

Hi-Fi WORLD

OCTOBER 1992 £2.00

6 BUDGET AMPLIFIERS
at around £200

ARCAM BLACK BOX 5
a new CD Convertor

CELESTION 1
a new budget loudspeaker

PIONEER'S radical new
PD-S901 CD player

SONY TC-K470
cassette deck

BEAUTIFUL PRECISION
new SME Model 20
turntable



COMPETITION

win the mighty
TANNOY GRFM MONITOR
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FT 930 TUNER



FC 920 CASSETTE DECK

Intelligence (E.S.I) which offers John and Sue the ultimate in ease of use. Remarkably, they can control anything Which is just as well, as they seem to have their hands quite full enough at the moment.



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Paul Hartley Studios 071-482 3768

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THE LISTENER

You'll hear better if you use your head

Ringing telephones, vacuum cleaners, traffic — and you thought CDs meant the end of background noise. Think again.

At Sennheiser we have been putting thought into producing high-quality headphones since the HD 414s (released in 1968). We're also highly thought of — worldwide critical acclaim has included six awards in *What HiFi* magazine.

The new Sennheiser range continues to excel in terms of sound quality. All our headphones come with a two year warranty, plus our assurance that all parts are and remain replaceable (nearly a quarter of a century on, spares are still available for the HD 414s). And with all products entirely developed and manufactured by us, backed up by 100% quality testing, the craftsmanship is guaranteed too.

That's the background. Now listen. Unbeatable sound quality — no noise.



**Sennheiser —
the thinking
man's
headphone**



Sennheiser UK Ltd, Freepost, Loudwater, High Wycombe, HP10 8BR.
Fax 0628 850958. Telephone 0628 850811.

 **SENNHEISER**

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IN ROOM
No. 1004

CHAMPAGNE QUAD TUNER

No, it's nothing to do with Quad's colour scheme, their new fully remote-controllable 66FM VHF-only tuner matches their 66 pre-amplifier and CD player in style and colour. A bottle of champagne is on offer for the first correct answer as to why it offers nineteen presets - a marked advance on the FM4's comparatively measly six. With no front panel controls, all operations are conducted from Quad's stylish table-top remote. A Quad-designed front end is claimed to offer improved immunity to interfering signals across the increasingly-crowded FM band. Price is £490. Quad Electroacoustics Ltd., Huntingdon PE18 7DB. Tel: (0480) 52561.

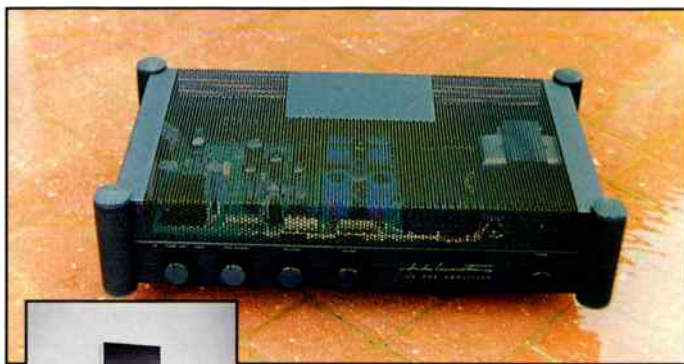


NEW AUDIO INNOVATIONS

Audio Components have announced the first new Audio Innovations pre-amplifier for over three years. Priced at £699, the line-level L2 uses an "Anode Follower" circuit for the active stage, utilising an ECC82 double triode, which Audio Components say gives a significantly better performance than the theoretically superior cathode follower configuration.

The L2 also incorporates a second ECC82 in a similar configuration in the active buffered tape output. As a no-compromise full-facility control amplifier, Audio Components say the L2 offers a significantly better performance than the Series 1000 Passive Control Unit or the passive line sections of previous Audio Innovations pre-amplifiers. Input sensitivity is switchable between 170mV and 530mV.

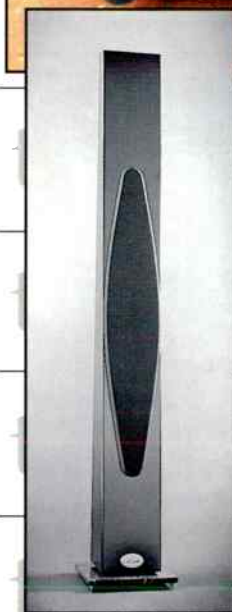
Details from Audio Components Ltd., Albany Court, Albany Road, Granby Industrial Estate, Weymouth, Dorset DT4 9TH. Tel: (0305) 761017.



SLIMMING DANISH STYLE

Newly landed on these shores are the Albatross loudspeakers from Danish company Posselt. Standing 186cm high from their marble base and only 31 cm wide, these pencil-slim speakers are a hybrid reflex/horn design using three drivers. Sensitivity is high at 91 dB. A phase aligned filter network is used which can be mounted externally near the amplifier. Bi-wirable, the Albatrosses are available in Piano Black, Ivory or Burgundy finishes for £1,750.

Contact G. T. Audio, 5 Upper Road, Higher Denham, Bucks. UB9 5EJ. Tel: (0895) 833099, or - Nottingham Analogue, 128 Cordy Lane, Underwood, Notts. Tel: (0773) 762947.



winds

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

NEW QUARTET MAKES UP A TRIO

Heybrook have added a matching stand-mounted loudspeaker, the Quartet, to their Signature amplifiers and Sextet speakers. The same polished wood vertical fillets either side of a black baffle continue the range's new look. A two-way design, using a 6 1/2 inch coated paper bass unit and 1 inch ferrofluid cooled tweeter fixed to a rigid 32mm thick baffle, the Quartets are available finished in Black Ash for £535 or Walnut veneer for £555 with contrasting front fillets of Walnut, Birds-Eye Maple or Yew. Other finishes are available to special order. Matching stands cost £135 for Black Ash or £145 for Walnut.

Heybrook Hi-Fi Ltd., Estover Close, Estover Industrial Estate, Plymouth PL6 7PL. Tel: (0752) 731313.



COPLAND PRE AND POWER AMPLIFIERS

Copland have announced a new valve pre-amplifier, the CTA301 at £1384, and a 50watt power amplifier at £1992. Half the height of the power amplifiers, and finished in silver alloy to Copland's usual high standard, the CTA301 offers five source inputs including a phono stage. This passive RIAA stage is suitable for moving magnet or high-output moving coil cartridges and uses two pairs of hand-selected and matched E83CC double triodes in Shunt Regulated Push Pull mode. Line level amplification is through E82CC double triodes, one for each channel. Tape monitoring is possible.

Ole Muller, the designer, has used the CAD facility at his research and development centre in Copenhagen to design a one-piece through-plated circuit board with all components mounted in the same direction. Copland's CTA301 is the first to feature 'Soft Start'. A progressive switch-on brings the voltage requirement in slowly, rising to the full working voltage within a 20 second start-up period, when the amplifier is fully stabilized and a relay switches the amplifier into operation.

Identical in looks to the two other Copland power amplifiers in the range, the CTA 504 utilises the same track-layout design principles on the



circuit board as the pre-amplifier. A brushed silver alloy control on the front panel allows the amplifier to be switched from Tetrode to Triode mode, when it delivers 26watts per channel instead of 50watts. Valves are hand-selected and matched: four E83CC double triodes on the input and four 6550 output triodes.

Contact **Absolute Sounds Ltd., 58 Durham Road, London SW20 0DE. Tel: (081) 947 5047.**

MONITOR AUDIO'S NEW STUDIO 6

A silky gleam emanates from Monitor Audio's new Studio 6 loudspeaker. Apart from the typical shine of the company's well known gold anodized alloy tweeter, this twin reflex stand mounting design also employs a 170mm metal cone bass/midrange driver built on a new diecast chassis. Recommended power amplifier range is 20-200watts for this new design, which has a claimed sensitivity of 89dB. Price for the Studio 6 finished in Monitor Audio's usual high quality Rosewood or Black Oak veneers is £799.99. If you really want to bring a shine to these speakers, they are also available in Piano Gloss finish at £999.99.

Monitor Audio Ltd., Unit 34, Clifton Rd., Cambridge CB1 4ZW. (Tel: 0223) 242898.

MORDAUNT-SHORT HOME ENTERTAINMENT

Six different loudspeaker combinations are now available from Mordaunt-Short to complement 'Home Entertainment' systems. If you simply have a

stereo video, then the 'Stereo Package' of two compact speakers at £99.95 will suit; for more bass add the self-explanatory 'Sub woofer Package' at £149.95 later, or pick up the three together as the 'Stereo-Plus Package' for £229.95.

If you're equipped with Dolby Pro-Logic you need the 'Pro-Logic Pack-

age' of three compact speakers with two wall brackets at £179.95.

Need a small speaker for a dialogue channel? That's the 'Dialogue Package' of one compact speaker for £59.95. Out of space? Hang them from the walls with a pair of wall brackets from - what else? - the 'Wall Bracket Package' at £29.95.

Mordaunt-Short have used shielded drivers in these compact speakers so they can be used close to a TV screen.

Contact **Mordaunt-Short Limited, 3 Ridgway, Havant, Hampshire, PO9 1JS. Tel: (0705) 407722.**

SUPER SLIM CD

Goodmans have added to their range of portable Compact Disc players with the "super-slim" GCD70. Using only two NICAD batteries, which are supplied along with a charger, with an LCD display and sixteen-track programming, it will be priced at £99.99.

Goodmans Industries Ltd., Units 2&3 Mitchell Way, Portsmouth, Hants. PO3 5PR. Tel. (0705) 673763.

PROAC SIGNATURE

ProAc continue their upgrading of the 'Response' range with a new Response Three signature at £4,935. Hand-built and fine-tuned at the test stage, the Signatures now contain a rhodium-plated new-configuration crossover with specially-selected components including silvered capacitors, and it's directly bolted to rhodium terminals. Even the bolts which secure the drivers and the spikes for floor-coupling are rhodium. The Signatures are available in a range of exotic but environmentally-conscious veneers, including Burr Oak, Burr Poplar and Silk Oak.

ProAc, 130-132 Thirsk Road, Borehamwood, Herts. WD6 5BA. tel: (081) 207 1150.

GOLDSTAR MINI

One of Korea's 'Big Three' electronics companies, Goldstar have moved into hi-fi with two mini-systems, the 20watt F303 at £329.99 and the 30watt F505 at £369/99. Both feature full-function remote control for the dual cassette deck, five-band graphic equalizer amplifier and Compact Disc player. Each system offers a surround-sound capability. Goldstar run an international design competition every two years: the work of this year's winners is currently on display at London's Design Museum.

Contact **Goldstar UK Sales Ltd., Goldstar House, 264 Bath Road, Slough.**

SLIM WALL PANELS

Sequence's new slim panel speakers can be stood close to a wall or even hung on one like a picture. Only 67mm deep, 850mm high and 67mm wide, they are a monopolar design: construction is such that there is no radiation of sound to the rear. A single 125mm doped fibrous cone provides the bass and mid-range, with the highest frequencies handled by a 25mm composite cone.

Designer Paul Burton, responsible for the origination and development of the Sumo Aria panel loudspeaker in Canada, says that the construction reduces problems of cabinet resonance, there being effectively no top, bottom or sides to the Sequence. Solid wood end caps are fitted and the speakers are available with either dark or light grille cloth.

Power rating is 20-100watts per channel; frequency response is a claimed 45Hz-20kHz. First in what is to be a range of panels, the Sequence costs £199.95 a pair and will be introduced at the Penta Hi-Fi Show in September.

Contact **Denis Wratten, Business Development International Marketing, 1 Orston Lodge, Old Farm Road, Hampton, Middlesex, TW12 3RO. Tel: (081) 941 6737.**

DOUBLE-EDGED SWORD?

Ruark have announced an upgraded Swordsman model, the Swordsman Plus II. Now biwirable, internal improvements have also been made to the crossover: capacitors have been upgraded and the components are hard-wired. The front edge has been bevelled to reduce diffraction and the rear panel is flush-fitted and finished in textured black.

Also new to the Swordsman is an alternative balanced real wood black Ash veneer in addition to the original American Walnut. A small price increase takes the Swordsman Plus II to £299.

Contact **Ruark Acoustics Ltd., Annwood Lodge Industrial Estate, Arterial Road, Rayleigh, Essex SS6 7AU. Tel: (0268) 728890.**

SUGDEN'S COMPACT DISC PLAYER

Sugden launched their long-awaited SDT-1 Compact Disc player at the Frankfurt High-End Show on August 12th. After a good deal of searching, Sugden have settled on the latest Philips CDM9 CD mechanism. A visual match for other Sugden products, North American readers will have a chance to hear it at the Toronto Hi-Fi Show between the 12th and 14th of September. U.K. price will be announced shortly, but is expected to be around £800-£900.

J.E. Sugden & Co. Ltd., Valley Works, Station Lane, Heckmondwike, W. Yorks. WF16 0NF. Tel: (0924) 404088/9.

CANON FIRE A SECOND SHOT

After Canon's first Wide Imaging Stereo loudspeaker, the domed S-50, comes the floor-standing S-70 first caught sight of last year. Visually much the same, with dome top and conical reflector below, the base has been extended down in a cylinder which houses the 7in bass driver. Mid and high frequencies are dealt with by a new 5in unit which fires at the 'acoustic mirror', or the pointed bit on top. Standing 30.5in high, and 10in in diameter, it's suitable for amplifiers between 15 and 150watts Canon say. Price is £599 the pair. Design, like that of the S-50, is by Allen Boothroyd of Cambridge Product Design.

Canon Audio Ltd., Unit 6, Genesis Business Park, Albert Drive, Woking, Surrey GU21 5RW. Tel: (0483) 740005.



DIGITAL COMPACT CASSETTE V. MINIDISC

A survey by P.W.A. in July on awareness of rival new digital formats, Philips' DCC and Sony's MD, has come up with some intriguing results. Of the 151 males questioned (why no women?), 55% said they would probably or definitely buy DCC, 27% MiniDisc.

However, there's more to be gleaned from the Survey results. For example, it looks as though both the MD and DCC in-car players and personal stereos due next year might be more attractive than the domestic separates to a number of consumers: eight out of ten felt DCC was good for personals, nine out of ten taking the same view on MD, with a similar majority feeling both were good for in-car use.

Opinion was split roughly equally as to whether they would replace their cassette decks with a DCC machine. Half those surveyed owned component hi-fi systems: could there be a correlation?

Philips' publicity this year (and media coverage) has been paying off, with over 62% having heard of DCC against 44% for MiniDisc. Startling, however, is the fact that a greater percentage of respondents had heard of (in order) DAT, CD-I and HDTV! Very few, however, realised that you can record on the new formats.

