player. Convincing, idiosyncratic and characterful. Has plenty of flair.	Jun 92
NAIM CDS	£2937	Two box, sixteen bit player. De rigeur for Naim-based systems. Musically informative, has both punch and delicacy.	Sep 91

COMPACT DISC TRANSPORTS

ARCAM DELTA 170.3	£650	Smooth. Draws the listener into the performance. Improves on all the strengths of the 170.	Jul 92
TEAC P-S00	£650	Can be too restrained for some tastes, but subtle and highly detailed.	Feb 92
DPA DIGITAL T1	£795	Superbly clean and detailed sounding transport when sync-locked to DPA's convertors.	Jan 93
MICROMEGA DUO	£1745	CD-ROM based transport. Defines refinement and air, but without sacrificing impact.	Nov 91

DIGITAL TO ANALOGUE CONVERTERS

QED DIGIT	£125	Based on Philips Bitstream. Excellent value, with no rough edges. Co-axial input for CD only.	May 92
MICROMEGA MICRODAC	£299	Philips Bitstream-based. Typical Micromega sound, very musical and refined, lacks the cutting edge of detail.	Mar 92
MISSION DAC S	£299	DAC7 based. Clean, forward mid-range, capable of portraying real subtleties. Bass lacks firmness.	Jul 92
ARCAM BLACK BOX 3	£360	Warm sounding DAC. Now looking a bit tired against stiff opposition.	May 91
AUDIO ALCHEMY D.D.E.	£376	Digital Decoding Engine has broad and smooth presentation.	Feb 92
DPA LITTLE BIT	£395	Sets up a wide, open stage and places a captivating performance within it. High performance/£.	
SUGDEN SDA-1	£650	16-bit Philips based. A wide open window for the transport to flow through. Very neutral.	Jun 92
DPA BIGGER BIT	£695	The Bigger bit has enormous insight revealing the mixing and production work behind most rock recordings.	Nov 91
AUDIOLAB 8000DAC	£695	Philips Bitstream-based. Well built and flexible. Typical Audiolab sound, very silent and neutral.	Jan 92
DPA PDM-ONE III	£1280	Less ruthless than, but staggeringly close to the PDM-TWO. The latest version of the PDM-ONE is a two box DAC-7 affair	Mar 92
PINK TRIANGLE DA CAPO	£1350	Own-design one bit DAC reaches new standards in Digital. One of the best.	Jan 93
DPA PDM-TWO	£2350	Frighteningly deep and controlled bass. Very forthright; a trifle violent in its truthfulness. Literally - stunning!	Jun 91

TURNTABLES

SYSTEMDEK IIX-900	£190	Surprisingly natural sound, if not as detailed as some. Suits Rega, Moth and Helius arms.	Aug 91
PROJECT 2	£245	Czech built turntable with much to offer. Very coherent.	May 92
REGA PLANAR 3	£250	Built to last. Transparent and lucid, although can sound bass light. Sets the standard to beat.	Aug 91
THORENS TD166/VI/UK	£270	Fitted with Rega RB 250 arm. Good basic deck, with tweakability.	Jun 92
MICHELL MYCRO	£397	(with RB300 arm, £539) Falling between the Syncro and the Gyrodec, the Mycro has superb mid-band clarity and poise.	Apr 92
PINK TRIANGLE L.P.T.	£449	Neutral sounding turntable with excellent soundstaging and decent bass. Use Linn, Rega or Roksan arm.	May 91
ROKSAN RADIUS	£550	(with arm) Isn't tripped up by unsettling music, the Radius acts a good mid-price turntable.	Nov 91
THORENS TD-300/BC	£650	Arm-less Thorens, good match for Rega RB-300 or Naim ARO. Easy to use turntable that gets very close to the Linn LP12.	Apr 91
PINK TRIANGLE EXPORT	£676	Terrific soundstaging properties, good bass and a neutral performance that considerably improves upon the LPT.	Jun 91
VOYD VALDI	£699	Similar to the Pink Triangle, the two-motor Valdi is an expressive performer, best suited to Audio Innovations equipment.	Jul 91
ROKSAN XERXES	£785	Highly analytical and exciting turntable. Can be almost CD-like in its presentation.	May 92
PT ANNIVERSARY	£1200	Very neutral turntable, but with a lot of magic. Excellent imagery and detail. A natural partner to the SME V.	Sep 91/May 92
SME MODEL 20	£2495	The last great turntable, bettered only by the £11,000 Model 30. The 20 never disgraces itself.	Oct 92

