

Hi-Fi WORLD

AUGUST 1991 £2.00



NEW LINN KAIRN
PREAMPLIFIER

NEW NAD 8100
LOUDSPEAKER



NEW PROAC
STUDIO ONE MK II
LOUDSPEAKER

EIGHT
PERSONAL
STEREOS

SCOOP!

NEW
SHEARNE
AMPLIFIERS

NEW TOP
YAMAHA
CD PLAYER

OLD! REVOX
G36 VALVE
TAPE RECORDER

*Any use in
to
Dear*

" THOSE MONITOR 14 SPEAKERS RIGHT,
THAT I JUST HEARD, PUT ME IN MIND, OF
THE FIRST TIME A CROCHET, RIGHT,
CARESSED MY COCHLEA. I CAN FEEL IT
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CASCADING IRIDESCENT SPECTRUM, OF
AUDIO LIGHT AND SHADE, AND
CULMINATING IN A SONIC CATHEDRAL
OF SOUND... RAVE ON".

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- Value rating ★★★★★
- Sound rating ★★★★★

HIGH FIDELITY NOVEMBER 1990



MONITOR 14

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World Radio History

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AMPLIFIERS

LINN KAIRN Pre amplifier: The latest from the Linn stable. Glasgow's finest. 22

JOHN SHEARNE PHASE ONE: Beautiful looking amplifier with a sound to match. 30

BUDGET AMPLIFIERS: Three quality cheapies come under scrutiny:
NAD 3020i
ROTEL RA820-AX
DENON PMA-350 54

COMPACT DISC

ARCAM DELTA 70.3: We test Arcam's first Bitstream player. How does it compare to their earlier models? 48

YAMAHA CDX-1050: Yamaha's latest heavyweight comes under the microscope. 52

CASSETTE TAPE

PERSONAL STEREOS: Here comes Summer! Eight players to party with on the beach:
AIWA HS-P505 MkII **AIWA HS-RX705**
AIWA HS-F150 **PANASONIC RQ-S65**
PANASONIC RQ-A70 **SONY WM-DD33**
SONY WM-190 **SONY TCD-D3 (DAT)** 16

TAPE TEST: Chrome tapes from both Maxell and TDK are put through the machine. 59

LOUDSPEAKERS

NAD 8100: Their latest: an inexpensive floor-standing loudspeaker. Is it another NAD bargain? 25

NEAT PETITE: Big sound, small stature. Do the baby Neats size up to their competition. 39

TANNOY DC3000: Large floorstanding loudspeaker with a large, floorshaking sound. 47

PROAC STUDIO 1 MK 2: The latest guise of ProAc's popular loudspeaker, reverts back to paper domes instead of metal ones. 60

MERIDIAN D6000: We test this innovative active loudspeaker-cum-DAC-cum-sky-rocket. 68

TUNERS

DENON TU-560L: Denon's tuner features lots of presets and remote control without costing the earth. 36

SONY ICF-SW7600 RECEIVER: It's portable, it can tune into almost anything and it can even wake you up in the mornings. 57

TURNTABLES

GROUP TEST: We test four classic turntables:
LINN BASIK **REGA PLANAR 3**
REVOLVER **SYSTEMDEK IIX** 40

GOLDRING EROICA LX vs AUDIO TECHNICA AT-OC5: Two budget moving coil cartridges battle it out. 50

FEATURES

LOUDSPEAKER POSITIONING: Correct positioning of loudspeakers can make or break the overall sound. We show you where to stick them (no pun intended). 63

CHICAGO CES REPORT: Malcolm Steward samples the joys of the Windy City with June 91's Consumer Electronics Show. Full report. 78

VINTAGE VALVES: Chris Binns looks at what classic amplification is available today. 82

REGULARS

NEWS: All the latest from around the hi-fi industry. 5

LETTERS: More and more comment from around the globe. 8, 9, 67

COLUMNS: Nil Taurus Excrement from the Hi-Fi World team. 10

KELLY'S CORNER: This time, the Rambling Sid Rumpo of veteran audio stumbles upon a classic Revox G36 valve (what else?) open reel tape recorder. 72

QUERIES: Answers to your hi-fi questions. 85

SPECIAL OFFERS: Strange and wonderful hi-fi accessories which can be bought through this magazine. 92

NEXT ISSUE: If you can't wait until next month, here's a sampler of some of the goodies in our September issue. 95

MUSIC

RECORD OFFERS: Our own ever-expanding selection of good quality music available on LP, CD and DAT by mail order. 97

RECORD REVIEWS: Our round-up of the latest releases you can't afford to miss!
Rock from Malcolm Steward 86
Classical from Peter Herring 88

AN APOLOGY: Sound Design Studios' massive direct coupled DCO-150 valve power amplifiers were due to be reviewed in this issue. Unfortunately, these amplifiers are made to order, and somebody had the audacity to buy them before we had the chance of reviewing them properly. A new pair are scheduled to arrive for review in time for the next issue.

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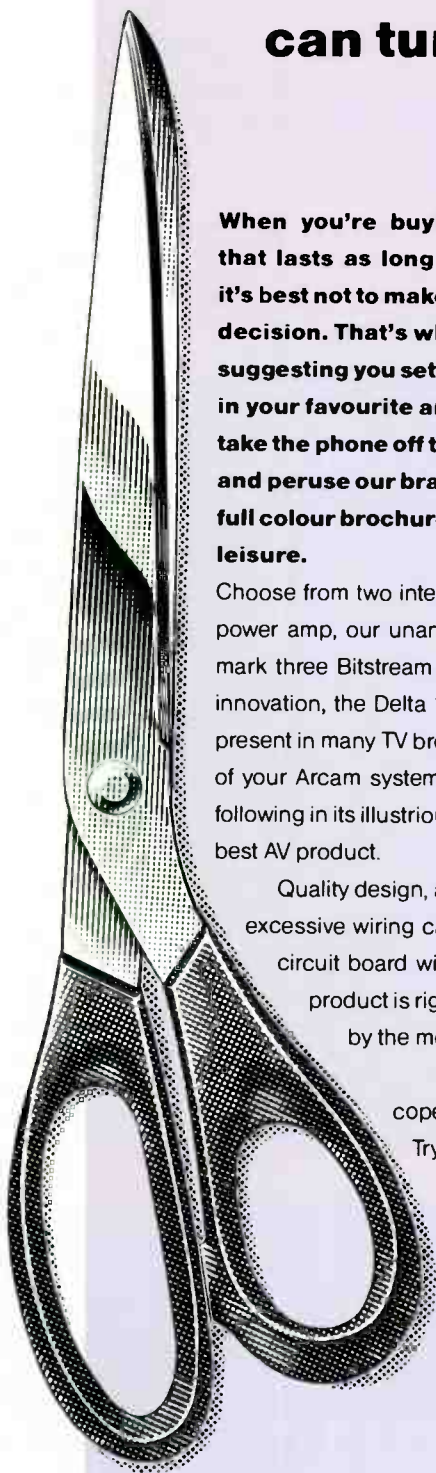
Choose from two integrated amplifiers, a tuner, a CD player, a CD transport, a digital preamp, power amp, our unanimously acclaimed Black Box digital to analogue converter (now in its mark three Bitstream version), and the Delta 2 speakers. Then, of course, there's our latest innovation, the Delta 150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

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

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

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

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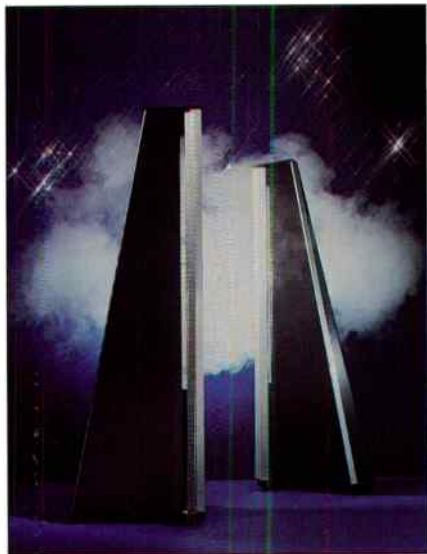
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DALI DIPOLE

Continuing with the Scandinavian connection, the Danish loudspeaker company Dali have announced their full range dipole loudspeaker, the Skyline 2000. Standing 1.6 metres tall and costing £1399.90, the 2000 is a hybrid ribbon/moving coil design, to take advantage of the dipole concept but with a deeper bass than would normally be expected.

The loudspeakers are designed to accept bi-wiring or bi-amplification and feature a sensitivity that is better than most dipoles at 90 dB for 2.83V/1m, while the impedance is nominally 4 ohms. In terms of drive units, the 2000 consists of a metre long transformer-less ribbon tweeter, combined with two 11.4 cm midrange units and a 38 cm (that's 15 inches, for those who still deal in pounds and ounces) bass driver.



Hi-Fi World brings you all the latest news from the hi-fi industry



TECHNICS LIFESTYLE SYSTEM

Following the latest trend, Technics have launched their £549.95 SC-CH7 component system with the accent on convenience and good looks. The system features Compact Disc, tuner/timer, twin cassette deck, equalizer and bi-amplification, where four mono amplifiers are used for bass and treble, left and right loudspeakers.

The system also features 'Artificial Intelligence' edit facilities. This does not mean that the SC-CH7 has Hal's computer circuitry from the film '2001', but instead allows the machine to set recording levels and calculate tape length. This system also allows the user to record songs from CD, fading out the last song on one side of the tape and recording it in full on the next side. All the features can be operated from a 48-key remote control, also supplied.

In addition, Technics have also unveiled their minute SL-XP700 personal Compact Disc player which is thinner than two CD cases. This model runs off rechargeable batteries (or standard alkaline batteries, when used with a clip-on holder) and features two digital to analogue converters and a multi-function LCD display; all for £199.95.



PIONEER AUDIOPHILE PRODUCTS

Following the outstanding success of their A-400 amplifier, Pioneer announce the launch of their latest innovation: the Stable Platter, or 'CD Turntable' transport mechanism. Where most Compact Disc players clamp the centre of the disc, leaving the rest of it to vibrate freely, Pioneer's system involves sitting the disc, inverted, on a platter. This helps to overcome many of the problems that have beset CD, such as jitter and cogging effects of the driving motor, they say.

Four models are available. They range from £249.95 for the PD-7700, to £79.95 for the top PD-75 model. All decks feature Pioneer's one-bit Pulseflow digital to analogue conversion circuitry. As yet, there are no plans for a transport-only device.

Pioneer have also announced the launch of two Dolby-S cassette decks, the CT-900S and the flagship CT-93. The

£499.95 CT-900S will be the cheapest Dolby-S equipped cassette deck in the UK. It features computer control of the tape reels, allowing them to work under optimal tension and 'Super Auto BLE' - which senses and calibrates tape bias, recording level and equalisation.

The more expensive £799.95 CT-93, has all the aforementioned features and more, but in a far more refined form. It also has a high degree of isolation, with extensive use of copper shielding and rubber insulators and a 'Line Straight' facility that can bypass the input balance control. Both decks have a facility that switches off the fluorescent display for serious listening.



TANNOY NEW LOUDSPEAKER RANGE

Tannoy Ltd have launched a new range of seven loudspeakers, which are known, paradoxically, as the Sixes. Their distinctive irregular hexagonal shape is designed to minimise standing waves within the cabinet itself. The use of mineral filled polyolefinic end caps is said to improve rigidity and the smaller panel size helps to eliminate resonances from the LF drivers.

Tannoy's study of Differential Material Technology, used in the Series 90 loudspeakers and their subsequent studio monitors, has also been utilised here in the design of the loudspeaker. The range starts at £119.90 for the 603 and goes up to £699.90 for the 615. A range of matching stands is also available, all priced at £79.90, with a foundation for the larger loudspeakers at £39.90.



CELESTION 7

Having created major successes in the budget sector with their model 3 and 5 loudspeakers, Celestion have launched their £199 Celestion 7. Using their existing titanium dome tweeter, it features refinements to the chassis of the bass driver and figure of eight bracing to reduce unwanted sound radiated by the cabinet and a new grille fixing.

The new Celestion 7 has also had its power handling improved to 150 watts and its bass frequency is extended down to 43Hz.



ROKSAN BITS

Roksan, the makers of the Xerxes turntable have announced a mid-price turntable and a (very) high-end pre/power amplifier. The Radius turntable, priced at £399 (or £550 with the Tabriz



tonearm it's been designed to work with optimally) is an elegantly styled model that uses many of the design features from the Xerxes.

Also of interest is their new Roksan Amplification system. This consists of the £2250 RoK-L1 Preamplifier, the £695 RoK-DS1 dedicated power supply and the 120W monoblock RoK-M1 power amplifiers, at £4500 per pair. This system shows great attention being paid to circuit design, insofar as no excess wire is used in the signal path. In addition, the amplifier features such exotic touches as dual volume controls, which have been ganged for ease of use and internal heatsinking. Roksan claim that in terms of speed and control it is better than any amplifier in the known world. We shall see!

METAXAS AMPLIFIERS

Aside from being a Greek brandy, Metaxas is the name of an Australian high-end audio manufacturer. Metaxas Audio Systems is the brainchild of one Kostas Metaxas, whose range of amplifiers and loudspeakers appear to be designed with that no-compromise attitude normally reserved for the American audiophile.

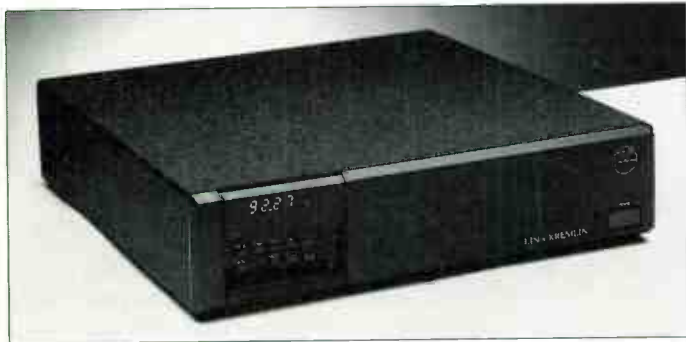
The amplifiers range in price from £1150 for the Charisma preamplifier to £5995 for the 100W monoblock Soliloquy power amplifiers, while the two electrostatic loudspeakers are £3375 and £16500 respectively. Of particular interest is the £4600 Opulence preamplifier, which has a variety of optional extras. These include internal high level inputs, precise user-adjustable impedance matching and special mains isolated power supplies. There are also options available for turning the Opulence into a recording engineer's fantasy. Contact Reference Imports 0435 868004 for more details.

GRADIENT SUBWOOFER FOR QUAD

Gradient Ltd, a Finnish company new to the UK, have recently introduced their SW 63 subwoofer for Quad's ESL 63 electrostatic loudspeaker system. Priced at £1500, the SW 63 is designed to visually match the Quad loudspeaker and fits without undermining the electrostatics' warranty.

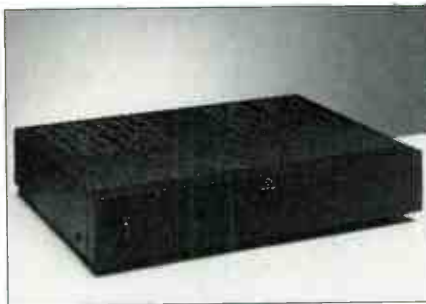
The subwoofer, which is "accepted" by Quad, consists of two bass units upon which the the ESL 63's are mounted. This means that an extra power amplifier is needed to drive the subwoofers. There is also a separate control unit.

It is said that this is the first in a range of products to be imported from Gradient by their distributors KJ West One, who will be arranging musical evenings and demonstrations to show off the joys of subwoofered Quads.



MORE LINN PRODUKT

Nary a month goes by without something new from the Glasgow stable. This month sees the launch of the long-awaited Kremlin tuner. Designed over the last four years, it's designed to complement their Kaim pre-amplifier (reviewed in this issue) and is capable of being operated via the Kaim's remote control handset. Its apparent ease of use belies its complexity: the Kremlin has interesting and innovative features such as user-adjustable mute/scan threshold. As yet, the price has not been set, but expect it to be well above £1000.



Secondly, we see two new additions to the world of the Linn Sondek. The Basik LP12 is a pared-down version of the standard LP12 turntable, except with a simple motor drive circuit. This allows the fledgling Linn owner an easier, less expensive way to upgrade to the Lingo power supply when necessary. In addition, Linn have also formally announced the Trampolinn suspension upgrade for the Sondek. This is a special rigid baseboard, with a silicon membrane suspension, used in the other turntables in Linn's range. This baseboard is said to improve the isolation properties of the deck, making it possible to site your LP12 on almost any flat surface.

Next we have the LK100 power amplifier. Styled similarly to the Intek, the LK100 is designed to fit requests Linn have received for a smaller power amplifier. With a maximum power output said to be 50 watts per channel into 8 ohms, the LK100 develops Linn's gradual move into distributive, or multi-room, systems.

Finally, two important developments concerning loudspeakers: K400 loudspeaker cable and the BINGO. Designed for use in bi-wiring applications, K400 cable features four cores of Linn's existing K20 cable, combined as two twisted pairs, making it useful for easy installation. A tri-wireable version will also soon be available. The BINGO is a bass equaliser for the Isobarik Aktiv system. Best used with the Dirak power supply, the new bass equaliser board improves the low frequency performance of the loudspeakers and gives the system a 'live' feel.

All the above produkts will become available during the coming season. As yet, prices are not fixed, but contact your dealer for further details.

IN BRIEF

GREAT LITTLE VALVE AMPLIFIERS

Fresh from the world of professional audio, the Great Little Valve Company have unveiled a pair of interesting looking power amplifiers. Built to order only, the two models are the stereo P50S 50 watt and the 200 watt monoblock P200M. Price suggested is around £3000-£4000 for the P50S and £8000-£10,000 for the mono pair.

For more details, contact GLVC at Chesham (0494) 778921.

PHILLIPS GO ART DECO

Not content with producing televisions that look like space helmets, Philips have introduced their Easyline collection, styled in a '90s version of '20s Art Deco. The range consists of a clock radio, an AM/FM portable radio and a radio cassette player, priced from £29.99 to £79.99

CORNFLAKE SHOP EVENING

Central London's Cornflake Shop is holding a series of musical evenings during July and August:

24 July	Proceed and Stax
31 July	Rega
7 August	Roksan
14 August	Naim Audio

Each evening will commence at 7pm and should run about two and a half hours. As well as the manufacturers themselves, The Cornflake Shop's staff will be on hand to provide advice and cappuccino. For tickets, please contact Angie Taylor on 071-631-0472, between 10am and 7pm.

MONSTER - THE HARMAN CONNECTION

Harman Audio have recently taken over the UK distribution of Monster Cable. New developments in the world of cables inaugurate the partnership. These are known as Interlink 800 interconnect cable, Interlink Light Speed 100 fibre optic and Datalink 100 coaxial digital leads. Monster have also designed what they refer to as the 'twist crimp' connector, which needs no crimping or soldering to make a good connection. Contact Harman Audio on (0753) 576911 for more details.



AIWA BUDGET CASSETTE DECK

Aiwa's latest £99.99 ADF-410 cassette deck is packed with features normally left out of budget units. The 410's record/replay head uses coils wound from PC-OCC5N copper, while the transport has full logic control. This, combined with bias adjustment and Dolby HX-Pro, appears to suggest that little is sacrificed in keeping the price down.

MISSION RECORDABLE COMPACT DISC

Mission have been chosen to be the first specialist hi-fi manufacturer to launch CD-R, Philips' recordable Compact Disc system. The first models will be professional devices, without copy-protection circuitry, while domestic versions will follow soon after.

● Mr Rein's criticisms of B.A.D.A. in your July issue are based on what he felt was poor service from one shop (a feeling he had not brought to B.A.D.A.'s attention). Without going into detail, the shop have a different view of what they feel is totally unreasonable behaviour from a 'customer'. This is history - but it's important to know where Mr Rein is coming from. He has complained to the magazines before. The comments to which he referred are a slanted report of what was actually said. He's more concerned with writing unbelievable letters that propagate false myths.

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

It is a regrettable that the price of much UK hi-fi will rise over the next few years, to fall in line with European prices. The message for the consumer is simple - buy now!

As for the disparity between UK and European dealer profit margins, related to standards of service, we regret that once again we have to disabuse Mr Rein's fanciful opinions. UK manufacturers who really care about the way in which their products are sold (e.g. Linn, Naim & Arcam) agree in general that UK specialist dealers provide better service than their European counterparts. They have even been known to bring their foreign dealers round UK B.A.D.A. shops to give them ideas on how to do a better job.

Yours etc
**Michael Lewin,
B.A.D.A. Operations
Officer**

● The Goldring Excelda turntable (July issue) being promoted as 'designed' by Remy Thorens and using a poor copy of the Thorens logo, has absolutely nothing to do with the genuine Thorens company,

who are based in Lahr, Germany.

The original designers and craftsmen of Thorens have no connection with this product, which in fact originates from the Eastern block.

The fact that the turntable (according to your reviewer) is more cheap than good speaks for itself.

The name Thorens and the accompanying logo has not been authorised for use in conjunction with this turntable, or indeed any non-Thorens product.

**Robert Follis Associates,
for Thorens Lahr GMBH.**

● May I raise two points concerning reviews of equipment in the June edition of the magazine.

Firstly, Roy Gregory's comments during the Marantz PM40SE/Pioneer A400 comparison. Mr Gregory writes "As a long term A400 user..." surely the amp. has been available for less than a year. This may seem 'long term' to a reviewer, but hardly for the average enthusiast. I wonder what 'short-term' is for Mr. Gregory. Long enough to play a couple of CDs or LPs perhaps?

Secondly in his review of the Musical Fidelity SA470 Noel Keywood writes "...it is so absurdly large and enormously heavy that it takes four people to move it...Three of us struggled to get the SA470 up our stairs" Come on Noel, how many people does it really take to move it, or did the review take place on the stairs?

Or perhaps Mr Keywood and/or his two helpers are not people. Perhaps one or more are gorillas. Or is Noel Keywood a gorilla? Maybe hi-fi reviewers are, as I suspect, super human. Or only Mr. Keywood? Who can tell?

**Barry Revell,
Ramsgate, Kent.**

● In due consideration of the nature and content of your magazine, we at Sound Advice and The Sound Factory Stands Firm feel that in a very short time you have chosen a format which is at odds with what we expect from a magazine. We feel that the principal role of a Hi-Fi magazine is to encourage readers to seek out and use

the better Hi-Fi emporiums (such as ourselves).

You are probably already aware of my views on merchandising out of the back of magazines. This is something I have been critical of in the past.

A much bigger source of annoyance are the 'old second hand, cum do it yourself' features. These might be of interest to the 'never buy anything new 'cos it's a rip off' type of person, but I put it to you that any self respecting, quality retailer such as Sound Advice needs these sort of customers like we need holes in our heads! These sorts of characters are, by long and painful experience of them, a total waste of space and never become Good paying customers.

Whilst I appreciate that you are trying to discover your relationship by - dare I say it - your need to explore a little in terms of the articles you write, please remember that the kind of readers that you are aiming at don't even buy your magazine. These characters stand in W.H. Smiths at lunch time and read their Hi-Fi Worlds at no cost to them and no benefit to you whatsoever!

My most serious criticism relates to an article which appeared in the March issue: six £200 amplifiers. All my worst fears were confirmed when one of the amps. in the feature arrived for us to evaluate. Quite how this product (no name no pack-drill) got into the review, let alone got the rapturous praise that it did, is quite beyond me. I have been in this business for some 20 years and I have never before seen what in my view is an ill designed, ill executed, ill finished and utterly lousy sounding product. I am bitterly disappointed in what I had previously thought could so easily be the number one mag.

I am not expecting Hi-Fi World to take the form of a 'Linn/Naim and very little else' publication. What I do expect from a magazine is a good balance of objective review, news and comment, supported by an attractive layout and presentation.

What I cannot abide are pointless features on product which should have died a natural death years ago. What

I cannot stand are reviews that can mislead by failing to comment fairly and realistically on the comparative build quality, circuit topology, overall design concept, electrical safety. As for your apparent predilection with the resurrection of museum pieces, what can I say except that I think that you will continue to alienate yourself from those who support you in real (financial) terms - your advertisers.

I wanted to say a lot more but sadly time has run out and I must direct another customer to the nearest Oxfam shop so he can pick up a Leak valve tuner which he will no doubt bring in to tell me how much better than a Naim NAT-01 tuner it is!!

**Derek P Whittington
Sound Advice
Loughborough**

The Editor writes: You may well feel that magazines exist to serve your own narrow commercial purposes. It is not an uncommon view within the industry and it is one that the magazines as a whole, under continual pressure, have tended to bow to. However, readers are very astute and they clearly recognise the problem.

It was always intended that Hi-Fi World should avoid such commercialism, which in the long term is destructive. Circulations have halved in the last twenty years.

Magazines must exist to serve their readers. The very articles you deplore are the ones our readers love. We have every intention of continuing with them.

● I was interested to read your articles about old Leak valve equipment.

I have been interested in reproduced sound quality for over 20 years but have always had a limited budget. By accident I acquired a Quad valve system about 10 years ago and since have become hooked on valve amplification. Because of cost this has always been "pre-owned". I have managed however, to acquire Rogers, Armstrong, Quad, Leak, RCA, Chapman, Scott, Mullard, Avantic and Audio Research components. Because of the variety available, Leak has been main type though.

My observation has been that whenever I have reverted to solid-state equipment I lose some of the live-ness or emotion. Of the amps which I have tried, Leak maintain the "sharpest" image and in every case efficient speakers more than compensate for low power output.

At present I use an Audio Research SP8 pre-amp with a pair of TL10's similar to those reviewed. I know it sounds an unlikely combination but it illustrates the potential of Leak power amps.

Of the Leak pre-amps, I have found the Point-One Stereo to be better than the Vari-Slope - probably because of the simpler circuit.

In terms of value for money a small valve system in front of your horn speakers would seem a very good place to start.

Good luck with the magazine.

Bob Sprowson
Rotherham

● I was delighted to see the article on the Leak Troughline tuner in the May edition. I was given one of these (similar to the one in your picture on page 81, but without the mono option) and a Leak Stereo 30 amplifier. The previous owner who had in turn received them from someone else had kept them in his garage because he couldn't get them to work.

The reason for this failure became clear after I plugged them in and began experimenting. Only one input, the one labelled Tape Amp, was working and only then if the adjacent gain switch was set to High, and the tape monitor switch on the front panel was set to On. Sometimes, in order to hear both channels it was necessary to jiggle this switch back and forth. The only other control on the front panel which worked was the Off/On/Volume knob.

I connected my cassette deck to the amp, and played a copy of The Eagles' 'Hotel California'. I was absolutely staggered by what I heard - this previously tame, folkly tune was transformed into gutsy rock 'n' roll. (This was especially unbelievable since the tape was copied from CD). I used my Nait 2 to enable me to play records from my LP12



readers' reply

through the amplifier's disc input and to the tape out and got similarly dynamic results. Unfortunately the amp is very temperamental and if it is not in the right mood it will just go loud without any evidence of the magic of which it is capable.

On the other hand the Troughline tuner has given me consistently good results (used via my Nait). The first thing I listened to with it was the Eric Clapton Blues Concert in Feb 1990 and I was very impressed with the sound. More recently I recorded a Jubilee Cruise concert which featured some powerful bass playing and when I played the tape through a friend's system, which has speakers at least four times bigger than my Heybrook HB2s, the bass went so deep I just sat there amazed. I'm in no hurry to buy a new tuner which says a lot for the quality of this vintage model.

Tim Westmacott
London N21

● First, congratulations on a new magazine which is going from strength to strength with each issue. There is a breath of fresh air about Hi-Fi World.

I cannot recollect having read in any other hi-fi magazine over the last twenty years or so, such an interesting and informative article as the one

by you in the May 1991 issue headed 'How to set recording level'.

The response too, by reader Ken Gill, in the June issue was also extremely helpful.

So comprehensively was the subject covered that I have one query only before I can at last tell the level meters on my cassette decks where to go.

My question is - details on the wrapper of a TDK SA90 include the figures 'MOL 315HZ: +4.5dB (0dB = 250nWb/m). What do these values relate to? In other words, if Cassette Deck 'A' had the Dolby sign shown at '0' on the level meters and Cassette Deck 'B' had the Dolby sign at '+3', would I be right in thinking I should set the Peak Level at +4.5 when using Deck 'A' and +7.5 when using Deck 'B'.

If the answer to my question is in the affirmative would I be right in assuming that TDK are placing the IEC point at '0', unlike your placing it at '+2'.

Clarification of this point also would I feel help me and many others to fully understand the matter.

T.W. Whitley
Grimsby, S. Humberside

The Editor writes: The 0dB value quoted is the IEC Reference level, which is roughly +2dB above Dolby

reference level, as shown by the Dolby sign.

So, on deck 'A' TDK SA would overload at +6.5 and on 'B' at +9.5. However, these figures represent tape performance on an industrial open-reel tape recorder with special heads, which manufacturers use to apply IEC tests. With domestic recorders, only Nakamichi discrete heads compare (e.g. CR-7E). Your own recorder is likely to distort heavily at such a level. I suggest you subtract 3dB from the figures to provide a starting point and then experiment.

● I think you have identified your niche correctly with people like myself who enjoy listening to music but also have a technical and practical interest. Some of your competitors go overboard with their descriptions. They turn from being an objective review into an esoteric piece of literature, whilst the others do not actually give you much information, although their DTP work looks good.

I was also interested to read Danny Haikin's comments about bringing his loudspeakers closer together. This is something I have noticed, and I am sure it is to do with the phase of the signals between

Continued on P67...

Point Five Series 2



"The direct coupled bass/mid range driver gave the system tremendous presence and vitality. Dynamics were forcefully presented and vocal delivery was particularly upfront. Stereo imagery was open and tangible.

But for me what made the Series 2 special were the special properties associated with solid core cables: the lack of edge and grain, the fine resolution of detail and the vivid sense of presence."

Alvin Gold, *Audiophile* Dec 1990



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We have an interest in all sorts of hi-fi equipment on this magazine, so it was with a little extra consideration but no special intent that we decided to put few 'old but gold' valve items in it. Everyone here knows and appreciates the merits of valve equipment, but at the same time nobody is a dyed-in-the-wool valve freak. Interest in valves was likely to be residual, at best, we used to think.

Our thoughts weren't worth much! Letters haven't stopped arriving ever since the Leak Troughline tuner article appeared. More amazingly, a new valve amplifier manufacturer seems to pop out of the woodwork every day. Our news page carries details of two new designs from The Great Little Valve Company, for example.

Old and New

Some might think Hi-Fi World is a 'valve magazine'. I have reservations about this label. We are certainly very sympathetic to, and interested in, valve technology, and we will continue to feature all manner of valve equipment, old and new. However, I don't want to give the impression that we believe valves are better per se, because our ears (and test equipment) tell us the matter is just not so clear cut.

My own interest in hi-fi started with valves 'cos it had to. Transistors did exist, but they were called OC71's and all I can remember is that you couldn't drive a loudspeaker with them. Mullard published an inexpensive, but beautifully produced, book around the same time (in the late sixties) called 'Circuits for Audio Amplifiers'. It was this that caught my interest and stimulated me to start building valve amplifiers.

Tempting Designs

Not only did the book explain all about frequency response and distortion in the easiest terms, but it contained the most superb range of designs for home built amplifiers. They progressed from a single ended 3-watt design right up to an unbelievably powerful - it seemed to me at the time - 20-watter. There were circuits, explanations, pictures of the finished units and parts lists. It was all too tempting. I slowly worked my way through the designs, in between building radios.

The Mullard book was a splendid introduction to EL84s, ultra-linear working, phase splitters and - last but definitely not least - 400 volt belts that

sent you reeling across the room. Funny, but Mullard never did mention anything about this minor problem! The sense of pride and satisfaction I got from building those valve amplifiers, let alone the entertainment provided afterwards, was more than enough compensation for the shock treatment they gave me.

Inevitably, I retain a strong interest in valves, but to be honest, I am not convinced they are innately better than transistors. As amplifying devices they have an awesome attraction and a peculiar sort of physical and electronic elegance. I'm not alone in thinking this, it seems. Alan Sircom, our Deputy Editor, is appreciative of the valve sound and is currently using an Audio Innovations Series 500. Richard Brice, and Chris Binns, both contributors to Hi-Fi World, have both designed and built valve amps. Roy Gregory has plenty of experience of using them. Richard Kelly was responsible for introducing us to the Leak Troughline and can be seen on page 73 of this issue, standing at King's Cross Station, London, with a Revox valve tape recorder (funny what some people do for a living). This list shows the amount of interest and experience we have, but none would claim unequivocally that valves are better. So what is it they offer?

Alluring

This is where the generalities start. I had forgotten about the valve until an EAR509 100 watter, designed by Tim de Paravicini turned up some time ago. It intrigued me. Here was a finely finished piece of equipment that, unlike the units I built, looked so attractive that boxing it was out of the question. That was back in 1977 (I seem to remember reviewing it for Hi-Fi News). It wasn't long before another valve monster arrived - a Michaelson & Austin TVA-1. Again, chrome plating and a high overall standard of finish made the TVA-1 unusually attractive to look at - and it was a fine sounding unit too. Both these amplifiers had a specification way beyond anything I had previous experience of and both sounded very alluring. They lacked much of the softness and floppy bass I remember characterised my own efforts. In fact, both had quite impressive bass power.

The implicit suggestion was that valves could sound much better than they ever had done, but only when put into modern circuits - and especially when

combined with unusually complex and sophisticated output transformers. Their change in status from the everyday, which has to be designed down to a price, to the exotic which is designed up to a standard, helpfully allowed an enormous improvement in output transformer specification to come about. This has served to distinguish modern valve amplifiers from those of yore. So why do I have reservations about them?

Generalising dangerously, valve amplifiers have a beautifully smooth, easy and cohesive sound that seems to flow with grace and liquidity. This offers a wonderful release from the often scratchy, coarse and grainy

quality of solid state amplifiers. And I have never heard solid state reach quite the levels of sweetness I have heard from valves. So what's the problem? In a word - analysis. Really good solid state amplifiers like our in-house Deltec's, provide an insight, a level of detailing and a sense of fine analysis that I have yet to encounter from any valve amplifier. They also exert far better low frequency control and in consequence give firmer, cleaner bass lines.

Valve preamplifiers in particular seem unable to match solid state in terms of analysis, yet there is no good technical reason for this. It is just one of those slightly unsettling conundrums. But for every valve power amplifier that has fallen short of my hopes and expectations, I can think of an example of valve technology that has exceeded them. In particular, our own Leak Troughline tuner continues to put all modern tuners to shame. It has an openness and an easy and totally natural clarity that is well beyond that of solid state tuners. Is it the simplicity of its circuits that is responsible, or solely the fact that it uses valves?

Psycho-Acoustic Trick?

Then there was the Japanese Ongaku triode amplifier that visited our offices for just a few hours (no longer because it costs



Reflections from Noel Keywood

kaleidoscope

£30,000 and there is just one in the country). This seemed so spectacular that its sound begged description. I am still not sure I did hear what I heard! The sense of closeness and intimacy it produced was quite beyond that of anything I had previously experienced. I am still wondering whether this is possible, or whether what I was hearing was a fiendishly clever psycho-acoustic trick!

Valves are fascinating and obviously very alluring for a great many people. It seems this is so whether they have previous experience of them or not. Quite whether valves are better is still an open question. They certainly offer a credible alternative to solid state. Perhaps it will be the growing renewal of interest in them that finally turns up the answer. In the meantime we are going to feature valve products regularly, but not to the detriment of our overall coverage of hi-fi.

And Next Month...

Finally, I've got to tell you that in our next issue we hope to feature, at last, a rare and fantastic animal: a truly direct coupled valve amplifier. Yes, this does mean that it has no output transformer or blocking capacitor and - even more terrifying to think of - the loudspeakers are coupled direct to the anodes of a line of PL-509s. Madness! ●



Feedback from Alan Sircom sircom's circuits

Freedom of the press. The phrase summons up images of journalists, writers and poets struggling to get political work published in Eastern Bloc countries before the fall of the Berlin Wall. It also evokes the 'Washington Post', at the time of Watergate. The last area that most people would consider in need of a little freedom would be the hi-fi press.

In our own little way we too suffer at the hands of censorship. As an independently-run magazine, without a large publishing house to act as a safety net, we walk a tightrope of financial security. If we publish anything contentious we can easily suffer at the hands of the advertisers; to cancel advertising in an independent magazine is rather like cutting off the life-support machine.

With a little bit of journalistic self-control, however, we can manage to consistently produce a magazine that is popular with both readers and the industry. As respect grows, we can hope to be forthright, maintain clear opinions and still keep an even keel.

Unfortunately the lean times that now prevail have shown the darker side of some of the people within this industry. We are fortunate; the 'sour grapes' mentality has not hit us as yet. Many others within the industry have not been so lucky. It strikes me as sad that a recession can cause so much bad feeling within an industry as small as specialist hi-fi.

Even more upsetting is the assumption some have been making that we should kow-tow to our advertisers. While I would never be a party to indiscriminately attacking dealers or manufacturers, I could also never allow myself to be led by our advertising revenue. If I like a product, it is because I enjoy what it does in sonic terms, not because any advertising inducement may come out of it.

There are also those who suggest that our features should also be led by the advertising department. While I feel that it is good to get a feel for what is going on within the industry, the concept of turning over editorial space to advertising features leaves an unpleasant taste in my mouth. I accept that my column last month was about the Mana table, but I still maintain that its inclusion in my hi-fi system was the most significant event that took place for me that month. If it had been a gas bill, last month's column would have been about the effect gas bills have upon hi-fi listening.

Enthusiasts

Attempting to produce a magazine that is run by enthusiasts, endeavouring to rise above the taint of commercialism is not an easy task. We are constantly looking for interesting areas in hi-fi that have not featured before, trying new ideas, or reintroducing old technologies and concepts that our rivals would pay not lip service to. Sometimes these ideas will fail to arouse much interest while others will hopefully lead the way.

It is because of this independent stance that we have looked at classic hi-fi equipment such as the Leak Troughline tuner, the TL/10 amplifiers and the Revox G36 featured in this month's issue. This is not done to undermine the current hi-fi industry - we may strive to be non-commercial, but not suicidal. Instead, these products are shown off in the same manner as modern day esoteric classics. Not one member of the Hi-Fi World team would expect our Revox G36 article to affect the sales of modern cassette recorders. Nor would we

seriously expect somebody to turn down a £1500 Naim NAT 01 for a £40 Leak Troughline.

There is a great deal of fun to be had in searching for antique pieces of audio equipment. Many people can turn their home into a museum with alarming rapidity, once the bug strikes. These people, although enthusiasts, will seldom enter the hallowed halls of a hi-fi shop to buy the latest flavour of the month, but I would feel proud if such a person came into my shop showing off his or her latest vintage acquisition, because it shows that they have trust in your interests and know that you are not just there to make a sale.

Staggering Response

We have had a staggering response to our second-hand articles. Many of these people have intimated that it has rekindled an interest in hi-fi that has lain dormant because of the 'business before pleasure' attitude taken by dealers and manufacturers.

We all have a living to make. We cannot afford to overlook any section of hi-fi, old or new. These are times of great change. Vinyl is fast becoming a curious relic with Compact Disc usurping its position of power and Digital Audio Tape, Digital Compact Cassette, and the new Mini Disc all snapping at its heels. Crystal ball gazing is a precarious profession at the best of times. Now one can only take wild guesses at what the next dozen years will bring. By being too busy fighting one another we may all miss the next wave of innovation and be swamped by a sea of products from distant shores.

Sails Filling

So where does this leave our little Hi Fi World with its sails filling? We are still trying to avoid the pirates that abound in the (sometimes) treacherous oceans of the British specialist hi-fi industry. Most sail past us looking for bigger booty.

In an ideal world manufacturers would manufacture, reviewers would review and dealers would deal and no-one would attempt to interfere on the other's territory. In reality this is seldom the case. I can accept that reviewers and magazines are likely to cause the most problems; an overtly critical review can be as damaging as a reputation for unreliability or a scandal in the press. For the most part, however, reviewers aim to be fair about the products they write about.

Like a large number of

reviewers, I have seen action at the front line. I have been a member of staff at one of London's better known hi-fi dealers and have experienced what it is like for a potential customer to wave a magazine at me saying, "But they say it's rubbish." At times this has made me want to throttle the reviewer responsible. But I would hope that no review, however negative, would make me as a dealer consider withdrawing my advertising. Bad reviews of products are a hurdle to overcome, but not a major one.

In some respects we are providing a service. A hi-fi magazine's *raison d'être* is to inform and entertain enthusiastic readers, hopefully creating new followers in the process. Our principal duty is to our readership, not our advertisers; they already know what is going on in the hi-fi industry.

Petty Squabbling

As I stated earlier, the industry appears rife with petty squabbling. I have always believed that a recession was a time for concentrated shoulder-to-the-wheel work in order to survive. While a good many companies are doing just this, some feel that the only way to maintain diminishing markets is to attack others around them like rats in a cage.

One case that I have heard of involves a large manufacturer (who will have to remain nameless) casting doubt on a smaller rival company by dragging up tales of long past financial difficulties. Whether a company has been in trouble in the past is virtually immaterial to its performance in the marketplace today. I'm sure that a thorough investigation of almost any company - in or out of the hi-fi industry - would show times of near insolvency.

At best this in-fighting can only damage the reputation of everyone concerned. We should reflect on why the specialist hi-fi industry is in existence in the first place. It is not a megabucks profession; as with any industry, success breeds cash rewards, but hi-fi multi-millionaires are quite thin on the ground. I would hope that the world of hi-fi is still populated by people who have a profound love of music. In the 'Twilight Of The Idols' Friedrich Nietzsche wrote a phrase which should be uppermost in the hearts and minds of all of us who are connected with this industry: "Without music life would be a mistake." ●

It's often said good movies are made in the cutting-room, not on the set. If you've ever watched a movie or video edit you'll know what a difference the director and editor make as they painstakingly piece together the finished article shot by shot. Mistakes, poor lighting and sloppy acting are edited out and consigned to the cutting-room floor.

Unfortunately, this practice has led to a belief in all sectors of the entertainment industry that performances can be fixed "post-production". Recorded music is no exception. It's a chastening thought to know that a classical Compact Disc may contain up to eight hundred edits. That's an edit about every five seconds!

There are several reasons for this state of affairs. Firstly, that it is possible at all. With the advent of digital recording and editing it's now feasible to stitch together one hundred 'takes' and seamlessly assemble them as an apparently complete musical performance. This has led to musicians, knowing the technical team can 'fix it in the edit' arriving at the recording session under-rehearsed. Also, record reviewers, who have criticised recordings with comments like "It's a pity about the sour oboe tone in bar 65 of the scherzo," have made record companies loath to release recordings with even slight flaws.

But, what price Beethoven in the age of digital editing? Is it any wonder that, time after time, music lovers cherish 30

year old analogue performances over their modern digital counterparts. At least the conductor knew, when he put down his baton 30 years ago, what the recording would sound like! Digital editing is doing for classical music recording what MIDI did for pop. The flawless, glossy and gutless is replacing the coherent, possibly blemished but sometimes inspired performance.

There is an energy - a vitality - well rehearsed live performances possess that a musical patchwork, no matter how beautifully or sensitively constructed, can never match. Nobody wants to hear dud notes, but a woodwind melody going slightly sharp at the climax of a musical phrase isn't a mistake, it's a natural part of a musical performance. The energy and fragility - it's human!

In pop and rock recording there is the beginning of a swing back to recording live. I know from rock recording sessions using MIDI sequencers in the past, that it was all too easy to fall into the trap of recording a sloppy keyboard part and then spending hours fiddling about with the technology, trying to fix bad timings and tunings. An attitude built up which was: "the technology is here to fix this and we'll do anything to avoid rehearsing and re-recording that piano part!!"

The trouble is, the technology gradually erodes the necessity and the inclination to put in a decent performance. This leaves the real job of shaping the music to the people with their fingers on

the computer mouse, rather than on the musical instruments.