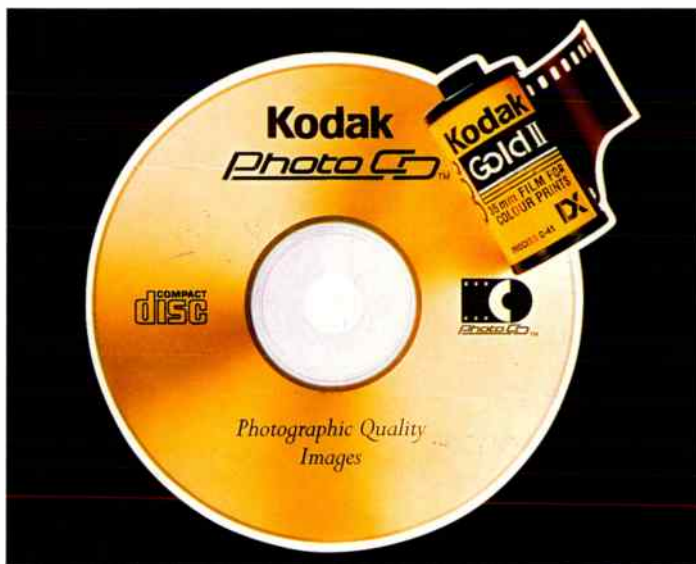


PHOTO CD SCHEDULED FOR SEPTEMBER

Kodak's Photo CD, which allows photographs to be stored electronically on a Compact Disc and then displayed on the domestic TV, is due to be launched in September.

The price of the special players, which also play ordinary CDs through the hi-fi, will be £369 for the PCD 865. This will be followed in October by the £299 PCD 265 and then by the five-disc carousel £429 PCD 5865 in October.

Transferring a 24-shot film to disc at time of processing is an additional £8.75; 36 will cost £12.11. Already processed films will cost £1.75 plus 40p per image with £9.75 the minimum charge. Cost of the blank CD (which is added to the transfer charge) is £4.99. A Photo CD will hold up to a hundred images and can be added to gradually until it reaches its full complement. **Kodak Ltd., Consumer Imaging Division, P.O. Box 66, Hemel Hempstead, Herts. HP1 1JU. Tel: (0442) 61122.**

DING DONG TAPE BATTLE

TDK, already with 41% of the tape market, are aiming two new tapes at the mass market.

'CDing II' (no, it really is called that!) is a chrome tape claiming wide dynamic range and low tape hiss. Available in twin-packs, it comes in C50, C70 and C100 lengths, for £1.99, £2.49 and £2.99 respectively.

'CDing I' is a new C100 length ferric also in twin-pack format at £2.79. **TDK UK Limited, TDK House, 5-7 Queensway, Redhill, Surrey RH1 1YB. Tel: (0707) 773773.**



SHOWS

PENTA HI-FI SHOW

This edition of Hi-Fi World hits the news stands just in time to remind you all not to miss seeing us at the Penta Hi-Fi Show sponsored by Hi-Fi News. We will be on Stand No 8 with ever-knowledgeable editorial staff and a full range of accessories and recordings from our Mail Order pages.

Very likely you might want to drop in on one or two of the other exhibitors afterwards. A long list of them is a lesson in the ABC, from A&R Cambridge through to Zenith Crown. Japanese majors JVC, Pioneer, Sony and Yamaha will be there, as will most of the Brits. Picking letters at random, Campus, (AMC valve amplifier, reviewed August) Celestion (Celestion 1s, this issue) Groove Tubes, Heybrook, Meridian, Musical Fidelity, QED, Pink Triangle, Rogers (P22 loudspeakers, this issue), Tube Technology (Unisis valve amplifier, reviewed August) Wharfedale, etc. Continentals include Cabasse of France, Gradient of Finland and Posselt of Denmark among others. Philips will be demonstrating Digital Compact Cassette.

We hear that Michell Engineering will have their new monoblock power amplifiers to partner the Argo in their room; John Michell tells us that in looks they do for amplifier aesthetics what the Gyrodec did for turntables. We don't know quite what he means - do they revolve?

New company Tesseract will have a pre-power combination of which we've heard half, and with which we were mightily impressed. T&R Industries of Coventry will be exhibiting for the first time: they produced a tweaked Marantz CD-94 last year which sounded splendid, and have a range of pre and power amplifiers which are said to tackle high-end American solid-state sound.

The show is sponsored by Hi-Fi News, the place is the Heathrow Penta Hotel, public days are 12th and 13th September and the time from 10am to 6pm. (Trade days are 10th and 11th.) A courtesy bus will run between Hatton Cross Underground station and the Show during public opening hours. Admission is £2.50.

ON SHOW AT PENTA

AR LAUNCH HIGH-END AMPS

Penta will be host to a major launch of new high-end amplification from AR. Designed in conjunction with Mark Levinson (Cello) and David Day (Day Sequerra), AR will be introducing the AR Limited Series: two Class A/B power amplifiers, one 200 watt, the other 100watt, a pre-amp, an 'Analogue Sculpting Unit' (based on the Cello Palette) an FM tuner, a CD player (designed by David Day) and a pair of loudspeakers, also called the 'Limited'. Also designed by David Day is a range of seven loudspeakers, termed The Classics. All will be on active display.

Contact: Entel Ltd., Vienna Court, Lammas Road, Godalming, Surrey GU7 1JG.

ZYP CODE

British miniature loudspeakers, the ZYP A1's are a mere 225mm high, 112mm wide and 145mm deep. Retailing at £199 a pair, the cabinet is made from cast aluminium with a metal grille. A screened version for use near televisions, the ZYP A1T, is available for £219 the pair. The two drivers are a 1in metal dome tweeter and 5in paper cone mid/bass unit, both British made "by an old established company" says the press release. Designed to be used near a wall, purpose-built wall brackets are also available for £29.95.



To be demonstrated in Room 1016 at the Penta Show, the ZYPs are available from Presence Audio on a 7-day trial money-back guarantee basis. **Contact Presence Audio, Woodside, Spronkett's Lane, Bolney, Haywards Heath, W. Sussex RH17 5SA. Tel: (044485) 618.**

SMALL TALK FROM PROAC.

Our Response Three flagship loudspeaker has made a lot of waves recently. Enthusiastic magazine reviews have sent this exceptional design to the top of audiophile shopping lists around the world.

Sadly, a lot of people will find a pair of our famous heavyweights out of reach. So to those limited by lack of space or funds, we'd like to recommend a very sensible alternative.

The ProAc MiniTower MKII's.

From the same stable as the Response Threes, they have a great deal in common with their big brothers. They're just a lot smaller and much less expensive.

The design philosophy is the same – slim and elegant, they feature a comparable offset drive unit layout and the highest quality components available.

Sound characteristics are similar too: three-dimensional imagery, seamless neutrality and a smooth but exciting performance right through the frequency range.

Featuring a new equalised reflex port which helps to produce a bass response out of all proportion to their size, the MiniTower MKII's wrap up all the outstanding ProAc virtues in a neat little package.

Smaller they may be. Lightweight they're not.

 **ProAc**
Perfectly Natural

HEAR THEM IN
ROOM 1055
AT THE PENTA SHOW



130-132 THIRSK ROAD BOREHAMWOOD HERTFORDSHIRE WD6 5BA ENGLAND TELEPHONE 081-207-1150 FAX 081-953 8933

PMC TRANSMISSION LINE

Latest loudspeaker company to reveal a new transmission-line design is the Professional Monitor Company whose AB1 will join two other models, one of which the company claims is the world's smallest transmission line and the other the world's largest. With a usable response from 20Hz to 25kHz and a sensitivity of 89dB, this slim two-unit design stands 790mm high and will be demonstrated in Room 1006 at the Penta Show, finished in real wood veneer, price is £1,598.

The Professional Monitor Company, 27 The Avenue, Highams Park, London E4 9LB. Tel: (081) 531 5308.



NEW RAE

Bruce Rae Audio's first three products, the ASAT and ASUB active loudspeakers and ACAB cable system, will be on show at Penta. Using glass-fibre reinforced concrete for the enclosures and Bando aluminium-coned drivers the ASAT is a satellite system with 100watt amplifiers built-in; the ASUB is a 300watt active subwoofer designed to partner them. Crossover frequency is plug-exchangeable and the ASUB comes with a separate control unit which provides an active crossover. ACAB 'active' loudspeaker cable, optimised for the ASAT and ASUB, allows balanced runs of up to 100 metres.

The ASAT speakers, including cable, cost £1,495 a pair; the ASUB £1,295 each, including control amp and PSU. The ACAB system, including PSU, two-channel transmitter and two receivers, is £295 each.

Contact Bruce Rae Audio, 12 Harpers Lane, Mancetter, Atherstone, Warwickshire, CV9 1NG. Tel: (0827) 715156.

EDWARDIAN ENSEMBLE

Ensemble of Switzerland, having shown their range of speakers and pre/power amplifiers in Chicago are coming to London too. Not at the Penta Hotel, though. They'll be in the Marlow Suite on the ground floor of the Edwardian International Hotel, just across the road and on the same dates and at the same times.

On show will be the new Tango speakers with optional Profundo bass units, the Carle valve amplifier and the valve/solid-state Virtuoso and Corifeo pre and power amplifiers with Phonomaster phono stage. Acces-

sories have a look-in with Ensemble's Tubesox valve dampers. Contact Ensemble AG, H. Annoni-Strasse 23, CH-4132 Muttenz, Switzerland. Tel: (Switzerland) 61-61-91-91.

LIVE IN '93

A British consumer electronics show planned for Olympia from September 16th-20th next year is rolling up support. Backed by News International with its 19.4 million readers - so there won't be many people who won't have heard of Live '93 by this time next year - the broad-based show will cover a wide range of entertainment technology from Hi-Fi through to Photography. Already signed up are Sony, Panasonic/Technics, JVC, Pentax, Atari and Commodore among the big names in the business. And Hi-Fi World, of course; we are definitely not going to be left out. News International Exhibitions Ltd. expect at least 100,000 visitors through the doors.

News International Exhibitions Ltd., PO Box 495, Virginia Street, London E1 9XY. Tel: (071) 782 6000.

HOOKED ON CLASSICS?

The U.K.'s first-ever Classical Music Show is at London's Barbican Centre from 24-27 September where Philips will be demonstrating DCC. Among the seventy-five exhibitors and artists aiming to change the stuffy image of Classical music will be 13-year-old violinist Vanessa Mae playing with the Royal Philharmonic Orchestra and Stephen Isserlis with the London Symphony Orchestra.

There will be an opportunity to buy instruments, music, hi-fi and CDs and attend masterclasses and recitals. There will even be a soundproofed room where you can learn to play an instrument! ●



IN BRIEF

DENON PRICES DOWN

Denon have announced reduced retail prices for two recent Compact Disc players. The DCD890 is now £269.99 and the DCD1290 £299.99.

NAME CHANGE

DNM Distribution Ltd. has now changed its trading name to Virtual Reality Audio Systems. Anyone for stereo Space Invaders? Virtual Reality Audio Systems, P.O. Box 383, Brentwood, Essex CM14 4GB.

CREATIVE WRITING

Creative Audio announce their first venture into publishing with their 24-page brochure 'The Works'. It covers where to buy second-hand LPs, how to look after and tune your hi-fi, new products, how to bring you Linn Sondek up-to-date, . . . Look here, chaps, you sell the stuff, we'll write about it, O.K.? Or we'll tell our readers what you told us about having had a spider in your loo for a year. Anyway, a free copy will come your way either by phoning or writing to these upstarts. Creative Audio, 9 Dogpole, Shrewsbury SY1 1EN. Tel: (0743) 241924

TECHNOLOGY AWARD

Winners of the Hamburg-based Edouard-Rhein Foundation's 1992 Technologiepreis - a Technology Award worth DM 100,000 - are Abraham Hagendoorn and his Philips research team, and Scott Brownstein and Steve Stepnes of Kodak. Hagendoorn received the award for Digital Compact Cassette, Brownstein and Stepnes for their work on imaging technology for Eastman Kodak's Photo CD system.

NON-FINGERPRINTING KIT

Galaxy have sent us a pair of white cotton gloves. At £1.95, they say they are ideal for handling CDs and keeping them pristine. If you don't collect CDs, of course, you can take up mime.

Galaxy Trading, 52 Galsworthy Close, Swindon SN3 6PR. Tel: (0793) 613528.

CARDIFF CAMPAIGN

Campaign Audio Design tell us they're moving nearer the equator - from Manchester to Cardiff, as it happens. They have also announced a partner to their digital shorting plug, a 50 ohm analogue one priced at £3 each. CAD offer a 14-day money-back guarantee.

Campaign Audio Design, Llandudno Road, Cardiff CF3 8PG. Tel: (0222) 779401.

The last great turntable?

From the builders of the awesome Model 30

comes a new turntable, SME's Model 20.

Alan Sircom hears vinyl at its best.

SME's new Model 20 turntable is a product of unrivalled quality; here's a record deck that will confidently outlive others, those that drift out of adjustment or even perish after a few years. This SME, like the home record libraries it will be associated with, is likely to be handed down from generation to generation.

If a price of £2,495 seems a lot of money to pay for a bargain, it may not seem so in thirty years' time. And it is considerably less than the company's top Model 30 that costs a cool £11,000. Whilst talking prices I should mention that the Model 20 we reviewed came fitted with an SME Series V cast magnesium tonearm for £3,500 all-in, a saving over the items bought separately.

Many of the concepts behind the Model 20 have filtered down from the Model 30 - SME's first turntable. Externally, the Model 20 shares the same four-tower design, the platter material, even the three-phase frequency generator motor and power supply. It is only when the two turntables are placed side-by-side that differences become apparent. The more expensive Model 30 makes the bulky Model 20 look almost diminutive, even though it measures 420mm wide, 320mm deep and 155mm high.

Both turntables were designed to wrest the best performance from SME's Series V pick-up arm. The Model 20 can also be supplied with any of the other SME arms to special order, to suit those markets where the SME 3009 or Series III arms are still popular, for example. Installing another arm would not be possible without surgery. It would anyway be like fitting a Ford radiator grille to a Rolls Royce.

Naturally, one would expect any product from SME to excel in the quality

of its engineering. The build quality of the Model 20 surpasses every other turntable I have come across - which is most. Occasionally, in other high-end turntables, good ideas are subverted by lack of attention to detail, producing bizarre situations like platters that run backwards, motor spindles bound with masking tape and various other sins hastily disguised in whatever way possible and submerged by clever marketing hype. When differences are obvious for all to see, the argument that something is 'over-engineered' will be used. I'm as likely to be impressed by an under-engineered turntable as I am by a car with under-engineered steering or brakes. The Model 20 is a feat of precision engineering and superb finishing.

Although the new turntable lacks the Model 30's sheer bulk, absolutely no compromise has been made in its construction. Put it within twenty feet of

“Engineering pursued so far it becomes an art form”

an engineer and he (she?) will be drawn to it like a moth to a flame. Here's engineering pursued so far it becomes an art form, a product so well made that even if it was never used, it would remain valuable for its aesthetic qualities and for what it represents. SME, we discovered during a factory visit some months ago, don't attain this standard by using the same approach as everyone else.

Not unsurprisingly, they retain total control of design, manufacturing and - especially - finishing within the Sussex based factory that nestles beneath the

South Downs, in some of Britain's most gently beautiful countryside. Only two major components in the entire turntable are made outside SME's Steyning factory: the motor and the power supply. Both of these Japanese-sourced components have been selected for their reliability and quality; for example the motor has a unique pole arrangement to minimise 'cogging' effects. Even then, both are subjected to about sixty modifications before they can be considered SME-ready. Such modifications include totally rebuilding the motor and fitting better bearings, for in bearings SME justly assume pre-eminence.

The modified power supply is a simple-to-operate, fully shielded unit with LEDs to denote the speed and operation of the turntable. It has three speeds, 33 1/3, 45 and 78 rpm and speed changes are remarkably fast. Obviously, of the world market to which the SME Model 20 is addressed, switching voltages is almost as simple as changing speed. This power supply consumes a nominal 5 watts and, like the Model 20 itself, has no radiated hum field.