TONEARMS

REGA RB 300	£139	For Pink Triangles, Michells, Roksans and Systemdeks. Simple and superb; dynamic with solid bass.	
MØRCH DP-6	£665	'Unipivot plus' tonearm. Plays music with a silken and rich quality. Perfect match for the Da Capo cartridge.	Jul 92
SME 309	£568	Based on IV & V; uses an aluminium armtube and detachable headshell. High end value for money. Smooth; excellent imaging	Jan 93
SME SERIES IV	£828	Simplified version of the legendary SME Series V. A precision measuring instrument only bettered by the V.	Mar 92
SME SERIES V	£1232	A masterpiece of precision engineering, with a cohesive sound.	Sep 91/May 92

CARTRIDGES

GOLDRING 1012	£45	Excellent value. Well balanced performer, rich and full without warmth. Very spacious and clear.	Apr 91
GOLDRING 1042	£89.95	A wealth of treble detail and a fine sense of analysis proffered by the Goldring secures its place in this section.	Jan 93
SUMIKO BLUE POINT	£99.95	The Blue Point casts a romantic charm over all types of music. Robust too.	Oct 92
ORTOFON MC15	£100	Moving coil cartridge at moving magnet price. Has a tight grip on rhythm.	Jun 92
ROKSAN CORUS BLACK	£110	Moving magnet cartridge, based on Goldring design. Exciting and detailed, with great speed.	Sep 91/May 92
SHURE VST-V	£150	One of the finest moving magnet cartridges currently available. Excellent tracker.	Jul 92
DENON DL-304	£199	Tonally uncoloured the Denon offers a superbly transparent mid-band. It could sound a little thin in some systems.	
GOLDRING ELITE	£200	British made moving coil. Good value, smooth and detailed, but can sound a trifle brittle at times.	Apr 92
GOLDRING EXCEL	£499	British made high-end m-c. Refined and lyrical presentation, slightly dull at times.	Oct 91
LYRA LYDIAN	£500	Scan-Tech designed moving coil cartridge. Magical sound, even better nude!	Aug 92
MØRCH DA CAPO	£500	Scan-Tech designed moving coil cartridge. Musical and accurate, without any flaw.	Feb 92/May 92
AUDIONOTE IO	£1295	Very low output cartridge, with high silver content. Needs step-up transformer. Very musical, can show up how poor most cartridges are.	Nov 91

CASSETTE RECORDERS

TECHNICS RS-BX404	£130	Terrific value and good sound for the money.	Sep 91
TECHNICS RS-BX606	£170	Three head deck, Superb value, capable of seeing off much more expensive machines.	Nov 91
SONY TC-K677ES	£240	One of the first low-cost three head decks. Can be grainy and slightly bright, but makes for stable recordings and playback.	Sep 91
JVC TD-VS41	£280	Three head deck. Good for both recording and playback, especially of prerecorded tapes. Easy to use.	Dec 91
DENON DRS-810	£300	Drawer loading cassette - just like CD. Sweet sounding, but a bit expensive.	Jan 92
NAKAMICHI CASSETTE DECK 2	£350	Makes fine recordings with metal tape. Excellent with pre recorded tapes. One of the finest two head machines about.	Mar 91
CASSETTE DECK 1.S	£500	Scaled down version of the Cassette Deck 1, without rivals at the price.	Jan 92
CASSETTE DECK 1	£600	In the light of the 1.S, this fails to be such good value, but still a sound three head deck.	Apr 91
PIONEER D-S00	£600	Very smooth sounding DAT deck, but still slightly coarser than the original source.	Apr 92
TEAC V8000S	£699	Dolby 'S' deck. Easy to use. Very stable sound, with instrumental textures close to perfect.	Jun 92
ARCAM DELTA 100	£850	Dolby 'S' deck. Excellent sound quality, close to the original source. The best Dolby 'S' deck around.	Apr 92
NAKAMICHI CR-7	£1500	No Dolby 'S', but auto tape tuning, motorised head and remote control. Astonishing complexity; the best!	Aug 92