I know it's one of the great patterns of history that technology replaces skill. I, for one, cannot remember the last time I had to fashion flint-tips for my spears or harvest my own wheat! But, at least with the necessities of life, they just need to be there, such is the nature of their importance. The arts are rather different, they're not a

necessity. Take the "art" out of food production and you may take away an indefinable something, but not its innate value. Take the "art" away from music and you're left with a kind of industrial by-product, completely negating its *raison d'être*.

Of course, it's not as bad as that yet. There's plenty of skill left. Audiences still go to live performances and that has ensured good orchestras and fine conductors. But digital recording is breeding new skills; fine editors and fine producers and fine MIDI programmers too!

It's not that the skills have evaporated from the production of recorded music but that the important skills have changed. I wonder how long it will take before the record buying public cotton on. Will we walk into "Our Price" in five years' time and see Beethoven Piano Concerto No.5 with credits for producer and editor on the front and a small credit on the back page of the pamphlet for conductor, orchestra soloist? ●



recorded message

Left by Richard Brice

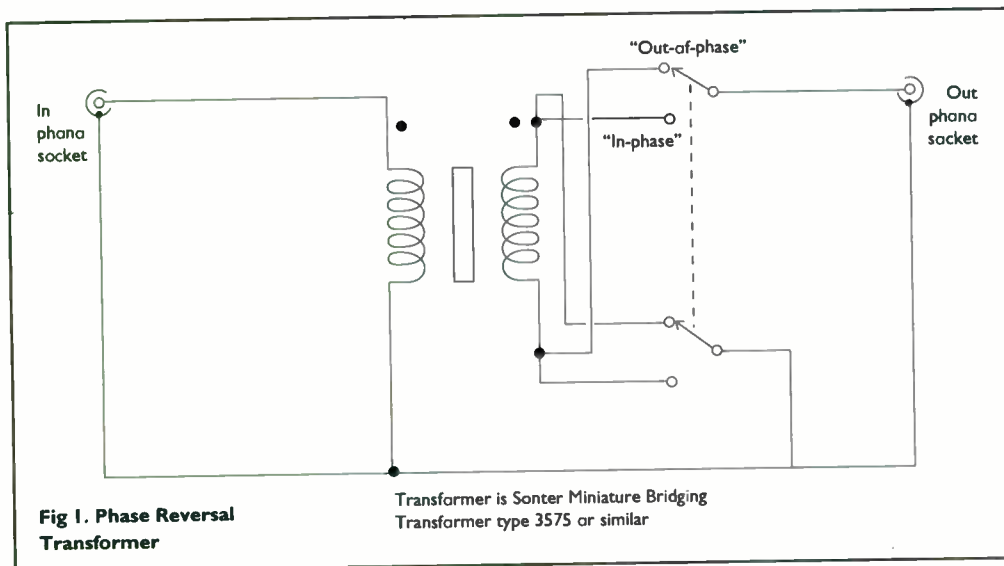


Fig 1. Phase Reversal Transformer

The Audio File

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any novice setting out, fresh and full of enthusiasm, on the road to a 'real' hi-fi system, is going to encounter, and sooner rather than later, the concept of a 'hi-fi hierarchy'. Whether from the lips of a dealer or the pen that answers the magazine queries, the attractive simplicity of the theory will soon exert its charms, a lifeline of logic in a sea of expensive ambiguity.

Examined as an abstract model, the idea of component hierarchy, a chain of reproduction which can only be as strong as its weakest link, has an impressive ring. It's logical. It makes sense! It's also easy to understand - and therein lies its great strength as a teaching tool (cynics would say 'sales tool'). My question is, how well does it translate into a Buying Guide, a purchasing strategy for audio Nirvana?

Those with long memories may well remember a Haymarket rag (I use the term advisedly, sure that the current batch of Mr. Heseltine's proteges could only agree), the infamous but long deceased Popular Hi-Fi. Each month, this august tome devoted two full pages to a diagram and tourist guide, laying out the full Linn/Naim upgrade ladder. All the way from an LP12 with Basik and a NAD 3020 (until the Naim Nait arrived!), to the full PMS Isobarik system in what were apparently faultless, trouble free steps. And they were, at least as far as the Linn/Naim products were concerned. As Popular Hi-Fi under the Editor of the time only ever believed in those two companies, to the exclusion of everything else, their 'upgrade path' was indeed a self evident truth. Not surprising, since these were the very companies which promoted the idea in the first place. Times have changed. Linn and Naim have gone their separate ways and Popular Hi-Fi has disappeared as well. And yet the 'hi-fi hierarchy' dictum still prevails. Yes, I know it works in theory, and it certainly works with Linn or Naim equipment, but remove it from the specific products around which it was developed, and suddenly the cracks appear.

Having started with the weakest link theory - so neat, so simple and so convincing -

we find it used to justify the allocation of your budget more toward the source, less toward the loudspeakers. The amplifier can only pass on what it's fed, it can't improve on what's gone before. Spend a lot on the speakers and they'll use all their time telling you about the inadequate signal they're receiving. The problem here is the equation of cost and quality, the idea that your amplifier has to be better than your speakers and that it should therefore cost more money.

It works for Linn and Naim, but it's as much a matter of the nature of their speakers as their price. If you design small boxes of low efficiency, and difficult drive characteristics into the bargain (remember we're talking Kann, Sara and Isobarik here), then you impose certain parameters on the designer of the driving amplifier. A large power supply with plenty of reservoir capacitance and good load tolerance costs a lot of money and your amp soon ends up costing more than its associated speaker. Drive units are comparatively cheap, and a simple crossover doesn't cost much. In fact, the box is the most expensive part, so the smaller the better.

So, small, inefficient boxes and beefy amplifiers certainly support the hierarchy of progressive cost increase from output to source. But what happens if you alter the design rationale of your speakers? If we go to a large, efficient box then the cost equation changes dramatically.

Big boxes cost money and the bigger they get, the more important quality and consistency become. In conjunction with increased driver cost, a decent big speaker costs a lot of money. On the other hand, assuming a commensurate increase in efficiency, the requirements now placed on the driving amplifier have eased. It will need less power and a smaller power supply, making it cheaper, but most importantly of all, making the designer's job easier. It's far less difficult to design a good small amp than a good big one, and remember, what we're concerned about here is quality. Thus the possibility of using a small, cheap but very high quality amp with a large, expensive

and efficient speaker fits in perfectly with the weakest link theory. Taken to extremes, there is the example of an expensive horn speaker with an amp supplying so few watts that they are countable on the fingers of one hand!

These are perfectly workable propositions and yet people (meaning journalists and dealers) rarely recommend them. Why? Because they upset the theory of how we should spend our budget. Indeed, that 'front end first' outlook is so ingrained that small amp/efficient speaker combinations were an endangered species until the emergence of Audio Innovations created a stay of execution [and Hi-Fi World came into existence!]

R.G. Bargy

Roy Gregory weighs in

All of which wouldn't matter unless the high efficiency route has something to offer as an alternative. Results show us it certainly has. I've been more than happy with the combination of Audio Innovations Second Audio's (a mighty 15 watts per channel) or Jadis JA30's with Kef 105 III's. Neither of these amps is exactly budget, but both show the benefits of low powered designs. Not one of the beefcake amps I've had through the house has come close to being as musically satisfying. They simply can't match the finesse and dynamic resolution of smaller units, nor the sheer speed and clout that they give to a system. Big amps may give you big peak-to-peak dynamic swings, but they happen so slowly! Who muttered "paralleled output stages"?

But the real impetus behind this column was a recent Pioneer road show, at which they presented their new (and extremely impressive) CD turntables. Speakers in use were the Kef 105's and the sonic results were excellent. I know how revealing these speakers are, and how choosy

about partnering equipment. And yet as I sat listening, dealer after dealer pronounced amazement at the sound. They'd never heard their 105's sound so good. That's because they'd never thought to use a £230 amp with these near £2000 speakers. You guessed it, the amp was a Pioneer A400.

The move to efficient speakers offers considerable benefits. They allow the use of smaller, simpler amps, which in turn make high quality sound easier to achieve. The availability of lower efficiency but more linear amplification using Triodes or Class A solid state designs is another option that arises. And last but not least, real bandwidth becomes a possibility. Never again will you find yourself offering apologetic explanations, for the 'superb bass quality' of your mini-monitors, which somehow just doesn't wash with the uninitiated - especially if they've had a few pints and a curry. Don't be intimidated by the hierarchy argument; it doesn't always apply. Consider the loudspeakers: more to get big and get re



personalities

Seven personal stereos and a portable

Digital Audio Tape recorder rested and taken

on the train by Noel Keywood

Personal stereos are one of the most exciting ways to experience music. With a pair of good headphones they can provide superb sound quality, with a closeness and sense of involvement in a performance that only headphone listening can give. But there are some nasties lurking beneath their plastic and alloy exteriors, waiting to offend or annoy.

I found two main problems: short battery life and terrible speed variations, which produce wow. My aim for this report was to find true hi-fi machines, free from major drawbacks but without costing a fortune. It would have been easy to review expensive machines alone.

Our group of personal stereo's spans a price range from £62 for a budget Aiwa (that does nearly everything) right up to Sony's amazing £500 digital DATman. In between lie a variety of different models, each with its own merits, each with its own

drawbacks. They are aimed at some distinct market niches; the art is to select the right one for your intended purpose. Get it wrong and you could be very disappointed. Conversely, some machines gave astonishing results - as good as the best hi-fi tape decks - and they were gems to listen to.

I use personal stereos on long journeys and for recording interviews for this magazine. And I love them. Seeing the gently beautiful Sussex countryside from a train whilst listening to Chopin is always an experience worth having. But whilst British Rail might suffer speed variations, I'd rather the personal stereo didn't! It might not matter with Motorhead or the Jesus and Mary Chain, but it can make other types of music sound terrible. Wow produces a horribly 'cracked' type of tonal quality, as well as an obvious slurring and jerking of pitch. Lots of personal

stereos suffer it, but there again, one of this group, which costs well under £100, has less wow than a Nakamichi.

Aiwa have no fewer than twenty nine different personal stereos spread over every conceivable market slot. It is useful if you know what the subdivisions are and what benefits and drawbacks are commonly associated with each. There are three identifiable basic categories.

‘whilst British Rail might suffer speed variations, I'd rather the personal stereo didn't!

First, there are modern fashion statements, performing much the same role as, say, an expensive watch. Then there are low cost, utilitarian models, invariably distinguished by bulky black plastic cases and crude 'turbo' graphics. The final category is a small one, the 'serious' machines, dedicated to providing good sound quality, but unadorned by hype, gadgets and Style with a capital S. This last category is the domain of a hi-fi magazine.

You pay extra for fashion statements - and suffer certain drawbacks as well, like short battery life and awkward miniature controls, with no better than satisfactory performance overall. Utilitarian players are cheaper. Buying decisions are based primarily on cost and available facilities. To keep the price down, manufacturers generally choose to make savings in the transport system, hence the common presence of wow. The key word for them is 'cheap'.

Nevertheless, in a curious sort of way, the cheapies are good value. They make no pretences and can be both entertaining and useful. Unfortunately, they are most certainly not hi-fi and for sensitive listeners they could prove to be a pain in the ear.

True hi-fi machines form a small third category. Not all of them are expensive, but most cost over £100. They need not be difficult to use, unduly bulky or short on battery life. In my experience, 'hi-fi' machines are the most soberly designed in every area and offer the best blend of good all-round performance, together with fine sound quality. They cost more, but it is worth it to savour the wonderful sound that can be achieved.

AIWA HS-P505 MkII

This mini-player was like the girl in the nursery rhyme; it could be very very good, but also very bad. With all Aiwa's experience in the manufacture of personal stereos (only Sony products can officially be called Walkmans) they should have been able to avoid trouble, but I suspect that their design team were given too much leeway with this one.

The HS-P505 MkII (£69.99) is delightfully small, being much like Sony's little WM-190 in this respect. It has auto-reverse and a small in-line remote control unit. It even shares features like a flat rechargeable battery and an external battery holder with the Sony. This led me to wonder at first if they might not be the same mechanisms in different clothes, as Aiwa and Sony do have a close relationship. Measurement and closer inspection soon showed that the two makes are very different players under the skin.

Sadly, the Aiwa is one of the most awkward personal stereos I have ever used. Its controls are small and their markings all but invisible. The forward/reverse positions of the fast wind slide switch were barely

discernible and the tape itself was virtually impossible to see through the tiny slit of a window. I could never tell whether fast wind was working or even in which direction the tape was going. An 'upside down' cassette orientation within the machine only made matters worse. Even the volume control was too close to the headphone jack, making level adjustment difficult.

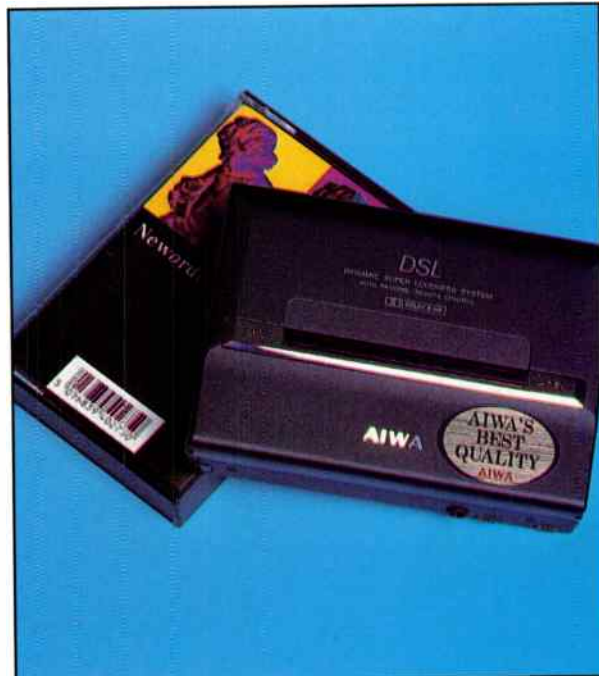
Good points were less immediately obvious, but they were there. Battery life is greater than the miniature Sony, its current drain being a low 78mA when playing and fast winding, giving around four hours from the 2V rechargeable supplied. Charging the battery takes place in situ though, which can be inconvenient since it prevents one battery being charged whilst another is in use.

The higher voltage used compared to the Sony resulted in a noticeably cleaner sound quality, with less apparent distortion at high levels. The HS-P505 MkII had stronger treble too, giving it a brighter sound. Switching in Dynamic Super Loudness gives bass boost, which is useful for the typical portable headphone.

Although measured wow was lower than that of the Sony, in use it proved easier to detect and therefore more upsetting. Random speed jerks occurred, plus sudden transient wow,

both of which made piano listening an ordeal. This player is best suited to piano-free Rock, which (fortunately or otherwise) excludes Elton John and Joe Jackson to name but two.

On balance, I felt that the HS-P505 MkII suffered - like the Sony WM-190 - too much from the pressure to miniaturize. A slightly bigger model would hopefully have fewer compromises.



AIWA HS-RX705

With its tuner in the lid and a small rechargeable battery that offers 3.5 hours playing time, the Aiwa HS-RX705 (£159.99) is as small as any player, matching Aiwa's HS-P505 MkII and Sony's WM-190, both of which are virtually cassette size. Like those players too, the RX705 has a bolt-on battery case to give longer playing time from conventional batteries. A mains power supply comes as standard and it doubles for recharging the battery. This does mean that when the battery runs down the player becomes unusable while the battery recharges, around half an hour or so being the minimum time to take a useful charge on board.

This miniature player has a complete synthesiser tuner on-board picking up VHF/FM and Medium Wave stations. There are no fewer than twenty station memories, ten for each waveband, so stations are available at the push of a button. All the circuits and a liquid crystal frequency display are packed into the lid! The Japanese are masters of miniaturisation: on top of all this they offer auto-reverse!

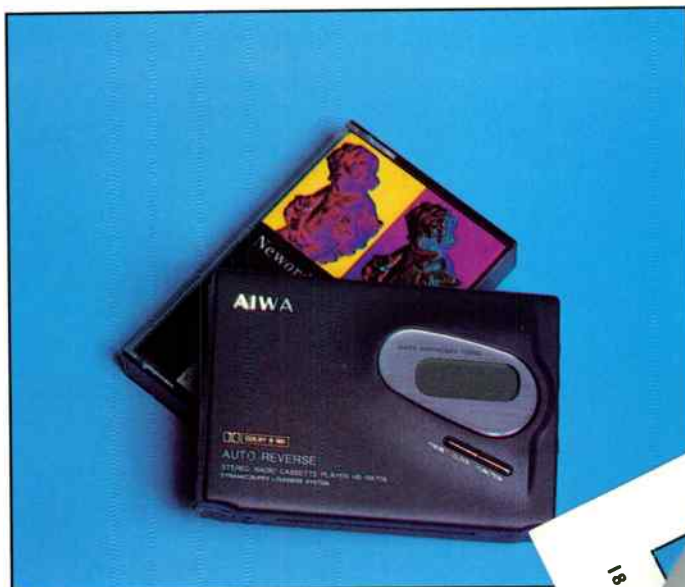
The player was well adjusted and gave the same sort of bright, clear sound as the 'P505 MkII, with Dolby

B reducing hiss. Measurement showed a healthy treble output right up to 12kHz, but some slight fall off in the bass. A dynamic boost circuit can be switched in to compensate however. Speed variations in the transport of the player measured 0.2% (total wow and flutter), which is a high-ish figure. In use I noticed the same vague, meandering pitch problem as that of the P505, whilst listening to piano. There were occasional speed jerks too. Put together, these effects conspired to compromise piano reproduction somewhat, at least for critical listeners.

The VHF tuner was blighted by noise, simply because it relies upon the headphone lead to act as an aerial. This is always the case with personal stereo tuners; it is not a reflection upon Aiwa's model. With the lead ideally arranged for receiving purposes to minimise noise, sound quality was excellent. Miniature radios with thumbwheel tuning are always difficult to tune in properly. Preset tuning proved more useful and appropriate for this role than I had expected. Simply being perfectly on tune helps to

improve sound quality and reduce noise.

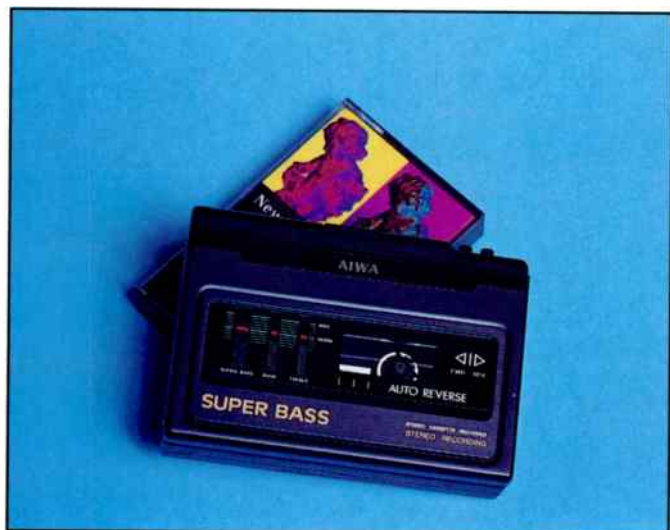
The RX705 was awkward to use because of its very small, poorly marked buttons and completely hidden cassette. There's no seeing whether the machine is winding forwards or backwards. The liquid crystal display frustratingly indicates Play direction only. Technically this is a very clever machine; not, alas, ergonomically. Again, many compromises have been made to achieve the smallest possible size.



AIWA HS-F150

This machine provides an interesting contrast to the smaller Aiwas. It is bulkier and less elegant, without some of its fellows' high-tech attractiveness. Yet the 'F150 (£61.99) fulfils a similar role. It records and replays cassettes, using either a simple internal microphone or (better) an external clip-on stereo mic. supplied with it.

The flimsy black plastic case gives the 'F150 a somewhat downbeat appearance; the others have more rigid and better finished metal cases.



The graphics, usually so restrained and discreet on small Aiwa machines, are bold and vulgar on this one. Aiwa seem to be aiming at a different type of user certain about what appeals to each. Finally comes the price difference: this machine is undeniably cheap.

The 'F150 is basically a no non-sense machine that would appeal to anyone who just wants something without fancy gadgets otherwise known as hidden snags. I use a now battered Aiwa recording personal stereo for our interviews, a predecessor to the 'F150, which is a sturdy, reliable workhorse. Its small, poorly marked controls are a problem and whilst the 'F150 has them too, the new model is much better than the earlier mini-Aiwa's in this respect. Cassette visibility is fair; the clear plastic window shows just one reel. The other is obscured by 'tone controls' which offer Super Bass, Bass and Treble

The machine will auto-reverse play, but it will not reverse record, as its record mode stops when reversing. Dolby B only works on playback too, in order to match prerecorded tapes that are Dolby B encoded. Recordings made on

the machine cannot be Dolby'd to reduce hiss.

This machine uses two 1.5V size AA batteries, which in alkaline form (Duracell or Ever Ready Gold Seal) give around 10 hours use. Measurements showed the current drain and end volts of the 'F150, which determine battery life, were quite low. Aiwa do not supply a mains unit, as they must with the rechargeable models.

Sound quality was fine, with its sense of tonal balance and dynamics. Like other players with a good power line from low impedance batteries, this one produced a strong, full bodied sound with plenty of punch for Rock and better in this respect than the smaller machines. There was only one serious qualification: piano had enormous body and power, which I found exciting, yet there were some serious slurring and tonal wanderings to be heard. Measurement confirmed that there was some drift and resultant wow was high at 0.3%.

Recording ability with speech was extremely good from the external stereo mic. The internal mic. is virtually a standby; it must be aimed directly at anyone speaking to be effective.

At the price, I liked this machine. It has weaknesses, but many virtues

PANASONIC RQ-S65

This miniature player (£129.99) vies with Sony's WM-190 in every sense. Its main attraction is its cuteness, a combination of its small size and rounded shape. Like the Sony, it is purely a cassette player; there is no radio or recording section. The case



is made from pressed alloy, finished in a dark gunmetal grey and then laquered to give a deep gloss. It is just millimetres larger than a cassette, making it another wonder of Japanese miniaturisation.

A full range of facilities are provided, including auto-reverse, Dolby B and C replay noise reduction, a bass boost circuit and a tiny, corded remote control unit with a liquid crystal display in it. This was

easier to use than the tiny buttons. Like all mini-players, the 'S65 wasn't especially easy to use, a difficulty made worse by the fact that yet again this is a machine where the cassette inside cannot be seen. Whirring sounds issue forth and (should you remember to carry a magnifying glass) you can check what button has been pressed. The rest is in the lap of the Gods. I would like to have seen a clear window in the lid, surely an essential feature in any cassette player.

Panasonic have used a small, flat lead/acid 2V rechargeable battery to power the player. Since the machine draws a lot

of current (200mA) when playing, battery life is not much more than four hours. Panasonic combat this problem by fitting a screw-on auxiliary battery compartment. If the rechargeable runs out, the player will run off a single 1.5V AA cell.

Use of a low drive voltage (1.5-2V) limits headphone volume, since maximum output is low at 0.3mV. The 'S65 goes loud, but not very loud. Like other single battery models, there wasn't a lot of punch behind the sound of the 'S65, another limitation that results indirectly from miniaturisation. However, there is a bass boost circuit (entitled S-XBS) with two boost positions and this added punch.

Loading a cassette and pressing the Play button I noticed an immediate problem: motor drone. This formed a continuous background accompaniment, to a piano solo that I found difficult to tolerate. Sustained notes sounded a trifle shaky and broken in pitch, but uncritical listeners might not find this especially obvious or annoying. Measured wow and flutter was 0.2%, a mediocre figure unfortunately typical of mini-players like this one.

The RQ-S65 is a visually attractive miniplayer, but sadly with all the drawbacks of the breed, plus added motor whine.

PANASONIC RQ-A70

Whilst the small Aiwa and Sony players are technological fashion accessories, Panasonic's RQ-A70 (£64.95) is altogether more mundane. Its role in life is to do as many jobs as possible at minimal cost. To this end Panasonic have given it a wide range of facilities. Apart from playing tapes, it will also record, from a radio or an internal microphone. Auto-reverse has not been fitted, but a small ultra-flat loudspeaker has been squeezed into the lid, so headphones are not obligatory.

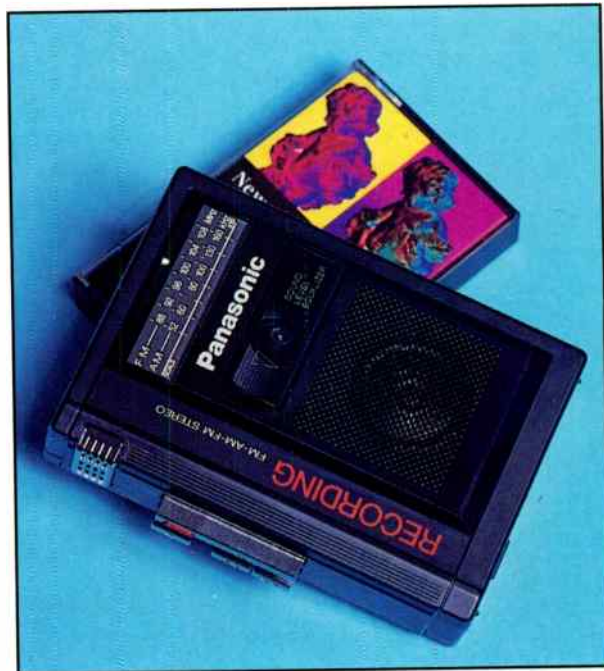
All this is partly explanation and partly excuse. You don't get all this for £65 or thereabouts without some penalty. Compared particularly to the mini-Aiwas the RQ-A70 is coarsely built and finished, but it is arguably on par with its price rival, the HS-F150. Like the 'F150, this machine is plastic cased, but Panasonic also include a two waveband radio covering Medium Wave and VHF/FM. The lack of any latch on the cassette compartment lid comes as a shock; in use head guides lock the cassette in place, which in turn holds the lid closed! It's not an idea many others look likely to adopt.

The Play button directly pushes the heads, guides and pinch wheel into contact with the cassette, which gives a heavy feel to the operating buttons. However, they are also very large and well marked, making operation easy. Just above these buttons lies a vulgarly chromed grill, behind which lurks the internal microphone. There is an external mic. input as well, for more serious work. Output can be switched from headphones to the loudspeaker, which is a useful feature. Whether Fast Play, the ability to increase speed by 20%, could be called a useful feature baffles me though. Is it jogging speed?

The RQ-A70 is powered by two 1.5V AA size batteries. It draws more current (150mA) when playing than many personal stereos, but alkalines like Duracell and Ever Ready Gold give around eight hours continuous playing time. Lack of Dolby B is a small warning about the uncritical nature of the user Panasonic might be aiming at; measurement of wow confirmed it. The RQ-A70 wows all the time, producing what I can only term 'broken pitch'. There's little sonority; percussion instruments sound like a cracked bell, because their pitch changes continuously. This and hiss apart (due to lack of Dolby), the sound was pretty good. There was enough bass, at least when using

good 'phones, and a good sense of clarity thanks to a reasonably extended treble output. Music sounded quite punchy, but I couldn't say fast, because my sample ran -1% slow. I didn't bother to find out whether 'jogging speed' was slower than spec!

This recorder is good value and packs many features into a relatively inexpensive package, but it might disappoint hi-fi ears.



SONY WALKMAN WM-DD33

Although little larger than the tiny WM-190, the WM-DD33 (£89.99) is a world apart in design rationale. Quite obviously, it is meant to be a true hi-fi machine - and it achieves its goal successfully. If you enjoy the sense of closeness and intensity that listening to music on a Walkman can give you, the DD33 will crystallise the experience with its fine performance.

Direct drive works: this player has less basic cyclic speed drift than most full size hi-fi decks - including Nakamichis! Listen to piano and you get a sense of complete temporal confidence, excellent solidity of tone and an utter absence of wiriness and shakiness in the sound. The intentions and abilities of the pianist come through, uncorrupted by intrusions from all those cogs and wheels.

From the outset, I knew this was a Walkman worth having. Listen intently in calm surroundings and there isn't a flaw to be heard. Dolby B suppresses hiss well and there is no motor whirr or whine in the background. At its best, Walkman listening is such a 'close' experience these

distractions can become intolerable. Conversely, when these obstacles are removed, the music comes through so much more cogently. On this Sony, it comes through clearly, sounding clean and stable. There is little sense of distortion or strain.

I have found externally opening battery compartments can spill out the contents accidentally. That cannot happen with the DD33, as it uses two AA batteries, housed within the heart of the machine. In spite of being direct driven, power consumption is normal, giving a battery life of around nine hours. A 3V external supply can be connected. Mega Bass is offered, mainly to add some bottom end weight to poor headphones. Curiously, it introduces hiss, negating its prospective worth.

Sony fit only necessary facilities, but engineer everything well. There is a tape selector switch, Dolby B noise reduction and two headphone outlets, but no auto-reverse. A large, clear window enables a tape to be seen easily. Everything is sensibly designed and the

whole both looks and feels good. The DD33 is small, but, thanks to its build quality weightier than average.

The WM-DD33 is one of the simplest, high quality Walkmans available. It is a fine exemplar of the Walkman concept, well worth having. And relatively inexpensive.



SONY TCD-D3 DATMAN

Even hard bitten hi-fi journalists speak of Sony's TCD-D3 (£499.99) Digital Audio Tape Walkman in reverential terms. In case you don't know, Digital Audio Tape (DAT) is the highly sophisticated 'successor' to cassette. Sony's TCD-D3, nick-named 'Datman' by the pundits, is a breathtaking piece of DAT miniaturisation. It manages to place a full sixteen-bit digital recording and playback system, complete with a highly complex transport mechanism, into a small case.

Even when doing nothing this



technological wonder draws a lot of current (220mA) to keep its operating solenoids energised. Current consumption increases to a maximum of 400mA when recording with the light on (8mA extra). Even the lid unlocks automatically when Eject is selected. Out of sheer necessity Sony fit a power off switch.

Two hours' recording time is available from the large, rechargeable clip on battery pack. Sony supply a mains unit which doubles as a battery charger with this machine. Because the TCD-D3 works from 9V down to 5.8V (absolute minimum) it will work off 6V or 9V dry batteries and, with a special cord, even off a 12V car battery. It can be used as a removable car player, because an analogue line output is fitted. There is also an analogue line input (3.5mm plug), plus a digital input/output through a special multiway socket. This allows it to be used in a domestic hi-fi system also - without which facility for home recording the listener might easily run out of tapes since so few pre-recorded DATs are available. We sell what there are (see our record marketing section), and what more natural but that they should be used for this section of the review?

The TCD-D3 is a semi-professional machine. It has punch-in recording, a microphone input, manual adjustment of record level indicated by a liquid crystal display

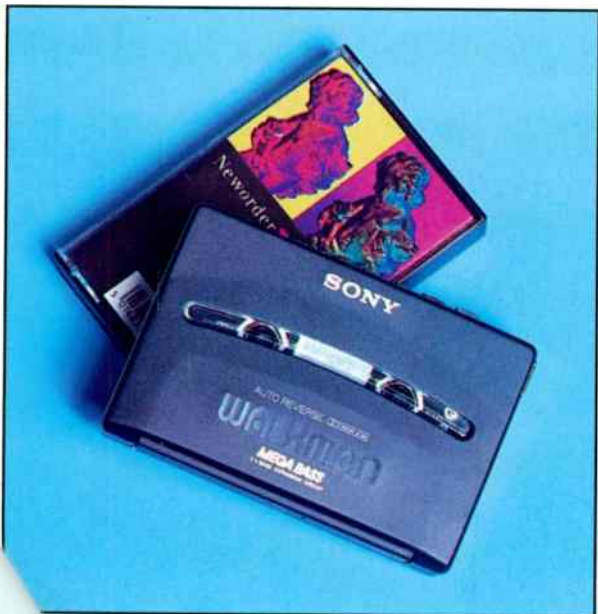
with a 50dB range. Track time and number are shown individually, plus the Start ID legends and such like. There is Track Skip and Music Search too. Little has been omitted; this machine is a recordist's dream.

With a near perfect audio specification the TCD-D3 offers superb sound quality. Its deep, clean bass seems uncanny. Walkman bass is practically always soft and slurred; the 'D3 fully preserves the power and stride of bass lines, plus the resonant impact of drums. With no speed variations, piano is reproduced with rock steady timing. There is an enormous sense of rhythmic precision from all-digital recordings (listen to Chick Corea's 'Light Years') that is utterly un-Walkman like.

Put in Joy Division, press the start button and - apparently - nothing is happening. There is perfect silence. Suddenly, someone shouts "Three, five, oh, one, two, five - go!" in the middle of your head and they are off with 'Warsaw'. Forget hiss: there isn't any. Even the Kylie Minogue DAT with its bright, clear treble demonstrates how much DAT differs from cassette: it doesn't soften or confuse strong treble signals. The impulsive synth work of New Order's 'Technique' album rearranges your brain matter in a way cassette could hardly manage; it borders on being brutal. Sony's TCD-D3 Datman is a real technological wonder.

SONY WM-190

It would, you might think, be physically impossible to make a Walkman smaller than this, unless it was smaller than the cassette itself. Everything's possible with the Japanese, however: I have tested a Toshiba player which was, and where the cassette slotted into one side! Otherwise, where the



cassette sits inside a compartment, the WM-190 (£99.99) offers the barest minimum in surrounding mechanical bits. I wondered how Sony do it, but I found there was a hidden price to pay.

This Walkman draws current like London Transport during the rush hour. Initially, I thought to myself "how well equipped this model is," as I took out a rechargeable battery, a mains charger and a bolt-on auxiliary battery compartment. Now I realise these parts aren't extras - they're necessities! Its consumption is about three times that of most other players, at no less than one-third of an ampere. Sony forgot only to enclose the power station shares.

The slightly fatter Walkman WM-DD33 tested in this report, with its sophisticated direct drive transport mechanism, has a normal battery consumption. As such, I can assume only that the mini-motor Sony use in this machine is responsible for this battery drain. They say playing time is 3.5 hours with the rechargeable battery supplied.

The need to use just one small battery also imposes a volume limit. Output is half that of other players; inefficient headphones need full volume to compete with other

personals and the outside world.

The WM-190 is well finished, but even though it doesn't look it, the lid is flimsy and fragile. The mechanism works very smoothly however, giving an impression of quality. Sony fit Dolby B, a tape selector switch and auto-reverse. Additionally, there is a two-position Mega Bass facility which simply applies enormous bass boost (+24dB at 40Hz) to give lightweight headphones some wellie.

Directly I pressed the Play button, a motor whine loud enough to be heard during low level musical passages became audible through the headphones. Frequency response was flat, making cassettes sound well tonally balanced. Wow made itself heard as temporal sloppiness in piano; measurement identified it as 0.3%, a very high value.

Listening to piano was not unbearable, providing you don't mind Ashkenazy changing his mind about which note to play - halfway through playing it! The WM-190 is best to suited to uncritical Rock music.

The main feature of this player is its small size. The penalties of Lilliput are great, being short battery life, wow and motor whine. Unfortunately, the sound of the WM-190 does not match its visual flair.

Conclusion

I suspect that many of the units tested are aimed more toward fashion conscious buyers than traditional hi-fi buffs. All the mini-players fit into this category. The Sony WM-190, Panasonic RQ-S65 and Aiwa HS-P505 MkII are much alike. All are elegant little mini-players, small size and chic appearance counting most. The tiny rechargeable batteries make the players little larger than the cassettes they play. So why the difference in prices?

The Panasonic is the only one out of the batch fitted with Dolby C. Whilst prerecorded tapes are not Dolby C encoded, home recordings can be. Anyone wanting to use their own Dolby C recordings may be interested in the RQ-S65, if they can tolerate the motor whine. For Dolby B-only users, its price is disproportionately high.



Sony's WM-190 drains batteries faster than its rivals, and is also so expensive the price hardly seems justifiable. I asked the Sony man to check his facts. When he told me the WM-DD33 is £10 cheaper. I thought he had it the wrong way around!

Best value is undoubtedly provided by Aiwa's HS-P505 MkII. This has a very moderate battery consumption, is small and well made, sounds every bit as good as the others, yet costs far less.

Aiwa's HS-RX705 is on its own. Being an HS-P505 MkII with a synthesised tuner incorporated, it looks like good value for those who want a high technology toy. I found its rechargeable battery gives plenty of playing time, due to low current consumption, just like the P505. Sound quality was very respectable too.

The Panasonic RQ-A70 and the Aiwa HS-F150 are similar to each other, but occupy a different market niche to the other models. These two players are cheap and cheerful, but quite effective all the same. Don't expect hi-fi from them; their speed variations will make you seasick! I had more admiration for these two no-nonsense cheapos than the fashion machines. They do a better job in many respects, and at a lower cost.

Sony's WM-DD33 Walkman is a bargain. I could hardly believe Sony's price for this fine player. It has better speed stability than a Nakamichi and

a superbly clean, easy sound quality that will do justice to the best recordings. It is small, easy to use and has a long battery life. What more could you ask for? Anyone wanting the best from cassette will love this player; it's thoroughly sensible, well made and entertaining.

Then there's the Datman. How Sony get a sixteen-bit digital recorder into such a small package defies the imagination. Their TCD-D3 is a little wonder that will appeal to amateur and professional recordists everywhere. For them, the £500 asking price is cheap. However, for an ordinary mortal, this machine is arguably a bit too much. There are few prerecorded DAT tapes, so music must be recorded at home. It is heavy and bulky when compared with, say, a WM-DD33 and the rechargeable battery fitted has a life of just two hours. As wonderful as it is, this machine is for the professionals.

DAccessories

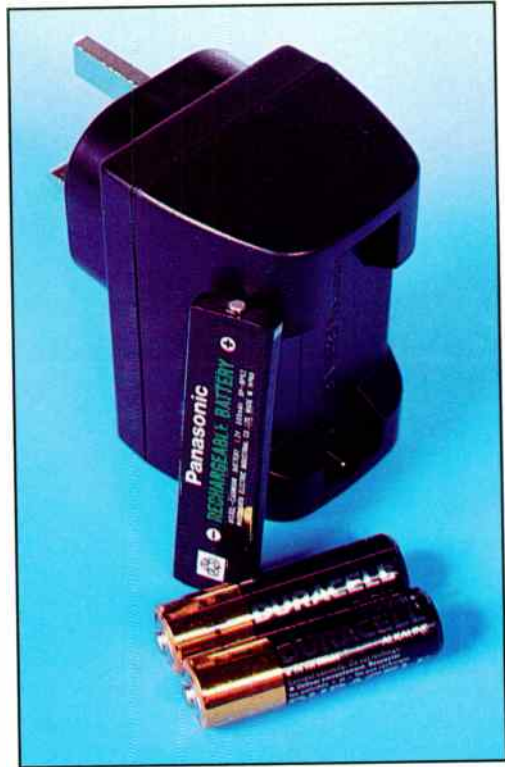
The Sony TCD D3 Datman, as befits a semi-pro machine, has a host of optional accessories.

Co-ax connector cable; low impedance OFC, with the obligatory gold-plated plugs, for linking up with a CD player or other source with a digital output. £34.99

Car mount kit for in-car DAT! Sprung to keep the nastier vibes from the car out of the way £49.99

Remote control; usual play, record and rewind facilities, and what Sony call 'Direct Music Search' - track skip and music scan. For the people who bought the car mounting kit it includes a mute so you can turn the sound down when the car-phone rings £99.99

Electret stereo microphone; Sony's figures are: frequency 150Hz to 12kHz (120 Ohm output impedance); dynamic range of 90dB. This also comes with OFC cable and gold plugs. Some idea of the seriousness with which Sony are pursuing the areas that have been the province of the humble cassette can be gained from the fact that this microphone has three settings including one for 'voice'. This is apparently intended for conference recording. Own up! Which companies out there are recording their board-meetings on two hour digital audio tapes? The other settings are 'wide' and 'tele'; intended for live recording, 'tele' allows the recordist to focus on the stage, 'wide' will catch the audience coughing (or the ambience, if you prefer) as well. The microphone costs £85.99 ●



Battery Problems

There are a host of battery related drawbacks with personal stereos. Miniaturisation demands use of the smallest batteries available. Usually, the tiniest batteries are not strong enough to run electric motors; they keel over and die within a few hours. Larger 'AA' types, in alkaline form (Duracell or Every Ready Gold) are fine, lasting eight to ten hours minimum, but they are bulky and heavy.

The latest solution is to fit custom designed, sealed lead/acid rechargeable batteries. But what happens when the rechargeable battery runs down? Recharging takes at least one hour, during which time the unit is effectively useless. This can be overcome by using two rechargeables - one battery can be charged while the other is in use. Sony provide an external charging unit, but you have to buy a second battery to utilise this system properly. With Aiwa players, this time-saving trick is impossible, as the battery recharges in the machine.

Whichever system is used, when a rechargeable runs out a replacement battery cannot easily be bought from a shop. You either carry a set of spare batteries, plus a charger when you go away, or the stereo rapidly becomes useless. In acknowledgement of this problem, Sony and Aiwa both supply somewhat incongruous appendages - external screw-on battery compartments. The addition of an add-on battery box rapidly quashes the ultra miniature, high-tech qualities of their best designs.

Rechargeables might have the benefit of smallness, but away from home, they do have their problems. Because of these difficulties, I have taken a close look at the battery requirements of each model in this group. Forewarned is forearmed. Knowing about battery life avoids dead Walkie syndrome. I usually carry four spare batteries in a bubble pack, and put fresh batteries in the player. This allows around thirty hours playing or recording time, with my machine.

Battery charges

Aiwa's PB3 and PB4 rechargeables cost £...
 Sony's NC-6WM rechargeable costs £...
 Panasonic's RBPB62 rechargeable costs £...



linn landmark

A listening session with the new Linn Kairn pre-amp has Danny Haikin falling off the edge of his seat.

The Kairn is a brand new, state of the art preamplifier from Linn Products, the result of several years' development of the ideas embodied in Linn's first pre-amplifier, the LK-1. At over a thousand pounds (£1,295) it's remote controllable, fully ready for bi-amplification, tri-amplification and installation in a multi-room system. To cut a long story short, it's the best pre-amplifier I've ever heard.

Maybe that's a bit too short. I have to confess I'm subconsciously predisposed to being utterly biased and partial, not because I use Linn products out of choice or because of this amplifier's super-fidelity, but because the other kind of cairn once saved me from continuing an inebriated passage right over the edge of a mountain. Had it not been for that little pile of stones, the deceleration trauma would doubtless still be affecting me.

Sophistication

The basic design of the Kairn is similar to that of the LK-1, but has undergone detailed changes in most areas. Like the LK-1, the Kairn is fully microprocessor controlled. However, in use it is far more sophisticated than the LK-1 or indeed any other specialist pre-amplifier.

Starting with the basics, there are seven source inputs. Two of these are for the output of a turntable (moving magnet or moving coil) and two are tape inputs. The remaining three are line level and are all the same. Unusually, the Kairn has three line outputs (one is the norm) which are intended for multi-amplifier systems

(bi- or tri-amping). These could also be used to feed the line-level input of another amplifier, feeding a second system. It also has two other curious sockets labelled Matrix and Remote in/out. Both of these will enable the Kairn to be used in a multi-room hi-fi system; presumably something that Linn are working on.

The user facilities provided on the Kairn are numerous. All the control buttons are hidden behind a hinged door, which, impressively, only needs a slight touch and will then open of its accord. A small sensor then activates the display panel which reports the news followed by a really interesting documentary... Just testing! - it actually reports what the volume setting is,



displayed as a number between zero and a hundred. Alternatively - and far more meaningful and precise - it can display the volume as an attenuation factor in dB.

Ins and outs

Like the LK-I, the Kaim has full listen and record facilities to allow recording from one input whilst listening to another - something which is very useful if you do a lot of tape recording but want to concentrate on another source while the tape machine gets on with it. Source Level Equalisation is the Kaim's unique feature. This, very simply, allows the Kaim to be set to keep the listening level constant whilst switching between inputs. This compensates for the differing output levels of most hi-fi components. The Kaim also has user selectable options which control a range of minor functions. Really picky pedants would find little to grumble about, suffice to say. Lastly, there is even a mono button.