Making a turntable that will last forever involves a dedication that is obvious. For example, the 19mm main spindle is machined from high carbon chrome steel which is then hardened, ground, finished and permanently sealed in an oil bath using thinned down watch oil. Should the speed drift over the years, the SME is supplied with a 300mm strobe disc and three adjusting points, one for each speed, on the deck itself.





the four corner towers. These towers are adjusted by means of an allen key.

The baseplate is fitted with four adjustable feet to level the turntable. Alastair Robertson-Aikman suggests that turntable levelling is relatively unimportant, except for aesthetic purposes. Four

point mounting is used for stability, but unlike

undulates gently via the thirty-two rubber O-rings and fluid damping employed on the four suspension towers. The turntable is closer to being 'damped' than 'suspended'.

Damping is also applied by a central fluid-filled unit that controls the motion of the sub-chassis and offers resistive grounding for vibrational signals, either acoustically induced or from the stylus. Finally, damping is continued up to the record itself with a diamond-cut Isodamp-faced heavyweight platter and a specially designed screw-down record clamp to minimise record resonance and warp.

My only criticism of the turntable's design is that the headshell of the pick-up arm stands proud of the turntable itself.

Although this facilitates easy stylus cleaning it could also result in easy stylus damage, especially since the Model 20 is supplied with a soft cover, like those used for computers, which could catch the stylus.

When set for carrying in its wooden packing case, the turntable

locks down completely. There is no play in any part of the Model 20 as it travels.

Setting up is easy and quick; a variety of SME-made tools for adjusting and setting up are supplied. One is not unlike a thick feeler gauge which sets the height of the subchassis; too high and the Model 20's damping system fails to act properly, too low and the subchassis 'bottoms out' onto the lower collars on

the Model 30 no spirit level is built into the base plate.

The feet of the Model 20 are ball bearings. As the turntable weighs forty pounds, they could mark a table. For expensive furniture, four little 'slippers' are supplied to prevent damage. SME would prefer the deck to be sited on a sheet of plate glass, even though they stress it is unaffected by its surroundings. I found the Model 20 appears to be far less influenced by a Mana table than, say, a Linn Sondek, suggesting it has great immunity to outside conditions.

Although the Series 20 is a suspended design, visions of a springy, bouncy deck like a Pink Triangle are way off the mark. The Model 20 doesn't bounce, rather it

If the cover is not used, the Model 20 will rapidly gather dust and it really needs a fine sable brush for cleaning - something SME don't, but usefully could, supply, preferably with the SME logo set into the plastic handle.

The first listening session with the Model 20 took place at Alastair Robertson-Aikman's own home, in his superb listening room, where we compared the player to the larger Model 30 to get an idea of its ultimate potential. Apart from the SME Model 20 and 30, both (naturally) fitted with SME Series V pick-up arms and two Clearaudio Insider cartridges, his system consisted of an LFD battery moving coil phono stage into an Audio Research SPI I Mk II preamplifier, Krell Reference power amplifiers and two pairs of extensively modified Quad ESL-63 electrostatic loudspeakers, sitting behind acoustically transparent curtains.

While it is very difficult to assess the quality of a product outside one's own system, listening in this context gave me some general guidelines. First impressions



A few good points to remember next time you choose a hi-fi unit.

Point 1. The AX-R742 (that's the amplifier in the foreground if you're not into serial numbers) has the kind of startling features to impress the most enthusiastic hi-fi enthusiast.

Six pre-programmed graphic equalisations plus six more you can create yourself. And for those even more in the know, it can handle both moving magnet and moving coil cartridges.

Point 2. The high-performance single cassette deck (TD-R452) has a new high-tech

direct drive motor for purer sound. Designed to decrease vibration, the deck also includes CD direct, Dolby B/C NR and Dolby HX-Pro.

Point 3. The CD player (XL-Z452) has the unique JVC 1-bit PEM DD which delivers highly accurate sound. It's less prone to mistracking

and read-out error and includes an optical digital output.

Point 4. The receiver (RX-506) has a built-in graphic equaliser and Dolby Pro Logic Surround for cinema sound experience at home.

Point 5. Each unit has a COMPULINK control system so one remote can control all JVC compatible components.

Point 6. You don't need to understand it all, you do need to listen to it all.

JVC

HI-FI + VIDEO + TV + TAPE

World Radio History

were of a distinct reduction of the noise floor. This was followed by a sound quality that gave the impression of being 'correct'; obviously in the reference class in every respect.

For example, I discovered an annoying squeak during the first track of the Lee Morgan track, 'Candy', from the Japanese Blue Note LP of the same name. This I had never heard before and could only

of the ultra-exotic Clearaudio Insider. The rest of the system consisted of a Pink Triangle Pip II preamplifier connected via Audioplan MusiCable Super AF interconnects to a John Shearne Phase One power amplifier and thence to a pair of ProAc Response One 'S' loudspeakers with A.R.T. cable.

Using the clamp, the Model 20's ability to override record warps is exceptional.

images in a holographic soundstage, a far greater dynamic range and it is as if there is simply more information coming off the platter. This does, however, create a sound that is slightly drier than usual and less involving, unless the SME Model 20 is partnered with the very finest of cartridges and amplifiers.

It is the bass performance of the SME Model 20 that really sets it apart, with a

force and intensity that can make you jump when playing music with sudden, dramatic percussion. I feel it redefines what is often called 'bass slam'. It peers deeper into the dark cavern of bass than almost any turntable that I have auditioned before, with an uncanny knack of adding an extra octave to the bass performance of the ProAc Response One 'S' loudspeakers.

In fact, this deep bass, played at very high volume levels, caused the Model 20 to encounter its only difficulty. Certain bass notes were played with such force that the room began to resonate. Eventually, as volume was increased, this energy began to feed back into the turntable. As the 'suspension' system uses a series of rubber bands instead of springs, this feedback took on a character not unlike a timpani roll played through damaged loudspeakers. However, in most

rooms, the sort of sound pressure levels needed to excite the Model 20 to feedback would be beyond normal usage.

Ultimately, the sound quality of the SME Model 20, although exemplary in comparison to the best of the specialist competition, all of which I have heard



The independent power supply of the Model 20, at left here, has 33, 45 and 78rpm speeds. It has to be accessible but not necessarily close to the turntable.

attribute to being a piano pedal in need of oiling. Although A.R.A.'s system is one of the most informative I have ever heard, such a squeak would normally be swamped by the noise floor of the turntable or the vinyl itself.

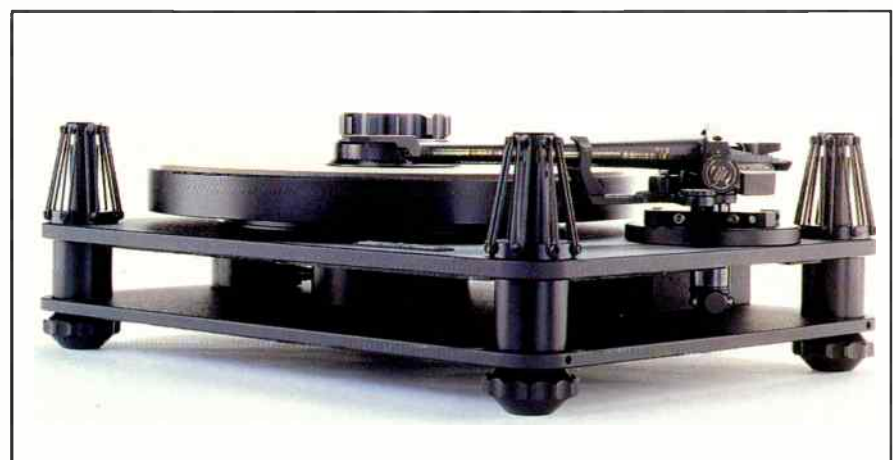
Comparing the Model 20 against the Model 30 showed just how much more detail could be resolved, yet the Model 20 did not disgrace itself in any way. On the most difficult passages of music, like the Athena Alexander Nevsky, the Model 20 resolved more detail than I have heard before - at least until I heard the same passage on the Model 30. Playing music with less complexity, the gap between the two decks narrowed.

People often speak of an 'architectural' solidity to a good deck's sound; both SME players are nearer to the monumental level. Hewn from the same sonic stone, the difference between the two is in sheer scale: the Model 20 is a Marble Arch to the Model 30's Arc de Triomphe.

There is an uncanny bass depth to the Model 30 which is not as profound in the Model 20. This is not to say that the '20 is bass-light, but the bigger deck has a control over the lower registers that is exemplary. It is this bass control, together with its ability to cope with complex music that justifies the extra cost and weight of the Model 30.

The next stage of the test was to put the Model 20 into my own system, using the superb Lyra Lydian cartridge, in place

Most record clamps or pucks help to force down the record and eliminate some of the warp problems. The SME's screw-down clamp is the best that I have yet encountered, enabling me to play records that were turning up at the edges like an ageing sandwich.



The towers at each corner of the turntable plinth support suspension springs that isolate the unit from external sound and vibration.

Once again, the absence of background noise was immediately apparent. There was no sense of strain or uneasiness at all and the overall sense of balance was fundamentally very neutral.

Compared to most 'mortal' turntables, the Model 20 has absolute stability of

comparatively recently, will probably be no less important than its longevity and visual qualities. Those with a substantial record collection, who demand the best, will probably buy it anyway. The next generation will be as appreciative of its qualities as this one - perhaps more so ●



World



HORN SCORN

When July's Hi-Fi World arrived on my door mat, Tannoy's "new" G.R.F. was on the front cover. Excellent! I thought, a new horn from one of my favourite loudspeaker manufacturers. First visual impressions were of a mini Westminster. Turning straight to the article, shock and severe disappointment set in. A reflex G.R.F.? Never! It breaks with tradition.

For those who don't know, there were three Guy R. Fountain models from Tannoy, the Autograph, G.R.F. and rectangular G.R.F. - all horn loaded. The Autograph was top of the pile, a monster of a loudspeaker, and like the ordinary G.R.F. model was designed to fit into your listening room's corner. This used the room walls as extensions to the mouth of the horn. Both corner models were designed in the good, old, brassy monophonic days, where if you did not have something the size of a double decker bus, you weren't taken seriously. Never mind cluttering the room up.

But with the introduction of stereo, two of these monsters became a bit too much. Tannoy produced the Rectangular G.R.F. "Introduced to simplify the accommodation of a pair of

loudspeakers for stereo" the brochure at the time claims. At just over three and a half foot high and with a foot print of 20 x 24 inches they are still on the large size, although more than acceptable for a horn.

All used the classic 15" dual concentric monitor units. Early drive units had enormous rare earth metal magnets, the size of which slowly shrank with the introduction of "new improved" units. The most popular drive unit (judging by what turns up on the secondhand market) was the Monitor Gold.

G.R.F.'s and all the classic Tannoys got the chop in the mid-seventies, to be replaced with the grossly inferior High Performance Dual range (HPD for short). The magnets were changed from rare earth to ceramic. Top dog was the Buckingham, three 15" drive units per side pumping out high SPL's with a claimed 1000 watts power handling; if any model fits Noel's description of coloured, bland, coarse and fierce this is it. The old G.R.F.'s never sounded anything other than superb, the only snag being their physical size. Westminsters (RHRs or not) are blown away by the Autograph fitted with the early drive units.

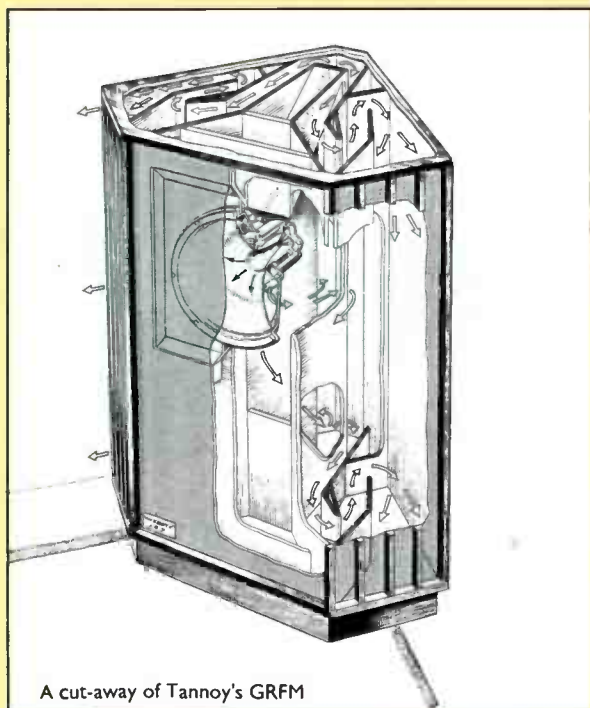
Tannoy's new G.R.F. memory is a doppelganger, an insult to the original loudspeakers, the name of Tannoy and the founder Mr Guy R. Fountain. Sure, this new model sounds good, but it's never a G.R.F. Names like Lansdown or York memory would have been better, and they still fit the style. To introduce a G.R.F. that has nothing in common with the older units is a great crime in my view.

Please Tannoy, don't abuse your reputation. I can't believe the Japanese are going to fall for this. Someone from Tannoy should explain the reasoning behind this abuse. I think it's a shame.

**Haden Boardman,
Audio Classics.**

The GRF Memory is reflex loaded because you just can't get a horn to work well enough in this size of cabinet. As Haden notes, the development of loudspeakers over the years has concentrated on making them more domestically acceptable in size and therefore the horn loudspeaker (together with the expertise associated with it) has become very thin on the ground, with the notable exception of our Westminster TW and Westminster Royal of course.

Reflex loading allows a deeper and more robust bass performance than horn loading in the GRF-sized cabinet. Put another way, reducing the



A cut-away of Tannoy's GRFM

Letter of

HI-FI STUDENT

I am a young student who reads your pages with enjoyment but, sadly, with an empty pocket. It is a case of 'if you can't buy 'em, build 'em.' So I remember reading in a magazine a year or so ago that there was a University/College course on Hi-Fi Audio Engineering for technically-minded hi-fi devotees.

Unfortunately, I cannot remember where this course is and have been unable to track it down. Could you please help?

For what it's worth, I like CD and vinyl, for different reasons.

Do I get shot now?

**Marcus Greest,
Reading,
Berkshire.**

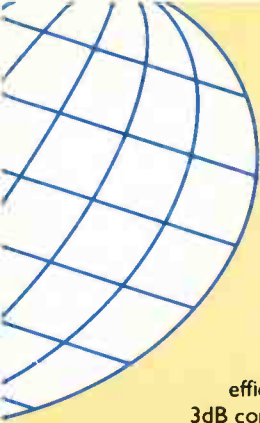
The best way to get your foot inside the door of the hi-fi industry is to approach a manufacturer with the intention of taking on a

holiday job/work experience (says Dominic Baker, who's just inveigled his way onto the magazine!). Most audio-based companies will be more than willing to take on an enthusiastic, well motivated student with a genuine interest in hi-fi. This approach will provide you with two main advantages when entering and leaving the Higher Education establishment:

1) Sponsorship is very useful to any student - as most will testify! - and this may be offered to you by your employer if you impress.
2) After a very short time you will know the majority of the Audio Industry Circle and more importantly they will know you. This means that when you finally are ready for the real world a job may well be awaiting you somewhere.