TUNERS

DENON TU-260L	£110	Excellent budget AM/FM tuner. Easy to operate, good all-rounder with a fine sound.	Mar 92
NAD 4225	£160	Warm sounding, but detailed budget AM/FM tuner. AM poor, looks dated.	Jun 92
ARCAM ALPHA 3	£199.90	Excellent vocal clarity and decent sharpness; good for Rock.	Dec 92
AURA TU-50	£230	Superb FM-only tuner. Produces a delightful, three-dimensional sound. A cracker	May 92
YAMAHA TX-950	£260	Fine all-rounder, with a good AM section.	Jul 92
KENWOOD KT-7020	£270	Silky smooth sound, but very insensitive and needs a good aerial.	Feb 92
ARCAM DELTA 80	£340	AM/FM analogue tuner. Realistic sound quality, but slightly insensitive.	Jan 92
QUAD 66FM	£490	Among the very best in terms of tonal colour and imagery; remote controllable.	Nov 92
NAIM NAT-02	£853	Little box, big money, dead good. Try and find better unless it's a . . .	May 91
NAIM NAT-01	£1377	The best tuner currently available. All else is mere artifice. If you want better radio reception, go and live in the BBC's studio.	Mar 92

INTEGRATED AMPLIFIERS

HARMAN-KARDON HK6150	£159	Good sounding starter amplifier. Great dynamic range. Excellent bass.	Jun 92
NAD 302	£159.99	Lots of insight and detail but could sound a little rough in the wrong system.	Jan 93

DENON PMA-350	£170	Packs a lot of punch for the money. Phono stage lags behind the line inputs.	Mar 91
PIONEER A300X	£199	Exceptionally sweet mid and treble plus the superb dynamic range of the A400	Dec 92
SUGDEN A25B	£203	Surprisingly warm and well rounded for the price. Worth seeking out.	Dec 91
ARCAM ALPHA 3	£200	Lean and lively, with an astonishing amount of detail. Excellent line stages.	Oct 91
MISSION CYRUS ONE	£249	The series 8 guise has brought about improvements in balance and power pushing it further forward.	Feb 92
CREEK CAS 4140 S2	£230	Bit soft and rounded, but with a pleasant character. Easy on the ear.	Nov 91
PIONEER A-400	£240	The amplifier that shook up the UK hi-fi industry. Very hi-fi sounding, but can sound good with high-end equipment.	Nov 91
AURA EVOLUTION VA-100	£270	Full of refinement, although not the best measuring amplifier around.	Jul 92
HARMAN/KARDON HK6550	£349	Thoroughly refreshing, tonally neutral amplifier with a realistic price tag.	Nov 92
MISSION CYRUS 2	£380	Best with PSX power supply (£300). More powerful, dynamic and well balanced than almost any of its price rivals.	May 92
AUDIOLAB 8000A	£430	Very neutral and superbly built. Good bass, great imagery, but can be sterile.	Apr 92
SUGDEN A48B	£460	Gentle performer, but never masks the music with warmth. Tonally very even.	Apr 92
AMC CVT-3030	£500	Valve hybrid amplifier. Has valve and transistor virtues in a reasonably priced package.	Aug 92
AUDIO INNOVS. SERIES 500	£990	Sweet sounding valve design. Good looking, but a little system dependent.	May 91
AUDIONOTE OTO	£1250	12w valve amplifier. More in tune with music than hi-fi. Superb dynamic range.	Jun 92
TUBE TECH.UNISYS	£1299	Superbly built chrome valve amplifier. Pacey and musical.	Aug 92
COPLAND CTA-401	£1495	Solidly built Swedish valve amplifier. Very refined and unfatiguing sound.	Feb 92