All the Kaim's functions can be operated from a very powerful remote control handset. Linn's previous attempts were frankly appalling; it's good to see they have learnt from experience. The remote will also control Linn's forthcoming Kremlin tuner and most European Compact Disc players - or even Scottish ones! - in the future. Surprisingly, the Kaim's power supply is internal. Whereas the LK-I in its ultimate form uses the separate Dirak power supply, Linn wanted to keep the Kaim in a single box.

Take a look inside and you will see that this has been achieved by encasing the whole transformer in a substance called Mu-metal which works by containing the hum inducing magnetic field a transformer generates. Bill Miller, Head of Electronics at Linn, told me that even if the transformer was situated right over the Moving Coil stage - the most sensitive part of a pre-amplifier - that no audible hum would be heard. The power supply also has a larger reservoir capacitance than that of the LK-I, which further improves performance. Linn's other electronic components will also feature this arrangement in the future.

Dark matters

The full use of phono socketry, rather than the cumbersome XLR sockets that Linn used previously is another surprise. "We discovered a decent quality PCB mount socket," I was told with the sort of enthusiasm with which a group of physicists might have announced the discovery that most of the universe is made of Dark Matter.

The main circuit board on the Kaim is truly complex. With hardly

any internal wiring and an absence of mechanical switches it is an impressive sight. Like the LK-I, its logic controls are mounted on the back of its front panel. In the Kaim however the logic controls are miniaturized surface mount components (SMT's), and are fully screened and powered separately from the main circuit board.

The line inputs are all fed straight to the output stages, taking the shortest possible path, and each stage is fully buffered to increase isolation. The Moving Coil stage, which could get quite warm in the LK-I, is now blessed with heat-sinks in order to dissipate the heat it generates. The output and gain control of the Kaim is 7db higher than that of the LK-I: in ordinary language, with a capable power-amplifier, it will play louder.

the feel of the music, and the Carnival, came across skankingly

The Kaim is the same width as its matching power-amplifier, 320mm wide, 326mm deep and 80mm high. High quality interconnect leads are supplied which are very similar to the cable used in Linn tonearms. Linn claims to have experimented with other, flashier cables but found them to be worse sounding than the (relatively) un-flashy arm cable. Reason: unknown.

The main equipment used to partner the Kaim throughout this review was: Linn Sondek LP12 turntable, with Lingo power supply, Ekos tonearm and Troika cartridge. Both pre-amplifiers were fed into a Linn LK-280 power-amplifier with Spark power-supply. Speakers were Linn Kans and Compact Disc Arcam's Delta 70.3.

Dramatic

I have already said the Kaim is the best preamplifier that I've heard; perhaps more importantly, it is also a quantum leap ahead of the LK-I. And what's more, this shows most dramatically using Compact Disc - here the difference is truly staggering. It is also quite weird. The CD input on the Kaim is exactly the same as the other line-level inputs. Yet switch from an LK-I to a Kaim on any reasonably competent Compact Disc player and suddenly the sound opens up and is clear, vibrant and fresh. I would guess this is most striking on Compact Disc because the innate

purity mimimizes the subjective inelegance of this medium. Use a very high quality Compact Disc player and the difference is even greater.

Certain general attributes have become obvious during the listening tests. The new Linn pre-amplifier is staggeringly detailed. But not in just peripheral ways: it tells you of the structure and beauty of the music; it tells you of the musicians' talent, or lack of it; it tells you of the quality of fine instruments. And most importantly, it does these things differently with every piece of music played. A seemingly uninspired and simple pop song becomes expressive and suggestive. A heavily orchestrated wall of sound is broken up into intelligible fragments which appear full of new emotions and ideas.

Skanking sound

Although any piece of music will reveal this difference, some were particularly elucidating. A record I bought some while ago, but have seldom played, is Aswad's 'Live and Direct.' Recorded straight into an early digital tape recorder, live at the Notting Hill Carnival, it has always sounded distinctly dodgy. Until, that is, the Kaim worked its miracle. From an almost mono sounding grubbiness at one end of the room emerged the Carnival, beer cans jangling and all. The heavy bass lines went down an octave or two lower and the crowd were placed, more appropriately, behind the music. In hi-fi terminology, the sound stage was much wider and deeper and resolution of detail was, if quantifiable, about ten times higher. Essentially, though, the feel of the music, and the Carnival, came across skankingly, if such a word exists.

The sunniest Linn

The notes to one of my Compact Discs describe the first movement of Mozart's Symphony No 29 as his sunniest work, which precisely conveys the improvement wrought by the Kaim over the LK-I. The LK-I did a satisfactory job at reproducing this CD, and was better than most, but suffered during the more strident moments, tending to loosen the ebb and flow of the music and harden up. A switch to the Kaim and this was a different piece of music. The sound matured. Gone was any lack of refinement and in its place, a truly refined and beautifully harmonious vibrancy. It reminded me of the first time I heard a moving coil cartridge and was taken aback by the sheer effortless grace of the sound it made.

All LK-I owners should listen to the Kaim when they next visit their local dealer. I'll indulge myself and say anybody looking for a pre-amplifier should audition the Kaim ●

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 **ProAc**
CLEARLY MORE ACCURATE

NAD have an enviable reputation for producing quality budget products that provoke a "how do they do it at the cost" reaction among hi-fi enthusiasts. If you are building a system on a budget, NAD is the company that represents a safe first choice. I suspect they will continue this reputation with their new 8100 floorstanding loudspeaker, priced at £299.95.

Their first loudspeaker, the 8225 mini-monitor, received critical acclaim for offering good sound quality at a sensible price. Unfortunately, to get the optimum benefit from a loudspeaker of this size involves using stands, sometimes adding over a hundred pounds to the cost of the loudspeaker. Even when placed on a good quality stand, small bookshelf loudspeakers do not have the cabinet size for a really impressive bass performance.

It is refreshing to find a mid-price design that can actually reproduce a bass guitar well enough to avoid criticism

To overcome this, NAD have designed their latest loudspeaker from the ground up - literally. The 8100 stands directly on the floor, or it will sit on spikes supplied. Finished in black ash vinyl, the cabinet stands 73cm high, 20cm wide and 24.7cm deep. It weighs 9.25 kg in its stockinged feet. It's a reflex design, with the port at the rear, so the loudspeaker works best away from walls.

Although the 25mm soft dome tweeter of the 8100 is relatively standard, the 172mm mid/bass driver has a cone made from Cobex. This material is said to combine rigidity with low mass and high internal damping. It facilitates the use of a large magnet for high efficiency and deep bass. As the loudspeaker is said to go as deep as 30Hz, with a sensitivity of 89dB/watt at 1m, this goal appears to have been achieved.

Such a high sensitivity (by modern standards) allows the 8100s to be partnered with many high quality low power integrated amplifiers on the market today, such as the Naim NAIT 2, without causing undue strain. As the loudspeaker is a six ohm load, with occasional dips down to four ohms impedance, some consideration



must be used when matching it to some of the more delicate amplifiers available, otherwise equipment could get damaged. For most amplifiers, however, this impedance will cause no problems at all.

When partnering the 8100, it is worth experimenting with options to bi-wire or bi-amplify the loudspeaker. Firstly, not to do so would be a waste of good gold-plated connectors. Secondly, it helps the sound along a bit (quite a lot in fact!) The crossover network has been designed to use as few components as possible. High quality items appropriate for audio work, such as polyester film capacitors, lend themselves to bi-wiring as well.

feet firmly on the floor

The sound of the new floor-standing NAD 8100s suits Alan Sircom down to the ground

a sound education



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The cabinet of the 8100 is quite narrow and unobtrusive for a floor standing loudspeaker. In this respect it bears some similarity to TDL's Studio 0.5. Like the TDL it also has a narrow front which benefits its imaging abilities. The 8100 differs from the TDL by the nature of its internal construction however. Both feature extensive internal bracing and damping, but the Studio 0.5 is a transmission line (see last month's issue for a brief explanation of transmission line theory) and the 8100 is a reflex port design. Both systems are capable of producing impressive amounts of bass, but the reflex design has a less complex cabinet structure, which keeps costs low.

As with all loudspeakers, some time is needed to warm them up. Fortunately, these are not the sort that need weeks and weeks of running in, but a good few hours with a signal running through them will reap major benefits. One of the joys of Compact Disc players is that little button marked 'repeat'; I feel that it should also be marked 'hi-fi reviewer labour saving device'. In the days before 24-hour radio stations and CDs with repeat functions, how did we reviewers survive?

Having warmed the NAD 8100s up thoroughly, I set about the listening tests. Bearing in mind their cost, equivalent to that of £200 loudspeakers on good quality stands, I feel that the 8100s are an important addition to the mid-price loudspeaker market. The extra eighteen inches or so of cabinet makes a considerable difference, notably in bass response. The bass it produces is deep, well controlled and never sounds 'one note'.

The 8100 offer fine imagery for the price. Many mini-monitor loudspeakers overcome their apparent lack of bass by operating against a load-bearing wall, but at the cost of imagery, which becomes vague. The floorstanding 8100s I found worked best about eighteen inches from the rear wall, which produced no deterioration in imaging. They produce a fine soundstage, almost as good as the more expensive Epos ES11s. The images do not stray too far from the loudspeakers, however, as the soundstage sounds a little restricted, especially in terms of depth and height.

As befits a loudspeaker that can go as low as 30Hz, their sense of solidity is very good. Bass guitars have a tendency to move around between the loudspeakers a little, but at least it is refreshing to find a mid-price design that can actually reproduce a bass guitar well enough to avoid criticism on its apparent positioning and solidity. Aside from the bass guitar

wobbliness, the rest of the performance was bolted down within the mix. The vocalists and other performers had a fine sense of power and authority.

I felt this loudspeaker was slightly lacking in conveying the most delicate articulations produced by good vocalists. While it was possible to make sense of what was being sung and to follow almost every word, some of the more subtle parts of, for example, Lou Reed's voice did not escape the box. At this point, I noticed a hint of sibilance, which was borne out by a slight over-emphasis of record surface noise; both problems seemed to be situated at roughly the same frequency.

they give a great impression of a performance, rather than a recording. The band plays together well on the 8100s.

Because of the NAD8100s ability to 'go deep', it was easy to follow bass lines. This helped their reproduction of timing. I felt they were a little ponderous, rhythmically, when compared to sealed box units. All the same, these loudspeakers were no sluggards, as they handled difficult rhythmic pieces like The Velvet Underground's 'The Murder Mystery' or Little Feat's 'Hi Roller' with ease, but their pace was not as tight, fast and defined as that of the Linn Kans, for example.

The 8100s were reasonably good at separating instruments' tonal qualities, although with some reservations. While more than capable of delineating performers and instruments across the soundstage, they were not as well defined when it came to defining their tonal colours. Instruments were portrayed as distinct entities, but they did also sound as if they were all tarred with the same brush; sax and trumpet were particularly difficult to tell apart.

This could have a great deal to do with their lack of very fine detail. Violin bowing, fret noises and breathiness were less noticeable on the 8100s than on loudspeakers like the Epos ES11s. This is strange, because on first listening, they gave me the impression that they were superbly detailed, but subsequent listening started to show some of the holes. This is only a minor criticism, when one considers the cost.

Finally, my listening notes point to the loudspeaker's sense of coherence and dynamics, both of which were excellent at the price. In a small room, the 8100s will get the floors a-shaking when the music gets loud, but play delicately when asked to do so. In addition, they give a great impression of a performance, rather than a recording. The band plays together well on the 8100s.

Analysis aside, these have a great sense of fun about them. As a reviewer, one's house gets graced with some very esoteric hi-fi equipment. Much of this can be disappointing on an emotional level. The NAD loudspeakers never failed to instil a sense of excitement and involvement that belies their price. Along with the aforementioned TDL Studio 0.5, Linn Kan and Epos ES11, the NAD 8100s have that factor that puts smiles on faces. And they are a lot cheaper than the others.

I had a great time with the NAD 8100 loudspeakers. They have that giant-killer sound so characteristic of NAD products in general. They are not the most refined loudspeakers in the world and will not upstage models at twice the price, but they do confidently stand toe-to-toe with all their rivals ●



sheer bliss shearne

The public was bowled over by its beauty at the Bristol trade show, but does the sound of John Shearne's 'Phase One' amplifier match its stunning aesthetics? Alan Sircom and Noel Keywood look - and listen.

Alan Sircom

The sheer aesthetic beauty of the 'phase one' has been catching - and holding - the public eye at trade shows since the prototype was first spotted in a press release over a year ago.

Now, John Shearne is ready to launch his pre- and power-amplifier combination on the world. It even seems as if the designer reflects his product: bearing a striking resemblance to Martin Fry of ABC, he's known for some of the smartest suits in the industry. As smart as his amplifier's appearance. Another example, perhaps, of that curious trick whereby dogs come to look like their owners.

As the photographs show, with their dark blue marbled front panels and highly reflective knobs, the Phase One's (pre-amplifier £879, power amplifier £856) are distinctive and attractive.

The amplifiers have spent a great deal of time on the factory test bench, prior to their launch, to get their sound quality matching their visual appeal. It is rare that a small company can design a product with equal design and aural strengths. To take both factors into account from day one is almost unheard of.

Style

Attention to detail is rife throughout. Styling details are worked out down to the use of blue LEDs, instead of the usual boring red ones, to match the front panel. High quality gold-plated phono sockets are used throughout. The headphone socket is placed to the side to be unobtrusive. In fact, upon opening the amplifier, the headphone socket was found to be connected to its own amplifier circuit, divorced from the rest of the system completely.

As we went to press, we heard from the makers that, since fewer buyers apparently use headphones with higher-end equipment these days, the headphone socket and its associated amplifier will be supplied as a £60 option.

The preamplifier has input facilities for a turntable, Compact Disc player, tuner, two tape decks and an auxiliary source. The phono stage is switchable between the separate moving coil and moving magnet sockets by means of a toggle switch at the rear.

At the front of the pre-amplifier there are five chromed knobs: from left to right, on/off and standby; balance; volume; listening selector and recording selector. To the left of the on/off switch is a small blue LED to denote that the unit is operative. Finally, the headphone socket is tucked away on the lower left hand side of the amplifier behind the extended edge of the front panel - a clever piece of concealment which keeps the fascia clean and doesn't make plugging the 'phones in at all awkward.

The front panel of the power amplifier is even more minimalist. Aside from John Shearne's logo and descriptive legend, there are but two knobs (matching the ones on the pre-amp) and two small blue LEDs to indicate if power is on or not. This suggests that the power amplifier is a dual mono design. Indeed, taking off the lid reveals that the Shearne power amplifier is essentially two mono amplifiers each with its own power supply sandwiched together into the same box. John Shearne has rated the amplifier at around the 75 Watt mark.

Partnership

Suspecting this equipment might be quite system-dependent, before assessing it I asked the manufacturer

about the choices of equipment and cabling he would be happiest with. We agreed that the amplifiers seemed likely to be good partners to equipment like Pink Triangle turntables, ProAc loudspeakers (also reviewed this month) and Furukawa cabling. In other words, the amplifier seems to suit systems with a 'balanced' sound in mind. Fortunately, equipment that shares these aims happens to be sculling around my flat at the moment.

‘the passion and the full impact of the music hit me right in the emotional bits.

Although I shied away from the amplifier until it was warmed up, it was clear from the start that the John Shearne Phase One amplifier has some outstanding features. It produces fine images within a soundstage which is wide, deep and high. When partnered with the right equipment, it resolves spatial information in all three dimensions with equal aplomb. In addition, the Phase One offers up a great sense of solidity in the images it produces. 'Clap Hands' from Tom Waits' 'Rain Dogs' album showed up these two factors well, as the soundstage was well outside the boxes and instruments were clearly defined in space.

Emotion and Rhythm

It was very easy to follow a lyric on the Phase One. The tonality of particular instruments was well defined and they had a good sense of separation, even when the instrumental voices were very similar. On this amplifier, it was easy to determine the delicate phrasing of folk instruments on 'No More To The Dance' by Maddy Prior and June Tabor; it is rare for amplifiers to resolve these areas of the musical performance.

While not especially 'pacey', the Phase One does not instill its own rhythm, either. Its sense of coherence and portrayal of a performance is also very impressive. Again, on the Maddy Prior and June Tabor album, there was always a sense of understanding between the musicians that can so easily be lost on other equipment.

Many criticise products that strive for a 'balanced' presentation, suggesting that they sound bland or unemotional. While this is true of some, it is not true of the Phase One. Playing what I think of as highly emotional

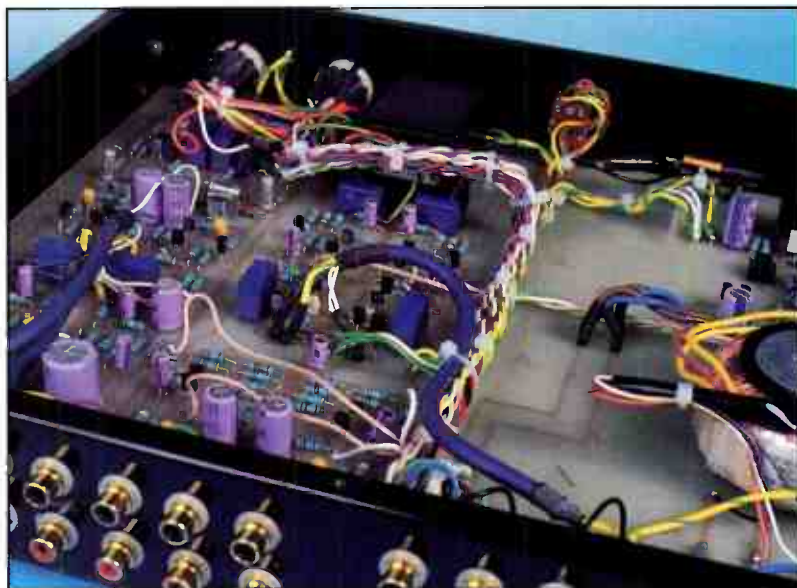


music - and that ranges from Prince's 'Purple Rain' to Mahler's 'Das Lied von der Erde' or Faure's Requiem - the passion and the full impact of the music hit me right in the emotional bits.

Phase One Pinned Down

I can (partly) understand why this criticism comes to be levelled at equipment such as this: it is very system dependent. In the context of this review, the system did not begin to shine until the loudspeaker cable which was in use originally (Audio Note Silver - highly expensive stuff!) was replaced by Furukawa's F5-2T30F loudspeaker cable (still on the expensive side!) This is not to say that one cable is inherently better than the other, but simply that, here, the Furukawa outshone the Audio Note.

As with everything else in life, the Sheame Phase One pre-amplifier and power amplifier pairing is not perfect, but its failures are never upsetting and are often even pleasant. The pre-amplifier does not have that near magical level of detail that the very best preamplifiers possess; but we are talking about a massive increase in price to achieve that last five percent the extra money buys.



An internal view of the pre-amplifier in prototype form. Production units are to have revised loom wiring, to lessen crosstalk.

The power amplifier has little to fault about it, especially for the price. The combination of pre- and power-amplifier work together well - their sound is hard to pin down, but I would suggest that it is slightly warm in the treble regions. Its bass performance is clean and tight, but could be criticised as being a little lean for some tastes.

For myself, I felt that I could

happily live with the John Sheame Phase One amplifier combination. Any blemishes it has in the sonic area are very difficult to find without calling much more expensive toys into play as part of a system.

John Sheame is now happy enough with his design to allow it out into the world. He deserves to be: his is one of the most significant amplifiers I have heard to date.

Noel Keywood

A primary requirement established in the initial design brief for the Shearne Phase One amplifier was that its sound should possess, as far as possible, the best qualities of valve amplifiers. John Shearne comes from a background steeped in valves and was determined to produce a solid state amplifier that offered the best of both worlds. In his own words, he wanted the 'involvement' a good valve amp can provide, but with typical solid state control at the bass end. This has been tried before, but always with limited success.

There is no agreed way of making solid state devices sound like valves. Some think valve amplifiers sound the way they do because of their distortion pattern, but that is simplistic and has been shown to be untrue. Others believe MOSFETs look like and behave like valves in basic principle and, therefore, they should offer the same sort of sound. There are plenty of MOSFET amps around and they don't sound valve like either. Quite what has been done to make the Phase One sound the way it does is a trade secret. Whether it is successful is a matter that would always be open to debate, so any attempt to be adamant about the sound, either way, would be unwise.

Power output measured 78 watts into a standard eight ohm load. I was surprised to see this figure fall to just 50 watts into a low (4 ohm) load. Usually in these circumstance power increases; I would expect around 100 watts minimum. An unusual clipping characteristic was evident when driving a low load, which suggested some abnormal mechanism was at work. John Shearne spoke to the designer and, apparently, 30%-40% more power will become available after resistors in our early review sample are changed. In the light of the fact that each channel has its own toroidal power transformer, I was surprised that power should drop so markedly.

The CD, tuner, auxiliary and tape inputs measure well. Frequency response has been limited to a moderate 20Hz-30kHz; there's no sign of a wide bandwidth approach here. Channel separation was limited but satisfactory at 60dB. Although the power amplifier is pure dual-mono, the preamplifier isn't, which often results in reduced channel separation

Post Script

Problems identified in measurement will be eradicated from production models, we are told. Crosstalk will be reduced by revised wiring. The disc input overload limit will be doubled and power into four ohms will increase by 30% to 40%.

across the balance control. In future the wiring looms will be separated to improve cross-talk. Noise was low at -88dB and there was no hum. There was little DC offset on the output of the power amplifier and input overload was in excess of 3V (probably infinite).

Distortion measured

If there is an area where one might expect to find something 'valve like' in the measured performance of an amplifier, it is in the distortion residual. As I mentioned earlier, that distortion is the reason valve amplifiers sound the way they do is fallacious, in my opinion. That aside, the mid-band residual possessed a dominant second harmonic, much like valve amplifiers, but also much like many transistor amplifiers! The situation deteriorated toward high frequencies, distortion harmonics increasingly substantially. The spectrum analysis of distortion at 10kHz (Fig 2) clearly shows an extended spectrum, which is, I feel, audible. Overall level was respectably low all the same, measuring 0.07%.

The moving magnet (MM) and moving coil (MC) disc stages were band limited, output dropping below 20Hz and above 25kHz approximately. There was little hiss, especially on the MC stage, which proved extremely quiet. It is also very sensitive (0.24mV), making the low hiss figure even more remarkable. High quality, low output MC cartridges can be used with this preamplifier. Input overload values were low, being 47mV on MM and just 3.5mV on MC. Usual values are at least twice as great, giving some margin of safety. I have measured short term peak outputs from cartridges though and found that with MMs peaks never exceeded 30mV. Both values are broadly satisfactory, even if they do look injudiciously low. They will be doubled, we are told, on the production examples.

Impressive Listening

The overwhelming impression I got from this amplifier was one of great closeness and presence in a performance. I believe this was due largely to a very rich sense of contrast revealed within performances. The range of expression, depth of inflexion and sheer dynamic scale vocalists displayed was both impressive and captivating. This is the essential quality that sets this amplifier apart. It is highly unusual and distinctive, as well as being vastly entertaining. I was held by the sound, fascinated and impressed also. The Phase One is wonderful in terms of providing sheer enjoyment; it really does draw you in.

Whether this unusual quality makes it valve like I wouldn't be bold enough to comment upon. One

could say so, I wouldn't. Although not the reviewer, I spent a weekend with the Phase One and loved every second of using it. It is not as coolly critical as my beloved Deltec, but it is warmer and perhaps more beguiling. I found them poles apart in character, yet would not want to choose one from the other.

Distinctive

In its sound quality, the Phase One had some mildly questionable characteristics that measurement subsequently explained. I felt that its treble was slightly 'chrome plated' in character and possessed a hint of 'clatter' about it. Luckily, it was not forward in terms of balance, so the effect never became intrusive or worrying. What I was hearing was the treble distortion.

There was some lack of real bass slam too. Again, it wasn't especially upsetting, largely because this amplifier possesses tight, fast and tuneful bass. Some may want more brute force or slam however. I suspect that when low impedance current delivery is increased, this will become available.

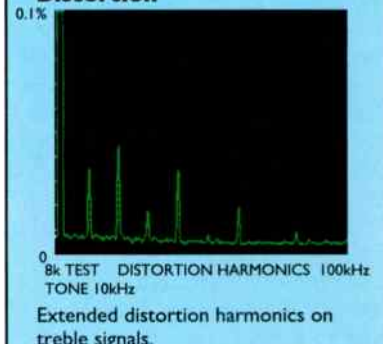
Such blemishes never really worried me. The Phase One is so innately characterful and distinctive in its sound - and so thoroughly impressive in a strangely beguiling way, that I found myself very happy to use it - and I wanted to continue to! But it has gone. I last spotted it going out of the door under Alan Sircom's arm ●

Test Results

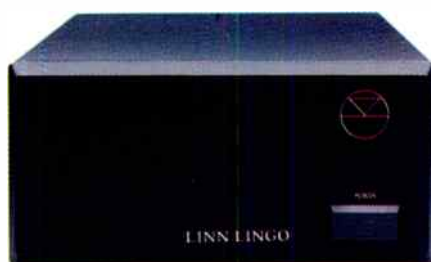
Power	78 watts
CD/tuner/aux	
Frequency response	19Hz-30kHz
Separation	-60dB
Noise	-88dB
Distortion	0.02%
Sensitivity	200mV
DC offset	15/6mV

Disc	MM	MC
Frequency response	14Hz - 27kHz	19Hz - 23kHz
Separation	-58dB	-56dB
Noise	-75dB	-68dB
Distortion	.02%	.02%
Sensitivity	2.8mV	0.26mV
Overload	47mV	3.5mV

Distortion

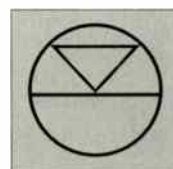


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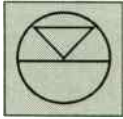
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distant control

Denon's new TU-560L tuner offers the convenience of a remote control and presets without a high price tag.

Noel Keyword investigates.

Armchair listeners will love this tuner. For only £150, Denon's TU-560L has a hand held remote control that scans through no fewer than thirty preset stations on VHF, Medium and Long wave. The memories are freely allocatable between the three wavebands, so any number of stations on a particular band can be stored for rapid recall, up to the limit of thirty, counting all wavebands together. That's enough to keep even the most enthusiastic radio listeners happy, I should imagine.

Like nearly all modern Japanese tuners, this one uses synthesised tuning in order to accurately align itself to stations and stay locked to that frequency over a long period, eliminating drift. This is achieved by using a highly stable quartz crystal frequency reference and stepping along the wavebands in small increments, at each step locking against the reference. It's a technique made feasible by the even and precise spacing of radio stations

Initial tuning is either by automatic or manual scanning. Once the stations have been loaded into memory, selection is from a row of front panel push buttons, or from the remote control unit. Whilst the push buttons select the memorised frequency direct, the remote scans through them using Up and Down buttons. Although this could be tedious, Denon have managed the affair so well that in practice it is fast and

convenient. The system scans up to thirty and straight on to one, in a 'circular' scan mode. Conversely, it scans down to one and straight on to thirty, so any wanted station is always a maximum of fifteen store numbers away - not thirty.

it has clean, uncluttered lines, free from spurious legends and styling artifices. I found it easy to use

Scanning is initially slow, but after a few digits speeds up to become fairly rapid. I timed it at just seven seconds to accelerate from one to thirty. In theory at least, this means that the maximum scan time is just 3.5 seconds. Add in some 'fiddling time' and you can still reckon on the Denon needing only five seconds to reach any desired store number.

How you remember where a station is stored is another problem altogether. Denon incorporate a preview scan mode. Press P Scan on

the remote control unit and stations are selected for five seconds duration in an ascending sequence through the memories. It's just enough to tell what is on offer from each. Other facilities available on the remote control are automatic and manual tuning, waveband selection and power on/off.

Any piece of equipment with remote control needs a display panel that is legible at a distance. Denon fit the now common blue fluorescent display, with clear, bright numerals showing station frequency, waveband, stereo reception and manual/auto tuning mode. To the right of this panel lies a signal strength indicator and a curious cable/normal mode indicator, all of which use tiny green LEDs.

I was initially baffled by this last facility. It turned out to be a simple input attenuator, which should be switched in for cable distributed VHF radio, to reduce excessive signal strength. It is best to leave this switched out, except in areas of very high broadcast signal strength or when a cable feed is used, of course. It would have been helpful if the signal strength meter had indicated when attenuation was needed, but tests showed that the meter's role was largely cosmetic.

It's curious that Japanese manufacturers cannot bring themselves to treat this facility seriously - Denon included. Worried that owners will suspect the tuner is insensitive if all the lights don't come on, this 'meter' indicates maximum with just 125µV of signal on the TU-560L. In truth, the tuner needs at least eight times as much signal (1mV) to give optimum performance. That the indicator cannot show this denies owners the ability to judge the effectiveness of their aerial systems. Only Hitachi's now unavailable FT-5500 (MkI & II) used an indicator system that usefully showed whether operating conditions were satisfactory.

Denon consistently make and finish their products very well. Whilst the TU-560L does not win any prizes for originality of appearance, it has clean, uncluttered lines, free from spurious legends and styling artifices. I found it easy to use, especially so from a distance with the simple remote control unit.

A novel aerial connecting arrangement has been included. Denon provide a special VHF plug to fit a rear 75 ohm coaxial, panel mounted plug (or socket, since it is both!). The plug accepts both 75 ohm coaxial cables and 300 ohm feeders, since it contains a balun transformer. Also supplied are signal leads and a medium/long wave loop antenna. External AM aerials can be connected however.

Sound Quality

From my experience with Denon tuners, I guessed this one would sound pretty good - and it did. The TU-560L provides a smooth, easy sound with good stereo imaging and a welcome absence of upper mid-range hardness. I listened intently to numerous stations over a long period and was never less than satisfied with the basic sense of tonal balance, plus cleanliness through absence of noise and interference. The only conceptual problem now facing us on Hi-Fi World is when comparing to our resident reference tuner, an elderly Leak Troughline. Most others simply pale into insignificance when compared to it! Switching to the Leak Troughline showed that in fact the images set up by the Denon were

I listened intently to numerous stations over a long period and was never less than satisfied with the basic sense of tonal balance

barren ones, basic outlines devoid of detail. Around them was blankness; just nothing. In contrast, the Troughline showed that these were people in a room. There was the atmosphere of the room to be heard and various noises in the background. It was altogether a different and more real experience.

On medium wave and long wave, basic intelligibility was very good. Even at night there were few whistles, suggesting good selectivity. The sound was 'warm' as it has to be on AM if selectivity is to be satisfactory for clean reception. Whilst the tuner scans automatically on Medium wave, Long wave must be manually tuned.

Summary

The matter of VHF sound quality must be disheartening for any poor soul who just wants a decent tuner! In practice, do not let me put you off by my observations of the Denon alongside our Leak. The TU-560L is a fine tuner, albeit a bit on the warm and bland side against our ultimate reference. Against tuners in its own price band however, I can happily recommend it on the grounds of sound quality and all round station-grabbing performance ●

Measured Performance

By using a very sharp notch filter to cut out pilot tone (MPX) at 19kHz, sub-carrier at 38kHz and other unwanted signals, Denon have managed to suppress 'rubbish' output, whilst at the same time keeping the frequency response flat. This ensures a good basic tonal balance is achieved, free from sharpness due to treble peaking, or dullness due to early treble roll off. Frequency response is shown in Fig 1. The sudden dive downward at far right is due to this MPX filter; you can see that to the left of it the trace is flat, measured limits being 10Hz - 15.6kHz (-1dB). This is a very good performance for a £150 tuner.

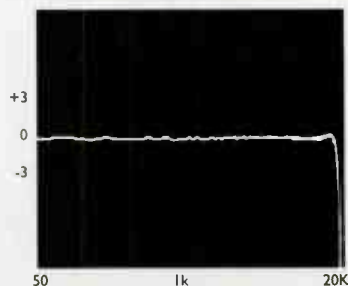
Channel separation was fine on stereo and distortion proved comparatively low. Whilst the 0.3% figure measured might seem poor in comparison to most amplifiers, the distortion analysis shows that it comprises mainly second harmonic, which is largely undetectable. It takes a lot of second harmonic to be problematic and even then it produces only a slight timbre change. The TU-560L compares well in this respect.

As the strength of the aerial signal increases, hiss from an FM tuner decreases. There is very little to choose between modern tuners here: all of them need around 1mV the Denon included. Hiss sank to -73dB with this strength of aerial signal, a level that is barely audible. More importantly, I have found that a strong signal significantly improves the sense of clarity provided by any VHF tuner.

Sensitivity was normal at 25µV for -50dB hiss level on stereo transmissions. Just 1.6µV was needed to capture mono transmissions with the same level of hiss. Alternate channel selectivity measured a good 75dB. This is enough to allow a weak station to be captured, in the presence of a nearby strong one.

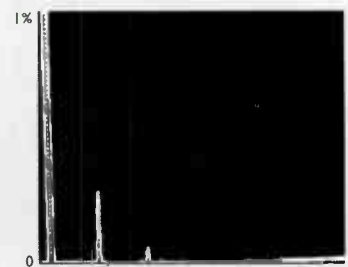
Frequency response (-1dB)	10Hz - 15.6kHz
Stereo separation	-42dB
Distortion (50% mod.)	0.3%
Hiss (CCIR)	-73dB
Signal for minimum hiss	1mV
Sensitivity	
mono	1.6µV
stereo	25µV
Selectivity (alternate channel)	-75dB
Signal strength meter indicator No.	lights at
1	6µV
2	10µV
3	25µV
4	63µV
5	125µV

FREQUENCY RESPONSE



Flat frequency response up to 15.6kHz

Distortion



TEST TONE 1kHz
Second harmonic distortion at 0.3%

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Audio Excellence are leading members of BADA - the British Audio Dealers Association. Audio Excellence have 4 times been voted best dealer in the South West and South Wales in the Sony Hi Fi News Awards.



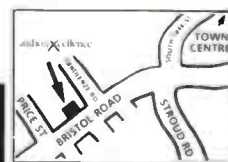
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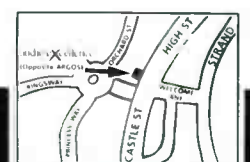
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North Eastern Audio Traders are better known as dealers than designers. Recently, unhappy with the quality of small up-market speakers, they designed the new Petite with an eye on a market segment they felt was sadly lacking: the mini-monitor.

NEAT have taken a conservative stance rather than join the companies which announce a plethora of new designs or tweaks almost by the month: the bass/mid driver, for instance, is a custom-made 6.5" doped paper unit. Isn't nearly everyone using poly-unsaturates or some such? This small monitor has little about it that is unconventional or mould-breaking in its construction, rather a greater accent on the careful implementation of traditional materials and rigorous testing and listening on the part of the designers.

As befits its name, the Petite is tiny, 30 cm high, 20 cm wide, 18 cm deep and weighing in at about 3 kg. Barely larger than the diminutive Linn Kans, they fit well on most 24" stands available, though NEAT plan to launch their own dedicated stands later in the year. The review samples, which were pre-production models and not necessarily indicative of the final production run, were supplied without grilles. The option of having grilles fitted is available, but only in extremis, because of the degradation it causes to the sound.

‘The sound these little monitors produced was very detailed without seeming too overtly so.

Well Rounded

The cabinet is constructed from MDF with a rearward-firing port at the same level as the tweeter, a variant of the well-known 1" Audax titanium-coated plastic dome; below the port sit two pairs of Michell gold-plated sockets allowing for bi-wiring or bi-amplification. And that's it! Apart from an "N" stamped on the front, there are no identifying marks at all, though the rounded edges are both attractive and distinctive.

No information was supplied with the loudspeakers, so I had to experiment to find the best position, running-in time and so on for them. I found the best placement was about 0.5 metres away from the

rear wall with about ten degrees of toe-in. The Petites needed some warming up, but not a substantial amount.

All sorts of equipment was used to determine their efficacy. Surprisingly, I felt that they worked best with a Voyd Valdi, with RB-250 amp and Goldring cartridge, Audio Innovations Series 200 'First Audio' pre- and power-amplifier combination using Audio Note Silver cable throughout. This amplifier only gives out 7.5 watts; normally I would

from Led Zeppelin's second album came over at a highly infectious pace and the Dread Zeppelin (a sort of Reggae-cum-Metal band with an Elvis clone singing) version of the same song, though performed in a far more 'dislocated' fashion than the original lost none of the compactness of the playing.

These little monitors can sound a bit fierce at times; in a system using amplifiers like the Audio Innovations this creates no problem, but the treble could seem bright, even a little

neat and tidy

The NEAT Petite packs a lot into a small package.

Alan Sircom checks to see if small is beautiful.

expect few loudspeakers to be efficient to cope with this triode amplifier; the Petites took it in their stride.

Once run-in, the Petites produced a fine sound. While they didn't image with the very best, the soundstage they produced was very open and well projected out of the boxes. It was rather two-dimensional, lacking something in both width and height, but still realistic. While it was not possible to pin-point instruments with absolute one hundred per cent accuracy, these loudspeakers' portrayal of imagery was easy to live with.

Joys of Small Boxes

Instruments were articulate and had a very positive solidity about them. On playing tracks such as 'Hyperreal' from The Shamen's 'Entact' LP the synthesizer bass line proved strong and powerful, but never overpowered the other parts of the track. In addition, the vocals were easy to follow and define.

The sound these little monitors produced was very detailed without seeming too overtly so. Pieces like Hyperion's beautiful recordings of the Mozart Piano Trios brought out low-level information which was very well defined; subtle nuances were well portrayed, but never at the expense of the dynamic range, which was very good for such a small speaker working in free space.

One of the joys of small box loudspeakers is that within the confines of their frequency range they are usually fast and tight-sounding with a good sense of coherence. These virtues hold true for the Petites. 'Whole Lotta Love'



excessive in some more forward-sounding systems.

The Petites take a place not quite filled by any of their nearest competitors: the Linn Kans, Monitor Audio Studio 5's and Acoustic Energy AE1's. They sound as involving, but are far less 'hi-fi' sounding than the AE1's and their compatriots, less bright than the Studio 5's and image better than the Kans. Each of these has its own character and its own followers. North Eastern Audio Traders' Petites could well carve themselves a niche that's not so tiny in their chosen market ●

making music with rubber bands

Four turntable packages costing between £250 and £320 come under examination. Malcolm Steward finds a personal favourite but realises that each has something special to offer.

In fact, every one's a winner.....

Despite living in these days of space-age specifications, high-tech happenings and digital derring-do, I still get excited by the prospect of playing twelve-inch slabs of plastic driven at thirty-three and a third revolutions per minute by a synchronous motor and a rubber band. There's something infinitely satisfying about taking an LP from its sleeve, placing it on a revolving platter, cueing a stylus onto the run-in groove and settling back to enjoy the music: far more so than struggling to prise a compact disc from its as-likely-as-not damaged jewel case, pressing a button on an anonymous black or silver box, inserting the disc in its drawer and then watching it disappear into its binary lair. I relish the greater hands-on involvement that comes with turntables.

I also relish the emotional fulfilment of listening to LPs: whilst I respect the arguments propounded with regard to compact disc's technical superiority I still find that the sound of vinyl discs playing on a decent turntable provides me with more entertainment and pleasure than CD has yet been able to do. I'm sure that CD will continue to improve and, indeed, I sincerely hope that it does, but, for the foreseeable future at least, I won't be joining the ranks of those who consider record-players anachronistic.

Testing the four mid-price turntables gathered here furthered my resolve. I'd recently been toying with a batch of similarly-priced Compact

Disc players, none of which offered the same degree of involvement or gratification that these decks managed with consummate ease. And whilst admitting that the situation is different for classically-oriented listeners, the decks have the added advantage of using cheaper software. Even ignoring this, if putting the listener in intimate contact with the music was the only arbiter Compact Disc wouldn't stand much of a chance against these record players.

‘real life is full of clicks and pops

Enjoying Music

Where most CD machinery at this price requires tolerating one or more obvious compromises, these decks offer very well-balanced performances. They focus the listener's attention on the music and not on mechanical artefacts. Please don't quote me the background noise argument: as John Peel is reputed to aver, "real life is full of clicks and pops". I buy records to enjoy the music, not the silence from which it might or might not emerge. These turntables are not the most sophisticated on the planet but none make a meal of surface noise or record imperfections.

All are basic manual designs, belt driven, and, with one exception,

utilising 'solid' plinths. Their setting up and operation will not be beyond the capabilities of anyone who can recognise which end of a screwdriver to hold. In most cases, anyway, the dealer supplying the deck will take care of the minimal preparation required, fitting the arm and cartridge where necessary. Only the Systemdek, by virtue of having a sprung suspension, requires actual 'setting-up': this task, however, should be well within the compass of any competent D-I-Y enthusiast.

A problem which can arise with auditioning turntables which don't come as ready-made packages is deciding how the individual components influence the overall sound. It's possible that a deck might fare considerably better - or worse - when fitted with an alternative arm or cartridge. In the case of the Systemdek IIX-900 I felt confident that the Moth arm was a suitable choice, having used the deck previously with five of the more common options. The cartridges used with the other decks were all familiar and 'accepted' partners.

Auditioning

All the combinations were auditioned with a variety of ancillary equipment but final judgements were made within the context of a 'typical' system into which these turntables would make their way as the primary source component, using a Mission Cyrus One integrated amplifier and Cyrus 780 compact speakers. Recognising that the decks might also be used as secondary sources in a CD-based system they were also tested with a £1000 Heybrook pre/power amplifier combination driving the more sophisticated and revealing Epos ES11 speakers. I sited each deck on a Mana Acoustics three-tier Reference support: I know this item costs more than any of the decks but it does remove one important variable by providing the most effectual turntable support I've discovered. All turntables are subject - in varying degrees - to mechanical disturbance: the Mana table is particularly successful at minimising its effects.

I was also careful to ensure that each deck was given a suitable running-in period. As mechanical devices they are subject to inevitable settling-in: moving parts and fixings bed down, electronic components burn-in, compliant parts like rubber feet adjust to having weight upon them. All these elements need time to stabilise before critical judgements can be made with any accuracy. Accordingly, each deck was set up, powered up and left running for one week, then checked again prior to listening.

LINN BASIK

The Basik is Linn's entry-level turntable, sitting below the Axis and the Sondek LP12 in the product hierarchy. It comes complete with the excellent Akito tonearm for an all-in price of £285. As tested here, fitted with the company's least expensive moving magnet cartridge, the K5, the total cost rises to £322.

It's a non-suspended design based on a wooden plinth and top-plate, supported by three, large compliant feet. The arm, motor and main bearing are tightly fixed to the top-plate, and the wiring to the motor and on/off switch (fixed underneath the plinth's front edge) is enclosed in a plastic moulding. Build quality is very good and the deck looks particularly neat and tidy.

Very little is involved in setting up the deck. The platter comes in two halves, the inner portion being fitted first after injecting a capsule of oil into the main bearing. The drive belt is then slipped around the inner half and the drive motor pulley, and then the outer platter and felt mat are fitted. These need to be lifted off to reposition the belt on the second step of the motor pulley if you wish to change speed, a task which sounds more onerous on paper than it is in real life.

The Akito tonearm deserves a special mention. It's the jewel in the Basik's crown. Its construction draws on that of the Ittok and Ekos models, albeit with less sophistication, and it makes a worthy partner for superior turntables. Having fitted a cartridge, setting the tracking force for the

tonearm is facilitated by a calibrated counterweight. Bias compensation is adjusted by a small dial beneath the tonearm rest. The arm can be easily adjusted to accommodate cartridges of different heights.

The Basik may only be Linn's starter deck but it nonetheless exhibits many of the familial qualities which characterise the top-flight Sondek LP12 and mid-price Axis. It has to be accepted that any budget-constrained deck is going to suffer compromises in its performance. The trick is to select them carefully and not make them obvious. In this respect Linn have done a fine job.

The Basik concentrates its attention and efforts on convincingly portraying music's fundamentals, pitch and timing. One of the deck's foremost attributes is its sense of unstoppable determination and drive in presenting rhythmic information. Tracks like "Crazy" from Seal's debut

LP, benefitted from insistent propulsion, the tempo never wavering. Although not as explicit as the Axis or LP12, the Basik emphasised the position of notes and clearly defined the spaces between them. Individual instruments and voices were picked out clearly, the latter being particularly expressive and articulate. Vocal sibilants suffered slight emphasis but not sufficiently to cause annoyance. Bass instruments showed good note-shape, pitch and fluid temporal progression, but sounded a little lightweight and lacking in substance. This is a typical example of the kind of compromises I was talking about: Linn were wise here in trading a degree of punch for musical accuracy.