If you are considering a degree course at a University or Polytechnic then I would suggest you considered a more conventional subject such as Electronics or Acoustics or maybe a combination of the two - many

Send your letters to: Hi-Fi World Letters Page,



writes

efficiency by 3dB compared to a horn loaded design gives a more domestically compact and affordable solution. The GRF Memory has a new concept of Dual Concentric driver, using a waveguide for high frequencies, twin isolated magnet systems and magnetic liquid cooling to prevent acoustic compression. It's a considerable step forward from the old days.

Just to set the record straight, the old rectangular GRF was twice the size of the current GRF Memory; Tannoy's magnets did not include rare earth elements; the HPD (High Performance Dual) had an Alcomax magnet (aluminium, cobalt, nickel, iron

alloy); the Buckingham had a 10in midrange Dual Concentric with two 12in bass units and the GRF Memory has won the prestigious State of the Art award in Japan!

Alex Garner,
Technical Director,
Tannoy Ltd.

LASER SHARP WIT - NOT!

Being a user of the Leslie Phillips method of playing vinyl, as described in *The Navy Lark* many years ago, viz:- place record on knitting needle, spin record, use a pin to track the grooves and place ear as close as possible to listen. (This is how Mr. Phillips listened to his only record, a copy of 'Release Me'.)

I tried this method with a CD using a razor blade to try and

obtain sound, having been told that "CD's are read by razor". It did not work.

If this makes knitting needles redundant, please start printing knitting patterns. Thank you.

Peter Trout,
Erith, Kent.

I prefer the Van Gogh method of listening - cut off one ear and listen in mono. I also need a new sweater for the Winter. If I send the pattern, will you get busy with the needles? **EB**

As for me, I favour the Linda Lovelace method of playing CD's, but not in public. **AS**

Who's she? **NK**

COFFEE FROM IKEA

I recently found myself dawdling in Ikea, wondering whether to part with the princely sum of £22 for one of those natty little coffee tables as recommended for my LPI2. It was only upon leaving empty handed that I saw the one month money back guarantee and decided to "take the plunge".

Open mouthed after the little table had outclassed the two rather expensive (and ugly) dedicated turntable platforms I own, providing an upgrade of far greater magnitude than that of Basik to Ekos arm, I began to consider my actions. Had I really deliberated over spending £22 for the Ikea table when I'd gladly paid a fortune for the Ekos? It is a sad fact that we are often happy to be exploited in order to 'know' we have the best.

These days everyone seems to be exploiting our gullibility and artificially hiking prices. There are exceptions, such as Rega and JPW, but the majority seem to base prices on however much they think they can screw from us. Take for example the Linn Troika; does it really warrant over £400 more than the materially similar Asaka? Ditto the Ekos; it may be a little better than the RB300 I used on a Townshend Rock some time ago, but no way do I think its worth 8 times as much! Not wanting to single out one manufacturer I should add that other examples abound. Take for instance the near fraudulent prices asked for some passive

pre amps & cables.

If we are to counter this trend, the hi-fi press must take a lead. I applaud your articles on older gear, questioning the so-called recent advances, but I feel you could go further. I realise you cannot reveal the material costs of products, as you require a good relationship with manufacturers and dealers in order to survive. You could, however produce a regular feature highlighting those products (or manufacturers) that offer exceptional value in material and sonic terms. You could also place good value much higher in your priorities when reviewing.

I chose to write to your magazine as I believe the others are too obsessed with the latest most expensive products to take my plea seriously.

T. Edward,
Winlaton Mill,
Tyne and Wear.

Like that of trying to gauge reliability, quality of service and sample consistency, the question of 'value' is a matter that hi-fi magazines, even at their most critical, have difficulty with.

Like you, we feel some products are, shall we say, unrealistically priced. Our aversion to this sort of thing tends to keep them out of our pages. However, the cost of the components in a product isn't its main price determinant in the context of a small, specialist market.

For the market to support highly specialised items, they have to be paid for in an entirely different manner to those mass produced and sold in quantity. Look at the parts cost and you'll shout "rip off!". If everyone thought the same, then such items would never get built. That's the choice.

Reluctant to poke independent innovators in the eye, we're not quick to shout "rip off" in this magazine. If we did, then we would simply be making life that much harder for those who seek to break moulds, generate new ideas and produce stimulating new products. Who knows what extra goes into a Troika; perhaps it has an expensively hand lapped diamond?

The alternative is present all round us: big companies with massive advertising budgets and dull, often cynically designed products, launched on a wave of flimsy marketing hype that condescendingly treats all buyers as pliable idiots.

Continued on page 38...

The Month

employers still consider highly specialist courses such as Audio Engineering as 'Noddy' degrees.

However if you chose Electronics for example, by the time you completed the course you would have a thorough, solid knowledge of everything required to complete any audio engineering task. Additionally, you will have a wide enough background in electronics to be considered for a broad range of jobs.

I have listed below a few courses which I think will appeal to you. Ring the appropriate numbers and ask for a current prospectus which will provide you with more detailed information about the courses, conditions for entry and every other piece of information you will require before you apply.

If the courses below are unsuitable for you, then a trip to your local library, or to Reading University library where copies of all the current prospectuses for Colleges, Polytechnics and Universities are kept, will enable

you to continue your search for an appropriate course.

1) City of London Poly (071-320-1000)

Course: Electronics for the Audio Industry.

2) Brunel University (0895 274000)

Course: Electronic and Electrical Engineering for Audio Systems.

3) Salford University (061-745-5000)

Course: Electroacoustics (electronics and acoustics combined).

4) Southampton University (0703 595000)

Course: Engineering Acoustics and Vibration.

5) Paddington College (071-723-8826)

Course: Sound Engineers/Electronics (City & Guilds)

Good luck - and yes, you do deserve to be shot, but we can't afford to cull any more potential Audio Engineers.

DB

64 Castellain Road, Maida Vale, London W9 1EX.

CONTENDERS FOR THE CROWN

Six amplifiers battle for the budget crown.

Report by Alan Sircom.
Measurements by Noel Keyword.



Until recently, just a handful of amplifiers classed as hi-fi have competed with each other in the £200 market. Once dominated by companies like NAD, Rotel and Denon, this niche is now attracting more competition, with developments from the upper echelons of amplifier design filtering down. There have been some notable successes. Pioneer's A400 administered a sharp kick to established designs, for example

Seeing this, other manufacturers have been keen to follow - witness Sony's TAF-440E, a new low-cost amplifier featured here. It joins the race alongside Harman-Kardon's recently introduced budget offering, which was quick to set a new pace. Sony - like Arcam with their Alpha 3 - are obviously trying to steal some of Pioneer's thunder.

Among these new contenders for the budget crown, and the now well-established Arcam Alpha 3, we test two household names that previously set the standard: Denon's PMA-350 and NAD's 3240PE. Joining the group is a rarer model we've grown to admire: Sugden's A25B is no less worthy than its rivals, it just has a lower public profile.

These amplifiers are battling for a richly diverse market. At around £200, not every prospective buyer is looking for a no-frills audiophile device, but neither are people necessarily searching for an all-singing, all-dancing amplifier that drips functions.

Although, in this test, we have looked for an overall balance of good sound, coupled with acceptable build quality and presentation, an amplifier that is best suited for a specific need should not be overlooked. For example, if you have six different sources you want to conveniently switch between, this limits the choices considerably.

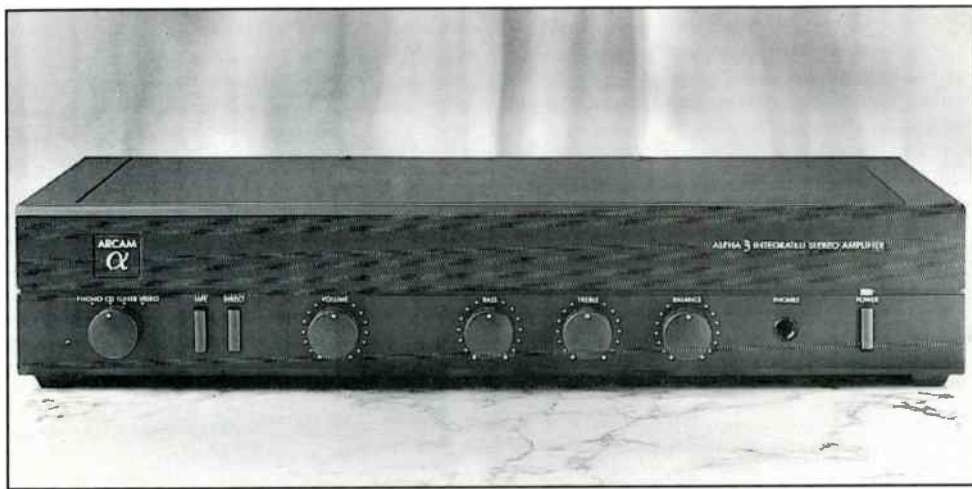
There's a large difference in available output power from the units in this group, something that might perplex potential buyers. Even though the step up from 30watts to 100watts of output is a clearly discernible one. A 100watt amplifier is not three times louder than a 30watt amplifier. So whilst a 100watt amplifier does go louder than a 30watter, the extra loudness isn't great. With sensitive loudspeakers, restrained listening levels and small-ish rooms no more than 30watts or so will usually be needed. Anyone wanting to go really loud should, however, look for more than 50watts or so.

Matching an amplifier to the rest of a system these days is as much a matter of individual taste and interests as it is to do with electronic compatibility. A Baroque music enthusiast might be as unlikely to enjoy listening to a muscular powerhouse of an amplifier as a Motorhead fan would be impressed by a light, clean and soft sounding one. The smoothness and subtlety that would seem very right with Baroque would be judged equally wrong for Motorhead. Such matters are, ultimately, in the ear of the beholder.

Ideally an amplifier should do as little as possible to the signal, merely making a low level signal powerful enough to drive a pair of loudspeakers. The best way of doing this cost-effectively is to leave out all gadgets and facilities, including tone controls of course. Since tone controls are often fail to provide the sort of subtle adjustments usually needed by users, this is not a bad thing.

However, perhaps sensing that many people feel unable to do without them, manufacturers like NAD and Arcam have re-engineered their controls to give better results, with less maximum lift and cut, but fine adjustment at the extremes of the audio spectrum.





ARCAM ALPHA 3

£199.90

Arcam's latest Alpha 3 represents the fightback of the quality, budget British amplifier, in response to the challenge made by the Japanese Pioneer A-400 and Denon PMA-350. Both the latter have met with a lot of success, due primarily to their truthful reproduction of musical dynamics.

Apart from detail alterations, the only addition to the front panel that distinguishes the Alpha 3 from its predecessor is the Direct button which, like the PMA-350's, disables the tone controls. The rear panel is similar, save for chunkier loud-speaker terminal posts. There are two sets - Switched and Direct. These options

allow headphones to mute the speakers when used, or not. Two pairs of loud-speaker outputs also allow bi-wiring to be used.

Internally, the Alpha has undergone a major redesign. The power output has been increased from thirty watts to forty. Bigger power supply capacitors are used, along with a weightier transformer and air-cored inductors. These internal improvements have cost us the optional moving coil phono stage - the Alpha 3 is now moving-magnet only.

The front panel has a plasticky feel, and the balance and volume pots have a light movement, but the controls are well laid

out with plenty of space between them. Although styled to suit the other items in Arcam's budget 'Alpha' range (a Compact Disc player and tuner) it blends in well with most other standard-sized products.

A label saying "Arcam recommends AudioQuest cables" (which they import) on the Alpha's packaging does not mean that there are problems with other brands.

SOUND QUALITY

While the Denon PMA-350 is coarse yet powerful sounding, Arcam's amplifier is the opposite - smooth and slightly underpowered. Yet it does have a terrific sense of balance, making it an excellent all-rounder.

No quality is overstated, yet conversely none is sacrificed. Instruments are clear and detailed, well focussed within the soundstage, but with less of the precision and clarity of more expensive products.

The Alpha 3 has a typically 'Arcam' sound quality: warm, easy and relaxing. It is a marked improvement over the previous Arcam amplifier but not stretching the warmth a little too far.

Although Arcam's new model has a good sense of clarity, if there are any characteristic traits in its signature, they are a slight thinness and hollowness to female vocals and brass instruments. It never reaches the realms of reedy-ness but it can appear too lightweight, a bit too fleet of foot on some music with a tightly defined and solid low end.

There's also some softness in the bass. Many will find this gives the amp a relaxing warmth, but fans of Thrash Metal and Grunge Rock, like Nirvana, may want to look elsewhere.

While the Arcam is not as much of a powerhouse as either the Harman-Kardon or the Denon, it still has enough power to play loud when partnered with a pair of efficient loudspeakers. Once again, Metal, House and Rap fans would find its lack of grunt a disadvantage, but for mortals who value their hearing, the power output of the Arcam is not a limitation.

With budget loudspeakers, the Arcam is so well balanced that both the Mission 760i and the Goodmans Maxim 3 models (tested in our last issue) would suit it, depending on individual taste. The new Celestions 1s reviewed by Dominic Baker in this issue would be suitable too.

Where the Arcam scores above its Japanese competitors is in its disc stage. It's every bit as good as the line stages, something which is becoming increasingly rare in today's CD-dominated market.

CONCLUSION

The Arcam Alpha 3 deserves some laurels. It is a smooth and satisfying amplifier, one that should last for years.

It may be a little too graceful, too refined and lacking in power for the headbanger, but it is still a fine amplifier at the price, offering excellent value and setting a standard to beat in its disc input in particular.

MEASURED PERFORMANCE

The little Alpha 3 turns out just 50watts per channel. That's enough to make the average loudspeaker go loud, if not very loud. Power increased healthily into low loads, so the Alpha handles awkward and demanding loudspeakers well.

The CD input has good subsonic extension down to 4Hz, but a top end that goes no further than it has to: the Alpha starts to roll off above 20kHz to become -1dB down at 40kHz; it doesn't amplify what isn't needed.

Low noise, good channel separation and high sensitivity also characterise the CD input (as well as tuner and tape), making the Alpha 3 compatible with a wide range of partnering components. There's little measured distortion, just 0.004% in the mid-band and a small rise as is usual to 0.01% at high frequencies. With second harmonic dominant I would expect the Alpha 3 to sound smooth and free from coarseness.

The disc input (MM) was one of the quietest of the group; hiss and hum won't be heard. A warp filter rolls off gain below 50Hz, to stop cone flap with reflex loudspeakers. Sensitivity is high at 2.2mV, so low output cartridges can be used. The Alpha has a fine disc stage.

Arcam have fitted excellent tone controls. They work usefully at low settings, to give gentle amounts of boost or cut, and alter only deep bass and high treble, rather than upsetting the whole audio band.

The Alpha 3 is a well developed and balanced little amplifier that measures well in even the darkest corners of hi-fi amplifier behaviour. **NK**

POWER 50watts

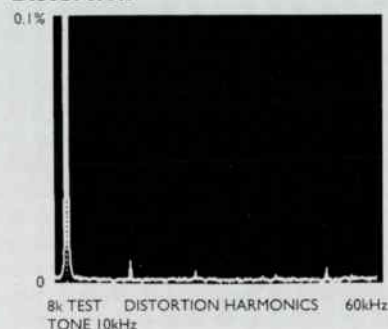
CD, TUNER, AUX.