PREAMPLIFIERS

NAD 1000	£180	Wonderful value. Relaxed, smooth and easy on the ear. Best with 2100 power amps.	Jun 91
QUAD 34	£336	Civilised, smooth and unintrusive. Not especially transparent, but relaxing and built to last. Clever tone controls.	Jun 91
AUDIO INNOVS. SERIES 200	£349	Valve preamplifier. Good value, rather Coloured but very dynamic. Best with Innovations equipment.	May 92
AUDIOLAB 8000C	£375	Superbly made solid state pre, without flaw. Clean sounding, if a touch sterile. Excellent all-rounder.	Jun 91
CROFT SUPER MICRO A	£649	Valve preamp. Great mid-band. Good soundstaging properties, a bit warm & euphonic.	Oct 91
MICHELL ARGO+ISO	£687/£393	(+£155 for optional Hera PSU) Pure detail, incisiveness and the beauty of the highest of high end especially with the Hera power supplies. Line-level only, hence an Iso required for vinyl replay.	Oct 91/Jul 92
DPA DSP50S-LJ-PSU	£745/£250	Line level pre-amplifier + onboard power supply. One of the best pre's available at any price.	Apr 91
DPA DSP50S-D	£325	Disc stage to complement DSP50S-L line level pre. Can be used with DPA power supply to form an excellent disc pre amp which could be used with any line level pre.	Apr 91
CONCORDANT EXCELSIOR	£900	Valve preamplifier with MM phono + 2 line stages. Magical and realistic sound quality, deep soundstage. Superb for recordings.	Dec 91
JOHN SHEARNE PHASE ONE	£1099	Attractive preamplifier with matching power amplifier. valve-like lucidity and sweetness. Suits neutral equipment.	Aug 91
ALCHEMIST FREYA	£1150	Line level pre-amplifier, with distinctive styling. Detailed and commanding sounding, may sound too bright in some systems.	Oct 91
LINN KAIRN	£1295	Remote control preamplifier. Flexible, but can sound too forward. Best suited to Linn equipment.	Aug 91
E.A.R. G88	£5246	Exceptionally solidly built valve pre, with a 'bolted down' sound to match. Can sound awesome.	Nov 91

POWER AMPLIFIERS

NAD 2100	£290	Matches 1000 pre. Powerful (150 watts) but relaxing sound ; big bass.	Jun 91
QUAD 306	£395	Well suited to the ESL-63 loudspeakers. Beautifully built, smooth sound but not transparent; weak bass.	Jun 91
CONCORDANT EXULTANT	£500	Modified Quad II mono amplifiers. Colder sounding than the original. Good value. Good match with Excelsior preamp.	Jan 92
AUDIOLAB 8000P	£545	Powerful solid state stereo power amplifier. Clean, natural sound with a slick styling to match. Very well made.	Jun 91
CROFT SERIES S	£548	Stereo 25 watt valve amplifier. Can be bridged. Rich, warm sounding. Good with ProAc loudspeakers.	Oct 91
QUAD 606	£570	100 watt stereo solid state amp. Smooth and civilised. Similar to 306, but more power and deeper bass.	Jun 91
DPA DIGITAL DPA50S	£1175	Together with the S0S pre and disc stage this forms Noel's favourite amplifier. Very clean, very clear and very neutral.	Apr 91
JOHN SHEARNE PHASE ONE	£1199	Matching power amplifier to Phase One preamp above. Attractive finish, sweet sound.	Aug 91
AUDIOLAB 8000M	£1190	150 watt solid state monoblocks. Typical Audiolab look, build and sound; crisp and clear but can also be clinical.	Sep 91
ART AUDIO TEMPO	£1398	20 watt triode monoblocks. Attractive looking, vibrant sounding, ambient and subtle.	Dec 91
ALCHEMIST GENESIS	£1400	100 watt valve monoblocks. Powerful sound. Very cable dependent but with plenty of dynamic range.	Oct 91
AUDIO INNOVS. SERIES 1000	£1499	50W valve monoblocks. Powerful sound.	May 92
MICHELL ALECTO	£1800	High end bargain of the year the Alecto's have a lucidity and three dimensional realism that it rarely attained.	Dec 92
ART AUDIO MAESTRO	£1927	Pentode/Triode switchable valve monoblocks. Beautiful looking, sweet and involving.	Jun 91
E.A.R. 549	£4372	Massive 200watt valve monoblocks. Awesome sound, uncanny solidity of images, hard treble.	Nov 91