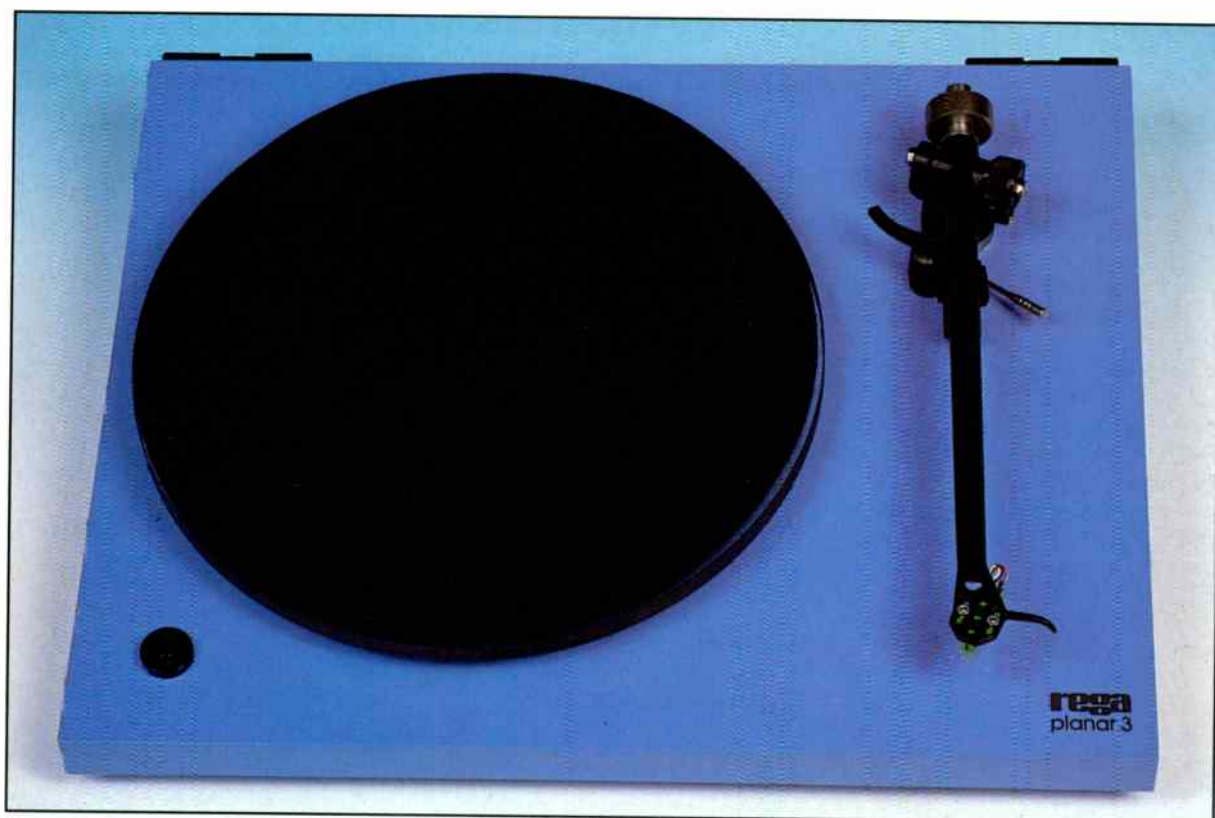
A note for those sensitive to soundstaging: the Basik tended to flatten the front to back perspective on recordings. In this area it fared best with mixes which were clean and inherently spacious, Joni Mitchell's "Night Ride Home", for example. Denser multi-tracks sounded more spacially compressed.

However, the deck's strengths lie elsewhere, in the portrayal of more vital facets of music. I ran my favourite torture track by it, the AAM's period instrument recording of Jean Fery Rebel's "Les Elements" - a candidate for being played exclusively on the very best decks if ever there was one. The Basik captured the essence of the music well, evincing its drama and structure with authority.

In a nutshell, this deck proved very enjoyable to live with and gave commendable insight into music and its performance. Although inevitably compromised in absolute terms it covered its tracks well.

‘The Basik may only be Linn's starter deck but it nonetheless exhibits many of the familial qualities which characterise the top-flight Sondek LP12 and mid-price Axis.





REGA PLANAR 3

The Rega Planar 3 is a true hi-fi veteran. During its long and successful career it had been improved and tweaked but its fundamental design hasn't altered a jot: a testament to its soundness. The deck is normally finished in the standard Henry Ford hi-fi hue but it can be had in one of Rega's 'special' colours for an £11 premium. The deck supplied for review came in a vivid light blue which clashed somewhat with the

the Rega excelled in the upper regions and in conveying large dynamic swings

cartridge we had fitted which is only available in a shade of green normally reserved for Teddy-boy's socks. £249 buys you a black Planar 3 ready fitted with Rega's acclaimed RB300 tonearm. The Rega Bias cartridge chosen to partner it added £34 to the bill, bringing the final reckoning to £283 or £294 dependant upon whether you're prepared to wear Ray-Ban's when playing records!

The deck is built around a solid medite plinth which is supported by three large rubber feet. The main bearing and arm are mounted directly

upon the plinth but the motor is attached with a degree of compliance. A small, two-step pulley drives the two-part platter via a circular section rubber belt. The driven 'half' of the platter - which is plastic - supports the main component which is made of heavy glass and topped off with a felt mat.

The Planar 3 is simple to set up and use, like the Linn Basik. Similarly, changing speed involves stopping the deck, lifting off the outer - or in the Rega's case, what is more accurately described as the top - platter, and moving the belt up or down the motor pulley. Its on/off switch is located more conveniently on the top of the plinth. Setting up the arm involves initial balancing using the counterweight, then applying tracking force via a calibrated dial. Bias compensation is applied magnetically under the control of a small slider on the arm base.

Authority

Switching from the Linn Basik to the Rega demonstrated that although similar in many respects their performances had marked areas of divergence. The Planar 3 sounded more obviously powerful, for example, on orchestral crescendi and when presenting fortissimo strikes on the piano in Talk Talk's "Happiness Is Easy". Subsequent listening showed what was happening - subjectively, at least. It appeared as if the dynamic windows of the two decks were in different places on a scale of amplitude: where the Rega excelled in the upper regions and in conveying large dynamic swings, the Linn Basik

seemed to handle smaller contrasts and subtle changes with more dexterity. On the Talk Talk track, for instance, the Planar sounded more authoritative on the heavy strikes whilst the Basik had a better grip on the player's lighter strokes, emphasising nuances. A similar effect was observed with bass guitar, the Rega having greater weight and slam, the Linn conveying note shape and pitch more explicitly.

The Rega's presentation, despite lacking the Basik's sense of instrumental individuality, still cast a deeper and more capacious soundstage. On the Joni Mitchell album instruments seemed better located in space and more three-dimensional. Her voice was warmer and richer but less detailed. Nonetheless, the deck allowed a good appreciation of her singing style, how she phrased lines, and how her breathing affected her vocal character.

Bass and drums on the Seal LP had plenty of impact and drove the songs along nicely. There wasn't the same feeling of precision as was heard on the Linn but it didn't adversely affect my enjoyment of the music. The sound had a greater sense of atmosphere - the Basik had made it rather 'dry' - and the Rega fleshed out the synthesiser voicings to good effect.

Summing up, the Planar 3 made music enjoyable and listening to it required no effort. I have memories of hearing the Planar 3 sounding a little more exciting and incisive, however, and so I'll reserve judgement on the Bias. Try the deck with a Goldring 1012 as well if you plan to audition it.

REVOLVER

The Revolver gets my vote for being the best-looking deck of the group. Whilst most hi-fi looks rather industrial and might be regarded as aesthetically intrusive in most domestic surroundings, this deck exhibits some sympathy for its environment. It is deliberately made to look attractive. This might not be of much concern to hard-core audiophiles but it's my guess that most hi-fi enthusiast's partners would ignore the rest and home in on this deck. The red custom-paint finish on the review sample (which for £249 included Revolver's arm and cartridge) was quite splendid.

Like the Basik and the Planar 3 its construction is intrinsically simple but it has an outward elegance. The deck is based around two plinth boards. The upper one, slightly smaller than the lower, carries the main bearing and the arm: the lower, which sits on the obligatory three squidgy rubber feet, has the motor attached to it and its spindle passes upwards through a plated aperture in the top section. The pulley then drives the one-piece platter circumferentially by means of a round-section rubber belt. Speed change is effected by moving this belt up or down the pulley but there is no need to remove the platter in order to do this. The platter is topped with a stiff felt mat (which Revolver call The Starmat) and a small rubber confection, shaped like a chess-set pawn, can be used to provide a

degree of clamping for records. This device they call The Pig.

As with the Rega and Linn, the amount of setting-up required is minimal. Oil the bearing, fit the platter, mat and drive belt, adjust the arm and you're ready to go. The arm's tracking force and bias adjustments are straightforward enough and aided by calibration markings. Arm height will be set for the fitted cartridge but if this is to be changed subsequent readjustment is simple.

The deck clearly appreciated its run-in period: when first run up I could hear some mechanical noise, but this subsided after a few hours. I was particularly keen to do this as the Revolver has been criticised in the past for having problems with speed stability. I'm pleased to report that I encountered none whatsoever during this test. Pitch and timing information wasn't molested on any of the music I played.

Fluid and Funky

In fact, the deck impressed me with its enthusiastic sense of rhythmic drive: on the tracks by Seal it created a particularly funky backbeat as a foundation for the rest of the songs' elements. Bass lines has a strikingly fluid groove and flow, with the starts and stops of notes being quite crisply defined. Bass had a nice timbre and richness too, and a good feeling of weight and impact. The Revolver also picked out the reverb on the singer's voice very clearly: this wasn't over-etched, nor were vocal sibilants unduly emphasised, the deck managing to integrate these elements

naturally into the structure of the music. It gave a good insight into the performance and the music's mechanical attributes without any loss of cohesion.

On tracks from the Joni Mitchell LP the deck gave a notably spacious and expansive presentation. Her voice was articulate and intimate, with subtle dynamic inflections being revealed clearly. Acoustic guitar sounded natural and vivid with good leading edge attack and a convincing portrayal of its harmonic qualities. Bass guitar was powerful and solid with good control evident.

Talk Talk's "Happiness" showed good dynamic scaling; being very even it helped to create an air of credible authority. Drums had particularly striking impact, powerful initial transients being followed through fully. In the busier sections of the mix the deck kept a tight rein on proceedings, allowing easy 'listening in' to background instruments. Pitch definition was good and at the lower end of the frequency range better than that of the Rega.

On Rebel's "Les Elements" the Revolver proved equally successful, particularly for its authoritative air and for maintaining the difficult harpsichord continuo which can vanish in the mix. It also had no problems in portraying the music's general melodic and harmonic structure and progression.

Overall, the deck gave a sterling performance. Considering that it was the cheapest in the group as well, I was impressed.





SYSTEMDEK IIX-900

This is the deck that the tweekers will find attractive: it has a suspended sub-chassis like that found on many super-decks and is the only one in the group which offers real potential for arm-swapping and general 'tuning'. However, there's limited scope for 'power' tweaking: the IIX (£190 without arm) has an electronically controlled sibling, the IIXe, which comes with an outboard motor supply. This item makes a significant difference to the sound of the deck but, sadly, it is not available as an add-on. An acrylic platter to replace the standard glass item can be fitted, if desired, to satisfy the urge to 'improve' the deck, although I've tried it and prefer the standard fitment.

“The deck captured my attention from the outset and thereafter encouraged me to continue listening.”

The IIX has a particle board plinth to which a steel bracket holding the drive motor is fitted. From the top plate of the plinth hangs a metal subchassis to which is bolted the main bearing and the arm-mounting plate. The platter is in two parts and, like that of the Rega Planar 3, comprises a

plastic sub-platter which supports a glass main platter, with a felt mat for record support. The motor drives the sub-platter via a flat-section rubber belt. Speed changes mean removing the glass platter and repositioning the belt on the motor pulley.

Unlike some suspended decks, the Systemdek is very easy to set up. Good instructions are provided, as are the necessary Allen keys, and all that the user attempting the task needs to supply is a screwdriver and a reliable spirit level. (Turntable table demons, Mana Acoustics sell a very accurate device for £25 which is the best I've found for setting up this, or any other, deck.) The £83 Moth arm fitted to the review deck was easily adjusted for tracking force and bias but a stylus pressure gauge proved to be essential for accuracy; the Moth/RB250 doesn't have conventional calibration markings and setting it up without a gauge can be hit-or-miss. No cartridge was fitted so I used a £19 Audio Technica AT-110e which fell to hand, intending to change to something more sophisticated if required.

That didn't prove necessary. The Systemdek capably demonstrated the validity of the hierarchy argument by extracting a stunning performance from the little cheapie. The deck captured my attention from the outset and thereafter encouraged me to continue listening.

With Seal's LP the IIX was the most successful at locking onto the music's agile rhythmical patterns, eliciting the most soulful 'groove' from the disc. His voice seemed at the height of its communicative ability

and the songs' arrangements displayed a convincing logic and sense of purpose. Every element fell neatly and convincingly into place. No particular facet of the deck's portrayal was dominant, the overall perception being that it was simply the most evenly balanced of the group. But there was no blandness about its presentation, as the bass line on "Killer" demonstrated: when the IIX wanted to 'impress' it could.

Talk Talk's album further demonstrated its virtues effectively. The deck sounded fast, lively and vivid but always in control. It exercised this control particularly well in reproducing the sound of the children's choir on "Happiness", picking out individual voices with striking clarity. In contrast to this delicacy the drumkit had persuasive slam, crisp attack preceding the blossoming of notes which then decayed naturally.

Joni Mitchell's guitar displayed an unadulterated character, with string and body resonances giving it a natural ring. Her voice was well articulated and intimately presented, and Larry Klien's bass sounded powerful without being intrusive or over-blown. Subtle dynamic shadings added further realism to the portrayal.

But Rebel's "Les Elements" proved most conclusive in deciding the IIX's ultimate value. The deck presented the piece with real sensitivity shown towards its drama, its brooding tension and release, and its majestic authority. The Systemdek had a 'completeness' about its portrayal that was effortless in relative, if not absolute, terms.

Conclusion

Each of the turntable combinations in this group deserves a recommendation, and each has features and facets that will endear it to particular listeners. All the decks made music enjoyable and there was little artifice evident in any of their presentations.

Ignoring price relationships for the moment, the Systemdek IIX with Moth arm proved the hottest property, offering a taste of the high-end for what is, when compared to real high-end money, a beer-budget sum. Its musical performance was the most whole and balanced, and it also presents the user with arm-upgrading possibilities. (It works particularly well with Roksan's Tabriz which can accommodate one of the less expensive moving coil cartridges if desired.) If you can afford it, then go for it.

Both the Linn Basik and Rega Planar 3 gave good accounts of themselves, though in each case I felt dubious about the cartridge choice - neither the K5 nor the Bias are personal favourites of mine; I prefer the Goldring 1012 which costs only a few pounds more. Anyone auditioning these decks comparatively - which is likely in view of their closeness in price - would be well advised to ensure that they are both fitted with

an identical cartridge. The differences apparent would then be attributable only to the turntables. I have to say that I've heard both decks exceed the performances they offered in this test.

Last but not resorting to cliché... the Revolver. I liked very much what this deck did and I was surprised when I checked the prices to discover that it was the cheapest of the bunch. All I can say is that if your budget restricts you to buying this deck you should not feel that you are missing out on any musical enjoyment. The Revolver is a fun product, it makes listening to records a really enjoyable pastime. And it's arguably the best-looking too!

Practical Considerations

I've mentioned swapping cartridges on the decks and this will be relatively simple in the case of the Linn Basik and the Revolver, both of whose arms have easily adjustable arm pillars to account for height differences in cartridges. The Moth arm and the Rega RB300 don't have this facility. However, Rega can supply spacing washers of varying thicknesses to allow either to be raised to accommodate taller cartridges. This involves removing the arm from the plinth, in the Rega Planar's case, or the arm-board on the Systemdek. It's a task that's probably best left to a dealer:

there's nothing complicated involved but refixing the Moth/Rega arms has to be done carefully. Holding the arms still whilst tightening up the large bolt which holds them in place, if done incorrectly, can result in expensive damage.

Proper turntable support is as important with these decks as it is with top-flight models. A couple of simple tests show why. Place a disc on the stationary platter, lower the stylus into the groove, turn up the amplifier volume and tap the deck's plinth with the end of your finger. Notice anything? On all but the Systemdek you'll hear a loud thump emanate from the speakers. Then place the stylus so that it rests on something like a cigarette lighter sitting on the top of the plinth, crank up the volume and switch the deck on. Note that it's best to zero the arm's bias setting before doing this. You'll hear motor noise and vibration that's being transmitted through the deck's structure coming through the speakers. A good turntable table will not eliminate these problems but it will reduce the severity of their impact upon the music. If you can't find room for such a floor stand or wall shelf, at least invest in one of the mini-tables available. Don't use any compliant mountings - like a Mission Isoplat - under a turntable, however.

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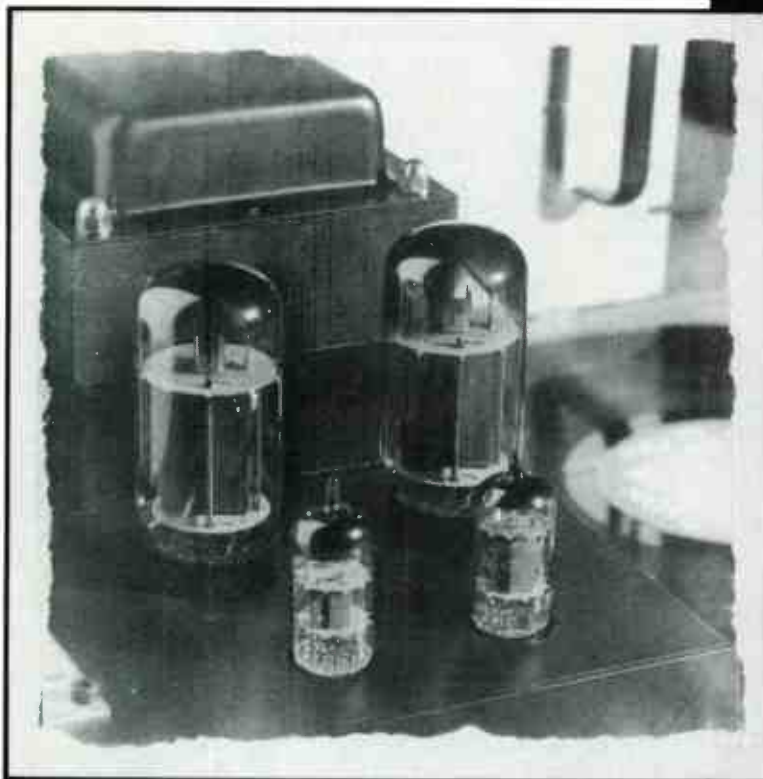
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Large, floor standing loudspeakers are coming back into vogue; they make a statement about your music that bookshelf loudspeakers cannot.

Tannoy's DC-3000 loudspeakers (£699.99) are a fine example of such a statement. Big, black and imposing, their striking aesthetic says 'hi-fi' to any listener.

Standing 910mm high x 260mm wide by 300mm deep and finished in black ash or rosewood veneer (for another hundred pounds), these loudspeakers need a large room if they are to fit into the living environment. In addition, the DC3000's have a high degree of room dependency; in a smaller room, they would be more likely to create a bass boost, making furniture, small animals and any loose teeth raise the white flag. So a large room is a must.

The loudspeaker comes complete with a removable grille, floor spikes and feet, for those who do not want to damage their floors. The quality of the spikes is only so-so; they are tolerably good, without being exceptional like those used by Audiotech or Mana. It is also possible to add damping and mass to the loudspeakers through a cavity in the base of the DC3000. This space, accessed through the bottom of the loudspeaker, is designed to take silver sand or lead shot, but neither are supplied. Minus extra baggage, the loudspeakers weigh nearly 27 kg each, so they are hardly light to begin with. Finally, internal wiring is Van den Hul cable and are they're bi-wireable, with a set of robust looking gold-plated binding posts.

Tannoy's Series 90 loudspeakers are set apart from the rest of the market by their use of Dual Concentric drive units. Here, both the high frequency and the mid/bass drive units share the same chassis, thus acting as a single point source. The advantage of placing the drivers on the same axis is that the loudspeaker should be capable of producing far more cohesive stereo images than conventional box designs having displaced drive units. This method of constructing drive units is both complex and expensive; although the Dual Concentric is not a new idea and Tannoy have relied on their own unique version for decades, it is continually revised to keep it up to date, which results in a product that is a little different.

One of the useful by-products of this line of drive unit development is the outstanding efficiency of the loudspeakers they grace. The DC3000s have a quoted sensitivity of 92dB at one metre for one watt input. In conjunction with a six ohms nominal impedance, this makes them a very easy load to drive. I found that there was no difficulty in using a seven watt Audio Innovations triode (valve) power amplifier. With the current interest in valve amplification, both new and old, loudspeakers as efficient as these are useful, providing volume and attack, without smothering or losing the basic qualities of the amplifier's sound.

Along with the triode amplifier, the loudspeakers were used with a variety of sources, amplifiers and cables ranging from the decidedly budget to the ridiculously expensive. Having been suitably run in, the DC3000s were tested, both at Hi-Fi World's offices and in my own listening room. I found that both rooms were a little too

small for the loudspeaker, so friends' rooms and systems were called up for active service.

Tannoy's research into Dual Concentric drivers and their imaging properties has paid off. Everybody who heard them commented about their fine soundstage, no matter how poorly matched the system was. Whether the loudspeakers were on their spikes or not the imagery they produced was good and solid, with realistic width, depth and height. In addition, listeners also commented on their efficiency; they all noticed just how loud the Tannoys could go.

impressive by virtue of their achievable volume levels, depth of bass, and fine imagery they are definitely Rock loudspeakers. Segovia's interpretations of Bach's lute works lasted about as long as you can say 'interpretation'.

The Tannoy DC3000 loudspeakers would go down (pun intended) well at parties, where a sea of hot, sweating bodies would soak up some of the treble output, and the strong bass plus high volumes would be appreciated, especially by the neighbours. But for normal domestic listening, think about the acoustic properties of your room first - and measure it ●

axeman's axis

Tannoy's dual-concentric DC3000 loudspeakers have an output that could make them killers at parties.

Alan Sircom holds on to his hat.

The DC3000's can go deep as well. On playing a DAT of Joy Division's 'She's Lost Control', the sparse, open recording placed Ian Curtis' voice accurately and well, while the bass and synthesiser drum beat went unquestionably low, without over emphasising their importance. This created a dark, brooding sound, so indicative of Joy Division.

Unfortunately, there are drawbacks. Maybe I am being overly critical, but from the outset, the treble of the loudspeakers sounded on the fiercer side of bright and even shouty. Playing 'Fever' by The Cramps, Poison Ivy's guitar playing - always sharp - became cutting, while Lux Interior's voice was virtually impossible to listen to, even when raised beyond a whisper.

The treble threw the surface noise from vinyl into sharp relief. Older pressings - in particular, my original copy of the eponymous Velvet Underground album - developed a level of surface noise bordering on the vexatious. This can make listening to some source material both tiring and difficult, especially as the tweeter can overdo things at times: it almost turned a tambourine on one recording into an instrument of sonic torture.

Traffic's 'Shoot Out At the Fantasy Factory' showed that the DC3000's were capable of playing a boppy rhythm, but I noticed that the bass, although deep was somewhat hard to follow. While the loudspeakers have a quality that is initially



bitstream

The new Bitstream Delta 70.3 Compact Disc player from Arcam's Cambridge plant, closely observed by Danny Haikin.

The Delta 70.3 Compact Disc player is the latest instalment in Arcam's evolutionary move to Bitstream technology. Arcam is neither the sort of company to scrap its entire product range the moment that fashion moves on, nor use the general public as unpaid testers to try out a new theory without knowing whether it will work. With an Arcam product you buy peace of mind.

Arcam are hardly slow on the uptake or reluctant to change. This is the company that pioneered the now popular add-on digital convertor; that introduced a TV Nicam Stereo tuner; and that will soon introduce a cassette player which is a tribute to British specialist engineering. If change seems slow it is only because thoroughness is a prime Arcam virtue.

The replacement, then, for the popular Delta 70.2 was unlikely to happen overnight. (In fact, Arcam claim it took two-hundred and seventy nights before the design team were completely happy with the results.) And this is not surprising. Arcam's budget machine, the Alpha ACD-I, astonishingly good value, means the Delta 70.3 has to reach high to justify the extra cost. (Delta 70.3: £650; Alpha ACD-I: £420.) The attainable peak is a standard which I felt the 70.2 never quite reached; one which the 70.3 attains easily.

The design basics of both are similar, starting from a Philips transport system (CDM4) and die-cast laser subchassis which has an impressively solid feel to it. Arcam use a dark grey extruded aluminium case, matching the rest of the Delta series. Facilities (of which more later) are minimalist, and therefore so are the legends that belong to them. The display panel is easily readable, but has a very thin plot (very poor.) But - a thoughtful touch - it can be dimmed or turned off completely.

Whilst I appreciate the simplicity of the Delta 70.3, its square corners

and visible joins give it a Meccano-esque appearance. It looks as though aesthetic input is a bit lacking; this is maybe what happens when you go truly minimalist and put several sheets of metal and a few rectangular buttons together. The rounder edges of the Alpha series are far more appealing.

The main difference between the new and the old is inside. The 70.2 is a multi-bit player; for the 70.3 Arcam use the recent Philips 7350 Bitstream chip. Keen observers will note that this is a later and (so I am told) better chip even than the 7321 which Arcam use in their Black Box 3. Even keener observers will have seen that an even newer chip, the DAC 7, said to be better still, appears in the Deltac PDM-2 converter, acclaimed as the best sound from Compact Disc to date.

Observers with medals and badges for telephoto vision will even further note that Naim Audio's new Compact Disc player uses the older multi-bit chip set. . . I'll forget I started this and refer you to Noel Keywood's technical column.

Main Difference

Although the addition of Bitstream in the digital board is the main difference between the 70.2 and 70.3, the audio board is also improved. Arcam do state, though, that this contributes only ten percent of the improvement. In both players, the audio and digital circuits are powered by separate transformers, reducing Radio Frequency interference.

In use, either from its front panel or full function remote control, the 70.3 is easy to operate. The display panel shows the selected track number, time elapsed, and index points together; it also displays special functions such as repeat, and even tells you what size disc has been inserted. Basic programming allows up to twenty tracks to be stored but

they can only be entered directly from the remote. Similarly, in normal use, direct track entry is only possible from the remote control - a sensible method of avoiding confusion on the fascia.

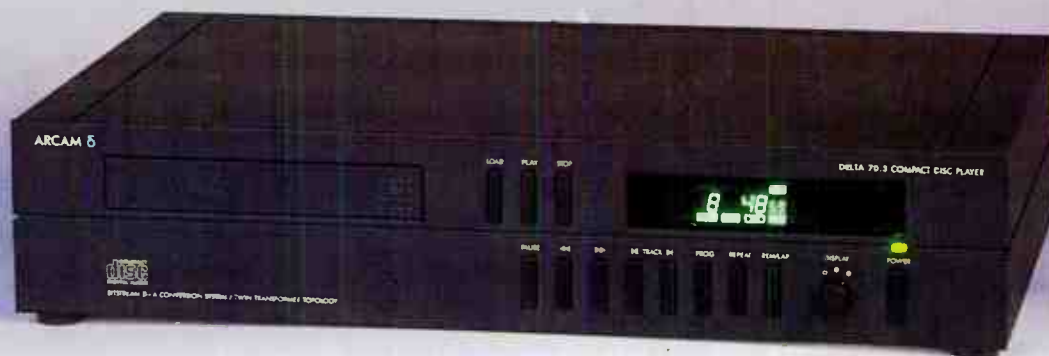
Unlike the less expensive ACD-I, the 70.3 has the option of a variable output socket, with volume adjusted via the handset. Although Arcam has paid attention to the quality of this device - it is a thick-film control as used by Philips - it exhibits enough of a drop in audio quality to rule out its use by 'no-compromise' users. It might be tempting to run the variable output directly into a power-amplifier, avoiding a pre-amplifier altogether. Unfortunately, by and large, pre-amplifiers are better at pre-amplifying than variable volume controls, so I would caution against it. Lastly, a digital output socket is provided; the inherent good quality of the Arcam transport makes this a very viable upgrade path and a useful optional step up the ladder of future convertor technology.

When you come to audition a Delta 70.3 - or other Compact Disc players - insist that it has been

‘ This is not a Bitstream bodge-it-job, offering up an utterly disjointed sound as the latest technology. Arcam get things right

allowed to warm-up for at least a couple of hours. Straight from the box the sound is cold and bright; it bears little resemblance to what can be heard a few playing hours later. Warmed up, this is a very respectable player. It inherits the generic Arcam (audio) warmth - a facet of all Arcam's components - but is still informative and clear. Crucially, Arcam manage to wring a surprising quantity and dexterity of bass from their Compact Disc players, and the Delta 70.3 is well blessed in this department. The use of Bitstream is very carefully implemented: if aims are rhythmic impetus and resolution of fine detail, both are equally well achieved.

The new Delta is also a lot better than the 70.2. And better in every single area. This is not a Bitstream bodge-it-job, offering up an utterly disjointed sound as the latest technology. Arcam get things right: the 70.3



is more dynamic and exciting than the 70.2 it replaces; it is also far easier on the ear.

Mozart's Serenade in B flat - KV 361 - is unsurpassed in wind music: a masterpiece of refined sonority. If you have seen the film "Amadeus", this is the piece Salieri described as containing all the notes from Heaven. And the Delta 70.3 portrays so much more of the beauty. The oboes and the clarinets reach out and add to the wealth of colour, and, most importantly, the music swells and gains grace.

On an older Compact Disc (Squeeze - '45's and Under) the classic track 'Tempted' demonstrated considerable added weight and impact to the drum sound. On the new Delta a catchy guitar riff, pushed far to the right-hand channel, stood out and pepped the song up. The bass line was both deeper and more in time with the drums, the singer less strained and focussed into the middle of the soundstage, rather than from as wide an area as the music.

This is a first class Compact Disc player, surpassing (in sound) similarly priced Japanese players which offer little competition. The best news: last depressed 70.2 owners need not fear redundancy. At a cost of £180, the main digital board of the 70.3 can be transplanted into a 70.2, giving ninety percent of the improvement. For another £120, the audio board can also be improved, adding the remaining ten percent. A smart company Arcam ●

Measured Performance

Arcam began the practice of rolling off treble output in their CD players long ago, in order to "soften" the sound and add some warmth. This finds wide favour, even though it is a form of engineered euphony. Compact Disc has reached a stage of development, in its software as well as its hardware, where this approach is not strictly necessary. I suspect that having developed a distinctive, popular and widely recognised 'house' sound, Arcam are loathe to wave it bye-bye. So the Delta 70.3 retains this feature, as the frequency response analysis shows. It may be caused by the output filter.

Although the 70.3 uses a Philips SAA-7350 Bitstream chip, it gave an unbalanced distortion performance between left and right channels, looking poor (by Bitstream standards) on the right. Philips told me that the '7350 is not available in graded versions and that poor results were likely due to implementation rather than quality variations. The distortion analysis shows the presence of rather more distortion than one would wish for from this one-bit

system. However, sound quality depends on factors other than distortion alone, so this does not solely determine sound quality.

In all other respects, the 70.3 measured very well.

Test Results

Frequency response (-1dB)	4Hz-20.75kHz	
Distortion (kHz) left right	-6dB	.004 .002
	-30	.026 .036
	-60	.76 1
	-90	31 32
	-90	14 18
dithered 10kHz Separation		
1k	-104dB	-106dB
20k	-94dB	-101dB
Noise (IEC A)		
emphasis	no emphasis	
-100	-99	
Dynamic range	102dB	
Output	2.3V	

Frequency Response

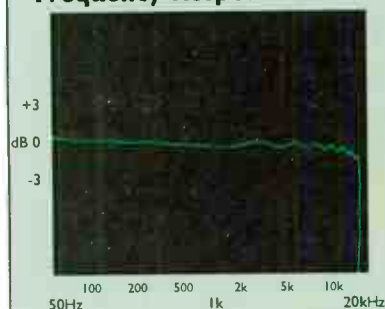


Fig 1 - Falling treble in frequency response.

Distortion

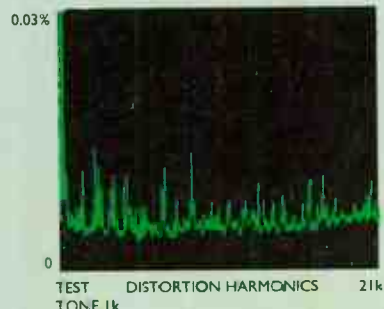
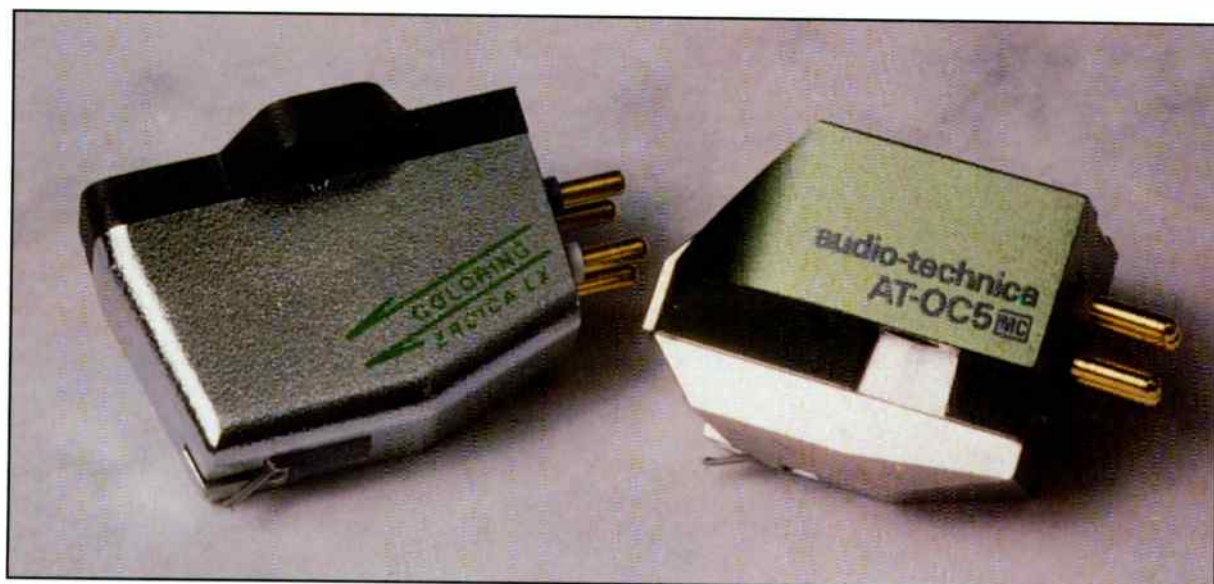


Fig 2 - Small amounts of distortion, seen as spikes.



twin peaks

Audio Technica's and Goldring's entry level moving coil cartridges both have treble peaks although they sound quite different. Special Agent Noel Keyword Investigates.

Moving coil cartridges are traditionally supposed to offer better sound quality than moving magnet types, but they are also more expensive. The extra cost can stretch to hundreds, or even thousands of pounds. To make life easier, there are budget designs, meant for entry level users, and they don't cost an arm and a leg, even if 'budget' means a little in excess of one hundred pounds. Both models tested here fall into this category.

The Goldring Eroica LX is a tighter specified version of the standard Eroica and it sells for £115. Goldring produce other moving coils, the most expensive being their £550 Excel GS. The Audio Technica OC-5 costs £122.95 and is the starting point in a range that stretches right up to the ART-1 costing £819.95. From this price span alone it is obvious that

both the OC-5 and the Eroica LX are inexpensive by moving coil standards.

Like most 'inexpensive' products, especially in the hi-fi world, performance compromises are to be expected. The impact of these upon sound quality has to be minimised. How it is done is part of the art of designing and building a good cartridge; the designer has to balance trade offs according to the effect they have upon the sound. This involves subjective assessment and the judicious selection of complex components, like the stylus. Although compromises will exist in the final design, their effect should be subjectively tolerable.

This is where matters get difficult. What one person might find tolerable, another may not. I have to admit that I am not very happy with raised treble and the bright sound that usually results from it. This is a common problem in MC cartridges and one that afflicted both the Audio Technica OC-5 and the Goldring Eroica LX, albeit in different ways subjectively. In particular I would beware of putting either cartridge into a system where the loudspeakers had a prominent sounding metal dome tweeter or the amplifier had any tendency to hardness or brightness.

A bright cartridge can be neutralised by a dull loudspeaker. In practice this doesn't always work, because brightness takes many forms, as the two units here demonstrate. I would not expect the OC-5 to sound a lot different in a dull system, but the Eroica could well do so. For the purposes of this particular review I used a Rega RB-300 arm attached to a Thorens TD-3001 turntable, feeding a John Sheame Phase 1 amplifier and TDL Studio 4 loudspeakers. This is a tonally well-balanced system having excellent bass extension.

There isn't much of consequence to note about the mechanical

structure of each unit. The OC-5 is heavy at 8gms, but most arms will accept a cartridge weighing up to at least 10gms. It has a simple bi-radial stylus and needs a tracking weight of 1.5gms, with 0.25gms tolerance either way. Goldring's Eroica LX is light for an MC, weighing 5.5gms. It needs a tracking force of 1.7gms and uses a Gyger 2 stylus profile. Like most MCs, neither cartridge has a user removable stylus assembly. Both have to be returned to the manufacturer for stylus replacement.

Sound Quality

Listening to Goldring's Eroica LX after measurement, I knew that treble emphasis would colour the sound for better or worse. In the Rega RB300, which in itself has a neutral high frequency performance, the Eroica LX showed that it possessed a light, tinselly treble that was emphasised in relation to, and divorced from, the rest of the music. This rather compromised any sense of cohesiveness. The peaky nature of the treble rise made it quite an obvious and at times intrusive characteristic too; recordings with strong treble could sound almost fierce. There might be loudspeakers that could soften this trait but I doubt whether it would be neutralised. Vocals were lightened and there was some loss of warmth and body. Even though 's's' became accentuated, sibilance was never a problem. The Eroica LX did not step over the borderline into unpleasantness, but at the same time I cannot honestly say I grew to accept its imbalances.

The main reason for buying a moving coil cartridge must be to hear the superb sense of clarity they can provide. In this respect the Eroica didn't disappoint me. It placed vocals well on the soundstage and there was a delightful sense of clear space around them. The blur that tinges so many moving magnet cartridges was stripped away, leaving a well etched

sound stage with credible images firmly set upon it. Treble emphasis inevitably heightened detailing, but overall, the level of detail did not exceed that of the excellent Goldring 1040 moving magnet cartridge, if my memory of it is correct.

A firm, fast bass line from the Eroica kept music sounding rhythmically tight and under control in its sense of timing. Lack of real depth meant the Eroica LX appeared to be fleet of foot, but never threateningly powerful.

Quite how different two cartridges can sound, when their measured characteristics are similar, was brought home to me within a few brief minutes of listening to the OC-5. Unlike the Eroica, it does not have a divorced treble peak and a more cohesive presentation was the result. I wasn't aware of the selective emphasis of the Eroica; instead the OC-5 has what I would describe as a chrome plated hardness to its sound. This was none too easy to adjust to. Even with a lot of tweaking it remained undiminished and coloured everything the OC-5 tracked.

Other problems were noticeable and conspired to make matters worse. Transparency wasn't a strong feature of the OC-5; it sounded like a moving magnet cartridge in the vague blurring and softness of its stereo images. Some coarseness and confusion that I noticed at low levels grew worse on crescendos, making for hard and raucous musical peaks. I was disturbed by this cartridge; others in the building were just as disturbed. Three other listeners sat in on events but no one was especially impressed by it.

If there was a strength that contrasted well with the characteristics of the Eroica, it was in the lower frequency regions. The OC-5 has a bigger, stronger sound, with a muscular bass delivery. It has a weight that made it more engaging and believable than the Eroica, which in contrast seemed neat and manicured in its presentation.

Summary

At best I could only say I felt cool about Goldring's Eroica cartridge; it is passable, but it is also not a unit I would strive to listen to again. In complete contrast I feel that their 1012, 1020 and 1040 moving magnet cartridges are superb, so to me the Eroica is an exception. Unfortunately, Audio Technica's OC-5 was a notch below the Eroica. Its performance was superior in the bass, but its treble was rather too raucous, for my liking.

I would tread carefully at this end of the moving coil cartridge market. Budget MC's can sound bright - and not always pleasantly so ●

Measured Performance

Both the Audio Technica OC-5 and the Goldring Eroica suffer rising treble output. There is nothing unusual in this, for the reasons explained above. Only listening tests can determine whether the characteristic is subjectively benign or intolerable. What worries me is that in both cases the treble peak is relatively low down in the audio band. It is centred at 10kHz, detectable to even insensitive ears.

Tracking performance of both cartridges was very good. Each was able to clear tortuous test tracks at 300Hz and 1kHz, which is impressive for any moving coil cartridge. Traditionally they have been limited in low frequency tracking ability. Very loud sounds will not upset or cause distortion in either cartridge.

On a low distortion lateral cut, the Eroica delivered 0.6% and the OC-5 0.4% distortion. This is not especially low. Both produced third order and higher harmonics, as the analyses show. Higher orders have a sharpening effect at high levels, more than 1% being the rough threshold of audibility. Both second and third are a result of tracking errors, but not in this quantity. The implication here is that there is a small amount of generator non-linearity in both cartridges, but it is unwise to make too much of this fact on its own. It may explain a particular subjective quality, but that is all - and the connection has to be speculative. The figures do however show that both units fall within normal performance limits in terms of lateral distortion.

Distortion on vertical modulation is determined mainly by vertical tracking angle (VTA). The OC-5 had a measured VTA of 22 degrees, which is correct, and the Goldring 27 degrees, which is too high. Consequently, the Eroica produces more distortion on this axis, as well as laterally.

There is more to this matter however. Goldring have used a short cantilever, doubtless for stiffness and low tip mass. Minimising flexure along the cantilever and transmission losses must always be an important consideration; VTA has been sacrificed in favour of this goal. Audio Technica hit the ideal VTA value and, as a result achieve low distortion on vertical modulation - which affects left and right images, not centre stage information. The trade off is increased cantilever length and the possible appearance of other problems.

Channel separation was satisfactory at -25dB for the OC-5 and -28dB for the Eroica. Both are common enough values, meaning that there is nothing amiss here. The Goldring produces 0.67mV output at 5cms/sec rms, which is fairly high. This compares with the more conventional output level value of 0.45mV from the OC-5.

Audio Technica OC-5

Tracking force	1.5gms
Weight	8gms
Vertical tracking angle	22degrees
Frequency response	20Hz - 20kHz (within 3dB)
Channel separation	-25dB
Tracking ability (lateral)	90µm
(vertical)	45µm
(lateral 1kHz)	25cms/sec
Distortion (45µm)	
lateral	0.5%
vertical	2.3%
Output	0.45mV at 5cms/sec
Channel imbalance	0.5dB

Goldring Eroica LX

Tracking force	1.7gms
Weight	5.5gms
Vertical tracking angle	27degrees
Frequency response	20Hz - 20kHz (within 3dB)
Channel separation	-28dB
Tracking ability (lateral)	90µm
(vertical)	45µm
(lateral 1kHz)	22cms/sec
Distortion (45µm)	
lateral	0.6%
vertical	4.6%
Output	0.7mV at 5cms/sec
Channel imbalance	0.7dB

Frequency Response

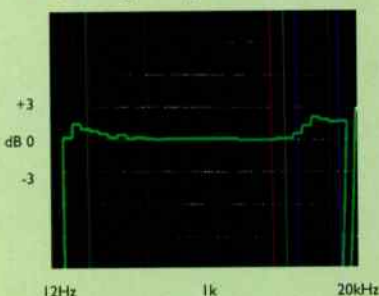


Fig 1 - Extended treble lift gives a bright sound.