Frequency response 4Hz-40kHz
Separation 76dB
Noise -98dB
Distortion 0.004%
Sensitivity 200mV
dc offset 3/0mV

DISC

Frequency response 50Hz-40kHz
Separation 66dB
Noise -76dB
Distortion 0.005%
Sensitivity 2.2mV

Distortion



A trace of second harmonic distortion (0.01%).

Collaboration between Denon Japan, Denon UK and a British amplifier designer produced a customised-for-the-UK amplifier in the PMA-350. There is provision for two sets of loudspeakers and the '350 comes with tone controls, but superfluous loudness buttons, or flashy LED displays are not part of the design. Even the tone controls have a 'Source Direct' button that disables them.

This does not mean that the PMA-350 is a bare-bones design; far from it. Apart from offering outputs for two sets of loudspeakers, the '350 has a headphone circuit and facility for accepting a turntable (moving magnet cartridges only), Compact Disc player, tuner, auxiliary and two tape machines, with good tape monitoring and dubbing facilities.

There is no gold-plate on the input sockets, but this is one of the few outward signs of the PMA-350's low price. Two sets of loudspeaker terminals can accept either bare wire, up to about the thickness of QED 79 Strand, or 4mm banana plugs.

The build quality of this amplifier is very good for the price. Internally, there is a solid heatsink running along the middle of the chassis, with a beefy screened transformer to the far right, adding weight to the amplifier. In common with other budget models, the Denon lacks the silky feel of more expensive models, but its controls react very positively, suggesting it is built to last.

Denon recommend the PMA-350 should be burnt-in for at least four hours before use. Letting it stand for twenty minutes after switching on then ensures that it performs at its optimum.

SOUND QUALITY

When originally tested, the PMA-350 impressed us with its deep, powerful and well-controlled bass, but its sound quality was a little hard-edged overall. Amplifier design has taken several steps forward since and now, although the Denon is still impressive sounding, it is outclassed by the likes of the Harman-Kardon and the Arcam.

Where the PMA-350 scores highly is in its forcefulness - something that may beguile first-time listeners. It offers a very forward presentation, which although acceptable, may prove too intense with loudspeakers such as the Goodmans Maxim 3. Playing Little Feat, the Denon squeezed Lowell George right to the front of the soundstage, something I felt was a little inaccurate in presentational terms. Of the loudspeakers in our budget test last month, Mission's 760i or the Castle Trents would suit this amplifier's character, smoothing some of its forwardness away.

On the Little Feat recording, it was clear that the bass definition of the PMA-350 was a little special. Drums were tight, fast and clearly defined and in this the Denon was only matched by the Arcam and bettered by the Harman Kardon. Bass was at once plentiful, deep and well controlled - it had lots of 'wellie'. Play a



DENON PMA-350

£169.99

driving rock track by Nirvana, and the PMA-350 turns loud and proud, with grunge and enough force to make your head bang and your hair grow.

It was with Classical music that the '350 began to show its weaknesses more clearly. Although its weight, power and bass delivery made Rock sound impressive, other features of the Denon's sound made Classical programme sound ragged by comparison. At the time of its launch, the '350 sounded clear and detailed, if a little bright and 'hi-fi' sounding. Now, blemishes are becoming more apparent.

Both phono and CD inputs were well matched in sound quality terms, although I

feel that the line stages (i.e. CD) were performing slightly better than the disc stage. They had a similar tonal balance, but phono lacked some finesse compared to CD.

CONCLUSION

It's surprising how fast the amplifier market moves forward. Little more than eighteen months ago, the PMA-350 swept the board to become the budget amplifier to beat. Today, while still a fundamentally good design, it can be out-performed by a number of later arrivals, most notably Harman-Kardon's HK 6150. Although barely out of short trousers, the Denon PMA-350 already shows its age.

MEASURED PERFORMANCE

The PMA-350's tone controls have been carefully designed to give just a reasonable amount of boost and cut at extremes of the audio band, without affecting the mid-band when low settings are used. Additionally, the amounts of boost or cut decrease as volume level goes up, both to suit the ear's increased sensitivity at high levels and to prevent loudspeaker damage.

In spite of its relatively compact dimensions the PMA-350 turns out 78watts, which is plenty enough to make even insensitive loudspeakers go pretty loud. Power increases into low loads, rising to 132watts, so low impedance loudspeakers usefully get even more from the amp.

The Denon has been tweaked to reflect the UK outlook of using just enough feedback to get distortion down to a sensibly low level, usually taken as around 0.1% maximum. The benefit of reduced feedback is better perceived dynamics. But some second and third harmonic distortion can be seen in the analysis. I do suspect that this distortion is responsible for some of the coarseness in the amp's sound.

Bandwidth on CD and LP (phono input) is wide, about which I have some reservations. I prefer Arcam's approach, with a warp filter on LP and curtailed high frequency gain on all inputs. Otherwise, the disc input (MM only) measured very well.

The Denon is a potent little amp, well designed, even in areas where Japanese amps are traditionally weak, like the tone controls. It has certain UK preferred characteristics, which enhance its appeal. **NK**

POWER 78watts

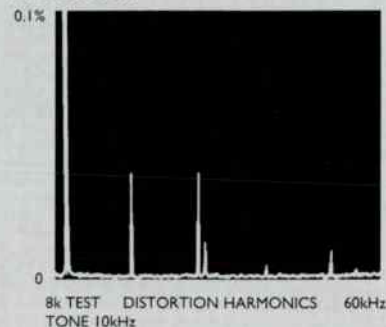
CD, TUNER, AUX.

Frequency response 5Hz-60kHz
Separation 62dB
Noise -100dB
Distortion 0.05%
Sensitivity 200mV
dc offset +3/-7mV

DISC

Frequency response 17Hz-80kHz
Separation -67dB
Noise -79dB
Distortion 0.05%
Sensitivity 3mV
Overload 160mV

Distortion



Some low order distortion of 0.05%



HARMAN-KARDON 6150

£159.95

Of all the amplifiers in this test, the HK6150 has the cleanest lines. It is stylistically under-stated, with only one green power LED above the on/off switch. Close by are a headphone button and a series of six similarly sized rotary controls for speaker selection, bass, treble and balance, tape monitoring and a source selector. Finally there is a large volume control knob and a loudness button.

All the controls have a positive feel to them and the amplifier in general is weighty and sturdily built. The internal wiring is a bit untidy, but no worse than

others at the price. Harman-Kardon use discrete components in the signal path, as opposed to integrated circuits, often used for the sake of lower cost. The '6150 is a high current design, using a good transformer which is supposedly responsible for its good bass handling and powerful sound.

Where most amplifiers operate in the 20Hz-20kHz range, roughly tallying with the limits of human hearing, the '6150 has a much wider bandwidth, from about 5Hz to well beyond 100kHz.

The amplifier accepts moving magnet cartridge, Compact Disc player, tuner,

video and two tape recorders, using solid phono sockets at the rear. Binding posts do not accept thick cables, or spade connectors - and 4mm plugs only fit after a fight. According to the manufacturers, this is to comply with safety requirements in some European countries which do not permit banana sockets on amplifiers. As with a number of others in this test the two-core mains cable is a captive lead, not a removable IEC or Telefunken plug as used elsewhere.

SOUND QUALITY

With this amplifier one can confidently talk of 'sound quality' instead of just 'sound'. Subjectively, the '6150 has a musical and graceful performance. It quickly established itself as the reference amplifier in this test.

Amplifiers like the Arcam can smooth over rough edges; the HK6150 is more honest. It has the most neutral balance of all the amplifiers in the test. This becomes most noticeable with Classical music, where orchestral voices sound surprisingly natural. While other amplifiers in the group would be good partners for some of the budget loudspeakers tested last month, this design is capable of more; Rogers LS2a2 loudspeakers would be a sensible match, for example.

Many of the Harman's competitors have a sound that is initially more exciting and impressive, but ultimately the '6150 wins out in long-term listening, as it has less of the fatigue factor of its peers.

This is not to suggest it sounds bland or uninvolved; play music like The Black Crowes or Nirvana and the '6150 will headbang like no other budget amplifier. But it won't sound sharp or fierce with anything, save the most jangly of jangly guitars.

There was a minor sharpening through the disc stage that may preclude 'starter' cartridges, which will sound a little over-bright as a result. With a good quality cartridge, however, there will be no problem and even with a bright one the sound was seldom harsh.

No part of the audio range was overblown, although really deep bass could become a bit carried away with itself, especially when using the loudness button (which adds some lumpiness to the sound).

The '6150 was superb in its stereo imaging. It has three-dimensionality to the stage it reproduces, with individual images well focussed upon it. There was some flattening of front-to-back image depth, but this was only to be expected at the price.

CONCLUSION

This is the amplifier that should be at the top of the prospective budget amp buyer's shopping list. It stands toe-to-toe with amplifiers like the Arcam Alpha 3 and Sugden from a sonic standpoint, yet is nearly twenty per cent cheaper. Although it may belong in the domain of budget equipment, it never shows a lapse in character. A great bargain.

MEASURED PERFORMANCE

The '6150 is no powerhouse: output measured just 45watts into normal loudspeakers, enough to make them go loud, but not very loud. This is an amplifier to be matched and used with care.

Like its predecessors, the Harman is a 'widebandwidth' design. The CD input stretches from 3Hz right up to 160kHz. Whilst many wide bandwidth amps sound a bit edgy and 'grey' in their treble quality, the 6150 seems to be a rare-ish exception in that it has the brightness or openness, but not the 'greyness'.

Measured distortion was low at around 0.02% but not non-existent, suggesting the amount of feedback applied has been deliberately limited. The analysis shows the presence of both second and third harmonics, but interestingly there was no rise in distortion at high frequencies, pointing to the use of very 'fast' transistors.

The LP (phono) input reaches right down to sub-bass frequencies, which is a little unwise without the option of a warp filter. Warps are likely to cause cone flap on reflex loudspeakers. Otherwise, the phono input was quiet and generally well engineered.

The CD input was engineered well in all areas. Harman fit tone controls, of which the bass control worked well but the treble did not, affecting the entire audio band and producing a shelving effect at all, except high, settings.

The 6150 isn't especially powerful, the tone controls are so-so and the subsonic extension on disc could cause speaker cone flap. Niggles apart though, it measures well and it has proven sonic abilities. **NK**

POWER 45watts

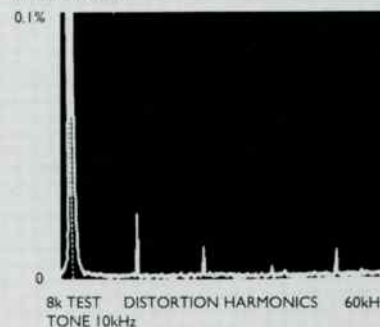
CD, TUNER, AUX.

Frequency response 3Hz-140kHz
Separation 70dB
Noise -96dB
Distortion 0.02%
Sensitivity 200mV
dc offset 4mV

DISC

Frequency response 6Hz-85kHz
Separation 78dB
Noise -80dB
Distortion 0.03%
Sensitivity 2.4mV
Overload 95mV

Distortion



Low distortion, but some second and third harmonics

NAD's 3240PE has the distinction of being the elder statesman in this group. Externally, its styling is typically NAD and today looks rather dated - harping back to the first NAD designs of 1978. In use the amplifier feels a little plasticky, although at the same time it is solidly built and weighty. Although feature-packed compared to the basic 3020i, in fact there is little on the 3240 that is trivial in nature or superfluous.

Below the on/off button is a headphone socket, which does not interact with the loudspeakers, as they can be switched off independently using an adjacent rotary selector. Then come the bass, treble and tone controls, followed by three small buttons. The first is marked 'Bass EQ' and is used to boost the low end of poor recordings and smaller loudspeakers; I found it added a noticeable thickening to the sound. There is an infrasonic filter, said to avoid amplifying non-musical signals below the audio band, and a mono button.

The tape monitor switch is situated below two soft-glowing LEDs; one shows that the 3240 is powered up. The second is a 'Soft Clipping' indicator. It is a unique NAD circuit that causes the amplifier to sound smooth rather than harsh when volume is set so high that intermittent overload occurs on musical peaks.

Along from the tape monitor button is the source selector for moving magnet phono, CD, tuner and video/tape 2 line input. Two smaller buttons, for muting or low level and loudness control, are then followed by a concentric volume and balance control.

At the rear, beside the usual phono sockets - gold for phono and CD - there are two removable external links that join the preamplifier stage to the power amplifier, thus allowing the 3240 to be used as either a pre or power amplifier. A captive two-core mains lead and rather scrawny loudspeaker terminals complete the picture.

SOUND QUALITY

The 3240 sounds like a beefed-up version of the budget classic 3020i. It has a deeper, more solid and better defined bass and also a generally soft and relaxed presentation, like the rest of the NAD breed. It bears comparison with the Arcam Alpha 3.

The 3240 is neither the most clean or clear of amplifiers, sounding a bit muddled against the best in this test. The phono stage especially sounds suppressed and lacking in life. At the same time, it has a bright and sharp balance on the wrong material. This can give an impression of detail but it will add a sting to a poorly engineered, bright-sounding budget cartridge or turntable.

Through the line stages, the 3240 offers a more balanced presentation, similar to the Harman-Kardon 6150. Although not ultimately as clean as the Harman, the 3240 is every bit as dynamic and forceful.



NAD 3240PE AMPLIFIER

£199.95

Its generally even balance suits Classical, Jazz and Rock equally. Imagery is a little soft-edged, like the Arcam, though with better depth, but instruments within the soundstage are vaguer and harder to pin-point.

What is impressive about this NAD is its ability to play music with some force, especially with regard to bass lines. Traditionally, lower priced amplifiers have sounded bass light due to weak power supplies. The 3240 was one of the first amplifiers in its class to have sufficient current delivery to provide strong, solid bass.

For CD replay the 3240's powerful and fundamentally neutral qualities make it a

sensible partner for a good budget system. Of the two loudspeakers that came top of last month's test the Goodmans Maxim 3 would suit the 3240, while the Mission 760i may sound too rounded and tubby.

CONCLUSION

Dated looks and a poor phono section let the side down a bit, but the 3240 is a good upgrade for those who like the sound of the humble 3020, but want a little more power. It lacks the detail and clarity of the Harman-Kardon 6150 or some of the grace of the Arcam Alpha 3, but it is still a contender.

MEASURED PERFORMANCE

The NAD 3240PE is even more powerful than the Sony: it turns out 112watts - enough to make any loudspeaker go very loud. Finding that a majority of British loudspeakers have an overall impedance above eight ohms, requiring lots of volts to force power into them, the 3240PE looks to be very appropriate. It really does swing volts and I'd recommend it to those who demand high listening levels.

The bass boost button marked Bass EQ gives a small but useful +4dB lift at 40Hz to pep up small loudspeakers. It's an addition that many will appreciate I suspect.

The disc stage has a slight upward lift towards the treble, which will act to subtly brighten its sound. Treble rolls off above 20kHz and bass rapidly below 21Hz to become -10dB at 10Hz - enough to suppress disc warps effectively.

The bass tone control works below 200Hz to provide gentle boost and cut, except at extreme settings when it suddenly becomes gross. The treble control worked well also.

The disc input was quiet, but it is also a bit insensitive at 5mV; with low output cartridges volume will have to be cranked up.