LOUDSPEAKERS

CELESTION I	£99	Low price, compact size, big sound. An exciting all round performer.	Oct 92
GOODMANS MAXIM 3	£99	Excellent budget small box. Forward sound, without undue box coloration.	May 92
MISSION 760i	£119.90	The 760is are detailed, fast and have bags of rhythm. Ear bashing pleasure.	
TANNOY 603	£124.99	The 603's are a rich and smooth blend that offer their best when bi-wired.	Sep 92
MISSION 761i	£169	Not a perfect loudspeaker, but is full of bass and a lot of fun and entertainment for the money.	Feb 92
MISSION 780	£180	Not without flaws, but the accent is on the music. Good small design.	Sep 91
TANNOY 605LE	£189.99	Highly analytical but has limited bass extension and is not particularly smooth. Very revealing.	Jan 93
B&W DM610	£200	Very competent and musical. Loads of life and energy.	Sep 91
ROGERS LS2a2	£209	So far the most correct loudspeaker we have discovered at the price. Sweet and even-natured. A bargain.	May 92
HEYBROOK HBI Mk III	£249	Powerful, efficient loudspeakers. Loads of welly, loads of bass, but somewhat unrefined.	Apr 91
TANNOY 609	£250	Cheapest Dual Concentric loudspeaker in the range. Fast and fun, but unsubtle.	Jan 92
NAD 8100	£300	Fine floorstanding loudspeaker that goes deep and loud. Terrific sense of fun.	Aug 91
EPOS ES11	£330	Two way reflex loudspeaker with a civilised but giant-killing sound quality. Excellent imagery.	Apr 91/Jan 92
TRIANGLE COMETE	£375	Highly efficient small box loudspeaker with a superb mid-band. Great for valve amplification.	Apr 92
WILMSLOW FOCUSS	£400	Kit loudspeaker, based around DynAudio drivers. Very transparent and detailed for the price.	Feb 92
KEF 101/2	£495	The baby of the KEF Reference range. Very system dependent.	May 91
CELESTION 100	£499	Need powerful amplifier and careful positioning. Have insight and good tonal accuracy.	Dec 91
NEAT PETITE	£525	Baby two-way. Tight, fast, great stereo and good dynamics. Few little boxes come close.	Aug 91
PENTACHORD	£534	(£1059 with subwoofer) Superbly transparent. With the sub-woofer, they go deep too.	May 91
PROAC STUDIO I MK II	£612	Two-way reflex loudspeaker. Easy to listen to and well-balanced, although somewhat Coloured.	Aug 91/Jan 92
KEF Q90	£649	Uni-Q design with ABR. Efficient, dynamic and capable of going very loud indeed.	Jan 92
REL STADIUM SUBWOOFER	£695	Mono, self-powered subwoofer that works! Very flat frequency response.	Jun 92
B&W MATRIX 805	£795	At home both in the recording studio and the listening room. Speedy delivery and excellent imagery; paint a clear picture.	Jan 92
AUDIO NOTE AN-J	£799	Good soundstaging with a very convincing, natural sound. Derivative of Snell design.	Jun 91
MONITOR AUDIO I200 Gld	£949.99	Excellent resolution of detail maintains a listeners attention; insightful.	Dec 92
HEYBROOK SEXTET	£1079	Revealing, lucid floorstanders. Not smooth, but tight and fast-paced. Need careful partnering.	Oct 91/Feb 92
PROAC RESPONSE ONE 'S'	£918	Excellent small box design. Can convey the spirit, drive and passion in music in a small room.	Jul 92
MAGNEPLANAR MGI.4	£1190	Electro-magnetic planar design. Needs long room. Can create an open, relaxed and easy musical performance. Lacks detail.	May 91
APOGEE CENTAUR MINOR	£1200	Hybrid ribbon design. Great imaging and detail, good value for panel fans.	Jul 92
CELESTION 700SE	£1399	Small box, carved from Aerolam. Excellent imagery, transparency and detail. Needs power and careful positioning.	Mar 92
TDL STUDIO 4	£1499	Need a large room, but can move a lot of air. Best with organ music, the 4's can sound impressive, awesome and frightening.	Jul 91
PENTACOLUMN	£1795	Stunning imagery, excellent detail. Speakers that excel at everything.	Dec 91
QUAD ESL-63	£2072	(Pro version, £2240) Legendary electrostatic loudspeakers. Can lack bass, dynamic range and volume but have detail and imagery impossible to better.	Apr 91
TANNOY GRFM	£3500	Giant loudspeakers. Capable of awesome sound. Need good valve amplification.	Jul 92
NAIM DBL	£6127	Capable of producing immense sound pressure levels. Not for the squeamish.	Mar 91