Frequency Response

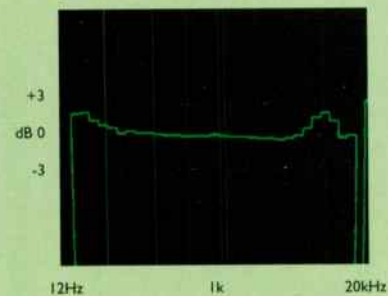


Fig 1 - Treble peak gives tinselly brightness.

Distortion

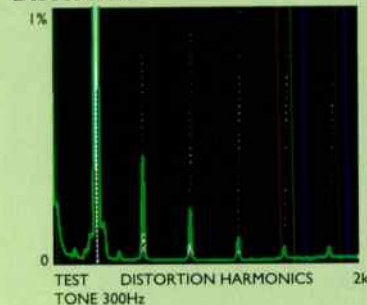


Fig 2 - Extended distortion harmonics.

Distortion

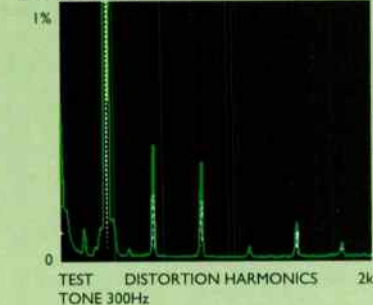


Fig 2 - High amounts of both second and third harmonic distortion.



bit reduction

Yamaha's new top Compact Disc player uses their own one-bit conversion technology

few manufacturers have been able to boast of instant success as they take their first tentative steps away from multi-bit towards bitstream Compact Disc technology. Yamaha themselves experienced a mixed reaction to their first bitstreamers.

No one would guess from the box that Yamaha's new CDX-1050 CD player (£429.95) includes Japan's first wholly home-grown genuine bitstream chip.

There's nothing to distinguish the outside from an older model: the same attractive orange display and range of facilities are paraded on the slim, contoured alloy fascia but there's not even a discreet logo visible anywhere to give the game away.

Second time around they've opted to develop their own Digital-to-Analogue Converter (DAC), a genuine 1 bit Pulse Density Modulated system in place of the Pulse Width Modulation technology (based on Technics MASH chipsets) which the company used in its first bitstream models and still favoured by many of

there's not even a discreet logo visible anywhere to give the game away

their Japanese counterparts. Top of the technological tree - this chip (designated the YAC501) is so precious it's only included in this one player.

But the sound? Ah, now this is very different, very different indeed. In fact the first player I received seemed to recreate an almost reverberant atmosphere, voices and instruments alike brought to life with vibrant detail. Yet this effect was so marked that many very familiar pieces of music actually began to sound, well, rather unfamiliar.

The extra depth, spaciousness and impact of Prefab Sprout's 'Michael'

was certainly obvious enough. The timbre of the vocals was natural in tone but, more importantly, they were bathed in an ambient pool, an acoustic glow or aura that permeated the entire soundstage.

Great as far as it goes! Yet this new-found resonance was also responsible for a mounting confusion that compromised busy or complex pieces of music. The tense atmosphere of the quieter interludes of swirling pieces (like the final allegro of Beethoven's Fifth Symphony) was steadily confused by the mounting weight of strings and winds.

Instead of building upon an already broad soundstage, this first CDX-1050 began to close in on itself, squeezing instrument after instrument into a tighter ball of sound. A ball, I might add, that exploded into a great sense of space once the weight of these multitudinous instruments was relaxed.

Now, I mention all this because a second sample of the player sounded similarly spacious yet was entirely free of this peculiar and overly ambient colouration. Both machines were taken from production stock and there were no constructional or technical features to distinguish them.

Nevertheless, this second CDX-1050 was altogether smoother, individual sounds were better focussed while the bass, in particular, was less prone to booming. There was still speed and crispness about its presentation without giving rise to an especially forceful or blatant sound.

Quite the reverse in fact. Though I

could still detect the same sparkling clarity I had heard from Yamaha's cheaper CDX-750 there was now a better sense of integration with the mid and bass; so many cheaper bitstream players unbalance the overall sound with a wealth of intricately resolved treble detail.

In this costlier player, however, Yamaha have engineered a fairly neutral sound equally well resolved from one end of the spectrum to the other.

Compared to competition from the likes of Denon, Harman, Marantz or Philips it is neither stiflingly polite nor overly enthusiastic; yet neither is it quite as fresh, brisk and engaging as I would have liked. Regardless of which sample (the first or the second) was the more representative, neither was entirely comfortable in the long term. The music never really seemed to blossom fully, almost as if it were technically confident yet emotionally self-conscious.

Comprehensive

The machine's inherent flexibility and slick, mechanical operation was never in doubt. Track access is as fast as it can be while conventional features like 25-track programming, direct track access, tape edit and multi-mode repeat are supplemented by a non-volatile disc file memory.

This program file enables you to bank up to ten favourite tracks from up to a hundred different Compact Discs, all of which are instantly recognised as the disc is loaded.

All this plus an infra-red remote with index selection and command over the motorised volume control adds up to a comprehensive but not over-complicated package.

As you might expect, Yamaha's flagship player is equally well specified under the bonnet. A double-skinned chassis means it is considerably heavier than it looks; pulling off its rubber feet neatly reveals four inverted alloy spikes which will improve isolation even further!

There are subtle touches too, like the use of a back-lit Liquid Crystal display rather than one of the standard fluorescent tubes which can kick out higher levels of spurious RF noise.

On the Circuit

The pivotal feature of this new player is Yamaha's two-stage PDM DAC. Stage one (the YAC501) includes an 8x oversampling filter followed by a 48x sample-and-hold circuit, yielding a total rate of 384x. Then come the second-order noise shapers while the 16bit data is reduced down to a single bit stream. Unusually, however, the final digital-to-analogue conversion process occurs in a second and separately synchronised integrated

circuit in an effort to rid the system of any residual jitter.

After this comes a balanced Class A amplifier with a fifth- (rather than the more usual third-) order analogue filter to cut back on ultrasonic noise escaping the player, very similar to that used by NAD in their 5425 and 5440 models.

Yamaha would certainly appear to have their digits neatly sewn-up even if, elsewhere in the player, loose ends (like the regulation and decoupling of power supplies or the quality of analogue stages) are left exposed. All exert a strong influence on the final sound of the player. Too strong, perhaps, in this case.

pulling off its rubber feet neatly reveals four inverted alloy spikes which will improve isolation even further!

I am also mildly disappointed because, in theory at least, a PDM DAC should be superior to any equivalent PWM-type bitstream processor. Inevitably, other factors in the design come into play and muddy what might otherwise be perfectly straightforward comparisons.

Nevertheless with PDM's lower susceptibility to digital jitter, lower equivalent clock rates and - most importantly - with noise-shaping operating over the full 16-bit dynamic range, more Japanese manufacturers can be expected to shift their emphasis from PWM to PDM style converters.

Singled Out

As I said in the introduction, this player is simply rather different. It does not sound like any Philips-based PDM player; then, neither is it particularly reminiscent of the cheaper PDM players in Yamaha's own range.

This is, though, the only player to use Yamaha's top-specification bitstream converter which (in tandem with a superior transport, decoding and processing circuitry) has endowed the CDX-1050 with a sophisticated if not always enthralling sound of its own.

If only for posterity, it's worth grabbing an earful of the CDX-1050 - Japan's first home-grown PDM bitstream CD player ●

Measured Performance:

There are few technical clues to help us appreciate the subjective performance of the CDX-1050 which, in many respects, is an example of state-of-the-art digital electronics. For a start its linearity holds true to within 0.1dB (both channels) all the way down to -0dB, and this together with a maximum S/N ratio of 121dB implies an effective resolution of somewhere between 18-19 bits.

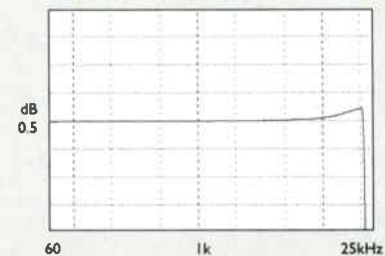
You're not going to get that sort of result with any Philips PDM converter just as you are unlikely to encounter distortion as low as 0.006% at -30dB. Take a peek at the distortion plot which, save for a trace of 2nd harmonic, seems completely clean. Still, it's interesting to note that distortion actually decreases slightly between 0dB (peak level) and -10dB, rather than the other way around.

The frequency response shows a slight +0.24dB lift towards 20kHz but the absence of any rippling is testament in itself to the quality of Yamaha's oversampling filters. Such a mild treble boost is unlikely to have any subjective impact, I should add. More important is the high 2.3-2.4V peak output which will influence A/B demonstrations between the CDX-1050 and other players adhering more closely to the nominal 2V standard. This is equivalent to a boost of 1.6dB - quite audible in practice.

Test Results:

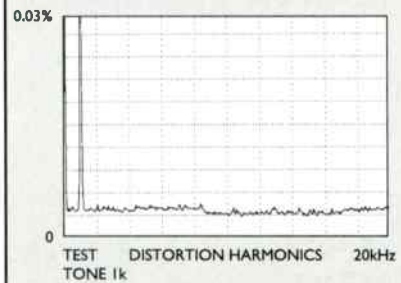
Frequency Response (-1dB)	1.3Hz-21.3kHz	
Distortion @ 1kHz	Left	Right
0dB	0.00098%	0.00099%
-10dB	0.00079%	0.00076%
-30dB	0.0072%	0.0060%
-60dB	0.179%	0.170%
dithered		
-90dB	<1.5%	<1.5%
Distortion @ 10kHz		
0dB	0.0031%	0.0028%
Stereo Separation		
1kHz	116.8dB	112.5dB
20kHz	94.6dB	87.1dB
Noise (A-wtd.)		
w/o emphasis		-119.9dB
with emphasis		-121.3dB
Peak Output	2.4V	2.3V
Dynamic Range		111dB

Frequency Response



Slight treble lift

Distortion



No distortion



three budget amplifiers

**One company started the trend
towards budget audiophile
amplifiers some years ago.**

The company was NAD.

**Roy Gregory reviews their new
3020i, along with competitors
from Rotel and Denon.**

All cost under £200 pounds.

This review brings together current contenders from two amplifier manufacturers who are old hands at the game, along with a relative newcomer that's been making some fairly outrageous claims.

It's Denon who have been shouting the odds on behalf of their new-ish PMA350. They believe this £170 amplifier belongs alongside the A400 and its rivals, all of which lie on the other side of the £200 barrier. We shall see!

From NAD we have yet another 3020 model, the 3020i. This makes at least five consecutive 3020 models in the genre I can name off the top of my head (I'm sure there have been others, but everybody at NAD was out at lunch when we phoned!) Rotel weigh in with the latest RA-820, this one with an AX suffix to separate it from the more expensive BX models.

On the surface, these amplifiers each appear quite different and individual. The Denon is far and away the largest, with the clean styling and slightly 'busy' fascia I've come to expect from the Japanese majors. You get rotary controls for tone, balance and volume as well as source select, apparently surrounded by a myriad of push buttons for lesser functions. In fact there are only four, but the graphics make them look busy.

The Rotel is altogether more straightforward. A simple row of rotary controls covers everything, the slightly overloaded graphics giving the '820 an almost naive appearance, in comparison to the understated simplicity of the original BX models.

Not surprisingly, the NAD is the 'plain Jane' of the group. Mind you, it's a distinct improvement on the 'ugly duckling' of the original. The former model had nondescript controls on a fascia of indeterminate colour which couldn't decide whether it was brown or grey.

And yet, despite this cosmetic divergence, these three products are conceptual soul mates. Each is a full facility integrated amplifier of reasonable power and driving abilities. By 'full facilities' I'm talking tone controls, speaker switching, balance and all the other paraphernalia. One thing these aren't is the kind of product typified by the Cyrus One. They have far more in common with each other than that which separates them.

At first sight, loading an amplifier with facilities which most manufacturers accept to be of dubious value may seem a strange kind of cost effectiveness. Indeed the Denon and Rotel's tone controls can be defeated, and sonically certainly should be. Where the budget's tight, why include them at all? After all, any additional features cost money and spending that money on things that matter produces a far better sound. The fact that these amplifiers compromise their performance in this way is in fact a reflection of the manufacturers' market view. They believe that real enthusiasts are going to find the extra cash for a purist straight-line design. The general public do demand such things as tone controls from hi-fi. The impoverished audiophile just has to like it or lump it though.

The concept of the stripped down audiophile amplifier was launched successfully by NAD with their original 3020. It was a revolutionary product in a number of ways, combining Far Eastern construction with European design and an insight into the real world problems faced by amplifiers. The result was a level of sound quality and a degree of load tolerance which were out of all proportion to its price. It did for budget integrated amps what the Golf GTI did for the 'super-mini': created a whole new class of product offering sports performance on a family budget. Amplifiers would never be the same again.

As sales boomed and the 3020 became the toast of the hi-fi industry (excluding rival amplifier manufacturers!), so the budget amplifier market changed to become hotly contested as other manufacturers vied, one with another, for a slice of the cake. Soon to appear were Rotel's BX series of amplifiers, slimmed down, 'straight through' designs which eradicated

tone controls and 'unnecessary' features of the companies' standard products.

In turn, their tenure in the number one slot was curtailed by the arrival of Mission's Cyrus One. Since then there has been a constant jockeying for position between the products of these and other companies such as Musical Fidelity, Pioneer, and the like.

As prices have risen to the wrong side of £200, a new stratum of budget amplifiers has appeared to fill the gap below. Keeping prices down to the £150 mark has meant a constant battle between circuit complexity and the cost of components. Something has got to give and the designer is faced with the job of papering over the cracks in his edifice. This delicate balancing act, deciding whether to hide this or improve that, gives these budget amplifiers their very different characters, and makes choosing one from the many on offer even more difficult.

Overview

So let's get down to specifics. The Denon PMA350 (£169.99) offers the buyer six inputs, including two tape loops with monitoring. Bass, treble and balance controls can be bypassed by means of a "source direct" button. Provision is made for two sets of speakers, one set being driven directly from the output stage, the other being switchable. If you're in the habit of headphone listening then it's the second set of speaker terminals you use, allowing you to switch off the main speakers if necessary. The PMA350 costs £20 more than the other amps tested here, but claims a 50 watt per channel output, which is double that of the NAD and Rotel.

The RA-820AX offers a very similar package to the Denon, less

one tape circuit but with a mono switch, the latter being rather curiously placed as an option on the tone defeat control. Rated at 30 watts per channel, it also offers gold plated phonos on its CD and phono inputs, which the Denon omits. Don't get too carried away though. Gold plating isn't necessarily all it's cracked up to be. The Rotel, costs almost the same as the NAD, at £159.95

‘within such a tight budget the designer has to make conscious decisions as to how he wants to shape the sound.

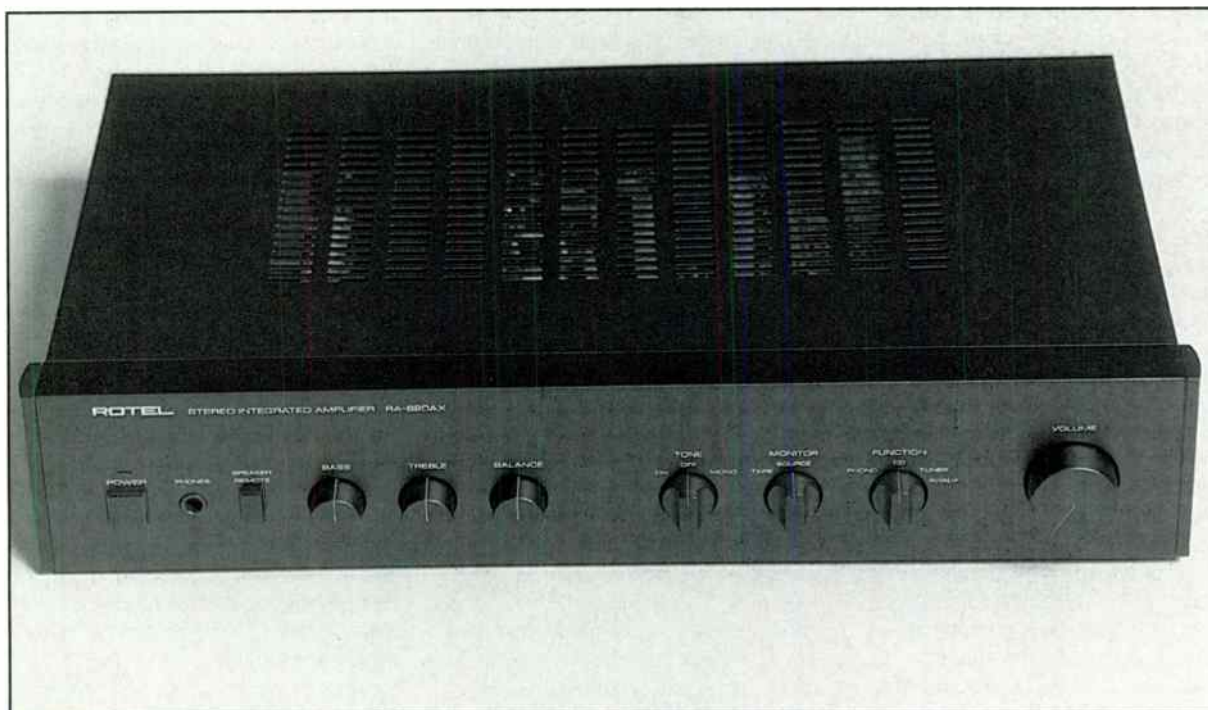
Which brings us to the 3020i. The NAD (£149.95) is the least well specified of this trio, at least on paper. Only four inputs (one tape), no tone defeat, a single set of speaker terminals and a paltry 20 watts per channel! Look a little closer and you'll see that NAD's customary care (and slightly eclectic view of amplifier design) has carried over into the 3020i. The speaker binding posts are of substantially better construction than the flimsy objects offered on the Denon and Rotel. Unusually for an amp nowadays, the phono input sockets are gold plated but the CD sockets aren't!

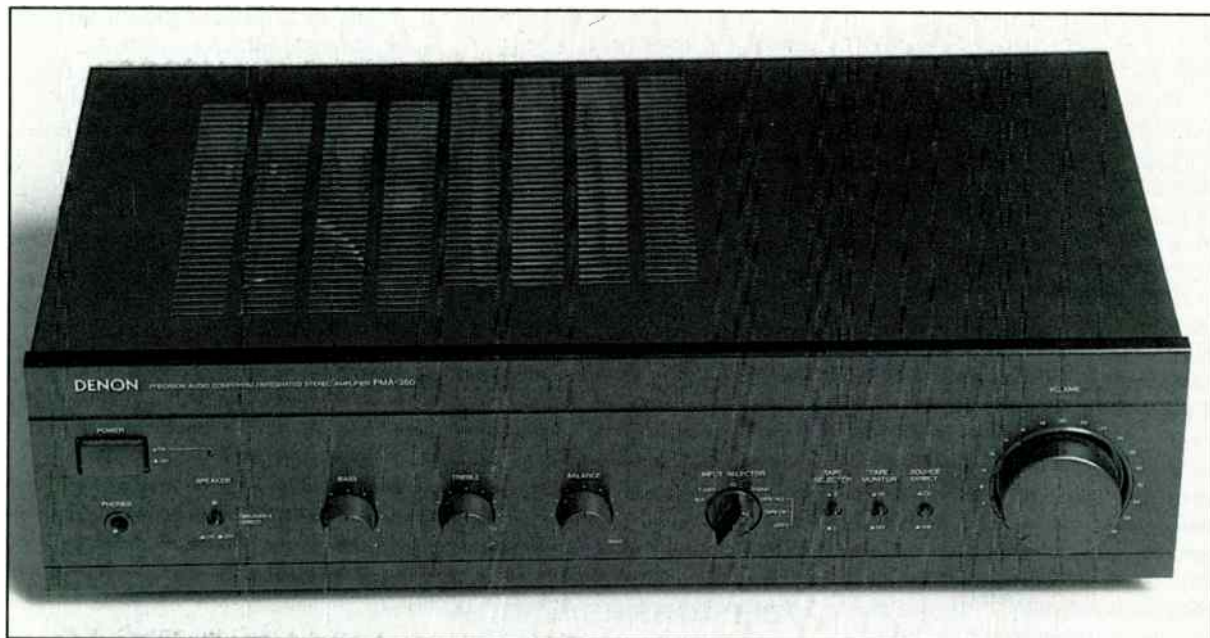
You also get a little bundle of oddities without which the 3020i just wouldn't be a NAD. They provide a

mono switch and a 20dB-cut switch in case you listen to sources of unusually high output level. It's more likely to be used if the phone rings. Around the back you'll discover Soft Clipping, a switch for partying that attempts to save your system from the effects of concerted overdriving. It doesn't do anything for sound quality, but after a few tinnies who cares? There's also a switch to optimise the output stage for normal (4-6 ohm), or high impedance (8+ ohm) speakers. Funnily enough, I don't see too many people using the 3020i with LS3/5a's. Finally you get a set of pre-out/power-in sockets. It's unlikely these will be used with external amplifiers, but they may well prove useful should you want to use an equaliser or external sound processor.

When setting out to produce an amplifier within such a tight budget the designer has to make conscious decisions as to how he wants to shape the sound. As I've already said, he can't do everything really well and so he must decide either to produce a competent all-rounder or a design which sparkles in some areas at the expense of others. He also has to decide how relevant he considers the difficult and costly phono stage to be and treat it accordingly. Each of these amps has elected to follow a different path, and to an extent, the one you ultimately prefer will depend on how closely the designer has met your needs.

I started listening with Compact Disc, using either a NAD 5440 or Marantz CD 50 SE bolted to a Shan slab. Speakers were either Wharfedale 505-2's on HBSI stands, or Kef C15's on heavy-weight Appolos. Cabling was MAS-terlink Blue for interconnect and either Audioquest





Each of these amps has elected to follow a different path, and to an extent, the one you ultimately prefer will depend on how closely the designer has met your needs.

FI4 (solid core) or vdH Clearwater (stranded) as appropriate. All three models were run for 72 hours before listening commenced.

Sound Quality

As listening commenced each amplifier quickly established its own character. First up was the Denon. This is a particularly refined performer for the price, offering exceptional detail and focus. Tonally it could sound a little dark at times, possibly even shut in, but the level of definition never ceased to amaze me. The Cyndi Lauper track 'True Colours' offers a perfect example of the Denon's virtues and vices. It features a tambourine, located stage left, which, with its complex high frequency signature, gives any CD based system a hard time. The PMA350 sailed through this test. It alone revealed the marked superiority of the NAD5440 Compact Disc player's high frequency resolution over the Marantz CD 50 SE's, clearly resolving the tambourine, its jangle, and whether the skin or rim had been hit. Contrast this to the NAD amplifier which lets you know something's there, but the splashy rattle it produces could be almost anything. On the Rotel the instrument is

subterranean, all but disappearing into the mix! It may only be a tambourine but its accenting of the offbeat is vital to the track.

Down below, the '350's bass is beautifully articulate but rather lacking in weight. Changing over to the vdH Clearwater improved things dramatically, and I'd say stranded cables are a must for the Denon. The real problems are in the area of dynamic range. The PMA 350 may be rated at 50 Watts per channel! but it doesn't sound like it! The hard-to-drive CI5's really gave it a tough time, and it never brought them to life. Even with the Wharfedales, dynamic contrasts aren't what they could be.

In other words, the difference between loud and soft sounds isn't as wide as it should be. The end result is an amp of exceptional poise and control, but one which never really lets go. If detail's your bag look no further. If not read on.

The NAD is a complete contrast to the Denon. It sounds much more powerful despite its 20 Watt rating. Bass is deep and driving and if it doesn't have the precise edges that the Denon provides, there's no shortage of pace, energy and life. Soundstage is wide open and if the music demands it the NAD gets real loud, real quick. The top end can't compete with the Denon for finesse, sounding almost gauche in comparison, but this doesn't detract from the NAD's ability to please, musically.

The Rotel is the all-rounder in the bunch. Bass is bouncier than the Denon, not as good as the NAD. Treble is more polite than the NAD, not nearly as good as the Denon. The real question is whether the Rotel does enough, well enough, to compete with the other amps' areas of excellence. Personally I don't think so. The treble may be less coarse than the NAD's, but it also has less information. Ultimately the weak

points of the other amps are really no worse than the the same areas in the RA820AX. It might be an all-rounder in some respects, but in this company, as far as CD goes, it's an also ran.

Change to LP's, played on a Linn Axis and the picture alters. Suddenly the Denon is a shadow of itself. The bass is even lighter and the whole sound gets congested as soon as the music gets going. The dynamic compression is worse with the result that complex mixes simply coagulate between the speakers.

On the superb Athena pressing of Ivan Moravec playing piano works by Debussy and Ravel, the complex runs of notes lose their shape and timing. The bass just disappears. In contrast the NAD conveys the touch and artistry in the playing quite beautifully and the left hand goes down deep, with a real sense of authority.

The Rotel can't match the NAD, but it easily betters the Denon. Both rhythmically and dynamically, its superiority is clear, but it is plagued by a thinness which robs the piano of weight and solidity. What you get is a good impression of Moravec playing a second-rate upright!

'The Real Ramona' further highlighted the differences. Music which was driving and tactile on the NAD was dense and raucous on the Denon, thin and lacking pace on the Rotel.

The conclusion is clear. If you are going to listen solely to CD and other high level sources your choice lies between the refinement and poise of the Denon, and the rough but ready virtues of the energetic NAD. If you want to play records then the 3020i is streets ahead. Me? I'll take the life and involvement of the NAD every time. Alongside the excellence of their budget CD players, this amp signals a resurgence in NAD's fortunes as purveyors of hi-fi to the impoverished ●

Sony's ICF-SW7600 receiver marks my return to radio listening. My last transistor, a cheap, basic and bulky Sanyo, breathed its last after surviving years of travel with nary a problem and received a decent burial on the beach five years ago.

The SW7600 has opened up whole new areas of radio listening for me which previously consisted largely of music programme, and trying to pick up English-speaking channels wherever possible. Several days of playing with this machine, and I can now appreciate where 'toy' radio ends and a true receiver begins.

The unit comes as a complete package - the radio itself, its case, mains adaptor, Short Wave extension aerial and not one, but two, manuals. The first is a comprehensive set of operating instructions in English, French, Spanish and Arabic for the polyglots among us.

Peace and Progress

The second manual, the 'Wave Handbook' lists almost every station broadcasting in the world, times, broadcast frequency, language and call sign. Russia turns out to have a splendid call-sign: 'This is Radio Station Peace and Progress, the Voice of Soviet Public Opinion.'

I can now appreciate where 'toy' radio ends and a true receiver begins.

While the instruction manual is intelligible, the Wave Handbook is obviously a translation from the Japanese; this is no problem in practice, but its prosaic language can be unintentionally entertaining.

The receiver covers most channels, including Single Side Bands. These are the fascinating wavelengths used by what Sony calls 'Business Radio' and where we would expect to hear radio hams broadcasting to each other round the world. On a clear night, the user can listen in, not to the Hancock-esque "Is it raining in Tokyo" but to dialogues that give a real insight into world events difficult to get from conventional news broadcasts.

Waving and Scanning

In use, the Sony is quite complex, so that manual needs to be kept close at hand. It can be tuned either of two ways, through standard up/down controls, or via the more advanced



numeric keypad which can be used (along with the Wave Handbook) to pinpoint a specific station without loss of time. It's also possible to scan the bands, and programme up to ten stations for instant recall.

Fine tuning is also provided for the AM and SW bands, aided by an LCD tuning display. Aside from the purely radio facilities the SW7600 has a built-in clock and alarm; the last turned out to be particularly useful, as the batteries in my own alarm faded during the review. This made the receiver one of the most practical gadgets I've reviewed to date.

Typically, Sony have thought of everything. There is a sleep function which turns the radio off after 65 minutes; a Key Protect facility to prevent the channel being changed accidentally, and a display panel light that dims after fifteen seconds or so. There are other facilities of varying degrees of importance, but none are superfluous. The build quality is excellent and the radio should give many years of service.

Not exactly pocket-sized, the ICF-SW7600 packs a lot into a little box. The tuner, while not having the sensitivity of the bigger receivers, pulls in signals from far and wide, and some the larger ones wouldn't be capable of. I found the nights lengthening as I listened to more and more foreign stations. Compared to its larger relatives, the Sony is both diminutive and inexpensive.

It's very difficult to pass judgement on the sound quality of a unit like this. While it does have a tone control with rather basic settings for music or speech, the sound from the built-in

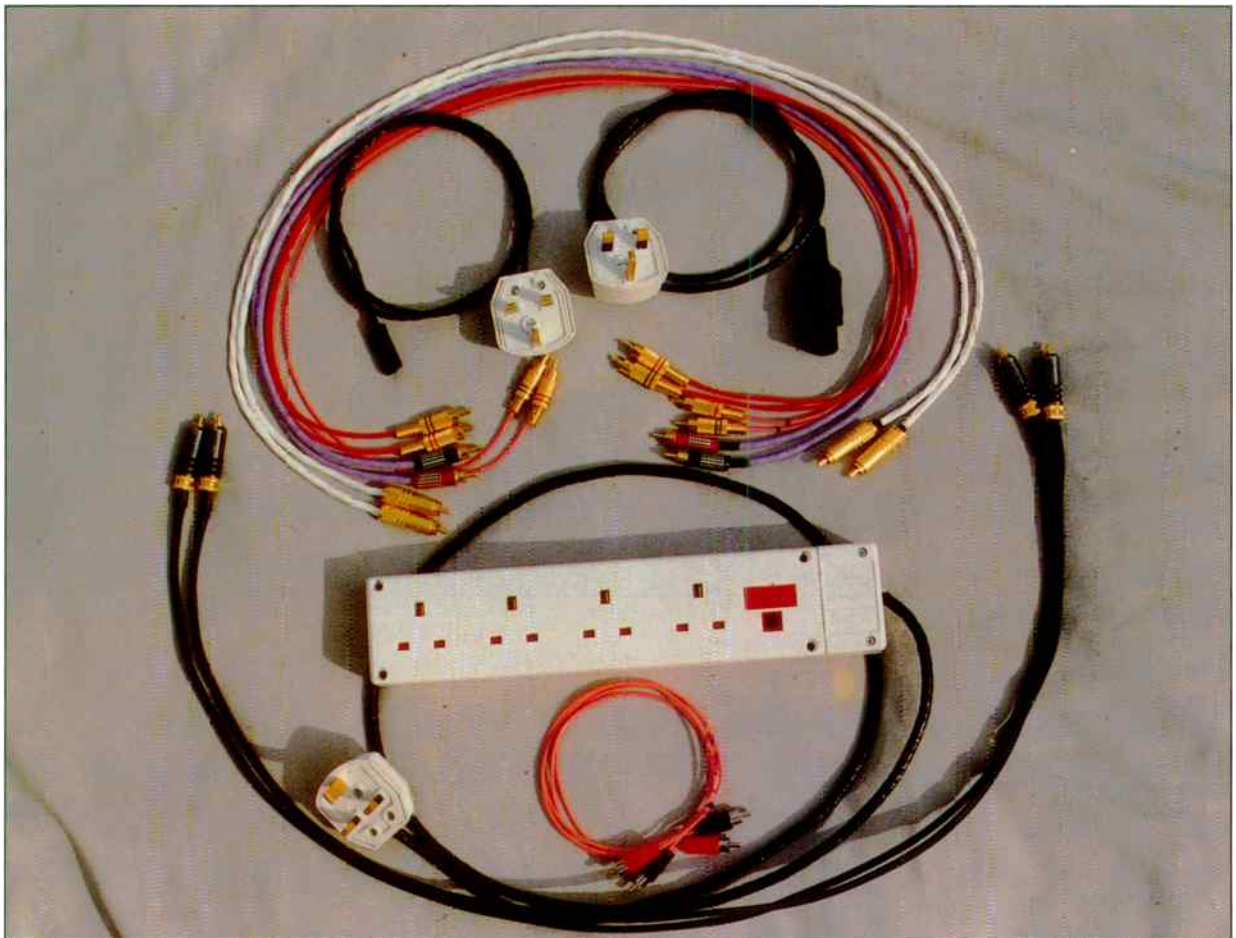
speaker is no more than you'd expect from any good transistor radio. It would be foolish to expect hi-fi quality from something this small. Portability, reception and convenience are more important than fidelity, especially when the original quality on these wavebands is so poor.

The Sony ICF-SW7600 is too expensive to dare call a 'trannie', it lacks the Air band, one of the most important for the dedicated hobbyist, and it does not have the 'pull' of the more specialised tuners. For the dedicated traveller, however, this receiver is a really useful link with the rest of the world ●

Sony world service

Alan Sircon is enticed by the Sony ICF-SW7600 into listening to the world's air waves after five years deprivation.

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tape trial

A new chrome tape MMaxell SX-II

takes on TDK SF. Noel

Keyword judges.

The traditional strength of chrome tape is that it produces less hiss than the common ferric. Cassette has always been hissy and this, of all its weaknesses, has been one of the most obvious and enduring. That's the main argument for buying chrome.

As you might guess, the principle drawback of chromes has been the usual one of cost. Luckily for tape users, there is a bit of a battle going on between manufacturers to secure 'chrome market share', as they put it. This entails the marketing of budget chromes. Maxell recently released a new budget tape for this sector: SX-II, which should sell for around £1.30 for a C90. Its main rival will be TDK SF. Both are tested here.

With quality ferrics pushing up to the £1.50 mark, these two chromes seem pretty cheap (whoops - I mean 'inexpensive'). They are just 10p-20p more costly than standard ferrics, so there seems little reason for people not to buy them. In practice, most tape users like to stick to a brand and type they know and feel happy with, which has hindered growth of the chrome market. In the UK just 10% of sales are chromes.

The low cost of Maxell SX-II is intended to woo buyers away from both ferrics and from rivals like TDK SF of course. The intense competition to offer better performance has led to a rapid improvement in budget chromes, noise being the chief victim. Hiss measured -59dB with SX-II, which is around 3dB less than that of a good ferric. For all those who record up to OVU and no more, this advantage will be quite audible, making this new tape a good budget buy.

The picture is only qualified by TDK SF which, since I last tested it has changed substantially. Once a noisy chrome, it has now become very quiet, measuring -59.8dB. So TDK have a small lead here in the tussle to reduce hiss.

Whilst on the subject of noise, I should move on immediately to modulation noise. This is hiss that exists only when a signal is present, being a random modulation of a signal. Very old films suffered this badly; speech was accompanied by a swell of hiss. With cassette, modulation noise isn't so obvious; it serves to lessen clarity and contributes (with flutter) toward the slightly jittery, papery quality characteristic of the medium. Maxell have traditionally kept the modulation noise figure of their tapes down and SX-II is no exception. Listening tests showed that recordings have a slightly firmer and smoother quality about them than with TDK SF, which had 3dB more modulation noise. What Maxell's SX-II loses in

hiss to TDK SF it gains in lower modulation noise, I felt. So in terms of noise, these two budget chromes are about equal and both very good by current standards.

Hiss determines the lower re-



cording limit, overload the upper recording limit. The gap between them is available for music, and is the dynamic range of the tape. In the past, chromes have had a low-ish overload ceiling, but it is creeping up. Maxell's SX-II measured +3dB (MOL315), which means it will record to around +5 above Dolby level on a very good tape recorder (i.e. expensive Nakamich), or +3 or so on an ordinary hi-fi machine. This is pretty good for a budget chrome and gives SX-II a dynamic range of 62dB. TDK again nose ahead however, SF hitting +3.2dB (MOL315), giving it 63dB dynamic range. The advantage isn't great in absolute terms, even if it is not insignificant by tape standards.

Treble overload (SAT10k) was 7dB lower than that in the mid-band, which is about normal. TDK SF was similar. Both tapes had normal sensitivity as well. Even in frequency response there was little to distinguish one tape from the other, as the two frequency response analyses show. Both have slightly less treble output than the current IECII Primary Reference Tape. This fact, in conjunction with identical sensitivity, means that they will match cassette decks very well. Both are highly compatible chromes.

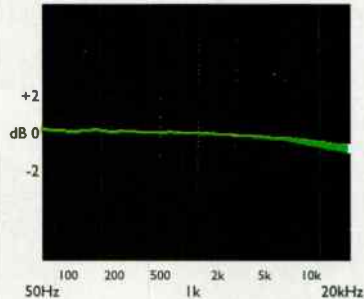
My conclusion is that Maxell have a good budget chrome tape with SX-II. It is, broadly speaking, just about on par with TDK SF, both being front runners in the budget chrome category field. You may just about notice just a touch more brightness from TDK SF, but a slightly smoother, firmer presentation from SX-II. Maxell will have to get back on their bikes though, because TDK are soon to launch a new range of tapes, meaning SF is shortly to be improved. In the meantime both SX-II and SF offer low hiss for a low price; they are worth trying ●

Test Results

MAXELL SX-II

Treble level (10kHz)	-1dB
Overload	
mid-band (MOL315Hz)	+3dB
treble (SAT10k)	-4dB
Hiss	-59dB
Modulation noise	-43.5dB
Sensitivity	0dB
Dynamic range	62dB

Frequency Response

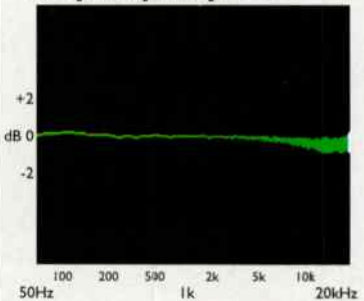


Very slight treble fall.

TDK SF

Treble level (10kHz)	-0.7dB
Overload	
mid-band (MOL315Hz)	+3.2dB
treble (SAT10k)	-3.8dB
Hiss	-59.8dB
Modulation noise	-40dB
Sensitivity	0dB
Dynamic range	63dB

Frequency Response



Slight treble fall and some mod. noise.

ProAc, together with their sister company Celef, produce specialist loudspeakers with a high reputation for solid construction, combined with impressive performance. The company has established a following among well informed enthusiasts, but ProAc have not become complacent. A new MkII version of their respected Studio I, priced at £612.25, has recently been introduced and is, in my view, a marked step forward for the company.

Traditionally, the Studio I's, along with ProAc's Super Towers, have used metal dome tweeters. However, some displeasure was expressed at the performance of the metal domes, which was resolved with the introduction of one inch soft domes in both models earlier this year. At the same time, it was decided that other refinements could be incorporated. These

included changes to both the cabinet damping and the design of the crossover.

While ProAc have substantially altered the loudspeaker, there has been no increase in cost. It is this commitment to the customer that sets companies like ProAc apart from many other manufacturers. In addition, it is refreshing to find companies who actively improve their products, rather than merely change them, for the sake of change.

High Standards

The Studio I loudspeaker displays the high standard of finish that we have

come to expect from ProAc. The review sample was finished in a light oak real wood veneer, which, on a cursory examination looks like solid tree, only without the leaves and branches. The rear panel is professionally finished in contrasting black with two Michell sockets fitted into a recess.

At the front of the loudspeaker, there lies the alternative to the metal dome (a SEAS soft dome tweeter), the custom manufactured ScanSpeak mid/bass unit and a small port. Attention to detail is shown in the use of the ProAc logo across

professor of music

ProAc's popular Studio I loudspeaker, now in its Mk II guise, professes neutrality and musicality.

Alan Sircom sits at the head of the class.



the front of the drive units. The loudspeaker has a black grill, with a gothic script 'ProAc' logo at the base. Here, I encountered my first niggle. From a design standpoint, why does the logo on the grille not match the logos elsewhere? This might seem a small point, but the change of typestyle jars visually and contextually. Otherwise, there is precious little else to criticise in terms of build and design.

While the loudspeaker looks conventional, the stands designed for it appear somewhat utilitarian, though purposeful. They are known as HJ17/2 and HJ20/2 for the 17 and 20 inch versions respectively and are normally available from ProAc dealers. Solid, heavy stands seem to be the order of the day at present. However, I felt that the Studio I's did not work on light stands, such as Linn Kan or Sara's, so heavy types appear to be a good choice. If the HJ-type stands are unacceptable for home use, Slate Audio stands would be a good-sounding variant and may suit domestic surroundings better.

Positioning

The ProAc's are not especially fussy about positioning, unlike loudspeakers such as Acoustic Energy AEI's. They are designed to work in free space, but not too far away from side or rear walls. About 12-18 inches is right. In addition, ProAc recommend that the loudspeakers should be placed between six and twelve feet apart. Obviously this would vary from room to room, but I felt that they worked at their best at about eight to nine feet apart, with a slight toe-in.

For a loudspeaker of this size (16" high, 8" wide and 10" deep), the Studio I gives an impressive amount of bass. Whilst never sounding flabby, it can be problematic in some smaller rooms. If this is the case, positioning does become more important, because it can lessen bass overhang. The loudspeakers are claimed to roll off at 30Hz, but when exploring the depths of their sonic spectrum, they never appear to run out of steam. This compares favourably to many similarly sized and priced models that just sound vague and gutless when playing deep bass.

For assessment of the loudspeakers, good quality equipment, from a variety of manufacturers was used. This included turntables by Linn and Voyd, amplification by Ion Systems and Audio Innovations and Compact Disc via a Musical Fidelity Digilog. Having allowed the loudspeakers a suitable time to run in, the Studio I MkII's took their place in the arena.

Superb Soundstage

From the outset, these loudspeakers sounded a little special. ProAc's are well-known for their imaging qualities and this reputation was borne out by the Studio I's. Their soundstaging abilities were superb, seeming to be limited only by the equipment they were partnered with. While images were not as well located in space as Quad Electrostatics and their kin are capable of, the Studio

I imaged as well as any box loudspeaker on the market with similar pretensions.

The soundstage produced spread - far and wide. It had depth and width, if not quite so much height. In all fairness, very few loudspeakers of this size and cost, with the possible exception of Pentachords and well set up AE-I's, can produce a soundstage that can image supremely well in all three dimensions. Instrument images were very solid and realistic, even when the instrument appeared far from the confines of the box.

The loudspeakers also sounded articulate and capable of excellent tonal separation. When playing 'Respect' from the album 'Adeval', one could clearly distinguish the lead vocalist from the backing singer, both in terms of their vocal characteristics and what they were singing. Vocals were never unintelligible, nor did the synth sound dry or indistinct. It was very easy to follow the tune of the bass line and to sing along with the vocal, which suggests that the loudspeaker's pitch reproduction was good as well.

Hand-in-Hand

These are comments that usually go hand-in-hand with reservations about a distinct lack of dynamics. Not so with the Studio I! Any time a passage became louder or quieter, the Studio I's responded well, without losing any sense of the meaning within the music. I noticed this with my elderly Argo copy of Haydn's Nelson Mass. Here, the choir and orchestra produced a sumptuous sound, often apparently lost with loudspeakers lacking in dynamics.

While we are breaking the sound of the ProAc's down into its constituent parts, I should mention that their coherence - the sense of a performance taking place - was very good indeed. Never sounding merely clinical or analytical, the loudspeakers were more than capable of delineating between individual musicians, but they never lost track of the music.

Whatever the sounds being played - and through whatever medium or amplification you care to mention - the loudspeakers gave their all, with detail, finesse and style. Trying to find fault was difficult; trying to define their individual character even more so. While slightly warm, changing a component in the system would change their own elusive character, subtly.

After a lengthy session with the Studio I's, I could detect a slight thuddy sound to the deepest bass notes. There was some slight loss of the most delicate information, but this was in comparison to loudspeakers costing up to about four times as much. In their price bracket few models could out-detail them.

They are not the fastest of loudspeakers. They do not respond to transients as quickly as sealed units such as the Monitor Audio Studio 5's reviewed recently. In their price bracket, though, few can out-detail these Mk. II's.

If there's a single word to describe the ProAc Studio I's, it's benign. While initially, in the company of speakers more immediately impressive they might strike the listener as lacking character this is their taking the side of neutrality. They do not lend themselves to systems which might be described as 'euphonically enhanced', where they would be in danger of being overshadowed by the characteristics of the source or the amplifier. The Studio I's would still display all their excellent qualities, but they really belong in a system where neutrality is high on the list of priorities.