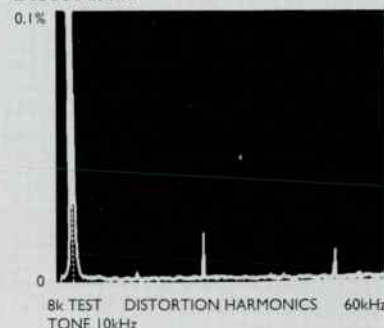
As always, this NAD has low distortion, but the distortion components were odd-order (i.e. 3rd, 5th, etc), which often gives a sharp or fast sound. However, NAD also band limit above 20kHz, which has the opposite effect. Quite what the final sound is can only be determined by listening.

The 3240PE is both powerful and well engineered. It offers great value, as always from NAD. **NK**

POWER	112watts
CD, TUNER, AUX.	
Frequency response	13Hz-33kHz
Separation	70dB
Noise	-106dB
Distortion	0.007%
Sensitivity	320mV
dc offset	-7/+2mV

DISC	
Frequency response	21Hz-33kHz
Separation	68dB
Noise	-81dB
Distortion	0.007%
Sensitivity	5mV
Overload	140mV

Distortion



Some odd order distortion of 0.02% at 10kHz



SONY TA-F440E AMPLIFIER £199.99

Physically, the Sony TA-F440E closely resembles that scourge of the UK hi-fi amplifier industry, the Pioneer A-400. Determined to get a slice of the A-400's cake, the F440E has a broadly similar style, lacking unnecessary details and buttons.

The front panel is very restrained. Only the headphone socket and the selector switch for two pairs of loudspeakers make any concessions to convenience. The rest of the amplifier is pure audiophile, with a distinct absence of any extraneous facilities that may affect its sound quality.

Apart from the headphone button and speaker selector switch mentioned above,

there are only four other controls. Above the headphone socket is the on/off switch, with an indicator light that glows red during the amplifier's brief warm-up period, turning to green soon after. Next to the speaker switch is the 'Record Out' selector.

On the right is the input selector and finally the large volume knob. There are no balance, tone or loudness controls. The rear panel has a vertical group of phono sockets for source inputs: moving magnet phono, CD and tuner sockets in gold, while the remaining auxiliary line input and two tape input/output phono sockets are nickel-plated.

At the rear of the amplifier nestle two sets of sturdy loudspeaker terminals capable of accepting almost any kind of cable. The only problem with them is that they are close together, making access slightly difficult. For those using 4mm banana plugs, there is no problem, but spade connectors or heavy bare wire may be fiddly to fit. Below these terminals is the captive two-core mains lead.

Internally, the TA-F440E amplifier is solidly constructed, with a large screened transformer and chunky heatsinking. The circuit board layout is simple and minimalist. It is a weighty amplifier, with a very positive feel, as if it is built to last, as opposed to being built down to a price.

SOUND QUALITY

The Sony sounds highly detailed. Every ounce of information is wrested from whichever stage is in use. It has a somewhat odd tonal quality, however, which is most noticeable on disc input. Although being both detailed and highly dynamic, it sets up a rather two-dimensional soundstage.

In addition, there is a very hollow quality to vocals, no matter what input is in use. Vocals are pushed forward, but given a nasality that is difficult to listen to for any length of time. This worsens with increased volume. The phono stage is silent, but has a 'forward' sound similar to that of the line stages.

In demonstration, especially in an environment where imagery cannot readily be distinguished, the F440E's forward presentation, allied to its powerful delivery, would sway many a customer. Once again, considering the loudspeakers tested in the previous issue, the Mission 760i would ameliorate some of its brightness and forwardness better than the Goodmans Maxim 3s.

This is a powerful amplifier, capable of very high volume. It also has ample amounts of bass - too much in fact, as often the bass can become overbearing, especially with smaller loudspeakers. At higher volume levels electric bass guitar and drums become intensely powerful sounding, yet with little of the definition provided by more expensive designs.

While the strongly detailed nature of the '440 shines through, it can, at times, result in a brightness and treble sting. This amplifier has plenty of bite and power, but for long-term listening I would prefer swapping some of that for greater smoothness and subtlety.

Impressive initially, the Sony's loud, powerful and dynamic performance will endear it to many, yet ultimately I find such a presentation wearing.

CONCLUSION

Too forward and too unsubtle for many tastes, the Sony TA-F440's sheer power, dynamic range and detail will endear it to those who can live with the brightness that ensues. It apparently aims to be an A-400 beater but in trying so hard, it loses sight of the music.

MEASURED PERFORMANCE

Like the NAD, this amplifier is a powerhouse. Output measured 98watts into a normal eight ohm load, increasing to 170watts into a low four ohm load. With low impedance loudspeakers in particular, the TA-F440E will be able to produce really high volumes.

At low volume levels, distortion was negligible, as the analysis shows. The value of 0.005% is, to some extent, a measure of noise. At high volumes, the same result was produced. This is as much a result of overall gain/bandwidth and the amount of feedback the designer has chosen to apply than unusual design flair. Most UK companies prefer to limit feedback in the belief that better dynamics and a more open sound can be obtained, a small amount of distortion that can be measured but not heard being acceptable.

Sony have given the '440E a wide bandwidth; via CD response measured 7Hz-85kHz within -1dB limits. The upper limit is unnecessarily high for CD, since signals above 20kHz are very much not wanted. However, few manufacturers at present give this much consideration. With high sensitivity, low noise and adequate separation the big Sony will match a wide variety of sources well.

The disc stage accepts moving magnet cartridges only. It also has wide bandwidth, there being no warp filtering. In some set ups, this will result in loudspeaker cone flap. There was very little hiss; this is one of the quietest amps I have ever measured via the disc input.

The TA-F440 is well engineered, in the classic Japanese mould. It is a high feedback design - one with bags of power. **NK**

POWER 98watts

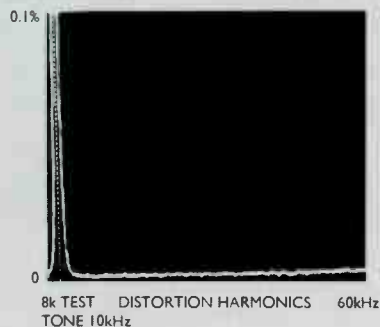
CD, TUNER, AUX.

Frequency response 7Hz-85kHz
Separation 62dB
Noise -90dB
Distortion 0.005%
Sensitivity 150mV
dc offset -3/-1mV

DISC

Frequency response 10Hz-90kHz
Separation 57dB
Noise -86dB
Distortion 0.006%
Sensitivity 2.2mV
Overload 130mV

Distortion



Negligible distortion of less than 0.005%

Even though the A25B is Sugden's least expensive amplifier, the hand-built quality this Yorkshire based company brings to its products shines through. Here's an amplifier that feels solid, but is simple to operate.

Some small details looked a bit amateur, notably the two square pieces of metal designed to hold the top panel in place. They appear to be an afterthought, incongruous given the fine build quality of the remainder. A couple of small screws would have been better.

Apart from this little quirk, there was little to differentiate the A25B from more expensive integrated amplifiers in Sugden's range, externally at least.

The front panel possesses five small push button input selectors, an on/off button with attendant recessed green LED and a central, click-stop volume control knob. The five sources catered for are moving magnet cartridge, tuner, Compact Disc, auxiliary line input and tape circuit. There is no provision for tape monitoring but since three head tape machines at the A25B's price level have been thin on the ground until recently, such an omission is perhaps understandable.

The click stops, or notches, on the volume control are well spaced, allowing comparatively fine control of the volume level.

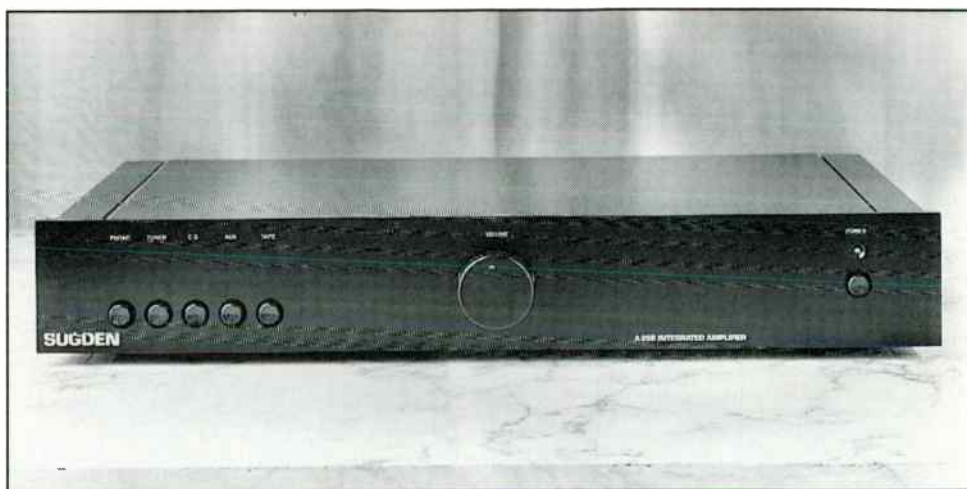
Black print on the aluminium rear panel makes for clear reading of the legends beside the input sockets. All are decently spaced and are solidly attached. None of the phono sockets are gold-plated and curiously they are not labelled left or right, leaving a moment's guesswork before connecting up a source following the cue given on the loudspeaker terminals, which do have a legend. Finally, mains connection is through a thick three-core captive lead.

SOUND QUALITY

Not only does the little A25B look more refined than many of its peers, it also has a sophistication to its sound that is sadly lacking in most of its immediate competitors. Like the Arcam Alpha 3 and Harman-Kardon 6150, the Sugden A25B is remarkably vice-free, especially when the price is taken into account.

Against the Harman-Kardon, which quickly established itself as the reference for this test, the A25B had a broadly similar and satisfying tonal balance, but with a bit of added warmth. In that respect, it fell between the HK 6150 and the Alpha 3, making these two amplifiers sound respectively clinical and warm.

There was no trade-off of detail for warmth, however, as the A25B was resolving every bit as much detail as the best of the rest. Instruments were clearly separate entities and the passionate playing of a Du Pre or a Hendrix was easy to follow. Ambience and reverberation were also clearly portrayed, although not in a manner that depicted the acoustic with total accuracy. This budget model lacks the ultimate detail of the larger A48 or an Audiolab 8000A, but that is only to be expected given the £100 price difference.



SUGDEN A25B AMPLIFIER £219.00

Unlike the Arcam Alpha 3, the Sugden had dynamic range aplenty. It was only matched by the Sony and the Harman-Kardon in this respect, with the Sony's lack of coherence negating it as a front runner. The A25B's coherent performance made it very versatile, able to play Rock Jazz or Classical music with equal aplomb.

In fact, there were only two minor transgressions that could be noted. It had a slightly 'muggy' presentation of stereo. It was not unfocussed but there was a blurriness to it. This applied equally right the way across the soundstage, as opposed to the very edges alone. A similar, if much reduced, effect was noticed in the more upmarket A48.

The other fault is more minor from a

subjective point of view. The A25B's phono stage, although as warm, detailed and dynamic as the line stages, was slightly noisier than that of the other amplifiers in the test. This would not pose a problem with cartridges like the Rega Elys, but would preclude high output moving coil designs like the Sumiko Blue Point, whose output would prove low enough to make the circuit sound slightly hissy.

CONCLUSION

Definitely one of the leaders in the £200 amplifier field, the Sugden A25B has a lot to commend it. This solid little amplifier proved to be one of the most listenable in the test - the only alternative to the HK6150 and better balanced than the popular Arcam Alpha 3.

MEASURED PERFORMANCE

The A25B produces a modest 36watts of output power into a normal eight ohm load, enough to go reasonably loud with most loudspeakers, but not very loud. The figure increases to 56watts into a low four ohm load, a value some loudspeakers are tailored down to. Just about every UK designed budget speaker measures eight ohms or more, however, so the lower output power will generally apply.

I notice that Sugden have brought down the upper frequency limit of the disc stage from 61kHz to 28kHz since I last tested an A25B, but no limit has been applied to the CD input, which remains wideband; it stretches from 7Hz up to 94kHz. Wideband amps, contrary to all simple theory, do commonly seem to sound clearer and more open than band-limited designs. This is more likely due to the 'speed' of the transistors used, than the actual frequency limits themselves.

The disc input is hissier than most, so high output moving magnet cartridges are best used. Otherwise, all input conditions were well tailored.

Comparison of the performance of this new sample with our records of an earlier one show that distortion has changed from multiple harmonics to second harmonic only, as the analysis shows. Since second is benign in its sound, I would expect this to result in a subtly smoother quality to be apparent.

The A25B is simple but well engineered, albeit with low power and a hissier disc stage than most. **NK**

POWER 36watts

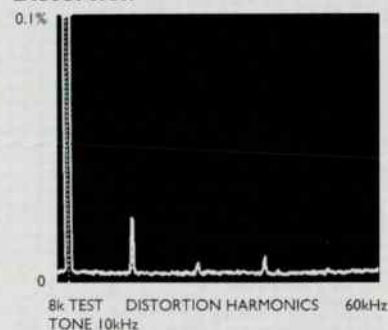
CD, TUNER, AUX.

Frequency response 7Hz-94kHz
Separation 73dB
Noise -101dB
Distortion 0.004%
Sensitivity 260mV
dc offset 6/6mV

DISC

Frequency response 20Hz-28kHz
Separation -58dB
Noise -69dB
Distortion 0.005%
Sensitivity 2mV
Overload 63mV

Distortion



A little second harmonic distortion

harman/kardon *HK6150* i n t

Power

Headphones

Speakers

Off

1

2

1+2

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AMPLIFIER CONCLUSION

There's no outstanding loser in this pack. Since even the weakest models have some useful strengths, the last three amplifiers to come out of our selection process are grouped together. They are the NAD 3240, the Denon PMA-350 and the Sony TA-F440E.

the grace of the Pioneer through the mid-band and treble, even if it matches its grunt lower down. Paradoxically, this is most apparent with small loudspeakers, where deep bass notes grumble away.

Although under two years old, times have moved on, leaving the Denon PMA-350 looking dated compared to the new

has a distinctive sound, although they all have a common trait of smoothness and ease of listening.

Arcam's Alpha 3 amplifier is a successful reworking of an earlier classic, redesigned to combat the assault made on the market by the infamous Pioneer A-400. Although displaying a typically warm and rounded Arcam sound, this amplifier is more than capable of complementing a large variety of source components and loudspeakers.

The Arcam has a civilising influence, but it also appears unobstructive, never showing up a poor CD player, yet never hampering a good one. It is a superb all-rounder, with both disc and line stages displaying a similarly strong performance. It is well built and carries the A60's mantle into the Nineties with style and refinement.

By far the biggest surprise in the pack was the minimalist Sugden A25B. It proved to be the most listenable of the amplifiers in the group and was only a hair's breadth from reaching the top of the tree. Well made and simple to operate, the A25B trades a headphone output and tone controls for a smoother, more sophisticated sound than any of the others in the group.

In a world where value for money is



The NAD is the oldest design and is showing its age, albeit gracefully. While it has good, deep and powerful bass, plus a fine line stage, its overall character is rather too rounded and warm for a market which today is now used to more of an 'up-front' sound. It often makes music listenable by rounding off the raw edges. In addition, the bright, yet ill-defined phono stage makes the 3240 difficult to recommend for turntable enthusiasts.

Yet even here, I could not damn the NAD totally. As an upgrade to a system that is ageing gracefully, it has an old-fashioned sound and sheer power that would suit elderly speakers. Ultimately, the NAD loses out against the clean, clear presentation of more recent designs.