MISCELLANEOUS

AUDIOPLAN DIGITENNA	£55	High-tech coaxial cable, for CD to DAC connection. Highly focussed sound.	Jul 92
AUDIOPLAN MUSICABLE	£VARIOUS	Superb, high quality cables that represent the finest in European cable.	Mar 92/May 92
BEYER DT411	£54	Excellent 'studio' quality headphones. Deep bass, powerful sound, if a bit splashy at times.	Jun 92
CELESTION DLP 600	£349	Digital signal processor for the Celestion 600 series loudspeakers, sounds like a £400 upgrade.	Jun 92
FRANCINSTEIN	£79	CD stereo enhancer, which adds crosstalk to make the sound more 'analogue'.	Jan 92
FURUKAWA FD-11 CABLE	£85	Coaxial cable, for use between CD and amplifier. Good quality, utilitarian cable. Safe choice, easy sounding.	Jan 92
FURUKAWA 7N PC-OCC	£900/£350	per mono metre. Very expensive cables. Highly detailed, sounds like an equipment upgrade.	Jul 92
KONTAK	£252	Space age contact cleaner. Upgrades your system at a single bound.	Mar 91
LASERGUIDE	£15	Coating for a CD surface. Is said to improve clarity, focus and spaciousness.	Dec 91
SONY ICF-SW7600	£150	Superb 'world' radio. Good reception, simple to use, even has a clock!	Aug 91
SONY WALKMAN WM-DD33	£90	Simple to use, high-quality playback only Walkman. Excellent, stable sound quality.	Aug 91
SONY WALKMAN WM-D6	£260	The famous 'Pro' Walkman. One of the finest cassette recorders at any price, but portable. Superb value, if a little 'touchy' at times.	Mar 91
SONY WALKMAN TCD-D3	£500	Better known as the 'DATMAN', this small, sophisticated DAT portable is a technological wonder.	Aug 91
TECHNICS SL-XP330	£129.95	Ignore the price tag for this is one of the best sounding portables around.	Dec 92
TECHNICS SL-XP700	£200	Portable CD player. The thinnest and most stylish of the breed, just happens to sound the best.	Nov 91
TDK NF-C09	£10	Designed to lessen Radio Frequency Interference in cables. Works too!	Feb 92

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MIDI SYSTEMS

KENWOOD	M-27	£449.00
KENWOOD	M-456	£729.95
KENWOOD	M-566	£779.95
KENWOOD	M-766	£849.95
KENWOOD	M-856	£1149.95
TECHNICS	CDX-120	£499.95
TECHNICS	CDX-320	£549.95
TECHNICS	CDX-520E	£699.95
JVC	W-37CD	£359.95
JVC	W-58CD	£469.95
JVC	W-76CD	£599.95

MINI SYSTEMS

AIWA	NSX-220	£259.95
AIWA	NSX-360	£329.95
KENWOOD	UD-300	£449.95
KENWOOD	UD-500	£599.95
KENWOOD	UD-700	£749.95
KENWOOD	UD-900	£949.95
JVC	UXA-3	£299.95
JVC	UXA-5	£359.95
JVC	MXS-2	£349.95
JVC	MXS-3	£399.95
JVC	MXS-4	£449.95
TECHNICS	SCCH-550	£449.95
TECHNICS	SCCH-650	£529.95
TECHNICS	SCCH-700	£599.95

RECEIVERS PRO-LOGIC

KENWOOD	KRV-6050	£329.95
KENWOOD	KRV-7050	£399.95

TUNERS

KENWOOD	KT-1050L	£109.95
KENWOOD	KT-2050L	£139.95
KENWOOD	KT-3050RDS	£169.95

TECHNICS ALL MODELS AVAILABLE

COMPACT DISC PLAYERS

AIWA	XC-300	£149.00
AIWA	XC-750	£199.00
JVC	XLV-164	£139.00
JVC	XLV-264	£159.00
JVC	XLV-464	£199.00
JVC	XLM-408	£249.00
JVC	XLZ1050LN	£499.00
MARANTZ	CD-52L	£209.95
KENWOOD	DP-2050	£159.95
KENWOOD	DP-3050	£199.95
TECHNICS	SLP4-340	£149.95
TECHNICS	SLP4-440	£169.95

AMPLIFIERS

AIWA	XA-003	£129.95
AIWA	XA-009	£229.95
PIONEER	A-300X	£179.95
PIONEER	A-400	£229.95
KENWOOD	KAV-8500	£699.95
KENWOOD	KA-3020	£159.95
KENWOOD	KA-1030	£129.95

CASSETTE DECK/ DAT RECORDERS

AIWA	ADF-410	£179.95
AIWA	ADF-810	£199.95
AIWA	ADWX-828	£199.95
AIWA	ADWX-929	£229.95
SONY	TCK-590	£199.95
TECHNICS	RSBX-404-626-727	
SONY	TCDD-3	£499.95
SONY	TCDD-7	£387.95
SONY	DTC-690	£499.95