Whatever the sounds being played - and through whatever medium or amplification you care to mention - the loudspeakers gave their all, with detail, finesse and style.

Neutrality should not be mistaken for blandness. Any number of products sound striking from the outset, but with time the impressiveness becomes overpowering and the striking qualities become fatiguing. Over time, a neutral system will still sound natural over an extended listening session. It's nothing to do with 're-educating your ears' as some dealers and reviewers would have it.

The ProAc Studio I's have their own time-machine effect. Readers of Hi-Fi World will be relieved to hear I'm trying to wean myself off the recordings listed in last month's magazine. (Jane's Addiction, REM, Rachmaninov's Symphonic Dances and so on.) My ears are beginning to find them clichés. Normally, reviewers seldom play themselves whole albums, preferring to skip from one track to another. With the Studio I's in front of me I discovered one track stretching into another, and another, until even my clichéd albums had all been played though from beginning to end.

In certain systems, the ProAc Studio I's will fail to shine. But, for just over £600, it is difficult to better them at the price. Their nature predisposes them toward the high end of audio and it is here that they will glow. In realms where many people would spend more on loudspeaker cables alone than these ProAc's cost for a pair, they will appear to be an outstanding bargain.

The Mk. II Studio I's might not stun on first hearing, but that is their strongest point; within a well-matched system, with neutrality the aim, I would be happy to recommend them ●

positioning your loudspeaker

Various factors in the listening room affect the sound from a loudspeaker. Here is how to recognise them and minimise the problems.

The sound of a loudspeaker is strongly affected by the room in which it is placed. Of even more consequence is its position within any one particular room. The room itself will usually highlight a number of bass notes, giving some unnatural and probably unwanted emphases. Care in positioning the speaker can either minimise this problem or greatly worsen it. Get it wrong and you'll hear nothing but bass - or so it seems!

Further up the audio band, high frequencies and their distribution determine the stereo effect. Too many reflections reaching a listener too quickly confuse the stereo stage. Again, the position of the loudspeaker can be crucial in determining whether this is a problem or not.

So here's a simple guide to loudspeaker room placement. I'll keep the whole outline as simple and practical as possible: articles like this often dive into long descriptions of things like 'eigentones' and forget to give any practical advice altogether. This is a 'where to stick it and why' article, with a minimum of acoustic theory, but just enough for a basic understanding.

Boominess

Every room has a series of basic low frequency resonances which commonly produce bass 'booms'. The effect is to emphasise certain particular bass notes. This becomes most irritating when a bass player is playing a particular repetitive phrase. If one note in it coincides precisely with a room resonance, a 'boom' is produced. With repetitive phrases the boom can be tediously predictable and may cast its stamp over the entire bass line, swamping it.

There are quite a few experiments with loudspeaker placement that will help minimise this problem. You have to bear in mind though, that it may be due in the first place to an unfortunate set of room dimensions, in which case spending the weekend re-arranging the furniture will only drive the wife mad and cause the cat to leave home. Then all you'll have left is the boom! It is possible to get some idea of whether such a problem is curable or not before such a drastic scenario happens.

The boom is caused by the air in the room resonating, just as it does in an organ pipe. The only difference between the two is that an organ pipe is open ended and resonates at a frequency where its length equals one-quarter of a wavelength. Rooms are closed, so they resonate at a frequency where wall-to-wall dimensions are equal to one-half a wavelength, for the reason given in the caption to Figure 2.

You don't have to know why a

room resonates at the frequency it does. All you need to check it out is the chart in Fig 1 which will tell you the frequencies at which your own room will sound off.

Measure the room length, width and height. Then look up the boom frequency in the chart (or divide 565 by the dimensions in feet). There are other resonant modes, but these are the main ones.

My own analyses of recordings show that the lowest note commonly to appear at full level is 40Hz. A few discs have full-level signals at lower frequencies, but they are exceptions. A twelve bar blues in the key of A on a bass guitar may typically run from 55Hz (A) up one and a half octaves to around 147Hz. The spectrum analyser confirms this - and that the strongest notes are commonly around 60Hz (often due to studio equalisation put in to add bass 'presence' and 'speed').

This frequency band unfortunately happens to straddle the range of dimensions found in many listening rooms, width and height being smaller than the greatest length and therefore being tuned to higher bass notes. So room boom is a common enough problem, except for those who live in buildings so palatial that even the ceiling is higher than 14ft.

Chart

The chart shows you where the main boom frequencies are. If you have a near-square room, or one where two dimensions are less than 15ft and much the same, then bass boom is likely to be a big problem. The worst case is a square room. Here, all the resonances coincide to give one massive bass boom that can completely overwhelm a loudspeaker. Believe it or not, 'golden' room

Room dimension (ft)	8	10	12	14	16		
Resonant frequency (Hz)	70	56	47	40	35		
(ft)	18	20	22	24	26	28	30
(Hz)	31	28	26	24	22	20	19

Fig 1. (Divide 565 by the room length in feet to get frequency in Herz.)

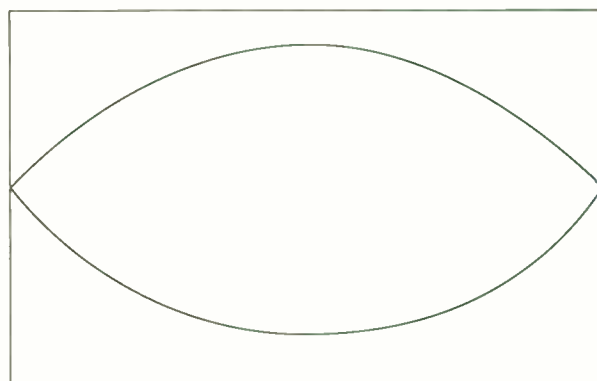


Fig 2. With zero air displacement (and velocity) possible at walls, maximum displacement occurs in the middle of a room at resonance. This makes the room dimension equal to one half of a wavelength of the frequency of resonance.

Sound pressure is reciprocal to displacement and velocity, being at a maximum at walls and a minimum in the room's centre.

dimensions have been proposed in the past, the ratio 1:1.6:2.5 being suggested as ideal. (In real life, this would translate as a living room with dimensions roughly proportional to 8' high, 13' wide and 20' long.) Also, non-parallel surfaces discourage resonance, making oddly shaped rooms potentially good in this regard. However, many specially proportioned listening rooms reportedly sound 'odd', which is why interest in them has subsided.

So far, you should have been able to determine where your room's main resonant modes are in terms of frequency and whether your room is such a dog that the only answer is to move out. Before reaching this stage, however, there are a number of partial solutions that should be tried.

Firstly, placement against a wall or, worse, in a corner, drives one or

music made live... music made live... music made live... music made live... music made live...

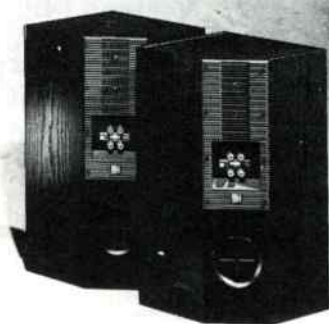
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more of the main room modes very effectively, resulting in the boomiest sound possible. This is because walls and floors act as reflectors, a corner bringing them all together. Any boundary is also a high impedance point, offering the best acoustic match of loudspeaker to room. The answer is to move a loudspeaker away from reflecting surfaces and out into the room. In theory, the centre of the room is the 'deadest' point. This is hardly practicable, but off the floor on stands, and two or three feet in front of a rear wall usually gives least room interaction at low frequencies. This will lessen room boom considerably and give clearer bass, with less overhang. It also avoids lumpy bass, due to cancellation between the main sound and reflections.

Make the speakers fire down along the length of a room if possible. Sitting well back, close to (but not against) the other end will give you the deepest bass and best integration from the usual staggered drive unit arrays found with box loudspeakers.

Furniture

Furniture helps improve bass quality as well; it breaks up standing waves. Items like settees and armchairs can be very effective in absorbing bass energy, helping to damp down bass overhang in particular. I have used cushions and even piles of magazines to help in this regard as well.

The only exception to the rule regarding wall placement concerns 'bookshelf' loudspeakers. These (sometimes termed 'boundary effect' speakers) usually have reduced and heavily damped bass in order to partially compensate for wall effects. But watch out, the phrase 'bookshelf' is sometimes used loosely to describe a small loudspeaker, rather than one that has been comprehensively tailored to sound right against a wall. The manufacturers' instructions

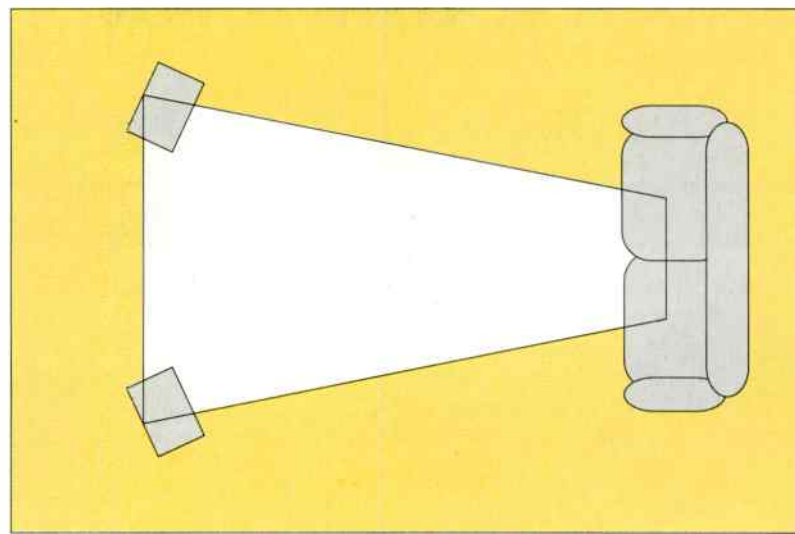


Fig 3. Place the speakers to fire along the length of a room and toe them in slightly to face listeners. Keep the speakers away from rear and side walls. Keep yourself away from rear and side walls as well!

should make this clear.

Minimising 'room-boom' isn't all there is to loudspeaker placement. Ideally, for best stereo imaging and stage depth, both loudspeakers should be at the height of the listeners' ears and on a triangle, facing inwards toward them, as Fig 3 shows. You will then be 'on axis' to them. Again, be careful to note that a few loudspeakers are meant to be listened to off-axis (e.g. Kef C55s) - they should usually be pointed to fire straight down a room. Quad ESL63's should be tilted back, because they beam downward.

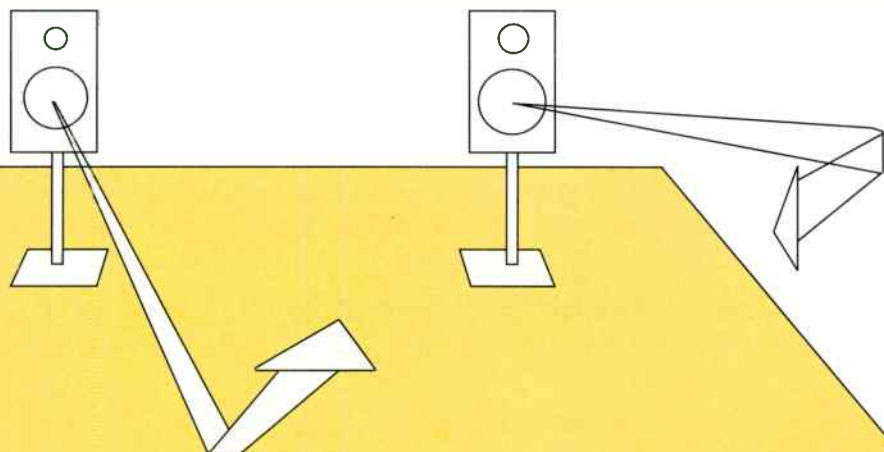
Keeping loudspeakers away from side walls and floors (Fig 4) lengthens the time taken for reflections off them to return to listeners. The human brain/ear perceives all sounds heard within 4mS of the start of an event as part of that event. In other words, it cannot discern discrete events that occur within a shorter time span. If reflections off walls or the floor (in particular) hit the ear quickly after the direct sound from the loudspeaker, they get added in as it were, to produce a messy, confused impression. Ideally, hard reflective surfaces should have irregular objects

placed against them to break up the sound or, better, they should have sound absorbing areas. Curtains are a good solution; what a pity that heavy ones are very expensive these days.

Floor reflections are a problem too, but path length cannot be increased, except by sitting on chairs 4ft high. A hard, wooden or concrete floor will therefore always produce early reflections that result in audible confusion. Carpets are the only solution to this problem. They absorb a lot of energy and in doing so greatly lessen reflected energy from the floor. The sound in every room of my house improved dramatically after the builders had left and decent carpets were put down. Heavy underlay with thick wool carpet on top works wonders in this respect.

This is about the limit to what can be done to remedy a room boom and ensure that speakers are not fighting a losing battle against room effects. With a bit of experimentation though, it is quite enough to tighten up the bass, even out the overall tonal balance of the system and give cleaner, better focussed stereo images. Which is a fair range of benefits for a minimal outlay ●

Fig4. Reflections off floors and side walls commonly reach listeners within 4mS of the direct signal, causing confusion within the sound. Sound absorption, using carpet and curtains, produces substantial improvements in this area.



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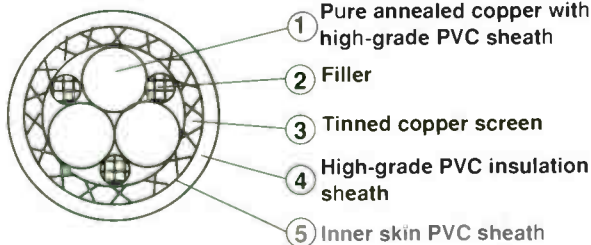
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...Continued from P9.

the speakers and your ears. An interesting experiment is place a 'ghetto blaster' at ear level and with a high quality stereo signal gradually walk backwards and forwards towards the machine. You will hear some very odd effects at certain points.

**Les Huett
York**

● A different aim to other hi-fi magazines? Getting away from the constraints of other hi-fi magazines. No end to ideas and no limit to what is possible...?

Having read (most of) the first two issues of your new magazine I have to say that first impressions in these areas do not bode well for the future. I wonder how long it will take for the publishers of hi-fi magazines to realise that there is an army of people out in the real world who are (or potentially are) interested in hi-fi, but are totally bemused by the sheer barrage of gobbley-gook used in articles which are supposedly intended to inform and entertain.

An example...your review of Nakamichi's new Cassette Deck I (April 91). Recording levels...+10dB (MOL315Hz). Treble overload...high at around -3dB (SAT10k). In spite of all Nakamichi's claims about diffused resonances, performance turned out to be relatively poor for...a...dual capstan design. The replay amplifiers were quiet enough (thank God!), hiss measuring a normal -6ldb (CCIR, 70µs).

I rest my case.

You guys might know what you're talking about - and you obviously assume us readers know what you are talking about. This high tech, mystique which surrounds the world of hi-fi does little if anything to promote people's interest in good music played on good equipment. If you want to be different, be different. You could get off to a good start by actually explaining, for example, what a decibel is and why it can be either positive or negative. Or you can follow the flock.

**K.Sleight
Cardiff**

The Editor writes: Your quotes come exclusively from

HI-FI WORLD AUGUST 1991

a Measured Performance section. My original intention was that these sections - but only these sections - would be technical. Perhaps we should try to make them a little less so - or ensure that they are at least partially decipherable.

Simple explanations are difficult: I have yet to see an easy one made for the decibel, but again I take your point and we will try to provide some guidance in the future.

● Professor Byckling's analogy, of small box speakers being equivalent to two small holes in a sound insulating concert hall wall (Readers Reply - June), is totally fallacious. In an idealised Blumlein stereo microphone arrangement (a crossed pair of near coincident figure-of-eight capsules), the feed to the speakers would represent the sound field at the microphone location. The feed to the listener from two holes in the rear wall of a concert hall would represent the sound fields at two widely spaced positions on that wall. As the basic premise of this analogy is incorrect, the rest of his argument also collapses.

In fact, the main reason for the differences in perceived sound from panel and box loudspeakers (assuming they are both of high quality) is the different way each type interacts with the listening room. Panel speakers are less likely to strongly excite low frequency room modes than box speakers, and their dipole sound radiation pattern means that early side wall reflections (which can smear stereo images) will be much weaker and therefore less of a problem.

Conversely, the strong out-of-phase rear output, if reflected from the rear wall, can give rise to a pleasing (but synthetic) sense of spaciousness. Many of the colorations attributed to box speakers are in reality caused by their greater excitation of room colorations, and it is probable that accurate box and panel speakers would sound the same in anechoic conditions.

This highlights the importance of matching the acoustic characteristics of the listening room to the loudspeakers being used, in order to

optimise sound fidelity.

**Bob Burns
Room Acoustic Services
Barton-Upon-Humber.**

The Editor writes: I can only partially agree with much of what you say.

There is a large number of reasons why panel and box loudspeakers sound different. Their drive units are usually of fundamentally different construction, they match the air load differently, which in turn affects diaphragm/cone behaviour. Rear reflections/return energy is a problem with box designs, not with panels, and box resonances colour box loudspeakers. For these reasons, it is very unlikely that box and panel loudspeakers would sound the same in an anechoic chamber.

That rear wall high frequency reflections produce 'spaciousness' with panels is another simplistic notion. My own experiments with stripped down Quad 63s have shown that rear wall high frequency reflections just produce a sense of treble confusion. Back damping with heavy felt curtains, hanging a few inches behind the Quads, eliminates this; it does not reduce 'spaciousness'.

The major, unexplored problem with dipoles is their alignment in a room. Non-aligned dipoles produce weirdly soft and often honky bass. This problem afflicts the Quads when they are used as full range reproducers. Only Celestion have tackled the problem scientifically, but their solution demands the use of a computer to achieve proper dipole room alignment. The really intriguing and exciting aspect of this is that once aligned properly, dipoles can produce better quality bass than monopoles.

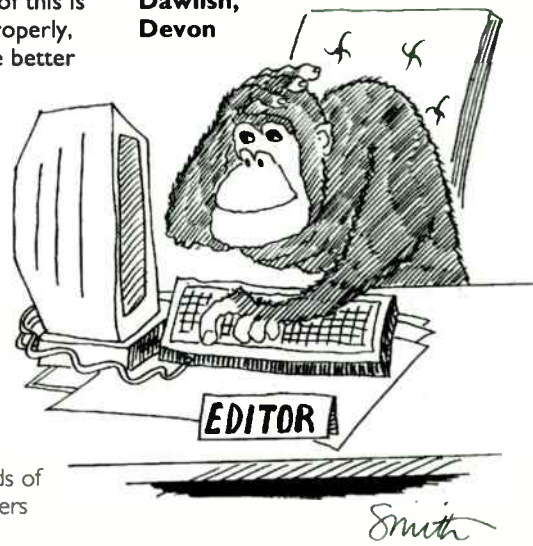
● It is good to find a magazine that doesn't seem to be committed to the vicious spiral of upgrading by buying ever more expensive products. It is much more fun to delve into the innards of amplifiers and speakers and improve them

yourself than to go to a dealer and buy an improvement. It isn't necessary to be an electronics buff to do this sort of thing. My trusty ten-ish year old A&R A60 has been improved out of all recognition by fitting a Kimber mains lead, Sidereal Kaps and Schottky diodes in the power supply and an Alps volume pot, under advice from Russ Andrews. I sent him a copy of the circuit diagram, which he returned, free of charge, with recommended modifications.

As you probably know, Russ Andrews also has a series of 'cookbooks' for modifying various popular amplifiers. I would really like to see, in Hi-Fi World, an article on upgrading a commonly available second-hand amplifier, such as Quad 33/303 with an independent opinion on the finished job. In effect, a review of the relevant 'cookbook'. There must be plenty of us out here who can wield a soldering iron and tell a resistor from a capacitor, but who aren't competent to design their own modifications.

The other thing I'd like to see - admittedly a rather minority interest - would be a design for a valve headphone amplifier, for dynamic 'phones. I find that, because of background noise, I do most of my serious listening on headphones, and such an amplifier is just what I want - and much cheaper than a valve pre-amp, I would think.

Nevertheless, you have a great magazine. I never thought I'd see a Hi-Fi Magazine (except HFN/RR) with informed reviews of Classical records, thanks to Peter Herring.
**Paul Killick
Dawlish,
Devon**



speaking by numbers

Roy Gregory and Alan Sircom

listen to the all digital, all dancing

Meridian D6000

It's long been an adage in the UK hi-fi industry (as long as Linn have been selling turntables in fact!), that the quality of a system is dependent upon its source. If the information is lost at the beginning of the chain, then the components further along can do nothing to restore it.

The logic of this viewpoint is unquestionable, but as a doctrine we can break it down even further. Whatever apparatus we are using to retrieve information in the first place, be it a record player, tuner or Compact Disc player, is itself dependent for its performance on the technology employed. Things which appear fine in theory don't always measure up (excuse the pun) in practice. Direct drive turntables, digitally synthesised tuners or the first CD players: the history of hi-fi is littered with technological failures and miscarriages.

I'm not saying that all new technology is bad. However, many take time to reach their full potential. Only after development can they overtake existing 'tried and tested' technologies, which have the benefit of years of refinement. So when you drop some new gizmo into your chain of reproduction, you'd better be sure it's up to scratch. And the more jobs it does, the more dependent you are on its performance.

What has all this got to do with the Meridian D6000? The D6000 system is a revolutionary one. Don't be mistaken, this is a system, not just a speaker. Each pair of D6000's possess a full range of on-board digital processing in order to work with pure digital sources. A CD or DAT transport are connected up directly, eliminating ordinary analogue

signal cables, together with their degradations. Thus you have a digital pre-amp with filters, tone controls, loudspeaker equalisation and crossover all acting in the digital domain. At the end of it all are three digital to analogue convertors, one for each leg of the crossover, and each is followed by a dedicated power amp connected directly to its own drive unit.

Using digital techniques to perform so many functions makes the D6000 uniquely dependent on the quality of its digital engineering. Unless the number crunching is up to scratch we could be looking at an expensive binary bungle. Of course, that's just the downside. On the other side of the balance sheet are the benefits of digital processing - and they are pretty extensive. The downside and the upside made themselves known in this product.

Control

Domestic compatibility is a key element in the D6000s design rationale. The digital interactive approach means that, sources apart, your entire system comprises just two loudspeakers. Cabling is limited to 'data in' and a communications link which enables the two speakers to 'talk' to each other and the rest of the system. This of course makes full integration with Meridian's multi room technology a cinch.

Sonic rewards should come from the ability to perform the sound shaping entirely digitally. This gives the listener user adjustable bass roll off and treble tilt controls as well as the ability to shift the sound field about its vertical and horizontal axes, to compensate for sitting off-centre or below the (very high) tweeter axis. In short, you should be able to tailor the sound to your listening environment. All, of course, by remote control - no less! There's no need to get up to adjust the balance, only to find it's gone a bit too far after you have sat down again. Naturally, volume and source select are also remotely controllable.

Interactive electronics also mean that you get the option of increased bass extension from a comparatively small box through the use of electronic equalisation. The D6000 is a very wide bandwidth system. And if you don't believe it's small for the bass performance compare it to other genuine full range systems - the Infinity IRS V, TDL Reference or Naim DBL, to mention a few. They all make the D6000 look positively sylph-like.

Finally, the catch. The D6000 only accepts digital inputs. Fine for CD or DAT but if you want to use a record player or tuner you'll need an analogue to digital convertor. Thoughtful as ever, Meridian supply one, the 607, but it ain't cheap - £1006 to be exact. Mind you the D6000's cost £7050 a pair.

What do you get for your money? Each cabinet consists of a bass unit, on top of which perches the mid/high frequency enclosure. This latter is an extremely strong, resonant free chamber, containing a polypropylene

midrange unit and SEAS derived metal dome tweeter. Its aluminium diaphragm looks slightly garish against the deep black and gold of the rest of the speaker. The truncated pyramidal shape helps to cut down internal reflections and spread the resonant mode of each panel.

The bass towers contain the electronic circuits, plus four plastic eight inch drivers acting as bass units. These are placed in pairs on the sides of the cabinet, hidden behind black cloth panels. The front is finished in black glass. It matches the lacquer work on the upper chamber unit and provides a window at the top for the remote control sensor and digital display readout. With so much available adjustment, the system must confirm its settings to a user. Spikes decouple the cabinets from the ground - and each other. The whole creates a tall, slim and rather high-tech appearance.

Room Interface

Aesthetics are always very personal, but I feel bound to observe that this is the first ever Meridian product that doesn't grab me. The aesthetic is striking, but you couldn't easily place these loudspeakers in any room, especially those with traditional furnishings. It would be

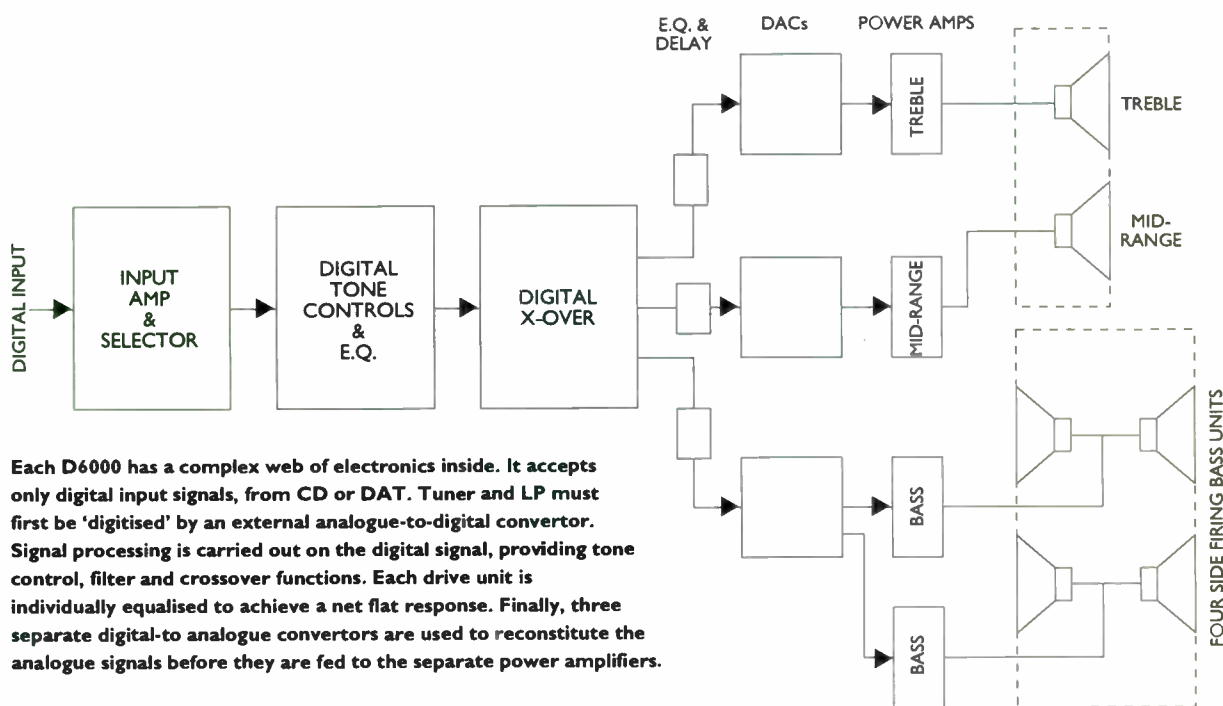
tailor the sound
to your listening
environment by
remote control

wiser to build a room around them. Some will love the D6000 - others may not. If you already own chrome and black leather seating, or visit Habitat or Conrans regularly, then they're likely to be the answer to your dreams (assuming £7500 is no nightmare).

The first thing which becomes apparent when you settle down in front of these speakers, is that they need a large room.

I started out determined not to be overawed by the gadget content and array of facilities facing me. As I listened to the Meridian's I soon came to realise that separating this product from its *modus operandi* is impossible. The chosen design path reflects a particular set of criteria when it comes to listening at home. Ignore them and you miss the point of the D6000.

Sonically, despite Meridian's claims to the contrary, this is not a state of the art speaker and amplifier system. For the money I could readily better its performance in various musically important areas. However, this would be achieved by resorting to such domestic nastiness as valves and cables as thick as your wrist. The D6000's are a no-nonsense music system for people who



Each D6000 has a complex web of electronics inside. It accepts only digital input signals, from CD or DAT. Tuner and LP must first be 'digitised' by an external analogue-to-digital converter. Signal processing is carried out on the digital signal, providing tone control, filter and crossover functions. Each drive unit is individually equalised to achieve a net flat response. Finally, three separate digital-to analogue converters are used to reconstitute the analogue signals before they are fed to the separate power amplifiers.

don't have the time or inclination to indulge in such tweakiness; people who don't want to suffer for their music. The D6000 is state of the art home entertainment. Realise this and you are halfway home to full acceptance.

The D6000's will play awesomely loud with thunderous bass and a huge sense of scale. They will fill a very large room with sound, doing so at the touch of a button. They'll integrate fully with a remotely controlled multi media, multi room system and provide impressive results here as well.

Sonic Standards

What Meridian have done is taken on Bang & Olufsen in their own backyard and blacked both their eyes. The D6000 sets new sonic standards for super-flexible, housetrained, high technology systems. Having said that, they ain't without flaws. The remote operation is pretty hit and miss at times, and very slow into the bargain. It doesn't approach the likes of Sony, nor B&O. A 'could do better' on the report card is warranted.

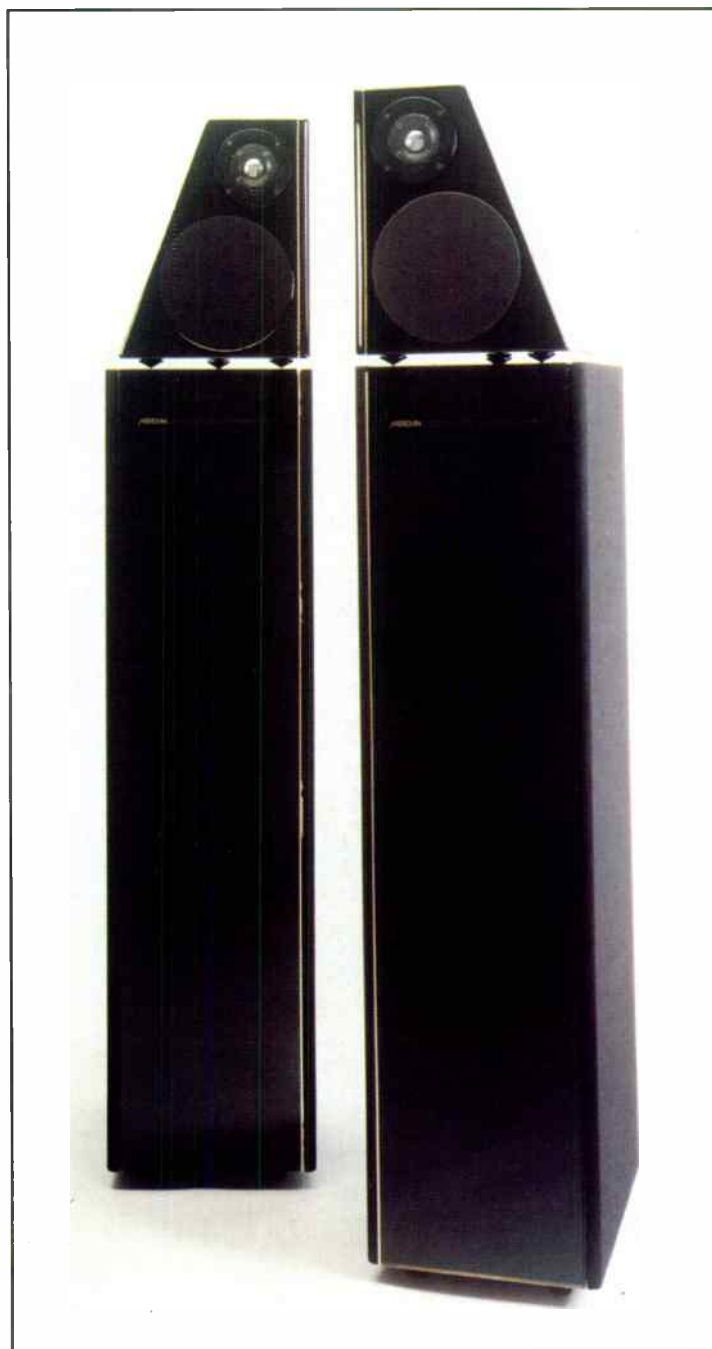
More worrying is the tweeter. Frankly, I feel that it doesn't belong in a speaker at this price. Bright and hard sounding, the problem lies in its fundamentally different character to that of the other drivers. High frequencies sound detached and exposed. I would say this is definitely a case for expulsion.

The question the purchaser has to ask is, 'how far has the art advanced?' As I said at the beginning of this review, the D6000's fortunes are substantially dependent on the absolute quality of the digital electronics employed. Several aspects of their performance left me feeling uneasy.

Many speakers are unable to accurately track a dynamic signal. When the music should get loud, they don't. The D6000's are a complete opposite. They always seem to be loud, unable to become quiet. Nor was I convinced by their overall presentation. Music never

seemed to gel, either in the spatial or rhythmic sense. How apparent these failings were ranged dramatically from disc to disc. Paradoxically, I achieved the best results by using the 607 analogue to digital converter, to feed the speakers either LP or the analogue output of a CD player! Why? I'm not really sure, but recent sonic compatibility problems in trying to mix CD transports and converters from different manufacturers leads me to suspect there might be difficulties with digital standards and their interpretation, an idea borne out by the D6000's dramatic improvement when fed a Meridian derived digital signal. Food for thought!

Where does that leave the D6000? It's an impressive combination of engineering and sonic achievement. Potential buyers will recognise it immediately for what it is; the no-nonsense answer to their musical dreams. They'll buy it, probably along with a Meridian through-house audio distribution set up and a huge Sony 'flicker-free' TV. If that sounds like you, then I recommend an immediate audition. If not, then approach with caution. These loudspeakers lead their field and, as the Daily Mirror once said of the Sex Pistols: they are number one in a field of one.



Mana Acoustics

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Martin Colloms, HiFi News, July '90

I haven't experienced such a startling improvement through changing a single component for a very long time.

Paul Messenger, HiFi Choice, June '90

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Dynamics expanded, low level information was scavenged from inaudibility, and timing, speed and precision nothing less than a substantial leap forward.

Malcolm Steward, Audiophile with Hi-Fi Answers, Dec '90

The Mana Reference Sound table deserves each and every superlative that's been heaped upon it.

Malcolm Steward, High Fidelity, Dec '90

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Alan Sircom

What we are dealing with here is the world's finest midi system; a midi system for Aston-Martin owners, no less. I say 'system' because I feel that the Meridian should be looked upon as a complete package, including 602 transport, 603 pre-amplifier, 607 Analogue to Digital converter et al. This is no simple 'loudspeaker'; to call the D6000 a mere loudspeaker is rather like calling the Space Shuttle a microlight.

Everything about Meridian's system suggests class; from the sleek lines of the loudspeaker, to the oversized remote control. It would look a little out of place in the average semi-detached suburban house, but owners of Docklands flats should apply immediately. The mirrored finish and sheer size of the loudspeaker fit in well with Le Corbusier sofas and the Modernist look so favoured by the people who are likely to buy this system.

In some circles, the sound of a system like this is secondary to its visual appeal and its ease of use. This is not a conventional, hair-shirt hi-fi design, awkward to use but wonderful to listen to. One should expect good sound from so expensive a product, particularly when coming from a company like Meridian, but this is provided in spite of the avant-garde appearance.

Astonishing

The D6000 more than excels in sound quality; it can astonish. The system has little to criticise about it, but much to discuss. By common agreement, everyone on the magazine felt that the treble could be a little bright, and at times remorseless, especially on some early digital remastering projects. There is a 'tilt' control that cuts treble. This can eradicate a fair amount of the excess brightness. In some sparsely furnished rooms the D6000 could still be overpowering. In addition, we felt that imaging, whilst satisfactory, was not the D6000's strongest point. They constructed a soundstage that was three dimensional, but placement of individual instruments within that soundstage was a touch vague.

Aside from this, the most common words on my note pad are 'controlled', 'detailed' and 'dramatic'. The dynamic range that these loudspeakers cover is little short of astonishing. When a powerful passage is being played, the quieter parts do not lose themselves in the melee. Few systems I have heard can manage this with the confidence of the D6000s. Citing specific tracks, on 'Out Of The Blue (Into The Fire)' from The The's 'Infected' CD, the subtle layering of guitar and synthesizer usually disappears into the overpowering drum track midway through the song. On the D6000, this drum, while still as powerful as ever, was carefully delineated from the other instruments, making the guitar and synth. easier to follow.

Listening to 'Down in the Tube Station at Midnight' from The Jam's

'Compact Snap' CD gave an insight into how mighty the D6000 could be. The opening, where the sound of the train usually swamps the children's voices, was well controlled. So was a very definite heartbeat playing against the bands rhythm. Within a later break in the record, a dramatic snare drum is grossly over recorded. This moved all bar the foundations of the Hi-Fi World house, but never once disturbed the remainder of the recording. Additionally, it highlighted the brightness in the metal-domed treble unit, which manifested itself as a spitty, sibilant air about Paul Weller's voice and made the cymbal sound splashy. By careful tweaking of the filtering controls, this was minimised, but it was still noticeable.

An area in which the D6000 scores highly is information retrieval. Every disc played seemed to have a staggering amount of information within it. All areas, seemingly from 20Hz upwards, were handled with both pace and control. The system had a good sense of rhythm and timing, without over-emphasising this aspect of a performance.

LP Friendly

What surprised everyone within the walls of Hi-Fi World was the way the system performed with LP. I had expected a mediocre phono input stage - adequate, but without any real finesse. Meridian are very involved in digital techniques, as the D6000 testifies, suggesting LP might receive perfunctory treatment. What nobody expected was a quiet, graceful disc stage that was refined and precise. To use a great hi-fi cliché: it did not get in the way of the music.

Despite the loudspeaker system causing slight feedback problems in our particular set up, the Meridian 603 pre-amplifier and 607 analogue to digital converter were more than capable of portraying both the character of the Linn we used as well as the music that was being played. The feedback was not a fault of either the Meridian or the Linn, but purely due to the close proximity of the bass driver to the turntable.

Each person who listened to the D6000 system had their own reservations about it. While we all felt that its treble was too intense for most ears, other areas of the loudspeaker evoked different reactions from each listener. Some felt that its dynamic range was unrealistically large; others felt that there was a distinct lack of imagery, while still more suggested that it was

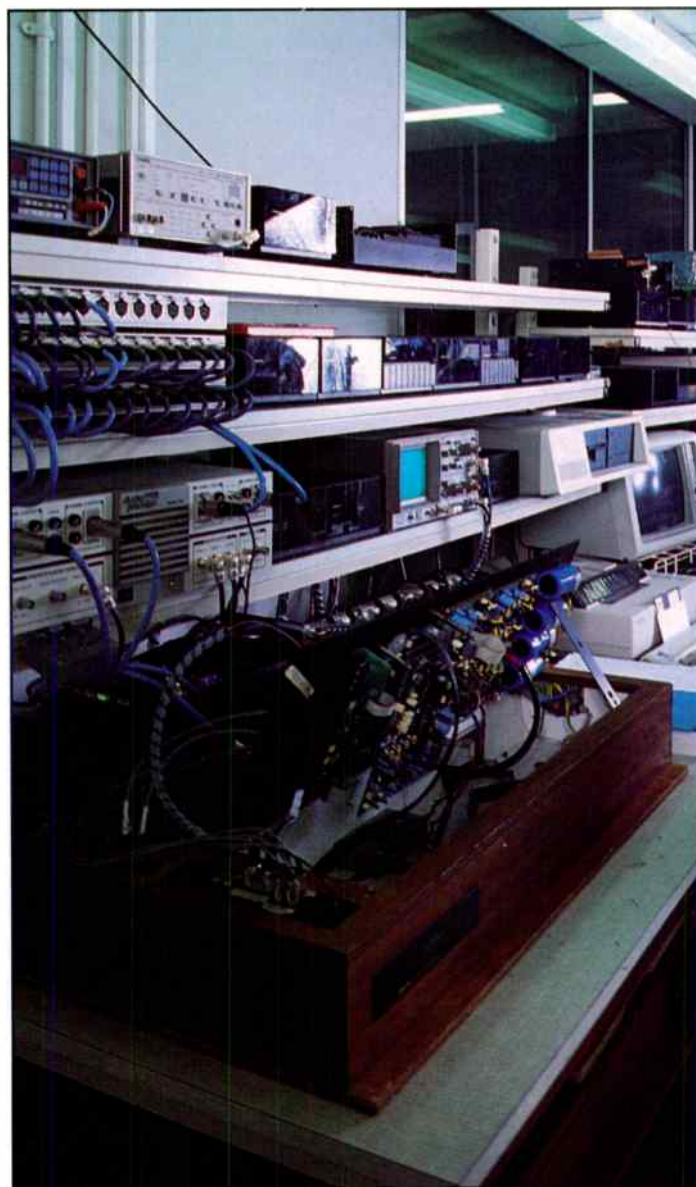
too brash sounding.

This started an interesting discussion about true accuracy. A few of the discs played were almost unlistenable, but have sounded at least tolerable on other equipment. This poses the question: 'why?' Bob Stuart of Meridian suggested that because the D6000 is totally accurate, it is showing up the poor quality of the recordings. This precludes their enjoyment. Regardless of how 'accurate' a system appears ('accuracy' and 'fidelity' are fundamentally notional concepts), one that misses out on enjoyment takes what I feel to be a contentious stance.

However, it is a bold venture for Meridian to produce a digital active loudspeaker, one that stays within the digital domain so far into the hi-fi chain. I feel that it should be very successful - it certainly deserves to be, from a technological stand-point.

The joy of flagship systems such as this is that they provide a glimpse of Tomorrow's World technology in use today. It may well be beyond the pocket of average mortals at present. In future, many of the innovations seen here will probably filter down to less stratospheric products, which we can all afford and enjoy ●

In the foreground on a test rig, lie the complex electronic circuits of the D6000.



Revox revival

We bring a Revox G36 valve tape recorder back to life.

● Richard Kelly relates its history.

● Phillip Pimblott renovates our second hand sample.

● Noel Keywood measures its performance

Our renovated G36, ready for a new life

Richard Kelly

I have vague recollections from my boyhood of grey tape recorders in the science wing of my school. I can clearly recall thinking how chunky and well engineered they were - and who was this Willi Studer fellow?

Well, now I'm a bit wiser - because I know who Willi Studer is! He was responsible for producing much of the machinery once found in recording studios and to quite an extent is still to be found there. The tape decks in my school were of the Revox 36-series. I know not which models they were, but they gave me my first taste of high quality engineering - and from that time on I was determined to own one.

The first model was the A36 launched in 1954, followed by the B36 a year later. It was not until 1960 that the first stereo model, the D36 was introduced. Again, a year later this was superseded by the improved E36, which was then followed by the F36 in 1962. The last of the series - and the best of the bunch - was released in 1964, and this is the beast that I rescued from obscurity in my friend's warehouse - an Aladdin's cave that has supplied many pieces of equipment for my system.

Unfortunately, a Revox G36 holds its price over the years, providing that it has been well maintained; no amount of haggling could lower the price below £250. Having said that, I must point out that the G36 I was after was an absolutely mint example. It had lain unused in a huge, custom built radio-gram, apparently only installed because the owner wanted the full bees knees system of the day. Close inspection suggested it had seen little more use than merely demonstration by the salesperson of the time!

In standard specification, the Revox G36 is a fine machine, but with improvements and developments that have been bestowed upon the model by various engineers in studios around the world, its performance has been uplifted into the realms of high, high-end, but at a cost that is not prohibitive.

Having secured said machine, I got onto the phone to F.W.O. Bauch for their advice. They don't service or repair these old valve models any more and after much conferring between the engineers they recommended that I should contact Audio Laboratories (Leeds) and ask for Phil Pimblott. This I duly did and was delighted to find that not only was he familiar with the G36, but he was also clued up on modifications to the heads and signal path.