The antithesis of NAD's 3240PE, the stripped-to-the-bone Sony TA-F440E is one of the newest models in the test, forward sounding in nature and capable of going very loud too. It is consistent in sound quality between both phono and line stages, although the phono stage has a strange but subtly 'dislocated' quality to its soundstaging.

I suspect that there has been an attempt at cloning the Pioneer A-400 to try to steal its thunder. There are visual similarities and even sonically the Sony offers a powerful sound. However, it lacks

kids on the block. It still has a powerful, forward and muscular sound and by virtue of its comparatively low price, represents better value than the NAD 3240. However, the PMA-350 does have a tendency to bare its teeth, showing coarseness and hardness, a trait that

"Sugden leads the field in the smoothness stakes, but the Harman-Kardon has a sense of correctness, especially in its tightly focussed imagery"

makes it harder to recommend in the light of more recent amplifier developments.

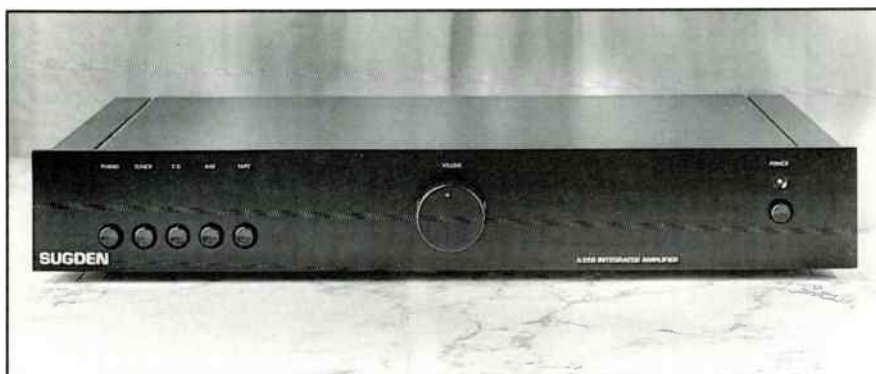
It is a solid, powerful and dependable amplifier, but now, in the face of the latest opposition, sounds very much a budget design. Where it still succeeds is for those that want a forceful, up-front sound, not mindfully about words such as grace and subtlety.

Moving into the winners' enclosure, the top three amplifiers all have virtues that make this race a photo-finish. Not one of the three front runners disgraced itself and there was little between them. Each

everything, the Sugden costs over 25% more than the Harman Kardon, but the two are surprisingly close in sound quality. The Sugden leads the field in the smoothness stakes, but the Harman-Kardon has a sense of correctness, especially in its tightly focussed imagery, that the others could not match.

The star of the budget constellation is Harman Kardon's 6150. It stands on a par with the others in this group test in almost every area, whilst also being the cheapest. There are no problems or idiosyncrasies, save for the loudspeaker binding posts. The 6150 has a deep and powerful sound, it images well and is coherent in its presentation. Here's an amplifier that should give long service in a system, withstanding upgrades to CD player and loudspeakers without being outclassed.

Of the two top amplifiers in this group - the Harman Kardon 6150 and the Sugden A25B - I marginally preferred the sound of the Sugden, but there was little in it. The Harman was a little more detailed and precise, it has tone controls and a low price; the Sugden simply traded some of its rival's detail and pin-sharp imagery for sparkle and life ●





Top Cat TC-K470

Sony's new budget cassette deck abounds with facilities and functions, and even a motorised widget, Noel Keyword discovers.

There's nothing like a motorised widget. They whirr and move and look impressive; they bring automation into the home, giving the impression that the future promised us back in 1955 has finally arrived. Then, homes of the future had robots whirring around doing the housework, usually with archaic household implements like a dustpan and handbrush. Sincere American commentators told us that the homes of the future would be fully automated and that endless leisure (pronounced "leeshure") awaited us all.

In what looks to me like a step down that road to the future, Japanese hi-fi manufacturers have been busy including motorised cassette doors on their top cassette recorders - and they're quite effective. Pop a cassette into the compartment, press the Play button and watch the door whirr shut and play commence, it cuts out a few manual inconven-

iences, but it strikes me as advanced an idea as automating a dustpan and handbrush.

The great thing about real life contraptions is that they grab people's attention and provide a little entertainment. I wasn't surprised to see the motorised door spread like a rash through expensive cassette decks; it adds to their air of sophistication. I was surprised to see it on Sony's new TC-K470, priced at £149.99. It's a budget machine, but one with a surprising number of useful features. All the same, I didn't imagine that powered doors would make their way down to this price level. It grabbed my attention alright.

Other useful features - ones that directly affect performance - are to be found. Variable bias is one of them. It tunes in blank tapes so they match the deck properly, in order to optimise recording quality. Most work only with ferrics and chromes, something

manufacturers are very reluctant to mention in their handbooks. Sony's works on metals as well, even though the handbook says its effect is "minimal". Tests showed that it altered frequency response substantially, enough to tune in TDK MA-XG metal tape well. I found it also tuned in other unusual tapes, like BASF Chrome Super II and TDK SA-X.

The value of this ability lies in the fact that such premium grade formulations offer the highest level of performance, but they also display strong treble and a bright sound that only tuning can counteract. I imagine that budget deck buyers are more likely to use ferrics and chromes than metals; good ones properly tuned in can give fine results.

All the Dolbies available are included, except the latest S noise reduction system. Dolby B is there for prerecorded tapes, Dolby C for quiet recordings and Dolby HX Pro acts

whilst recording to allow strong treble signals to be put onto tape. This helps avoid the dull and messy treble that results from tape overload (saturation). Sony include a neat looking electronic tape counter with big numerals, allied to a simple memory facility. This is part of the fluorescent display panel which also includes the record level indicators.

Whilst I like the way this panel has been laid out, one part proved especially misleading. The automatic tape type sensing system that can tell a ferric tape from a chrome or a metal also illuminates a row of red dots that suggests the level up to

which music peaks can be taken. They settle at a plausible +3 for ferrics and chromes, but +7 for metals - a level that is far too high. The recorder is just able to hit +3 with metals before serious overload distortion starts to set in.

Like many recorders, it actually gets the highest levels (in the mid-band) onto TDK AR ferric tape. In practice metals don't record higher, except on a few very high quality decks. I notice also that Sony have put the 0VU peak record limit up to a high level, so recording to 0VU on this machine automatically gives louder sounding cassettes than on others.

The transport controls all have a light-touch action and the transport moved quietly. There were no clanks or clunks, just gentle clicks as the machine started and stopped. This was impressive for a budget deck. It helps make the TC-K470 feel quite sophisticated. Another small but unusual feature was a back-lit tape compartment capable of showing how much tape was left when recording - something I find useful.

Headphone listeners are well catered for: Sony fit a small headphone volume control. They also provide a music search system that relies on gap sensing. These things are

Measured Performance

There's only so much you can do with the sort of build budget that must have been allocated to this cassette deck. Yet Sony have tried to furnish it with all necessary gadgets; the expected disrobement process has not been applied. Where are the weak points?

The transport of the review model wasn't a hidden victim, that's for sure. I was surprised at how speed stable it proved to be, at least in wow and flutter. There wasn't a small speed wobble or jerk to be detected, at least not of the magnitude expected at the price. The wow meter needle usually swings past 0.1% fairly strongly with budget decks; it wouldn't go past 0.07% with the TC-K470.

That's a good performance. Precisely what it means in practice the spectrum analyser showed: the review sample had very little capstan wow. This removes the warbling, modulated tone that capstan wow stains music with; in doing so, it improves the sense of purity. Absence of shoulder spikes either side of the main spike in the speed analysis show this. There's also an absence of flutter peaks across the centre of the picture - another sign of a good transport. Flutter produces dirty, clouded and coarse tone; it is also responsible for that peculiar paperiness that characterises cassette sound. Suppression of flutter is quite important if recordings are to sound smooth, clean and clear. Although both wow and flutter were low, there was some drift - a form of low rate speed variation; it was detectable in use I found, marring an otherwise exemplary performance.

Sony talk about the transport too, describing it as a '3 motor transport mechanism' in a legend on the cassette compartment lid. It is in fact an ordinary two motor type, one driving the tape capstan and the other the reel hubs. A third actuator motor closes the powered door automatically; it has no direct effect upon performance. A two motor transport is less affected by the quality of the cassette than a single motor type, so it offers a more stable and predictable

performance, but it is a minimum standard for a hi-fi cassette deck these days - just about all single capstan types have them. Three motors in this instance has no special meaning; it's like saying a car has four wheels.

I was disappointed to find falling treble output in the replay frequency response. Prerecorded tapes will sound less bright on the TC-K470 as a result. Tapes recorded on the machine will replay properly though.

There was little hiss or hum. With Dolby C noise reduction switched in the noise level sunk to -75dB, which is a hair's breadth within the lower limit. The replay amplifier was very quiet, which helped.

Frequency response with blank tapes could be tuned flat - even on metals - using variable bias. Even TDK MA-XG, a specialised dual-layer metal, could be accommodated properly. The response analysis of TDK MA shows there was little deviation from flatness from 50Hz right up to 20kHz, a good result from a budget recorder. Similar results were possible from chrome and ferric tapes I found; even the most non-standard like BASF Chrome Super II were coped with satisfactorily.

Inevitably at the price, and in light of the gadgets provided, the head has limited overload ability. Too much cannot be expected; with metal tape the TC-K470 manages +2dB in the mid-band. It gets up to +3dB with MA-XG tuned flat by turning bias up to maximum. These (IEC) figures equate directly with those on the record level indicators, so with metals music peaks should be allowed to hit +2dB or so. I notice that Sony's display has a red warning line at +7, suggesting this is the upper limit; it's optimistic.

Results with ferrics and chromes were pretty good, which is perhaps more important. Dolby HX Pro maintains treble overload thresholds well with these tapes, giving them good all-round performance. It makes more sense to use a premium grade ferric (TDK AD, AR or Maxell XL-IS) or chrome (TDK SA, Maxell XL-II or BASF Chrome Super II) tape with a budget recorder like this and the Sony works well with them.

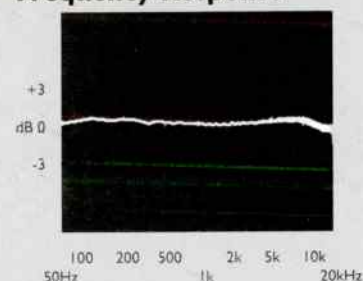
REPLAY (prerecorded tapes)

Frequency response (-2dB)	30Hz-12kHz
Speed accuracy	+0.9%
Hiss (70uS, Dolby out)	-61dB

RECORDING (blank tapes)

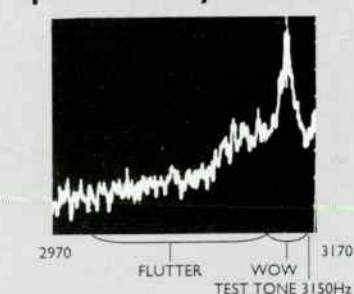
Frequency response (IEC Primary Refs.)	
ferric (IECI)	30Hz-20kHz
chrome (IECII)	30Hz-20kHz
metal (IECIV)	30Hz-20kHz
Separation (1kHz)	-50dB
Distortion (315Hz)	1.3%
Hiss (70uS, Dolby out)	-56dB
Speed variations (DIN total)	0.05%
Flutter energy (3-3.13kHz)	-25dB
MOL/SAT (IEC Refs)	315/10k
IEC I (ferric)	+3dB/-5dB
IECII (chrome)	+1.5dB/-5dB
IECIV (metal)	+2dB/-0.5dB

Frequency Response



Flat frequency response up to 20kHz with TDK MA metal tape.

Speed Stability



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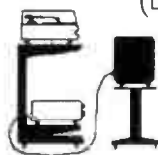
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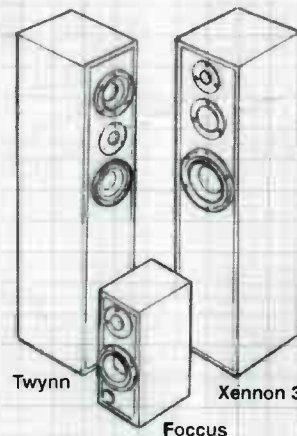
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most effective and useful with prerecorded tapes. There was less dullness than I expected with prerecorded tapes. In comparison with our reference Nakamichi ZX-9 some sheen and upper treble zip was missing, giving a lucid but slightly softened presentation. Measurement suggested the dullness would be more obvious, but some slight discrepancy between azimuth of the test tape and the recorded azimuth of prerecorded tapes does occasionally conspire to confuse correlations I find. With strong and solid bass I was happy that the Sony played prerecorded material well. My only surprise in this area was obvious wateriness of pitch with piano, an indication of gentle cyclic drifting of speed. Being used to the rock steady timing of quartz locked, direct drive, dual-capstan transports, which give precise notes, the haziness of the Sony came as a surprise. However, it is no worse than its rivals in this respect and drift is not especially noticeable to the untrained ear.

I recorded up to the indicated maximum with TDK MA metal tape and, inevitably, got a splashy and confused sound. Sony have placed the recommended recording limit far too high. However, hiss was

completely inaudible even with Dolby B, showing just how quiet decks are becoming these days when used with low noise, high output metals. Pulling record level back so that music peaks hit +3 or so cleaned up the sound, but slight hiss then became just audible. The Sony doesn't hum or drone by the way, like many cassette decks.

With Maxell UD-XLII chrome tape I found a similar performance, providing recording level was pulled back even further to around +1 or so. Some treble confusion and splash could be heard at times, but it was a minor blemish.

As with so many budget decks, best value for money comes from using high grade ferrics, carefully tuned in. A touch of bias reduction got TDK AR tuned in perfectly and with this superb ferric tape the deck gave its best, sounding smooth and very relaxed. There was little of the slight strain and confusion that tinges metals and chromes if pushed a bit level-wise when recording on a budget deck. All

I did notice was a small loss of general sharpness and precision, due to an accumulation of minor effects. It wasn't unpleasant though; in contrast originals on CD sounded harder and more clinical.

Sony have pulled together a nice

"with this superb ferric tape the deck gave its best, sounding smooth and very relaxed."

blend of convenience, performance and facilities in the TC-K470. Its powered cassette door is unarguably a major convenience. I even find myself feeling disappointed these days when my Nakamichi cassette door doesn't fly closed unassisted at the tap of a button; automation can be subversive. The Sony plays prerecorded tapes well enough and it makes good recordings that sound smooth and clear. It's simply very good value ●

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Sansui's flagship £299.99 TU-X711 tuner is laden with facilities and proclaims its status with a front panel finished in glossy black. The use of a big, colourful signal strength meter makes the whole package look both visually attractive and purposeful. The Sansui makes a

claim for people's attention.

There are four main ways of selecting a station: via the thirty station presets, scanning them, scanning the frequency range or by punching the frequency in using the FD (Frequency Direct) button. Programmed frequencies are stored in a volatile memory, with only a capacitor to provide backup and there is no standby circuit. It will discharge over a week - if you plan on a two week holiday, don't be surprised to come home to a tuner that gives you a blank stare instead of Radio One when you first switch it on.

There are RF Direct and IF Band selectors, their function being described in the measured performance section. It has provision for two aerials, useful for those who receive cable or satellite stations as well as conventional FM broadcasts. Often, cable companies' stereo television channels are played as FM simulcasts instead of NICAM. On the other hand, conventional FM channels through cable lines are notoriously poor. Two aerial sockets offer the best of both worlds. There is also a record level calibration tone and a facility to record from a timer.