SPEAKERS

MISSION	760 I	£109.95
MISSION	761 I	£169.95
MISSION	762 I	£229.95
WHAFDALE	DIAMOND IV	£129.95
WHAFDALE	DELIA 3D	£99.95

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JUPITER AUDIO VISUAL

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BETTER BASS

I own a budget system comprising: Aiwa XC700 CD player, Denon TU260L tuner, Aiwa AD-WX77 cassette deck, Rotel RA-820AX amp, Mission 760 speakers on Target stands, Exposure speaker cable, Tandy gold patchcord interconnects.

Whilst very pleased with the detailed sound it provides, I would like to improve the bass slightly. I don't have a Swiss bank account to pay for alterations, so possibly, could you suggest stands, cables or leads which may improve matters. The room is 13' x 8' and is brick walled.

C. Pontin,
Swindon,
Wilts.

The Mission 760s are designed to be placed 2-3inches from a rear wall, so if they are not already in such a position, this may give you the slightly better bass you are looking for. In addition the Exposure loud-speaker cable you are using can sound quite bright in its tonal balance, so some experimentation with other types of cable may give the bass a little more drive. I would suggest trying a solid core cable, perhaps Mission's own Cyrus cable which retails for around £3/m. A cheaper alternative that can often give excellent results is mains cable. 1mm² twin and earth is plenty heavy enough for the kind of current that your amplifier will be producing and it costs less than 50p/m from an electrical shop.

If you are handy with a soldering iron you may like to try bi-wiring your Missions, if so see Mr X's letter below. **DB**

LOW LIFE

My present system comprises: Marantz CD50, Rega Planar 3 with Roksan Corus Blue cartridge, Denon DRM710 tape deck, Pioneer F223L tuner, NAD 3130 amp and Heybrook HB1s (series 2). Cables are QED 79 strand and Audioquest Turquoise interconnect.

I am planning to upgrade and would appreciate your advice. My problem at the moment is that I am unable to get involvement from my system at low to moderate volume levels, which I am forced to listen at due to living in a flat. I find myself resorting to the NADs loudness button all the time to make the sound livelier. It lacks clarity and insight without it. On the other hand the loudness button can make things unnatural and bass heavy, especially with the Rega.

BUDGET QUERIES

Write in with your problems to Hi-Fi World, 64 Castellain Road, Maida Vale, London W9 1EX. Our panel of experts will endeavour to solve them or at least offer some practical advice.

The NAD is the oldest item in my system. What would you suggest I replace it with? Would a Harman Kardon 6150 do the job (it beat a NAD 3240 in your recent test), or should I be looking to spend more?

Your suggestions and comments would be greatly appreciated.

Ian Appleyard
Eastbourne

The Harman Kardon HK6150 would indeed be an ideal replacement for your ageing NAD 3130. It has a firm and powerful bass that would certainly help matters at the low volume levels you use. However, to cure the problem I would suggest changing the loudspeakers first and then the amplifier at a later date.

The HB1s are a very good loudspeaker, but are a little on the light and dry side of neutral. At low volumes they are not working at their best and will not come into their own until



driven quite hard. The Goodmans Maxim 3s, Keswick Audio Research Arias and Tannoy 603s all play very good bass lines at low volumes and would be better suited to your situation.

I presume that if you are in a flat the floor will be suspended. If this is the case, you may find

ornaments on the top. This is very inconvenient so I intend to purchase a modern hi-fi system and use it with the two speaker boxes which are separate and removable within the existing cabinet.

The speakers I have are each complete with their own crossover networks and consist of two 15Ω drive units in parallel.

I have been reading your report on the Goodmans 650 system and wonder whether I could use it to feed the two speakers I have.

Can you please advise me and let me know where I can obtain a leaflet on the Goodmans system and where I can purchase one if I so decide?
Name and address withheld

There will be no problem connecting your existing loudspeakers to the Goodmans 650 system. They may not go as loud as an 8Ω pair that would be better power-matched to the amplifier, but being a modern transistor design the Goodmans 650 should produce more than enough level for domestic purposes. I would, however, strongly recommend auditioning the excellent Maxim 3 loudspeakers when you make your purchase as you will then be able to judge the quality of your existing 'speakers and whether you are getting the best from the system.