Leeds being in the land of my boyhood, a return visit seemed like a nice idea. The Revox is a big, awkward beast and there was some trepidation about consigning it to carriers. I went down to Kings Cross to catch the Inter-City Sleeper, but she wasn't there so I caught the train to Leeds instead! I spent a couple of joyful hours on one of BR's finest wondering how you can get a weekend in Paris for what they had stung me for!

Immaculate

Arriving at Audio Laboratories I was greeted by Phil Pimblott and his right hand man, Roy Walker. They apologised for the mess and offered me tea. I'm not sure, but I think they were having me on. The place was absolutely immaculate, as far as I could see. Not a single chopped out capacitor or resistor was lying around on the floor or on the benches, no loose wires were hanging around and everything that was not in use was in its allocated place. In fact, this place seemed to be nothing short of a Private Hospital Operating Theatre for your dying hi-fi - and no, they didn't know I was coming!. This alone gave me a great sense of confidence in their operation. I'm a great believer in the adage of "tidy desk, tidy mind". Audio Laboratories are authorised by many manufacturers as a service centre, namely Revox, JBL, Quad, Aiwa, Akai, Pioneer, Nakamichi, Marantz, Yamaha, Sansui, Teac and Tascam.

Basically they are prepared to handle any job that you care to throw at them, and if they feel that they can't help, they will surely point you in the right direction. Sadly, this might mean that it's best if you by-pass the municipal rubbish dump! It is unfortunate, but some items are not worth the likely repair cost. I can only say that if you have a sick piece of hi-fi, then Dr Pimblott's surgery is one of the best places I have seen for a speedy recovery to good health. Our Revox came back gleaming and had actually been upgraded in performance to meet modern standards. It will probably see more use in the next few years than it has in the last twenty five. That's a tribute to Revox, Willi Studer and people who know about such things and care, like Phil Pimblott ●





Richard with the G36 at Kings Cross Station, waiting for the train to Leeds.

Philip Pimblott

The Revox '36' series of open reel tape recorders ended with the G model I renovated for this report. It is an all-valve design, except for the power supply. The transport is made by Willi Studer of Switzerland and uses three motors to provide two speeds, 3.75ips and 7.5ips (inches per second linear tape speed). Three heads are fitted, so off-tape monitoring is possible.

This stereo recorder is a remarkable design. Weighing, cased, getting on for half a hundredweight, the unit is based on a heavy gauge, double chassis construction, the upper chassis being the mechanical department and the lower chassis housing the 12-valve electronics and solid state power supply.

The transport mechanics feature a strong and rigid arrangement of independent spooling motors, tape guides, pressure roller assembly and direct drive capstan motor. Bolted to this upper chassis there are also twin differential band-brakes, a detachable headblock, the main control switchbank and a pair of V.U. meters.

Of special interest are the three motors. All are of the celebrated outer-rotor design from Papst. They combine smooth power with rugged build. The two spooling motors are identical, but the capstan motor is anything but conventional. Although a split-phase design, it has two speeds and direct drive and speed control of an AC motor is no doddle.

Poles

The potential difficulty is elegantly overcome by designing the motor as a twelve pole unit, switchable to six pole format! On a 50Hz supply a twelve pole motor will run at 500 r.p.m. and a six

pole motor at 1,000 r.p.m. Bingo! Two speeds, one exactly double the other - and no belts, gears or idlers in sight. The design tricks don't end here, however. Mounted co-axially with its shaft and coupled to it via special compliant membranes is a balanced annular flywheel, the couplings and coupled mass forming an effective low-pass filter, leading to exemplary flutter characteristics.

Also solenoid operated are the twin band-brakes, arranged to give a differential braking effect, the 'trailing' brake always doing the hardest work in order to maintain tape tension whilst decelerating.

good common sense design and proven circuitry

Sense and Circuitry

Sporting twelve modern B9A valves, the electronic section is an area of good common sense design and proven circuitry. Revox used high quality low-noise resistors, close tolerance equalisation capacitors, a push-pull bias oscillator and a push-pull (sadly, mono) monitor amplifier.

This design is over a quarter of a century old and some aspects may seem, well, odd. For example, no true Tape/Source monitoring is possible even though this is a 3-head design. The V.U. meters will not monitor the playback signal. This was all quite normal for the time, in what was essentially a sophisti-

cated domestic tape recorder. It makes no difference to performance, but you do have to learn how to drive it.

So much for the overview of Revox's '36' series tape recorder. The specific model sent to me by Hi-Fi World was, fortunately, a late Series 2 chassis in very good order. I was asked to restore the machine to good order, and bring it up to, and if possible beyond, original specification.

As with all high-voltage equipment, great personal care has to be taken when working on it. We also must remember to ensure that the equipment doesn't damage itself as well. Some basic safety checks before any power is applied are therefore mandatory. We did a 1KV flash test from the (shorted together) mains cable to the machine's metal chassis. All was well here so resistance checks were then made on the motor-start and switch suppression capacitors. Any shorts here could be disastrous but again, all was OK. A few more resistance measurements within the electronics convinced us that, fortunately, there were no short circuit capacitors.

As far as was known, this recorder hadn't been used for a long time. There was a distinct chance therefore that some of the electrochemical capacitors inside might have deteriorated and they might not re-form. If this happened, large currents would flow through the capacitors causing them to give off gas and eventually explode. When one of these things explodes it's not only a nerve jarring event but it also splatters a goeey, corrosive paste all over the nearby innards, as well as plastering them with shredded aluminium foil! This is definitely something to be avoided and the trick is to power-up the equipment in gentle stages, pausing to check the leakage current as you go.

Checks

Some rapid voltage checks were made around all relevant valve pins, revealing a few suspicious areas but nothing disastrous. The machine was then de-powered and left to stand for a few hours. The valves themselves looked little used but all were found to be fully operational.

Whilst the valves were out the pins were cleaned and a quick dab of cleaning fluid applied to each valve socket. This was a convenient time also (by now the capacitors had completely discharged) to take a few more resistance measurements on the anode load, screen feed and cathode resistors to see if anything could account for the voltage discrepancies we had noted earlier. Nothing was found amiss in this area but a resistor in the H.T. section had risen (the G36 has no less than five different feeds of high voltage from its power supply).

This problem overcome, it was now time to check the critical bits; the values of the capacitors in the record and playback equalizer circuits. All seemed well.

At around this point it was noted that the speed change and record mode push buttons seemed unduly stiff. These buttons operate rotary-type wafer switches via a couple of push rods. Although the switches are visible, they are not easy to work on in-situ, so they were unscrewed from the chassis for better access. Both switches had a paste of dust and old grease in them which was duly removed with lubricated solvents.

The action was too smooth in fact! This G36 had a grubby little ball bearing about 3mm diameter Sellotaped to its head cover. This had puzzled us at first, but now the penny dropped! The ball bearing had fallen out of the switch's index mechanism, thus giving the unwanted no-click feel. A few moments of fiddling and cursing saw the ball back in its place and its retainer firmly in position.

With these below stairs dramas over, it was time to revisit the top deck and attend to the heads.

Heads

The G36 has a removable headplate from which are suspended the independent erase, record and playback heads. Some years ago Willi Studer, Swiss manufacturers of the transport mechanism and the heads, decided to

re-design those for the G36, following the general form of current A77/B77/PR99 heads. Magnetic materials, winding and manufacturing techniques have advanced enormously since the original designs, so fitting new heads to the G36 brings it up to modern specification.

The new heads were fitted and mechanically aligned. This is a fiddly process as they are all adjustable for height, zenith, yaw (wrap) and azimuth. The first two parameters can be set using gauges on an inert machine. Wrap can be set by eye on the erase head, but wrap and azimuth for the record and play heads can only be set with the machine in operation.

With this task completed, the tape guides were meticulously cleaned and the end-of-tape (e.o.t.) switch looked at. During its production run the G36 has had three different sorts of 'e.o.t.' sensor: a photo-electric trip built into the right hand guide pillar, a mechanical lever plus microswitch and this present arrangement, a sensing lever operating a (frankly) Heath Robinson switch made from thin, springy, goldplated phosphor-bronze wire. Adjustment is a matter of bending and tensioning the thing in various contours until it operates satisfactorily.

With valves replaced and pinch roller squeaky clean we were ready for the big switch-on, but not before removing all tapes from the vicinity and thoroughly de-gaussing the complete tape path.

After all the work, the big moment arrived: brake tensions were OK, pinch roller pressure was OK, a blank tape was on the machine and it had been quietly warming up for ten minutes. A firm push on the start button and we were off!

Calibration

First the e.o.t. device needed a lot of adjustment, accompanied by appropriate expletives. The playback calibration tape was on next, so that azimuth and wrap angles of the playback head could be precisely set. There is no adjustment as such for output level, nor indeed any provision for doing so. This recorder was designed for domestic use, where precise levels were not held to be vital. However, fine adjustment of level and balance is possible by component selection but this particular recorder did not need it.

After level setting came replay equalization checks. Again, there is no provision except by component changing for adjusting the replay equalization, but again this particular G36 with its new heads gave no trouble. It was necessary though to remove the original loading capacitors (C40 and C49) and to fit 220Kohm damping resistors across the head.

Changing to a blank tape of the type to be used for recording, the first task was to adjust the record head's wrap and azimuth. When adjusting the play head we used a calibration tape as our measuring tool. The record head has then to be adjusted to give optimum results on playback, which is why the

playback head must be perfectly set initially.

Final calibration of these machines to original specification is fairly straightforward. The original specification is well within the machine's capabilities; the bias is adjustable and it's not difficult to achieve a good, wide frequency response. Neither is it difficult to achieve the specified distortion level.

Tantalisingly, this machine can do yet greater things with good modern tape, than its original designers ever envisaged. The G36 has been extensively re-worked, most notably in the U.S.A. Here in the U.K., Tim De Paravicini has rebuilt many of these recorders, removing the unwanted speaker drive amplifier, building in an improved record amplifier and line output stages, incorporating line/tape monitor switching, re-cabling with high-definition cable, replacing significant signal-carrying resistors and capacitors with Holco and Wondercap components and fitting new input and output sockets. All this adds up to a tidy sum, but the G36 offers a unique platform for such work.

Buying Tips

First of all make sure that a likely candidate is a G36, and not an earlier model. At first glance in the back of a dusty secondhand shop it may be possible to make a mistake here. Earlier models had a magic eye level indicator, which should give the game away. The real problem is, however, that earlier models only take 10" reels, not the now standard 10.5in NAB spool.

It's not likely that you'll be able to delve inside the unit but at least ask for a demo, and check for yourself the feel and action of the main control switchbank. If any of the switches do not work, forget it. Check the e.o.t. sensor. If it doesn't cancel the main switchbank first time, forget it. Both of these tests, if negative, could indicate a problem with the switchbank. New switchbanks are difficult to find and even if you could get one, replacement takes at least a couple of days of unpleasant and costly work.

Listen to the motors. If they are rattling or grating look on the machine with suspicion. In fact, use a screwdriver as a listening rod and put it as near as you can to the top of the capstan bearing. If that seems to be where the rattle's coming from, forget it.

There are many good G36's still about. If the sweet sound of yesteryear appeals, then a G36 could make you very happy ●

Warning

Underneath the plastic top plate of the G36 you will find a small leaf switch. It is immediately behind the headblock, just about in the centre of everything. Don't touch it. It's got the mains on it and it bites. If you are handling the machine uncased the whole of the left hand side can bite. There's mains on the contacts of the main switchbank and there's nearly 300v DC on the tags of the big smoothing capacitors which are, of course, facing outwards waiting for you to grab them!

Typical Spares Prices

(supplies are not guaranteed)

Record or Playback Head	£120
Erase head	£66
Pinch roller	£38
Brake band	£8
" drum	£20
Main switch bank	£120
Spooling motor	£101
Capstan motor	£101

Noel Keywood

The crash of levers and whirring of great reels of tape is an experience I left behind twenty five years ago. Operating the Revox G36 open reel tape recorder jolted my memory: I once owned a German Korting valve tape recorder, bought second hand for me by my father. It lasted just months before the modifications started!

Similarly, the G36 proved to be a machine that needs understanding and some effort if it is to give of its best. Unlike our Leak Troughline tuner, which anyone can buy and use with fantastic results, the G36 is a specialised and difficult piece of equipment to operate successfully. I wondered whether ours had seen so little use because of this. In good condition and well aligned, this open reel recorder can provide superb results - and at reasonable cost. Apparently, it is now being sought after by knowledgeable studios in their quest for a simple but effective valve tape recorder capable of offering a professional performance, with valve standards of clarity and sweetness.

As Richard Kelly explains, our machine was expertly restored and calibrated by Philip Pimblott of Audio Laboratories (Leeds). Philip is quite a tape expert, fluent in matters like record and replay equalisation accuracy. I was impressed by his detailed appreciation and analysis of the G36. Owners or prospective owners would be wise to use his services, since tape recorders are a specialised subject beyond the abilities of normal repair centres. Our Revox was highly specialised in places too, I was to find out!

I fitted the machine into a case and bought a new (7in) reel of Maxell XL-I 35-90B tape for £7.50. You tend to get blank stares instead of blank tape when asking for open reels these days! I found Hi-Fi Care (Tel: 071-637-8911) in Tottenham Court Road, London kept a stock of tapes, plus blank reels. The G36 will take 10.5in NAB reels or normal 7in reels.

Two Track

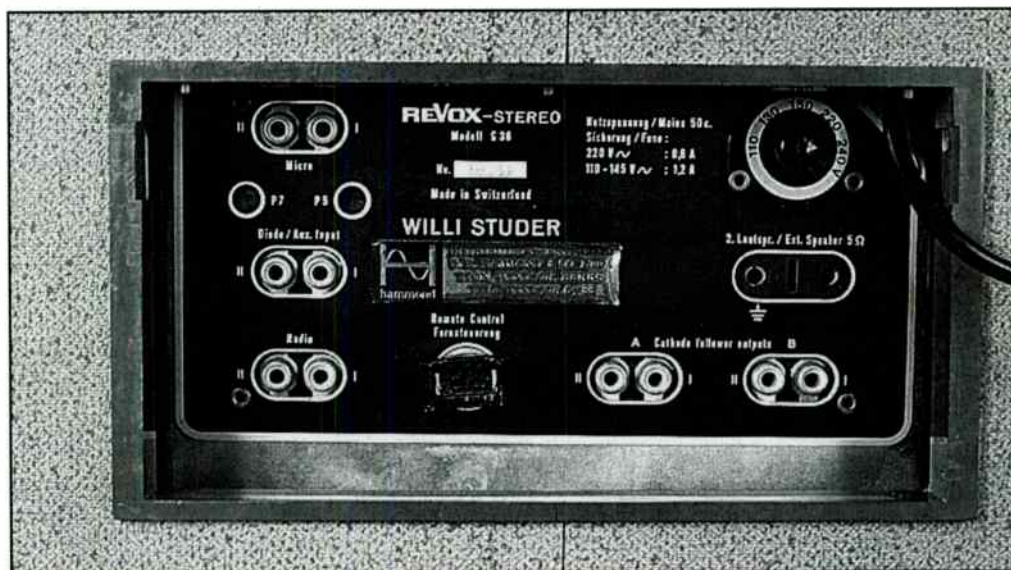
Our machine was a two track recorder, which means it lays down two tracks for stereo across the full tape width. Run at maximum speed of 7.5ips, this gives 45 minutes of playing time. It can be doubled by using 10.5in reels or by changing speed to 3.75ips, the latter resulting in reduced sound quality. Four track machines are also available that offer double the playing time, with the inconvenience of turning the tape over but, again, they suffer reduced audio quality. We decided at the outset to try and get the best quality achievable, hence our choice of twin track run at full speed. This proved wise, since without noise reduction there isn't much dynamic range to spare.

Full technical details of the G36 are to be found in the Measured Performance section. Providing bias is finely tuned to match a tape in, frequency

response measures flat within tight 1dB limits from 35Hz to 20kHz, which is fine for professional recording purposes.

For optimum performance, bias tuning is necessary, which is why I feel the G36 is not easy to exploit to the full unless you know a thing or two about tape recorders. Luckily, tuning is relatively straightforward: the plastic base is removed by undoing four screws, revealing the left and right

‘ a simple but effective tape recorder capable of offering a professional performance, with valve standards of clarity and sweetness.



channel bias adjuster pots. They are easy to get at with the recorder standing upright and, this being a three head machine, adjustment is best carried out 'on the fly', whilst in record mode. A simple audio oscillator and meter are all that's needed in the way of tools. Just remember the valves have up to 265 volts on them!

I found that with XL-I tape our machine would hit +9 above 0VU for the industry standard 3% distortion limit, but the meters only go up to +3, leaving 6dB of usable headroom out of the meter's range. The 0VU point can be easily reset to compensate for this however, according to the tape being used. Revox recommend 0VU is set -7dB below the 3% THD limit to account for meter ballistics.

All this - plus a lot more! - is in the service manual. Owners should have one, or use the services of Revox (UK) or Phil Pimblott, who is recommended by them. Revox prefer Phil to work on the G36, by the way, because he is something of a valve expert. In addition,

Tim de Paravicini of Esoteric Audio Research also rebuilds and modifies the G36, for £200 to £400. There is a six to eight week delay for the G36 modifications, because of their complexity.

With hiss at -57dB below 0VU when using either Maxell XL-I or TDK LX-35, our G36 with its modern heads had a dynamic range of 66dB in all. That's almost the same amount of hiss as produced by a cassette deck with Dolby B noise reduction. As such, hiss can be heard, but it is faint.

There was no problem in getting highs onto tape: treble level measured only -2dB less at 10kHz than at 300Hz, meaning it offers clean, clear treble.

Speed stability proved exceptionally good too and I suspect this is where the G36 in particular scores over other models of the day. All the same, the simple, heavy mechanical transport controls seem archaic, as does the mechanical tape counter. This recorder has a fine Studer transport, with independent reel motors and a direct drive capstan motor. Fast reeling gets quite frightening. As a spool empties, it

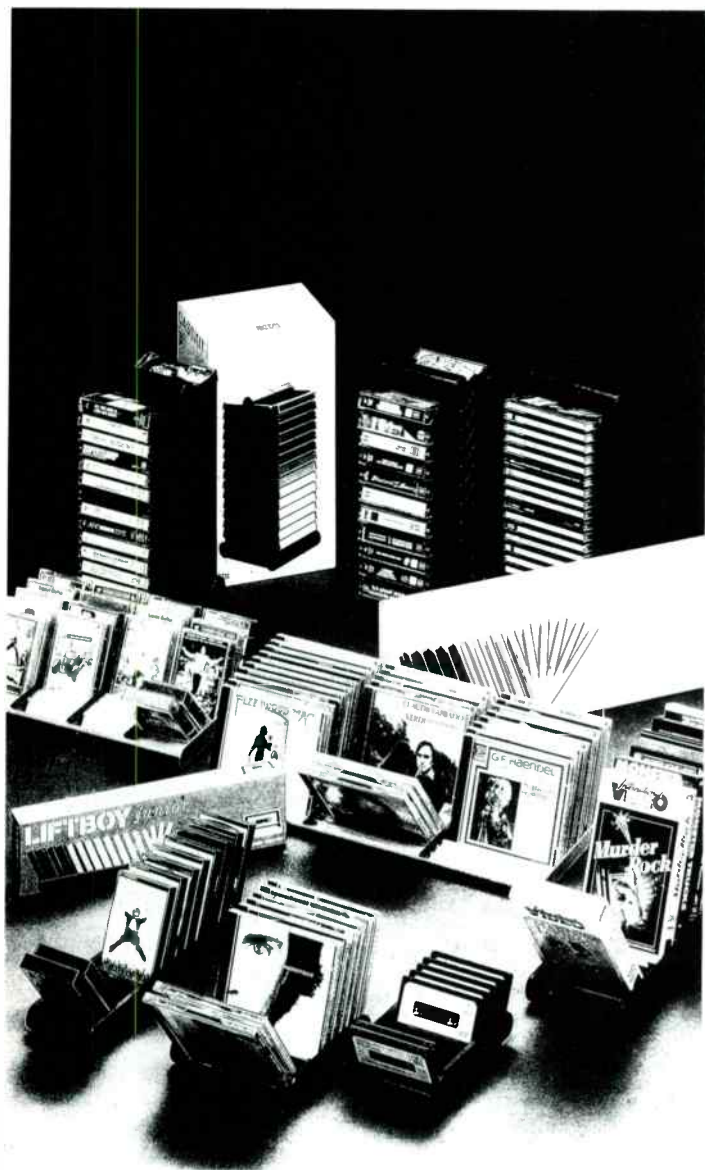
speeds up to reach a frantic scream. I found myself stopping the transport before the end of a tape, just to ensure the tape didn't whip through the head block assembly like a cable parting under strain!

In use, two weaknesses quickly made themselves apparent. Most alarming was an immediately obvious lack of bass in recordings, not indicated by measurement. I guessed this was due to amplifier mismatching - and I was right. The 'cathode follower' outputs must see a minimum load impedance of 100kohm, a very high figure for modern transistor amplifiers. To get around this problem I inserted 100k series buffer resistors in each output before the feed went to our resident Deltec amplifier. This restored the bass, at the expense of level. Luckily, the Deltec was sensitive enough to compensate.

There is a loudspeaker amplifier within the G36 and some models have a monitoring loudspeaker on-board. Power is 6watts into 5ohms. For best quality, the output from the power

The rear connecting panel complete with inscriptions for the valve age. The 'cathode follower' output (see text) is at the right.


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A black and white advertisement for a Neat hi-fi speaker. The image shows a tall, rectangular speaker on a dark, cylindrical stand. The speaker has a large circular driver and a smaller tweeter at the top. The text is arranged in a clean, modern layout, with the brand name 'neat' in a large, lowercase serif font. Below it, the words 'PETITE' and 'A Little Giant' are written in a smaller, uppercase sans-serif font. At the bottom, the company name 'neat hi-fi' is written in a lowercase serif font, followed by the address and phone number.

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amplifier should not be used to get around the matching problem.

Another weakness was lack of full erasure with XL-I. Phil Pimblott warned me of this; I heard all sorts of funny sounds coming off tape after one pass. A modern high coercivity tape needs at least two passes for full erasure, which is a lengthy business. Bulk erasure is best used when a perfectly silent tape is required.

After sorting out the niggles and finely tuning the bias on both channels I recorded a number of our best Compact Discs. These offer quite a challenge - and to make matters worse I used TDL Studio 4 loudspeakers which are capable of reproducing deep bass. The main attribute of this recorder proved to be its superbly clear, natural and open sounding mid-band. Why studios are beginning to value it I can understand: modern transistor amplifiers still do not commonly sound so spacious and natural, which suggests that

modern tape recorders are compromised by their electronics. I should say at this point that in my view, this is due mainly to unsatisfactory design. Solid state can work well, but it takes more effort and knowledge than is often applied.

I heard some blemishes at spectrum extremes, but they were subjectively benign. Deep bass is slightly curtailed and bass definition blurred by a small amount. In spite of the very high measured treble overload figures, I also detected some coarsening and splashing of treble, at least when using high recording levels (necessary to minimise hiss). In spite of this, the G36 provides excellent recording quality. There is magic in its sound, attributable to the use of a high quality transport, fine tape heads and of course, simple valve amplifiers. Anyone who wants to make superb live recordings in terms of spaciousness and clarity should consider a Revox G36 ●

For Revox G36 service and repair, contact:

Philip Pimblott,
Audio Laboratories (Leeds),
3 Kildare Terrace,
Whitehall Road,
Leeds LS12 1DB.
Tel: 0532 440378

Revox is imported by:
F.W.O. Bauch Ltd.,
49 Theobald Street,
Borehamwood, Herts. WD6 4RZ.
Tel: 081 953 0091

Revox G36 improvements can be carried out by
Tim De Paravicini,
Esoteric Audio Research,
Unit 11, Stukeley Meadows
Industrial Estate,
Huntingdon, PE18 6ED.
Tel: 04804 53791

Measured Performance

All performance figures relate to our two track model (Serial No 38259 - prior to super-sonic response peak mods.), used at 7.5ips with a new reel of Maxell XL-I 35-90B back coated ferric tape, for which bias had been carefully set.

Frequency response can be seen in the high resolution analysis. It can be adjusted to flatness from 35Hz to 20kHz within 1dB limits, which is an excellent performance. Just a small movement on either bias adjuster pot. produces a large change in treble output, so there is plenty of range, but care must be taken. Fall off in output at response extremes is rapid, so the -3dB frequency response limits are little better than the ones I quote.

Revox recommend bias is used to adjust frequency response, even though bias should ideally be preset and record equalisation changed. After bias adjustment was completed, MOL315 was +9dB and SAT10k +7dB above nominal 0VU, giving a 2dB overdrop at high frequencies. This suggests bias is a bit low for optimal exploitation of the tape's properties, somewhere around 6dB overdrop being common. However, there is no mention of record equalisation adjustment and I doubt whether enough high frequency gain is available in the record amps to give the boost that increased bias would demand. As matters stand, however, the G36 will accept very strong treble signals without suffering tape saturation. This can be valuable with close miked Rock and even strong vocals.

Revox recommend 0VU is set -7dB below MOL315 to account for record level meter ballistics. Our machine was -9dB below. Hiss measured -57dB down, giving a good dynamic range of 66dB in all. There was some measured hum, probably due to imperfect shielding in our old case (yet to be checked!). However, in critical listening tests absolutely no hum was heard. Subjectively, hiss was slight and had that smooth, unobtrusive quality that comes from tape moving smoothly over good heads.

Channel separation was satisfactory, being -41dB at 1kHz and -35dB at 10kHz. These are not wonderful figures but imaging was unaffected. Crosstalk in fact only

lessens stage width and it wasn't bad enough to compromise the G36 subjectively in this respect.

I noticed that tape guidance was imprecise when fast reeling. The tape rode up and down, causing edge damage. This resulted in some slight low rate cyclic drift, a little wow and even flutter. Using a new tape (Maxell XL-I, which is back coated) improved matters, drift becoming unmeasurable (less than 0.02%), with wow and flutter lessening appreciably, as the chart shows. These are extremely low values, giving an overall DIN weighted wow and flutter figure of just 0.03%. Obviously, high quality recordings should be made on new tapes. Luckily, at £7.50 for a 45 minute reel, cost is hardly prohibitive.

	damaged tape	new tape
Drift	0.1	0.02
Wow	0.03	0.015
Flutter	0.18	0.12

Fast reeling caused edge damage to the tape, which affected speed stability slightly. A new tape should be used for best results.

The speed stability analysis demonstrates negligible drift by the sharpness of the test tone peak at right. At either side are 2Hz (FM) sidebands caused by the pinchwheel and, further out and clearly visible, 17Hz sidebands caused by the motor capstan. The latter are primarily responsible for measured flutter. These are very good figures; in use the G36 gives a clean, stable sound.

Output is 700mV (0VU) into a load higher than 100kohms. Low loads result in bass loss and must be avoided. Various reactive elements are in the output line (capacitor, bias trap, etc) so inputs should be resistive or buffer resistors must be employed.

Inputs are very sensitive, 'diode' needing just 3mV (adjustable down to 50mV, into 47kohm), 'radio' 20mV (into 1Mohm) and mic. 3mV. The handbook states that low impedance dynamic microphones must be used with transformers. I suspect that modern mics are best connected through their own low noise preamplifiers to the 'radio' input.

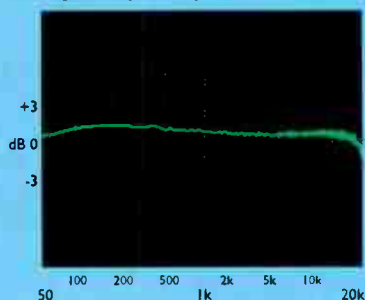
In most areas the G36 puts up a very

good performance by modern standards. Ours, which had been expertly serviced, exceeded all the manufacturer's quoted performance figures. Prospective owners only need bear in mind that it takes expert attention to keep a deck like this in such good form over a long period ●

Test Results

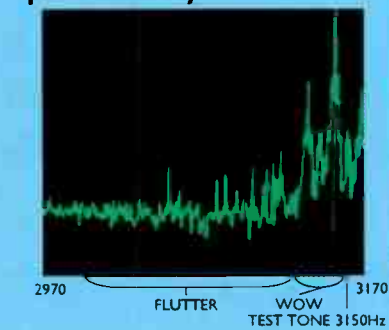
Frequency response	35Hz-20kHz
Separation (1kHz)	45dB
Hiss (below 0VU as set)	-57dB
Dynamic range	66dB
Speed variations (DIN total)	0.03%
Drift	unmeasurable
Wow	0.03%
Flutter	0.12%
MOL/SAT	315/10k
	+9dB/+7dB
Output	700mV into 100kohms
Input	3mV-50mV

Frequency Response

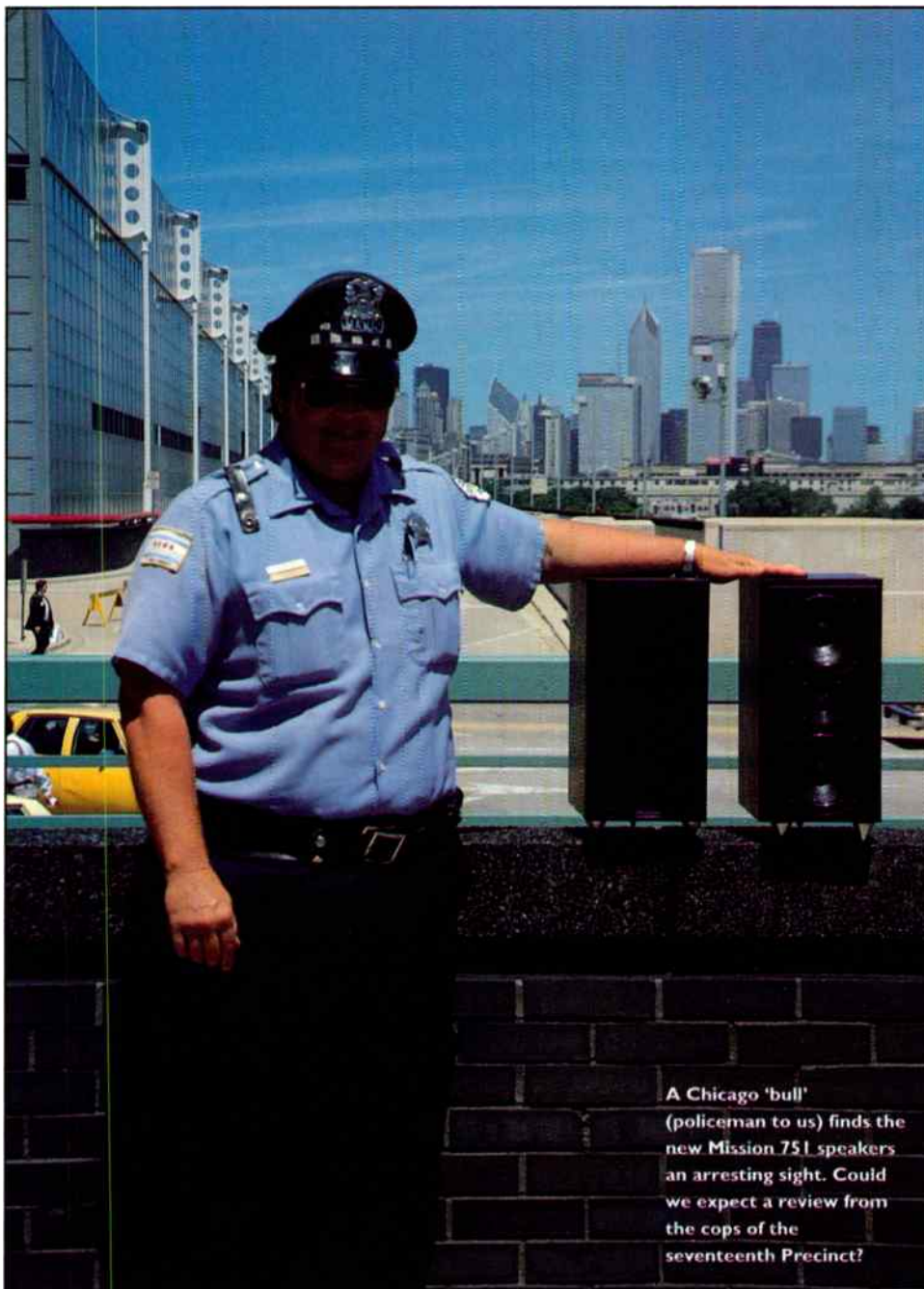


Flat frequency response up to 20kHz

Speed Stability



Capstan flutter spikes at 17Hz



A Chicago 'bull' (policeman to us) finds the new Mission 751 speakers an arresting sight. Could we expect a review from the cops of the seventeenth Precinct?

our party there refused vehemently, saying that he had no wish to shuffle off his mortal coil that particular evening. I spoke to one or two Chicago residents about this melodramatic reaction and was greeted with knowing looks and tales of all manner of horrors. But I've heard people talk about areas of London with an equally cautious tenor. Then I had dinner with another local who told me "you wouldn't really want to go to the south side... and neither would I". Now when a W.A.S.P. gives you a warning like that you have every right to suspect that he's just trying to impress you with his sus and street-cred: when a six-foot 'bro' who makes Mike Tyson look like a faggot issues the same warning you know he's not kidding. I took a rain-check on that excursion.

So I was left with the hi-fi show for entertainment. And it provided some amusing moments, two of which came courtesy of Mission Electronics. The first was being greeted by Mark MacDonald, the company's Canadian-based sales manager, the only man at the show who could moon-walk convincingly to the music of demonstration favourites, Dire Straits. His personal taste in music is,

“Visiting Chicago, with attending an electronics show as one's prime concern, seems a virtually philistine pursuit in light of the city's other attractions

Chicago Blues

Chicago, the home of the Blues, hosts the June Consumer Electronics Show. Malcolm Steward does the rounds of the exhibits.

Chicago is a wonderful town. Cosmopolitan, cultured, and cradling a conglomeration of characterful and classy architecture. And, further to its roster of credit-worthy "c's"... it has a cluster of clubs! Unfortunately, this time round I managed to hit all the right ones on all the wrong nights. Never mind, there was always the C.E.S. to occupy the non-partying hours!

Visiting Chicago with attending an electronics show as one's prime concern seems a virtually philistine pursuit in light of the city's other attractions: the aforementioned nighteries, great restaurants, Orchestra Hall (home of the Chicago Symphony currently under the baton of Sir George Solti), the Historical Society, blues haunts like Kingston Mines and Buddy Guy's Legends, and jazz venues like the famous Cotton Club.

I never managed to get to the latter: it's located on Chicago's south side, a notorious district immortalised by Jim Croce in the song "Bad Bad Leroy Brown". The taxi driver we asked to take

thankfully, much better, and he proved that the way to fill a large demonstration room quickly was not to play the usual hackneyed roster of 'impressive' discs. When there was a temporary lull in passing trade he put the Stereo MCs into the CD player and started to shake the walls of the McCormick Hotel with hardcore rap through the fridge-freezer lookalike Mission 767 speakers: as if by magic the room filled rapidly with inquisitive visitors.

However, I'd called in to see their newest speaker which was being launched at the show, the 751. It's a grown-up version of the successful 760, having a larger cabinet and two bass-mid drivers, as you can see in the photograph where they're being guarded by one of Chicago's finest. Sales Director, Dave Marchant demonstrated his flair as a publicist by organising for me to photograph the speakers with the Chicago skyline as a background. While I set up the picture, he disappeared to return minutes later with

an officer of the law he'd managed to coerce into posing with the new model "to add further local colour and character to the shot". Anybody else would have got themselves arrested. As he managed to retain his liberty he was able to tell me about Mission's hottest news, the company's intention to be the first British specialist manufacturer to release a recordable Compact Disc player. It is hoped to ship the first machines - non copy-protected professional units - before the end of the year. Subsequent consumer players will feature SCMS.

Linn Develop Digital

Linn Products were quietly being digital, privately demonstrating a CD player and D/A convertor, but they were at pains to point out that this was only a development project at present, nothing more. The message to anyone who fancies owning a Linn CD machine was basically not to hold their breath because the company couldn't say when or in what form the player would be going into production. However, there was a range of new products heading for the shops. A Basic LP12, with no Valhalla or Lingo circuitry, just a capacitor supply to the motor, should be on sale towards the end of the summer. A new, smaller power amplifier, the LK100, is promised for September when the Kremlin tuner should also surface. Also on display was a meaty new four-core speaker cable for bi-wiring which looked like it might also whip up some interest in S & M and correction circles!

Sony were stationed in a non-show hotel showing their magneto-optical mini CD system. In a convincing demonstration of the player's suitability for use on the move, the machine was hurled into the air where it revolved for a second or two before falling and being caught. Not a glitch was heard. The megabyte of RAM that acts as a buffer for the information

coming off the disc seemed to do its job effectively. An American company spokesman admitted, to my relief, that the ATRAC coding system employed (not unlike that of the DCC tape system) made the player best suited to portable applications, saying that it wasn't really an audiophile medium - a surprisingly honest statement.

However, when What Hi-Fi? editor, Mark Payton attempted to photograph the player with which the demonstration had been conducted two Japanese gentlemen appeared and requested politely but firmly that he desisted. In view of the previous openness I wonder why? Two mock-up portable players were displayed, one replay-only, the other record-capable, and I have to admit that if the actual production machines - set to appear in late 1992 - are similarly sized, then we are talking about a very attractive proposition. These players were smaller than a Walkman.

Forthrightness was the order of the day in Roy Hall's Music Hall room. As the U.S. Distributor for Creek products he had the company's first Compact Disc player on display. An aesthetic match for their amplifiers it looked interesting. Could I hear it? "Sorry, no", he replied, proffering an excellent malt whiskey as compensation, "it was sent over just so that people could get an idea of what it looks like. It hasn't got any chips inside. Nice, though, isn't it?"

For amazing visual appearances there was no need to go further than the Primare room, where the 200 Series was on display. Featuring a preamp, mono power amps, CD player, FM tuner, and remote control, the system was literally

Right: A film-maker's spacecraft model? The Primare 200 Series CD player.

Below: Roksan's new budget Radius turntable on display in Chicago.

dazzling with its cabinetry and mechanical parts fabricated from highly polished stainless steel. The styling reminded me of early film-makers' visualisations of space craft, but it was drawing a lot of serious interest.

Another amplifier - or rather pair of amplifiers - which drew incredulous stares from observers was on show in Tube Research Labs' room. Sitting between the wardrobe-sized Soundlab speakers, themselves occupying acres of floor-space, were some of the biggest valve amplifier creations I have cast eyes upon. Called The 800, each mono unit was housed in two open top chassis, one of which contained the power amp, the other its power supply. Beefy? "Eight hundred watts of pure triode power, or 1300 watts in ultralinear mode," the brochure declared. This is what you come to Chicago to see: American excess at its most glorious.



Vishay resistors, MIT capacitors, Cardas wire, silver tube sockets, front and rear case panels machined from 1" thick aluminium, and 25 amp pure silver Amphenol connectors hooking up the amp to its power supply. Quad II owners would wig out on this stuff. Each chassis weighed in at around 13 stones! And you wouldn't believe the First Sound phono preamplifier they were using (LP freaks in the States take playing records very seriously). Another four boxes, with a total weight of merely 21 stones, forty-four premium grade Gold Aero valves, the obligatory one inch thick front and rear case panels..... And the sole purpose of this array was to boost the output from a cartridge up to line level. You still needed a preamplifier - and a flat-bed truck to get it all home.

More valves were on view in the Yakov Aronov room. Here the styling was reminiscent of the age of the radiogram, but the volume levels being achieved were way in advance of anything that era ever produced. The Russian father and



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son team who build these pre/power combinations was never far from the volume control: as a visitor entered they cranked up the SPL's with vigour and gay abandon. It was like watching people walking into a storm-force head wind as they tried to overcome the blast of a brass section in full flight attempting to push them back out into the corridor.

Sanity and more space-age visuals greeted me in the Krell room, where the company was showing its latest CD player, the CD-1Bit. This fully integrated unit with central drawer loading is expected to be on sale in the U.S. by August. Also present was the legendary Day Sequerra FM tuner complete with oscilloscope display embedded in its fascia. I didn't get to hear it but I looked at it for ages: I don't care what it sounds like - I want one!

Offering a complete contrast to Krell was Classic Audio Reproductions, a company with fond memories of products like the McIntosh amplifiers and the Marantz 10B tuner, items regarded in the U.S. as classics. One of the objects of their affections was the Hartsfield speaker system, a horn-based unit with a frontal area of nearly sixteen square feet. The company founders tried to buy a pair of these speakers, which were in production from 1954 to 1964, but found that most had been shipped overseas. So, they formed CAR to reproduce the design. I should have told them about the editor's love of the Leak Troughline tuner, they might have been persuaded to resurrect that.

Loudspeaker

Speakers always play a big part at C.E.S. The cynic would suggest that it might be because virtually anyone can slap a couple of drivers into a cabinet and call themselves a loudspeaker manufacturer. Many of the most weird and wonderful creations on show will thankfully never cross the Atlantic. However, not all the exhibitors in the speaker market are flakey wannabees. The British speaker companies were showing many new and genuinely interesting models and doing a very professional job. Tannoy, for example, had the new Six range on display, comprising seven models from the diminutive, stand-mounted 603 to the tall, floor-standing 615. All have cabinets which consist of four different sizes of panel shaped as unequal-sided hexagons. The 609, 611, 613, and 615 use dual concentric drivers. A range of stands has been produced to support these unusually shaped enclosures.

Celestion were showing the new 100, a £499 arrival which looked particularly elegant in its mahogany cabinet. It sounded promising too. They also had the bigger brothers to the successful 3 and 5 models on show. Not half so pretty but considerably less expensive. KEF were demonstrating the Reference 103/4, available now in the U.K. for around £1100. I'll reserve judgement on its sound



"Nice, isn't it?" said Roy Hall, U.S. distributor for Creek, of their new Compact Disc Player, though the chips had been left out of the wrapping.

quality until I've heard it without prior exposure to copious amounts of champagne: KEF do know how to provide an oasis for an Englishman abroad.

One floor below in the same hotel Meridian were holding court with a system using their D6000 digital speakers fronted by the no-compromise 601 DSP preamplifier. The new unit's facilities would require a page or two alone to describe in full, so let's settle for comprehensive. Announced as an "audiophile" preamp it has to be the world's first example to incorporate graphic equalisation, 'psycho-acoustic' and other adaptive adjustments. Bob Stuart spent a long time taking me through its features and in so doing introduced me to some astounding music... including some which was less than 900 years old!

However, my best-disc-of-the-entire-show-award has to go to speaker manufacturers Proac who were conducting demonstrations with the Butthole Surfers' version of Donovan's "Hurdy Gurdy Man". I was so taken aback to hear this that I excused myself immediately, took a cab to Rose Records and purchased a copy. Now that's what I call an effective demonstration disc!

Tweaks

No American show would be complete without its fair share of tweak accessories. My favourites at this C.E.S. came from Room Tune Inc. of Sugar Creek, Ohio. The company's products allow the enthusiast to "tune" his listening room, so that he can "Kick Back, Listen and...Enjoy" - and presumably "have a nice day" as well. There's plenty to play with: CornerTunes, RoomTunes, EchoTunes and BassTunes, all acoustic devices which resemble squared-off bolsters, cushions, and dinky little triangular pads, made from fibre glass, which you position on the floor, walls and ceiling of your listening room.

Get it right and you can improve sound quality by as much as 90% (I wonder how you measure it?). In fact "it will be like owning a totally new stereo system". Be

prepared to work hard, however: the booklet proclaims "unless you are reading this guide six months after you first began tuning your room, you are probably less than 50% done". Which, I presume, means that your room will only sound 45% better, the same as having half a new stereo system! Pick of the RoomTune crop, however, was the AmpClamp which is claimed to "eliminate resonant tones" in your stereo components. The device looks like a press and included with it are "eight spheres of black glass" (why didn't they just say a 'load of balls?'). You place your amplifier, or whatever stereo component is resonating, between the two boards with four balls on top of it and four below to form a 'sandwich'. Then you tighten up four rods which pass through the boards' corners and your amp is clamped. AmpClamps are available in custom shapes and sizes to suit "most odd shaped units, turntables(????) and vacuum tube products with special requirements". Call me a sceptic but I didn't feel inclined to rush home and start clamping my Linn.