For more information on the Goodmans 650 system contact:

Goodmans Industries Ltd
Unit 2
Mitchell Way
Portsmouth
PO3 5PR
0705 673763



The Keswick Aria's play good bass lines at low volume levels.

that good results are to be had by mounting the 'speakers on wall brackets such as those from Target. There tends to be at least one wall within flats that is a supporting wall, meaning it is a sturdy one. If this happens to be in your listening room it would be an ideal place to mount the loudspeakers. **DB**

DECCA REPLACEMENT

I am the owner of a very attractive Decca 799 Stereogram, in a splendid Walnut Cabinet, but in order to use it I have to lift the lid and remove and replace various

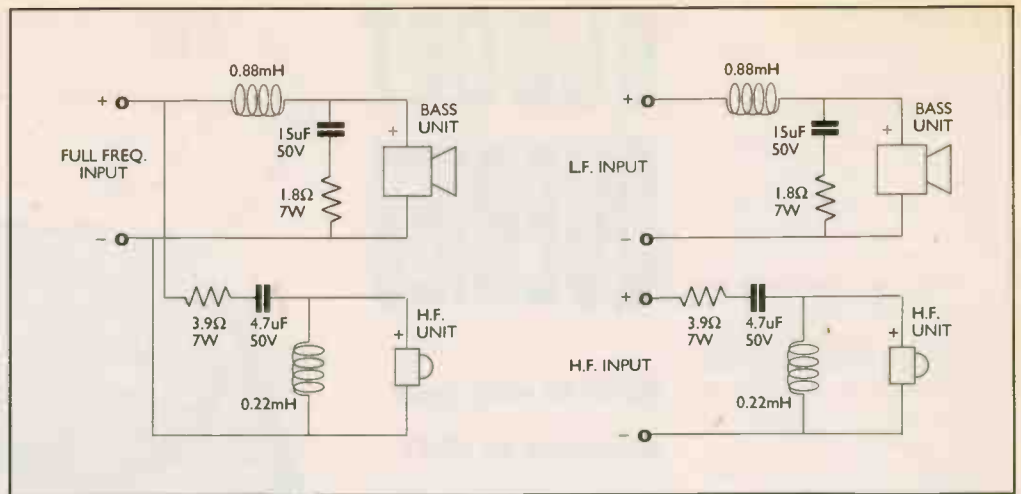


The 650 system is available from hi-fi retailers and high street electrical stores. **DB**

BARGAIN HUNTER

It was interesting reading about the tweakability of the Creek/Goodmans Maxim 3s, but what you did not say is whether improving the cable in the box would bring about any sound benefits.

I am not an audiophile and tend to think that people who spend thousands for what must be small differences (if audible) may as well flush their money away. But what I am is a bargain-hunterophile, anything cheap to improve the music. My system comprises; Technics SLPG500A CD, Rotel 930AX amplifier, Mission 760is with Rotel Supra 4 and Tandy interconnects. How about an article on tweaking the Mission 760s as there must be thousands of us who own them. The crossovers are more



Splitting the crossover for bi-wire operation of the Mission 760is is a relatively simple operation. You may like to try upgrading the components and internal wiring whilst you are at it.

complicated on the Mission 760i than the Maxim 3s - three capacitors and two coils per speaker.

What improvements could you suggest for my system i.e. amplifier, cables etc and any other tips for sound quality.

Name and address withheld

Upgrading the cable within the box of the Maxims would bring about a small improvement in sound quality, but we intended the tweak to be as affordable as possible to encourage people to try some experimentation. The upgrade could be done for around £10 as it stood but,

with the addition of say 1.5m of audiophile cable at £12/m, the cost of the upgrade would be tripled and would represent a near 25% increase over the standard price of the Maxims.

For those who wish to get the very best out of the Maxims we designed an active crossover which was published in the April Supplement No.2. This offered a vast improvement over the standard Maxim but apart from the extra amplifier needed, cost little more than upgrading the crossover or bi-wiring them.

If you are interested in tweaking your Missions you

may like to try upgrading the crossover components, internal cable and bi-wiring the crossover. See the diagram for further information. Higher quality crossover components are available from -

Wilmslow Audio Ltd
Wellington Close
Parkgate Trading Est
Knutsford
Cheshire
WA16 8DX
0565 650605

Have fun - I hope you enjoy these tweaks. **DB**

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