On the last day of the show I called by Exposure's room to find that they had a new amplifier on display. Called the 20, the new integrated is essentially a line-level only 15 with no separate record-out selection. Selling in the U.K. for £499, it was a welcome breath of fresh and sensible product. I also popped in to say hello to Naim, listened to their CDS Compact Disc player (full review coming in these pages soon) and while so doing caught my first glimpse of the long-awaited lift device for the ARO tonearm. Its name? Aromatic. How quaint!

Now I could head for the airport having seen most of the show and with my final thoughts being of real-world products. And no, I didn't sneak an AmpClamp into my suitcase. I was quite content to be going home to a system that would probably only welcome me back with ten percent performance. I somehow guessed it would still sound better than all of those I had heard in the rooms which had been 'tuned' ●



veteran valves

As more and more people rediscover the joys of valve amplification, Chris Binns looks to the Golden Age of audio to see what can be used today

Why on earth should anyone want to buy an amplifier that is 30 years old, looks like a prop from Fritz Lang's 'Metropolis' and smells funny? Good question. Why should anyone want to buy a car that's 30 years old, rusty, uneconomical and uncomfortable? That would seem a bit easier to explain - a few suggestions come to mind. The joy in owning something unusual, the sense of achievement in restoring it to its original condition, the envious glances as you drive through town on a Saturday night - we're talking enthusiast here! But I doubt whether even the most ardent enthusiast would argue that a new car isn't better suited to get from A to B.

It will be cheaper, more comfortable and probably faster.

Here the analogy ends. If one accepts that the purpose of an amplifier is to assist in reproducing music for enjoyment, a 30 year old model could do the job as well, if not better than today's equivalent. As you needn't spend vast amounts of money, one can begin to see why there is still an active interest in valve classics from the 50's and 60's. Don't get me wrong - I'm not suggesting that every potential purchaser of a Pioneer A-400 should head for the nearest church fête in the hope of finding an old Quad; far from it. What I am suggesting is that some of these 'aged' amplifiers can be made to work in a suitable system with results that can equal or even out perform their modern counterparts in terms of musical enjoyment.

Since the general introduction of the transistor to hi-fi in the mid sixties, designers suddenly had the wherewithal to produce amplifiers with ever increasing power output in relation to size and cost. In fact, it seemed, with some of the more extreme examples, as if the only limiting design constraint was 'if it's worth doing, its worth overdoing.'

Meanwhile, from the loudspeaker designer's point of view, all this power to play with meant that the efficiency of a speaker system could be sacrificed for smaller enclosures, an extended bass response, lower colouration et al, quite often by way of a 'power hungry' crossover network.

The valve reared its shiny little head again in 1977 - much to everyone's surprise. New products, such as Michaelson and Austin's TVA-1 burst onto the market. This meant older amplifiers such as Radfords, Quads, Leaks and all sorts were dragged out of their hiding places, dusted off, and pressed into service. Needless to say, the second hand value of these items rocketed almost overnight; previously one could hardly persuade the dustman to take them away. Predictably, these followed more contemporary designs with power outputs of 100 watts or so, the majority of them being re-workings of classic circuits culled from the yellowing pages of manufacturers' data books.

Rosy Glow

That almost brings us up to date - valve technology ran quite happily in the minority alongside solid state, whereas the personalities involved did not. There are still those who feel that anyone showing more than a nostalgic interest in valves must suffer from mad cow disease, while those who listen to music by the rosy glow of hot filaments consider the merest mention of transistors a dirty word.

The last five years or so have, however, proven to be interesting in so much as there has been a subtle shift in people's attitudes towards listening. Ironically enough, this shift has dictated that massive power output is no longer the order of the day in hi-fi systems. Loudspeaker designs have reflected this trend with drive units that do not require complicated electronics to shape their response, and hence, greater efficiency. Combined with the introduction of various high quality amplifier designs with very moderate power outputs, such as the Musical Fidelity AI and - at the other extreme, the Ongaku - both rated at approximately 25 watts, you can see that using a 'classic' amplifier no longer seems as outlandish as it once did.

What is available

So, having made a case for actually using an older amplifier, let's have a look at what is actually available. Leafing through a 1959 hi-fi yearbook revealed no less than 43 manufacturers of amplifiers, each with a range of several products. But by far and away the most common names to emerge 30 years on are Radford, Leak and Quad. As a testament to their quality, these manufacturers produced units in literally thousands, many of them survive to this day.

Radford Electronics' first production amplifiers were introduced in 1948 essentially based around the original Williamson triode design. It wasn't until the late 50's that Arthur

Radford introduced the now legendary STA Series, starting with the STA12 power amplifier and its attendant DSM pre amplifier. These progressed to the STA15 power amplifier, the monoblock MA15 and SC2 pre-amp. The STA25 and MA25 models were introduced when the STA15 reached MKII status, being essentially the same circuit but with greater output power, namely 25 watts with 0.1% distortion and 36 watts at 1%. Apart from the introduction of printed circuit boards for the MKIII series, the Radford amplifiers remain virtually unchanged up to today's STA 25 MK IV, now produced by Woodside Electronics.

HJ Leak

As discussed in a previous issue, the first commercial power amplifier to be produced by HJ Leak was the TL/12 "Point One", the point one referring to the distortion at rated power output. Introduced in 1953 it featured a triode connected output stage; perhaps this is why many people consider it to be the finest sounding of Leak power amplifiers. This was closely followed by the introduction of the TL/10 - essentially a poor man's TL/12, with a reduced power output and simplified power supply. The TL/25 introduced at this time appears to have been a 'professional' version of the 12, with 25 watts output, a valve regulated power supply, and pentode connected KT66 output valves.

With the advent of stereo in the late fifties, Leak introduced the stereo range of amplifiers, namely the Stereo 20, 50 and 60 (the number relates to total power output). At the same time, Leak re-vamped the TL series to mark II status, also introducing the TL/50. All of these amplifiers now used essentially the same ultra-linear circuit with a twin triode phase splitter.

With The Acoustical Manufacturing Company, alias Quad, the product line up is considerably more straight forward. The first commercial amplifier to be produced was the 'Quad I' power amplifier and 'QC-1' pre amplifier in 1951, which ran until 1953, whereupon the more familiar Quad II power amp was introduced. Rated at 15 watts output (0.18 per cent distortion), this amplifier continued in production until 1970, with two being used with the 22 control unit for stereo.

Pre-amplifiers

I have not said very much regarding the pre-amplifiers that partnered this equipment. Unlike the power amplifiers, by and large they have not aged so well in terms of sound quality, and were usually loaded with features that are not likely to be used

today. The major drawbacks concern sensitivity - their phono stages are crippling insensitive by today's standards and Compact Disc players tend to overload other stages, so they really are only of academic interest.

Having put forward a case for using classic amplifiers such as these, where does one buy them? Like any sort of second-hand items, they are inclined to turn up anywhere; local papers, jumble sales, second hand columns, hi-fi magazines - the list goes on. As for prices, I have seen full Quad set ups at car boot sales for fifty pence, through to £100 or so for fully reconditioned units in the back pages of magazines such as this.

Probably more important is the condition of the equipment. Like anything else, if the amplifier looks as though it has been badly abused, you could be letting yourself in for trouble. Careful inspection before you buy will usually reveal any major problems.

There is always the danger that this sort of equipment has been modified, which is not always so easy to spot on a cursory examination. Even when done well, the amplifier can lose much of its original character and reliability is often impaired by components being stressed more highly than the designer originally intended. The safest attitude is that if a component has functioned quite happily for the last 30 years, it will probably do so for the next ten or so.

Finally, a list of people who can all be of help in not only servicing and restoring 'classic' amplifiers, but in many cases supplying and advising on system matching. Oh, and by the way, if that amplifier still smells funny when you switch it on ... turn it off! ●

1. **Mike Solomon**
London Sound 081-868 9222
2. **Denys Trickett** 071-723 8545
3. **Mike Pointer**
Worthing (0903) 39980

4. Primary Acoustics Salisbury (0722) 322169

All of the above will happily advise and restore most valve equipment to its original specification, as well as supplying 'overhauled' second-hand products.

5. Quad Electroacoustics (0480) 52561

Will still repair Quad valve equipment

‘There are still those who feel that anyone showing more than a nostalgic interest in valves must suffer from mad cow disease, while those who listen to music by the rosy glow of hot filaments consider the merest mention of transistors a dirty word.

6. Woodside Electronics (0272) 877611

Will still restore most Radford amplifiers to their former glory. In particular they offer a kit for STA25's which includes a new PCB @ £125.00 or a complete factory overhaul at £175.00.

7. Electronic Colour Services (0532) 782185

Will overhaul most Leak products including timers.

8. PM Components (0474) 560521

Offer a very comprehensive range of valves, including their own brand, and a matching and testing service.



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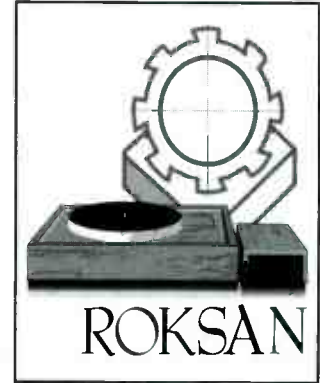
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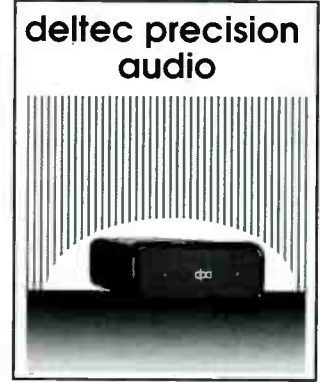
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● I have just purchased a Pink Triangle Anniversary Turntable, SME V tonearm, Audio Technica ART 1 cartridge and Acoustic Energy AE-1 loudspeakers. My problem is finding an amplifier to match this system. I have a budget of £2000 and the amplifier would be a stepping stone to an upgrade at a later date.

**Mr R. Tennant
East Kilbride.**

Acoustic Energy loudspeakers are notoriously difficult loudspeakers to drive. To get the best from your system, you will need an amplifier like the John Shearne Phase One tested in this issue. Although I have not heard the Phase One/AE combination, I can imagine that the Shearne amplifier would drive the AE-1s well enough, but the combination would have the subtlety that a system such as yours can create.

Aside from John Shearne's, it might be a good idea to look at Musical Fidelity's P180 power amplifiers. A single P180, combined with the PS Audio 4.6 preamplifier would suit nicely. Finally, I would suggest looking at Audioblab's 8000C/8000P combination. While firmly under the £1000 mark, the amplifiers take some beating. In addition, one could look at using two 8000P power amplifiers in a bi-amplified system, that would be very difficult to better for the price.

This would then leave a fair amount of money over to look at really good quality loudspeaker cables and interconnects, befitting such a system. My guess here would be Furukawa cable throughout. While not cheap, this cable can make dramatic improvements in a system that is aiming for transparency. **AS**

● My present system consists of a Rega Planar 3/RB300/Linn K5 with a NAD 3020 amplifier and a pair of ageing, yet useful Wharfedale Linton 3XPs. However, with the CD market slowly, but surely, ousting vinyl from the high street 'record' shops, I have decided to buy a CD player.

I am considering the Marantz CD50SE, although I feel that the extra money involved in an Arcam Alpha ACD-1 would reap worthy benefits. Is this justified?

With this new addition, I feel that it would be worthwhile upgrading my amplifier. Is this true? Do you think the Ion Obelisk 2 or Onix OA21/5



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will endeavour to

solve them or at

least offer some

practical advice.

would be the right area to look? Lastly, I believe the loudspeakers should withstand this upgrade although I am open to suggestions...

**S. Connolly,
Sheffield.**

Your choices of Compact Disc players and amplifiers seems to be well balanced. The Marantz CD50SE, now superseded by the CD60SE at the same price, can only be bettered by a select few players, most notable being the Arcam Alpha ACD-1. With regard to amplifiers, both the Ion and the Onix would be a successful upgrade from your NAD, as they both perform well on both CD and phono (many other amplifiers at this price tip the scales one way or another).

Yes, I do think that the extra cost of the ACD-1 is justified. Over a long term, the sound quality of the Arcam is easier to get along with than the rather clinical-sounding Marantz, although the Arcam could prove a bit too warm for some tastes. The choice between the two amplifiers is not as easy, as both are very good in their own ways - Ion's amplifier is a delicate performer, while the Onix has a greater sense of drive and pace to it.

When loudspeaker time

comes around, Wharfedale 505.2, Rogers LS4a, Royd Sapphires, Heybrook HB1s or Monitor Audio 9s on their appropriate stands would be worthy of investigation. If funds permitted, it may be a good idea to look at the highly excellent Epos ES11 loudspeakers. Sudden, large leaps in hi-fi always make the bank manager jump, while spending gradually you can usually sneak past unnoticed. All of these loudspeakers would benefit from good cable - Linn K20, Audioquest Type 4, or the more expensive Van den Hul, Kimber, Audio Note, Space and Time, Sonic Link or Fukuwara all spring to mind; your choice being dependent on budget and your local dealer's range. **AS**

● My system is: Ariston Pro turntable with a Linn K9 cartridge, Meridian 200 Compact Disc transport (used with a Pandora Mains Conditioner), Deltec PDM One Series II digital to analogue convertor (with a Deltec 'The Power' RF filter), Cyrus 2 amplifier with PSX and Rogers LS3/5A's on a pair of 'designer' Foundation stands 1' from the rear wall. Loudspeaker cable is Cyrus solid core and the interconnect is Van den Hul MCD 102 III. The entire system is powered through Sonic Link mains cables.

I mainly listen to CD classical music at a decent level as I live in an apartment. My listening room is 7 x 4 metres with a very 'dead' acoustic. I quite enjoy how the system sounds as I like its natural, well balanced and slightly laid back sound. It makes me feel as if I am sitting in the 12th row of the concert hall. So good imaging is a real concern for me.

I am now considering the next upgrade, so I would like you to advise me if I should trade my existing DAC for a Deltec PDM TWO or Wadia DM X 32, or would you suggest upgrading my

amplifier first to a pre-power combination? I have shortlisted the Audioblab 8000C/8000P, Lynx Vega, Heybrook C3/P3 amplifier.

**Yves Pinton,
Vincennes, France.**

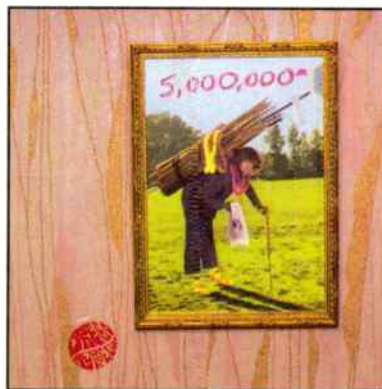
The two DACs that you mention are very different. The Wadia is a big American number-crunching computer, which clearly defines every musical event. I find its presentation of music too 'Technicolor', especially in the upper mid-range. The PDM-TWO on the other hand may appear to be less initially impressive, but I feel that it sounds more accurate and closer to the original recording.

As you suggest that you listen to music at decent, or polite, listening levels, I can heartily recommend moving up to a pre/power combination. If you were wanting to play your music at ear-splitting levels, the amplifiers you have shortlisted would rapidly destroy the LS3/5As as they are only designed to work with amplifiers up to about 25 Watts or so. All three are very good indeed; my feeling is that the Audioblab would fit your criteria, with the Heybrook and the Lynx coming a close second. Alternatively, it may be an idea to look at some of the valve pre/power combinations available, from people like Croft or Audio Innovations. These would offer a very different view on hi-fi, one that would be worth exploring at least.

When you ask which one should come first, I would suggest looking at the DAC before the amplifier. The Cyrus 2 is a fine integrated amplifier and with its PSX is very hard to beat. Unless you are having age-related reliability problems with the Cyrus 2, keep it until the DAC is installed. The difference between the two DACs is more profound. **AS**

The oddballs have taken over the asylum this month. After a quick dabble with a blues legend and the Clash's former bassist, Steward goes in search of the Weird - or should that be wired? - Bunch.

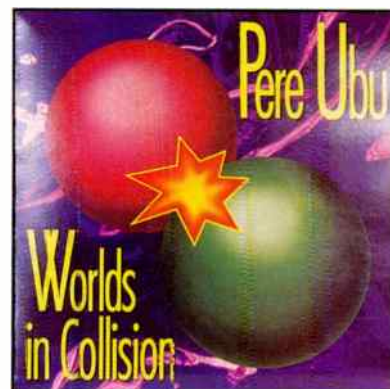
malcolm steward



DREAD ZEPPELIN
5,000,000
IRS X2 13092

● This is Dread Zeppelin's second album. The first "Un-ied-Ed" was magnificent, the kind of album where you simply can't decide which track to play so you wind up listening to it in its entirety each time you take it off the shelf. 5,000,000 isn't quite that good, but it still manages a high EQ (entertainment quotient).

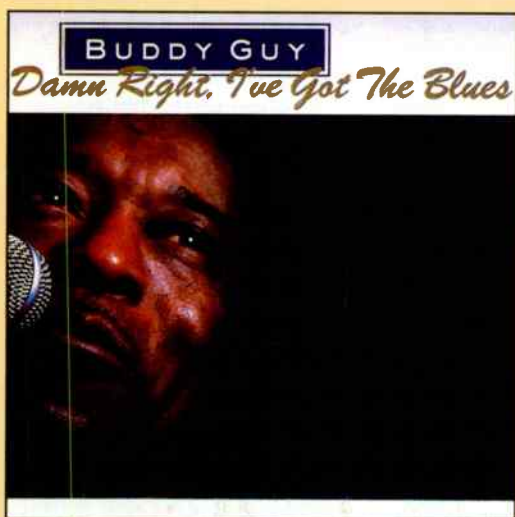
The Dreads are a weird bunch - and that's being polite. If you saw them without having heard them you'd probably bin the album straightaway. But their weirdness is the very secret of their success. Can you cope with white boys playing reggae versions of Led Zeppelin numbers? With a singer called



Tortelvis, who looks like Vegas-era Elvis but sounds like the king in his early years?

If this sounds like a parody to you, it is. But it's an inventive and charming example. There is even some original material on this disc, alongside reggae versions of "Misty Mtn Hop", "The Song Remains The Same", and "Nobody's Fault (Butt Mon)". Bob Marley's "Stir It Up" also gets the treatment, gunge-shredding heavy metal guitar, flabba-bass, and sneering, hiccupping vocals.

People keep wondering what the band will do when they've exhausted the Page and Plant songbook. "Big Ol' Gol Belt" indicates that they might get by with their own songs. Until then they seem quite happy tripping and falling down the "Stairway To Heaven".



RECORD OF THE MONTH

BUDDY GUY
Damn Right, I've Got The Blues

SILVERTONE ORE CD 516

★ "Buddy Guy is by far and without doubt the best guitar player alive... if you see him in person, the way he plays is beyond anyone. Total freedom of spirit." So said Eric Clapton, speaking in *Musician* magazine. A guitarist's guitarist, George "Buddy" Guy commands the respect of the cream of contemporary players; Clapton, Jeff Beck, Carlos Santana, and the late Stevie Ray Vaughan have all rated him

as the most exciting blues player alive. It is even reported that Jimi Hendrix once cancelled a performance so that he could visit a club where Guy was playing and tape record the gig!

As well as performing in his own right, Guy, who was born in Louisiana in 1936 but relocated to the mid-west's blues hotbed, Chicago in 1957, has played alongside legendary stars like Muddy Waters and Howlin' Wolf, and duetted with singer/harpist Junior Wells. In the famous 'battles of the blues' he blew all-comers off the stage, including the likes of Otis Rush and Magic Sam. Since those days he has toured the world and now has his own Chicago club, Buddy Guy's Legends.

Despite his popularity and the admiration accorded him, his catalogue of recorded work is patchy and sparse. Silvertone Records - who were responsible for John Lee Hooker's recent LP, the highly successful "The Healer" - afforded Guy the opportunity to make the album he wanted to record: the one where he could go into the studio and just "be Buddy Guy".

Recorded in London this year, a galaxy of luminaries joined the sessions to pay their respects and perform on various tracks. You'll see credits for Clapton and Beck on guitar, The Memphis Horns, Pete Wingfield on organ, and Little Feat drummer, Richie Hayward.

The album has a brilliant raw edge which explains why Robert Cray refers

to Guy as "the wild man of the blues". His guitar work variously stings, bites, prods and assaults the listener. Blistering runs mix with howling, screaming, tortured high-string bends that will make your eyes water. Intense flurries of clipped and chopped notes spill from his guitar with cutting attack and a deliciously dirty tone.

The opener is the assertive now-you-damn-well-listen-to-me title track, which sets the scene for that which is to follow, a ten-course helping of non-nonsense, gritty blues. The fire eventually burns down to the embers with the last track, a slow-moving elegy to Stevie Ray Vaughan: "Rememberin' Stevie" goes down with the smoothness of a glass of fine Chardonnay but this particular vintage has a kick like a litre of Jack Daniels.

Get to know Buddy, he's a swell Guy.





PERE UBU
Worlds in Collision
 FONTANA 848 564-1

● Pere Ubu, musical surrealists, founders and only members of the avant-garage movement, had me worried. For the first two or three minutes I thought that with "Worlds in Collision" they'd released an LP which could be labelled as straightforward rock music. On the opening number, "Oh Catherine", I didn't hear any evidence of the musical montage that used to characterise their backing tracks, and David Thomas seemed to be singing a simple, logical melody, not ricocheting from one note to the next with little regard for their relationship or lack thereof.

Track two's title, "I Hear They Smoke The Barbecue" made me feel a little easier, and Thomas's vocals seemed to be a little looser and slightly more tangential. Track three, "Turpentine!" saw him slipping closer to stream of consciousness mode, and by the time I reached the title track which opens side two the music had begun to sound as though it was tethered to normality by string and safety pins. Pere Ubu hadn't lost it!

But then I went back to earlier albums and realised just how much softer, warmer, and cuddlier the new LP seems. Comparing older material with "Worlds" is like comparing a meat cleaver to a butter knife. It hasn't the same edge or free-form approach, and it's not so complex. But it's still not mainstream. Put it alongside slush like Dire Straits and there's no competition in terms of inventiveness and daring.

Nonetheless, I'm warming to it, and it will serve as a gentle introduction for those who are not familiar with the band's work. It will pave the way for adventures with left-field albums like "The Art of Walking".

SONIC YOUTH
Dirty Boots
 GEFEN DGCD 21634

● "Dirty Boots" is actually an EP., but there's no reason why this six-tracker shouldn't get a mention. Musically it's valid and important, though I can't see that opinion gaining unanimous approbation.

Sonic Youth are more likely to be dismissed as punks who can't play, than as pioneers who are doing their best to



stretch the envelope of contemporary music. Pompous? But true. Myriad bands have used feedback, distortion and unadulterated noise in their music but few so effectively as this particular four-piece.

In fact, listening to tracks like the instrumental "The Bedroom" (Whaddya do when your mom is a skinhead? You write a song about her.) it struck me that Sonic Youth show far greater affinity with the spirit of Jimi Hendrix than most of the bands and individuals who've paid tribute to him with carbon-copy versions of songs like "Little Wing". They might not have the same technical skills as James Marshall H., but the way in which they sculpture crude slabs of aural turmoil takes them closer to where he stood than many of his pale imitators.

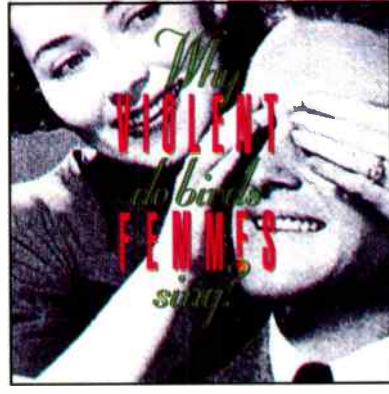
Sonic Youth are obstreperous, brash, uncompromising, and often unmusical when measured by conventional parameters but their music is infinitely more exciting and invigorating than the calculated posturing of thrash metal poseurs. At times it's positively menacing, sounding like the death throes of some post-industrial monster. Play it loud, then turn it up some more.

HAVANA 3AM
Havana 3 a.m.
 IRS EIRSA 1047

● Paul Simonon used to play bass for The Clash, arguably punk rock's most eloquent ambassadors. Now he's formed Havana 3 am, a band which displays articulacy with a heightened rock sensibility. The message mattered more to the Clash than the aesthetic. That's altered. And their politics wouldn't have allowed them to put out an LP with a raven-haired seductress in fishnet stockings and a leotard draped across the cover. It would be hard to maintain one's credibility as a right-on, Sandinista-supporting socialist whilst adorning one's latest album sleeve with a buxom wench whose shoulder straps are struggling with gravity.

Times have changed and so has Simonon's music. Havana 3am's debut will, I'm sure, introduce more new listeners to Simonon. IGone is the threatening, hectoring Clash assault to be replaced by music characterised by a strongly melodic, almost soft-rock ethic.

Distancing it from true AOR - although its influences seem decidedly



American - is its eclecticism. In there with the standard rock'n'roll guitar fare you'll hear strains of spaghetti western mixing it with reggae and ska beats. And Simonon's bass playing is more varied, more tuneful and defined. The wallowing, dumpy plod of "Guns of Brixton" has sidestepped to allow in a snappier, almost funky, more energetic style.

Simonon's muse has led him out of Notting Hill and he'll soon be turning up in living rooms all over this country and the U.S. He's still got plenty to say but he's talking in a softer voice these days.

VIOLENT FEMMES
Why Do Birds Sing?
 SLASH 9 26476-2

● The Violent Femmes - not weird, more psychotic.

Although "Birds" doesn't rival the band's eponymous album in terms of demented ravings it comes close in places. Try "Girl Trouble" for size: "I'm not giving you no jive. Make me feel I'd rather be dead than alive. Take a look what's shoving up my behind. Problems drive me out of my mind. Girl trouble, I got girl trouble up the" For the sake of propriety I'll leave Gordon Gano's personal problems for you to hear about firsthand.

Gano, Femmes' front person, writes the material, plays guitar and sings in a Johnny Rotten-meets-David Byrne-then-takes-a-lot-of-drugs kinda way. His partners are Brian Ritchie who mainly plays acoustic bass guitar, but doubles on didgeridoo, bouzouki, and assorted other instruments, while Victor DeLorenzo hits things: snare drums, cowbells, timpani, Arabic Tablas, fire extinguishers.... The Femmes are impossible to categorize: speedbilly guitar rock comes close... maybe. There's a rock sensibility in there somewhere but it's deeply submerged.

The music has a manic and emotionally disturbed quality, that mixes sophistication with extreme naivete. It's chaotic but professionally so. It encompasses a song based on a sixteenth century poem and a cover version of Culture Club's "Do You Really Want to Hurt Me" Boy George probably wouldn't recognise, along with Gano's originals.

Decidedly weird, but in its own charming way, quite wonderful.

Give a composer a bad label and how it sticks!

Brahms - dour and dusty.

Prokofiev - difficult. Scriabin - certainly incomprehensible, conceivably crazy. Heinrich Schutz - gloomy and austere.

Paul Dukas - only wrote one worthwhile piece. Dvorak - couldn't write for the piano.

And, of course, Scotland has never produced a composer worth mentioning. All misconceptions about to be confounded.

peter herring

RECORD OF THE MONTH

It was, to be honest, a close-run thing between the two Conifer releases reviewed this month. The Scriabin/Prokofiev has it all - superlative playing and recording, and content that stimulates the senses and provokes thought. What swung it in favour of the second new issue was simply the fact that Heinrich Schutz - so often thought of as a rather dour, sombre transitional figure between the glories of the Renaissance and the splendours of the Baroque - needs the publicity more than the fantastic - literally - music of Alexander Scriabin.

Heinrich Schutz was born in Germany around 1585, becoming a chorister and then court organist. It was a period of considerable change in sacred music. In the wake of the Reformation, churches in the Protestant lands had abandoned the complex choral polyphony of the Roman church for a simpler worship which involved the congregation on its own terms: simple hymns and chorales, sung in the native tongue.

Schutz was part of this new order, but also too intelligent a musician to eschew all that Italy, and the polychoral tradition had to offer. Between 1609 and 1612, he studied profitably under Giovanni Gabrieli in Venice. The experience inspired him to a work which puts

the lie to Schutz as the composer solely of music whose austerity matched that of the Lutheran church.

HEINRICH SCHUTZ Psalmen Davids

Choir of Trinity College, Cambridge; His Majesties Sagbutts and Cornetts (director, Jeremy West); James Morgan, Richard Pearce, organs; director, Richard Marlow
CONIFER CDCFL90 (DDD/64.06)

★ Schutz published this remarkable collection of twenty-six psalm settings and motets (thirteen of which are recorded here) in 1619. It finally established his reputation in Germany, and put paid to any lingering thoughts he may have had about giving up composing for a career in law.

His years with Gabrieli in Venice had taught him a great deal: colour, spatial effects, balance, emotional contrast. The elements of Gabrieli's music for St Mark's (has any other church in Christendom had such an impact on musical history?) were fused with his inherent Protestant precepts.

The Psalmen Davids are written for combinations of two to four choirs, using the principle of a 'cori favoriti' - selected singers to bear the brunt of the music - and 'cori cappelle' to add richness and splendour. Thus all manner of effects are possible, from exhilarating antiphonal exchanges through to glorious blocks of sound underpinned by the squeals of cornets and sour growls of trombones.

The composer's recommended diagonal placings of the choirs are followed in this recording (made in Trinity College, Cambridge) and the result is a sound both magnificent and exciting. All credit to the recording team of Mark Brown and Antony Howell, and to the Trinity singers who respond with rare commitment to the graphic quality of Schutz's inspiration. How skilfully he uses changes of pace, texture and colour to illustrate the nature of the texts, which range from the reflective to the joyfully exuberant.

It is refreshing to recommend a recording which should not only enhance the reputation of a composer, but force some to reconsider their conception of his music. On the evidence here, Schutz was more than a convenient musical bridge between Palestrina, Monteverdi, Bach and Handel. The Psalmen Davids show, that at his most inspired, he could be their equal.





JOHANNES BRAHMS

Scherzo from F.A.E. Sonata; Sonata in F minor Op. 120 No 1; Sonata in E flat Major Op. 120 No 2

Barbara Westphal, viola; Ursula Oppens, piano

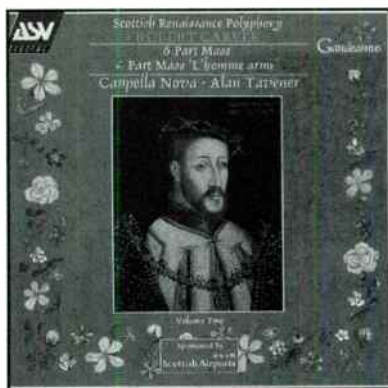
BRIDGE BCD9021 (DDD/51.27)

● It was Richard Muhlfeld, principal clarinetist of the Meiningen Orchestra, who inspired Brahms to write his four great chamber works for the instrument: the Clarinet Quintet, the Clarinet Trio and the two sonatas Op. 120. However, the last also saw the light of day in arrangements for viola and piano, and, although the composer always considered them inferior to the originals, the scores show that he did not content himself with a note-for-note transcription. The range and colour of the viola is used to the full with the result that, despite Brahms's own opinion, the viola versions have come to be regarded as the equal of those for wind instruments; and there are many who even prefer them.

These performances by German-born violist Barbara Westphal and American pianist Ursula Oppens make as persuasive a case as any I've heard for the alternative string scores. As in all good Brahms playing, the response to mood goes hand-in-hand with an appreciation of structure, nowhere more so than in the remarkable set of variations which concludes the E flat sonata. Despite the date of their composition - 1894 - these works are still crafted in the classical-romantic tradition, even if bathed in its autumnal glow.

The performances of the sonatas are prefaced with Barbara Westphal's own transcription of the memorable scherzo Brahms contributed to the 'tripartite' 'F.A.E.' Sonata dedicated to the violinist Joseph Joachim, F.A.E. being the initials of Joachim's personally-devised motto, *Frei aber einsam* (Free but lonely). Robert Schumann and the now-forgotten Albert Dietrich provided the sonata's other movements.

Whether fiery and intense, or warmly reflective, this is fine Brahms playing, though I would have preferred a slightly less resonant recording; while suiting the timbre of Barbara Westphal's beautiful Gasparo da Salo viola, it does add a brightness to the piano tone. Otherwise, a first class production by the New York-based Bridge label.



ROBERT CARVER

Mass a 6; Mass 'L'Homme Arme' a 4
Cappella Nova; director, Alan Tavener
ASV GAUDEAMUS CD GAU126 (DDD/
66.01)

● Great Scot! And Robert Carver was. Born around 1484-85, records suggest he was associated with the abbey at Scone and was probably in the employ of the Scottish Chapel Royal at Stirling. In musical terms, he can be seen drawing away from the late medieval style into the splendour of the high Renaissance and, as such, offers more than pure curiosity value.

This is the second of three recordings setting out to document all of Carver's sacred choral music, for the first time, I think it can be safely said. Rightly, the job has been entrusted to Scotland's only a cappella ensemble, the Cappella Nova under the enthusiastic direction of Alan Tavener. They sing with tremendous character and spirit, if not quite the jewel-like precision of some more famous (and more practised) exponents of 16th century polyphony. However, the rhythmic poise is there, as is the clarity, although the latter is helped by a finely-delineated recording (made in the church of St Michael, Linlithgow). Seldom have I heard the individual voices quite so defined, yet within a wholly natural, 'believable' space. The immediate advantage is that each voice part can be easily distinguished and its progress traced, and that is worth doing in, for example, the *Agnus Dei* of the four-part Mass. It is technically a tour-de-force, and sung here with considerable virtuosity; but Carver's technique is not an end in itself. The artifice, the visual and aural symmetry is distilled into the most sonorous and uplifting music.

This setting of the Mass takes its theme from the French popular song 'L'Homme Arme' which was much used in European 'parody Masses' of the period. It is, though, its only usage by a British composer. Its companion here, the six-part setting, dates from around 1515 and displays Carver's rich textures and imaginative contrapuntal writing to the full. He may not be among the first-rank of Renaissance composers, but is certainly worthy of ASV's commitment to this series.



ANTONIN DVORAK

Slavonic Dances Op. 46 Nos 1-8; Op. 72 Nos 1-8

Duo Crommelynck, pianos.

CLAVES CD 50-9107 (DDD/65.09)

● As a composer for the piano, Dvorak was a wonderful symphonist. That's the received wisdom and while it's true he did not enhance the solo piano literature as much as, say, his friend, Brahms, it does overlook the fact that several of Dvorak's best-known orchestral compositions began life as piano scores. The well-known Slavonic Dances are a case in point. But, you say, surely the orchestral version is preferable; the piano score can only be a kind of 'preliminary sketch.' It must be better with the 'colours' filled in.

I'm not sure I entirely agree; in fact, in the case of Mussorgsky's 'Pictures at an Exhibition' which also began life for piano solo, I have come to prefer that version to Ravel's lavish, but tame orchestration. The Dvorak is a little different; these dances are a delight in their orchestral colours, but I wouldn't now want to be without this piano duet version played with such verve and exuberance by the Belgian-based Duo Crommelynck.

The Duo was formed in 1974, when Patrick Crommelynck met fellow pianist Taeko Kuwata, a Japanese who had studied in Tokyo and Vienna. This is the second volume in a series embracing all of Dvorak's music for four hands and, well, it's a winner - hands down!

The Op. 46 dances, adapting styles from Serbia, Poland and the Ukraine as well as the composer's native Czechoslovakia (Bohemia, as was), established Dvorak in the front rank. By the time he came to offer the Op. 72 set to his publisher, he could command several times the original fee. The remarkable thing about all sixteen of the Slavonic Dances is that the melodies are all entirely original. Here, indeed, was a gift for melody that has remained unsurpassed.

Every classical collection needs the orchestral version of the dances; those who - like me - find this music irresistible will relish this stylish two-piano version, too. It sounds as though they enjoyed making it!

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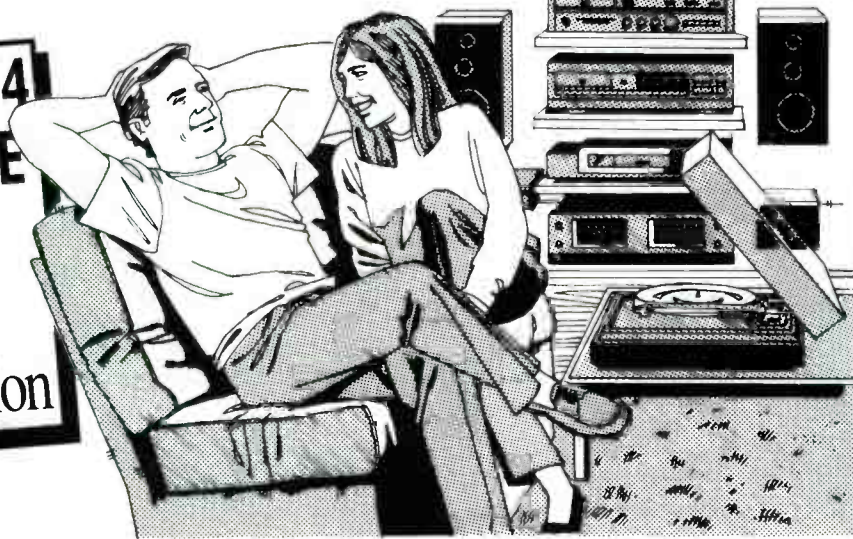
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**PAUL DUKAS**Symphony in C Major
GABRIEL FAURE

Pelleas et Melisande.

Monte-Carlo Philharmonic Orchestra;
conductor, Lawrence Foster
CLAVES CD 50-9102 (DDD/57.23)

● Paul Dukas - didn't he write 'The Sorcerer's Apprentice?' Yes, and? 'Er, that's about it.' While it's true his excessive self-criticism led to Dukas's published output being small, he was rather more than a 'one-work' composer in the mould of, say Max Bruch. There was, for example, this solitary symphony. Not epoch-making (the influence of Cesar Franck is apparent) but certainly no potboiler. It is, in fact, a very compact, lyrical work, full of ideas which are well-worked.

There are no real surprises, but the andante is a lovely movement and the finale is dazzling. The skilful orchestration, which contributes memorably to 'The Sorcerer's Apprentice', is evident, too.

If not strikingly original for its time (1897), Dukas's C Major Symphony certainly transcends the merely competent. And how well the Monte-Carlo orchestra (which, regardless of the image you may have of Monte-Carlo, has actually produced some very fine recordings) plays the work. The performance, under the direction of American conductor, Lawrence Foster, fairly fizzes and is warmly recorded.

Maeterlinck's symbolist drama, 'Pelleas et Melisande' inspired composers as diverse as Debussy, Schoenberg and Sibelius. Faure was another, producing a sequence of four atmospheric intermezzos of which the third, the Sicilienne, is graced with a melody of haunting beauty. Like the symphony, these are played with style and affection.

**SERGEI PROKOFIEV**

Visions Fugitives Op. 22

ALEXANDER SCRIBIN

Sonata Fantasy No.2 Op. 19; Six Studies - Op. 8 Nos 2,4,5; Op. 42 Nos 3,4; Four Pieces Op. 51; Piano Sonata No 9 Op. 68; Vers la Flamme - Poeme Op. 72

Nikolai Demidenko, piano

CONIFER CDCF204 (DDD/73.13)

● With their burning incense, coloured lights and all manner of other effects, recitals given by the Russian composer-pianist, Alexander Scriabin, could be said to have pre-dated the psychedelic sixties by half-a-century. Yet Scriabin was a formidable musical talent.

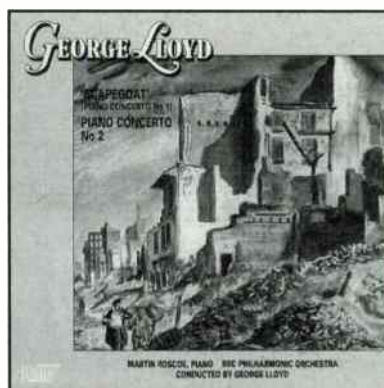
In the early 1900s, Scriabin became a devotee of theosophy, a form of religious mysticism which transformed his life and his music. He saw himself as divinely inspired, his mission to bring salvation through a unity of all the arts.

His music became charged with an unbridled sensuality and a white-hot emotional intensity and, at times, it does seem that some force has taken over as notes cascade from the piano in an apparently frenzied, high-voltage display.

Scriabin himself believed he was practising a kind of sorcery when playing the extraordinary Op. 68 sonata, a revelation which was promptly taken up by his publisher who - to the composer's displeasure - dubbed the work the 'Black Mass' sonata.

Colourful as all this is - it's a wonder Ken Russell hasn't made a film of Scriabin's life - it does lead to assumptions about the nature of the music. Therefore, I suggest you approach this exceptional recording by the Soviet pianist, Nikolai Demidenko, with no preconceptions. You will hear music that is provocative, disturbing, imaginative and unique. But it is also remarkably disciplined and translucent. Scriabin may have been crazy, but his musical sensibilities always remained intact.

'Scriabin can have no disciples. He must stand alone. He is a solitary genius.' The words of Sergei Prokofiev on his countryman. One of Prokofiev's finest piano compositions, the kaleidoscopic soundpaintings of the Visions Fugitives, completes one of the most satisfying piano recordings to have come my way for some time. I have nothing but praise for the playing, or the lustrous recording from Snape Maltings.

**GEORGE LLOYD**

Piano Concerto No.1 'Scapegoat';

Piano Concerto No.2

Martin Roscoe, piano; BBC Philharmonic Orchestra; conductor, George Lloyd

ALBANY TROY037-2 (DDD/58.30)

● Now seventy-seven, George Lloyd looked set for a successful composing career until the Second World War intervened and left him psychologically wrecked. He returned to composition only slowly and, it was inevitable that war would cast its shadow over the music he wrote thereafter.

Many musicologists regard Lloyd as little more than a pleasant anachronism, mainly because he writes in a style which has long gone out of fashion. Lloyd's music is always accessible, always melodic, and although there are those who cite such attributes as evidence of shallowness, what is undeniable is its integrity.

These concertos may have echoes of Rachmaninov and Ravel (to my ears) but they are not mere pastiche. He wrote the first of his four piano concertos after hearing the playing of the late John Ogdon, who then premiered the work in 1964.

In its single movement, it sets out to depict the world of the scapegoat - the universal 'fall guy'. It is reflective, melancholy, sinister, violent (although the violence is comparatively muted), but frequently poetic, too, with some quite magical writing for the piano.

The composer describes the second concerto as being bound together by a dance of 'gleeful viciousness', the result of an image which has haunted him for fifty years - that of Hitler dancing a jig of triumph after one of his conquests in 1940.

Yet somehow that vision of evil doesn't come across - I don't think George Lloyd can bring himself to write music that is quite that evil, although he is able to portray other levels of emotion from extreme bitterness to bludgeoning brutality. Certainly, the brilliant, whirlwind ending, with the gentle tinkling of the celesta, evokes nothing more than delight.

Both concertos are superbly played by Martin Roscoe and Manchester's BBC Philharmonic shows once again its empathy with George Lloyd and his music. This is certainly one of the few major recordings of contemporary British music to have appeared this year.

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advertiser's index

ARCAM	4
AUDIO EXCELLENCE	38
AUDIOFILE	14
AUDIO INNOVATIONS	35
AUDIO TECHNICA	95
BANDOR	80
BARTLETTS	64
CLEAR CRYSTAL SYSTEMS	96
GRAHAMS	84
HEYBROOK	10
ION SYSTEMS	80
LIFT	76
LINN PRODUCTS	33/34
MANA ACOUSTICS	70
MONITOR AUDIO	IFC
NEAT	76
NEWBURY AUDIO	84
PENTACHORD	95
PM COMPONENTS	45
PROAC	24
RUSS ANDREWS	76
SANSUI MISSION	BC
SONIC LINK	58
STANDENS	58
VINYL TUBE AUDIO	46
VOLUME ONE	80
WEST MIDLANDS AUDIO	62

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