In their manual, Sansui are remarkably honest about the functions on the 'X711. When describing the FM Noise Canceller button, for example, which removes some of the background hiss on stereo signals, they admit that the channel separation may be affected in the process, but this is not of much consequence in practice, the sound stage contracting little.

In use, most of the functions fall to

hand readily. I felt that the numeric keypad could have been larger, but familiarity eases its use. In addition, it seems strange that the memory button is not of a similar size to the Enter or AM/FM button; it is a function that is often used, but is comparatively difficult to locate. Finally, I would have liked an option to dim the display.

In use I found the TU-X711 imparts a similar sound quality to stations, whether they played Jazz, Hip-Hop, Classical or Spoken Word. Tonally it is not the most neutral tuner around, having a distinct signature.

When listening to Jazz FM, I noticed a somewhat hollow, nasal and cuppy quality to the presenter's voice, making him sound similar to David Coleman with a head cold. At first, I put this odd vocal characteristic down to routine Jazz FM signal compression, but when comparing the 'X711 against a reference tuner, it was found to be a function of the Sansui alone.

This vocal strangeness appeared whenever and wherever spoken word was broadcast, regardless of the sex, pitch, dialect or projection of the speaker. For example, it emphasised Greater London Radio news reader Nicky Hinman's diction, making her sound like John Major. It was still possible to distinguish the reader or speaker, especially with as unique a voice as Tommy Vance.

With musical tracks I know well, I found that the Sansui had an excellent low end, presenting deep and clear bass lines that were easy to follow and tap your foot to. It is also a

days, so the Sansui didn't shine in this area. It needs more signal than most to give a similar hiss level (which is how sensitivity is gauged).

This was the performance of a second sample in fact. Our first sample was even less sensitive, hissy, of poor selectivity and suffering distortion.

The new sample was reasonably selective, in Narrow and Wide mode managing 75dB alternate channel rejection (a station 0.4MHz away) of a strong, nearby signal. That will be good enough in most situations, if not all. In comparison, rivals these days commonly manage 80dB or better.

The Narrow/Wide IF selectivity option had little effect except in discriminating against adjacent channel stations, just 0.2MHz away from each other. In Britain it's rare to find stations so close. The Sansui is not especially selective by the standards of modern solid-state tuners, but it will be adequate in the UK, all the same.

Sansui fit a local/distant switch. Measurement showed that it offered no improvement in audio performance, except for raising the input overload ceiling. The

Behind the Gloss

Sansui's TU-X711 tuner has a glossy black finish, but does Alan Sircom take a shine to it?

Measured Performance

The large signal strength meter of the Sansui TU-X711 caught my eye initially. Having recently found an excellent meter on Yamaha's TX-950 tuner, I rather hoped that the thinking behind it might percolate through to other Japanese manufacturers, including Sansui. It was Hitachi that first started offering serious signal strength meters on their FT-5500 series tuners (now discontinued); Yamaha followed on, unfortunately Sansui have not. They remain wedded to the idea of using the meter to suggest the tuner is working to its full ability with a feeble signal, when it is not, giving a misleading impression of great sensitivity.

The meter of the TU-X711 hit maximum, all vertical bars alight, with just 50uV of aerial signal. This is a weak signal, too weak for any tuner to work really well. Measurement showed that no less than 1600uV was necessary for minimum hiss to be attained. That's more than thirty times more signal than the meter would suggest was enough! Consequently, the meter is of little

practical use, since by lighting fully at 50uV it gives no idea of whether the aerial is supplying an adequately strong signal or not.

I understand that Japanese manufacturers are scared of giving the impression that their tuners are insensitive by fitting a meter that won't light up fully without a strong signal. If the meter hits maximum from a piece of damp string, then it looks good to the uninitiated. However, a simple, concise explanation in the handbook could allay fears in this direction, so it's not an outlook I have much sympathy with. Outside Japan it is common to make the signal strength meter cover higher signal strengths, giving a good indication of whether 1mV or more is being provided by the aerial, since this is the magic value all tuners need as a minimum to work really well. Without this, a signal strength meter is barely worth fitting to a tuner, since it conveys little that relates to hi-fi conditions of use.

The full scale reading of the meter coincided roughly with the tuner's stereo sensitivity figure of 40uV. Competitors commonly achieve 25mV or less these



smooth and graceful tuner, although sometimes it erred too much on the side of smoothness.

When GLR played 'A Day In The Life' by The Beatles, I found that little of the hard-edged sound of the studio came across, making it seem laid-back and recessed. Moving over to a reference tuner - a Leak Troughline - although harder sounding, it also had a greater sense of effortlessness, lacking in the 'X711.

Although centre stage imaging of the 'X711 was good, overall stereo staging was a little vague and lacking in image width and depth. In addition, music seldom jumped into the room,

filling it with sound; the 'X711 preferred instead to let the music hover between the loudspeakers.

On Classical programme broadcast by Radio 3, the shift in tonal colour almost turned horns into a hybrid instrument, somewhere between brass and strings. Perspectives were flattened and I felt that generally the sound was uninvolved and uninspiring.

The AM section, on the other hand, proved quite good, as such things go, especially when used with the IF band set to Narrow. It has much of the smoothness found in the FM section. Listening in to a science fiction play on Radio 4, voices took on

a depth and clarity rare on AM.

Although the AM section is very well engineered and the smoothness and bass quality of the FM section has much in its favour, I cannot say I found the Sansui TU-X711 especially distinguished or exciting in its sound. This was a competent tuner, but not a ground shaker. I can't help but remember that a distinguished little tuner like the Aura TU-50 costs less and sounds better, even if it has far fewer facilities. But then that's the tuner market, chip-based and populated by similar designs delineated more only by appearance and functions than sheer performance ●

tuner is best left in Distant, except when very close to a transmitter (i.e. within a few miles). This is something that Sansui make clear in their handbook.

The slight insensitivity of the TU-X711 is possibly due to its use of aerial input switching, since obstructions in an RF signal path commonly cause problems. Used with a good aerial though, the '711 will appear capable enough in bringing in stations.

Given a minimum of 1.6mV from the aerial, hiss sinks to -75dB on stereo, low enough to be inaudible even on Radio 3, where silences tend to reveal background hiss. The 1.6mV figure is a bit high; some tuners nowadays need only half the amount for similar results.

The audio performance of our second sample was good in all areas. It had a flat frequency response, as the analysis shows, that extended up to 15kHz before a notch filter takes effect to suppress pilot tone at 19kHz. This filter gave the tuner a 'clean' output signal, free not only from pilot tone, but also sub-carrier at 38kHz, both being -80dB down.

Distortion hovered around 0.06% in the mono channel and the stereo difference

signal channel, just a trace of second and third harmonic distortion being produced, as the analysis reveals. The TU-X711 is a low distortion tuner, meaning it will possess a smooth sound free from harshness. Channel separation on stereo was good too. **NK**

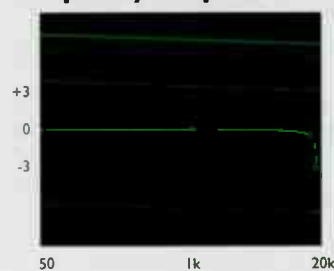
Tuner Test Results

Frequency response	5Hz-15kHz
Stereo separation	59dB
Distortion (50% mod.)	0.06%
Hiss (CCIR)	-75dB
Signal for minimum hiss	1.6mV
Selectivity (at 0.4MHz)	75dB
Sensitivity	
mono	3µV
stereo	40µV

signal strength meter

LED No.	level (µV)
1	2
2	8
3	20
4	32
5	50

Frequency Response



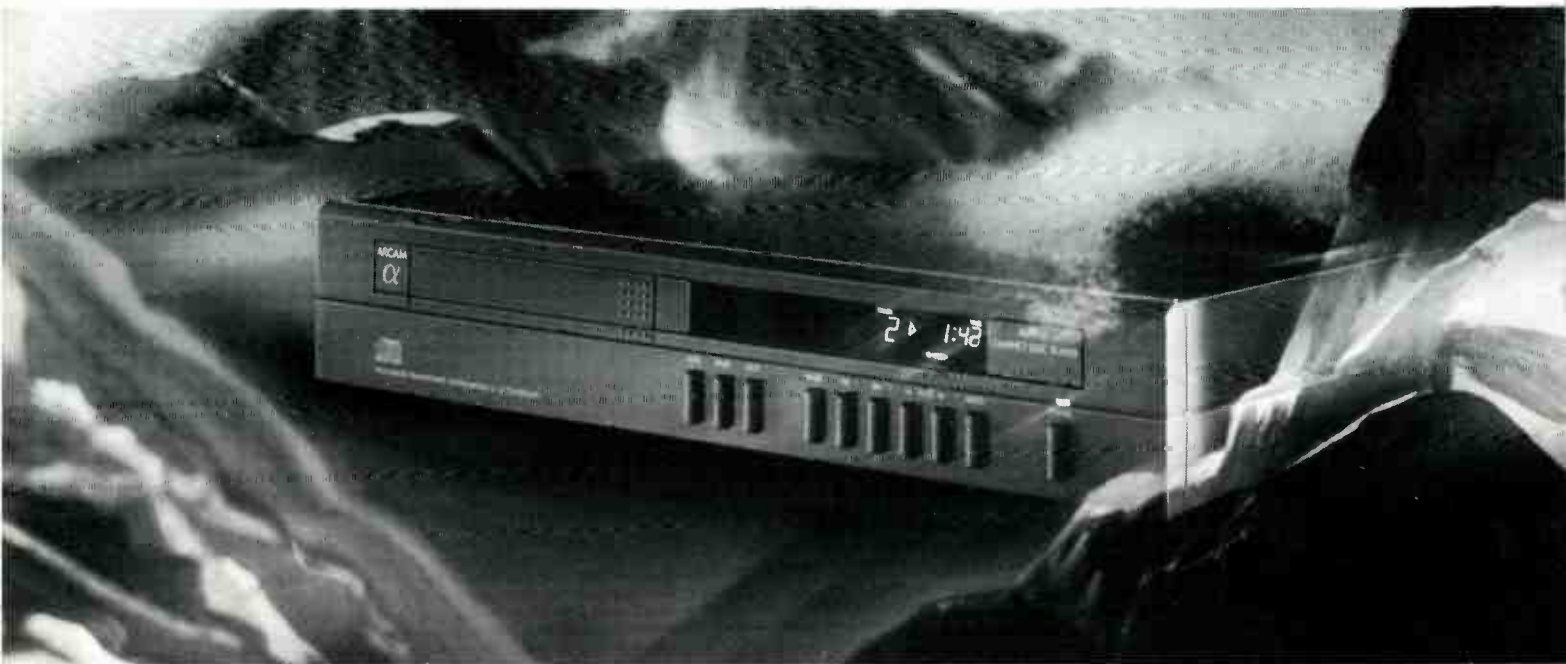
Flat frequency response to 15kHz.

Distortion



Very little distortion at 0.06%.

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World Radio History

Arcam have just launched a new digital-to-analogue convertor, the latest model in their Black Box series. It has now progressed to Black Box 5. At a very affordable £449.90, this convertor hides a trick or two under its unassuming Delta-series styled sleeve.

Foremost of these is the new Sync-lock feature, which allows the latest Delta 170.3 transport to lock onto the stable master clock within the Black Box 5. This is a new technique. It replaces the old industry standard arrangement where the convertor 'regenerates' the clock signal from the transport under the old Sony/Philips Digital Interface (SPDIF) standard. This introduces mistiming, due to the influence of jitter and noise upon the process.

The essential reasoning behind Sync-locking is that DACs and transports free of the jitter bug should sound more coherent, should have a clearer sense of focus, and should be subtler in portraying the finer elements of a recording.

Not that you have to have an Arcam transport to use the Black Box 5. The circuitry automatically senses whether or not a 170.3 is connected up; otherwise the convertor will behave just like any other. More, I suspect, from the point of view of dealers having something to demonstrate than anything else, the Sync-lock circuitry can be switched out via a push-button on the front panel.

bit has better low-level linearity, but tends to be less forceful sounding.

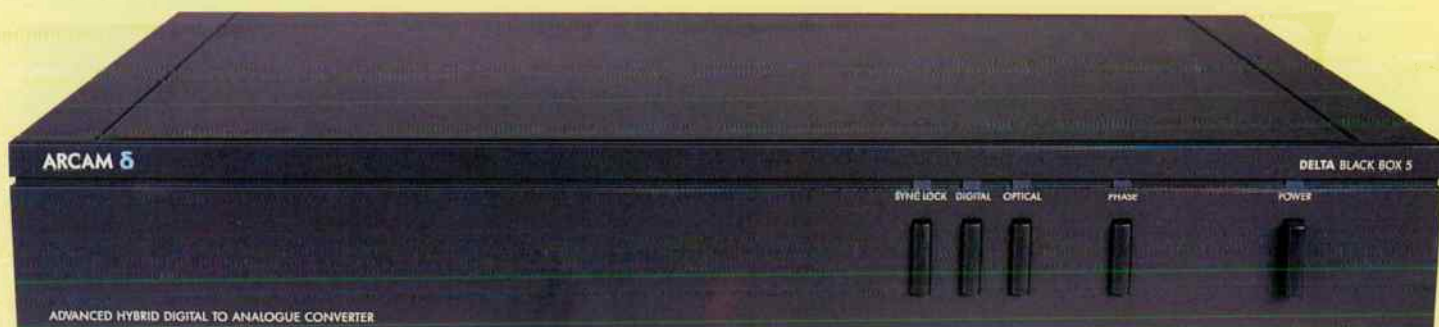
Apart from the push-button that disables the clock link to the transport, there are more controls than usually decorate the front panel of a DAC, a breed notable in general for the blank face they turn to the world. There's a switch to select between two digital sources, one connected to the optical Toslink input and one to the 75 ohm co-axial input. Also at the back is a tiny blue switch which is so discreet I nearly missed it: this prioritises

Toslink optical lead. If you buy the Delta transport to match you get another co-axial lead and a set of Audioquest sorbothane feet. Or at least I did. The two were put together and listening commenced.

I've been listening to the Delta 170.3 transport for some weeks now, awaiting the arrival of this new partnering DAC, and have come to revel in its display of firmness, control and improved subtlety over the previous version Delta 170. All round, in every way, it's a much classier

ARCAM CLOCK IN

Synchronising a CD transport to a digital converter eliminates the jitter bug. Eric Braithwaite performs a merry dance with Arcam's new solution - Black Box 5.



It's worth pointing out at this juncture that Black Box 5 isn't a Black Box 3 with a new clock in it. Since 1989, in order, the original Black Box and Black Box 2 were Philips multibit; for Black Box 3, Arcam turned to Philips Bitstream. Fourth in line is Black Box 5 (explanation later), which is a hybrid, incorporating multibit and bitstream technology, from U.S. chip manufacturer Burr Brown ("Fourth, but number 5?" No, we can count! There wasn't a Black Box 4. Apparently in the Far East, where Arcam sells 25% of its exports, the number is associated with death, so the company judiciously passed over this number.)

Why a hybrid chip? As in horticulture, it's a way of combining the best of two worlds, like creating a rose without thorns. Multi-bit, characteristically, is dynamic, but at the cost of low level distortion. Single-

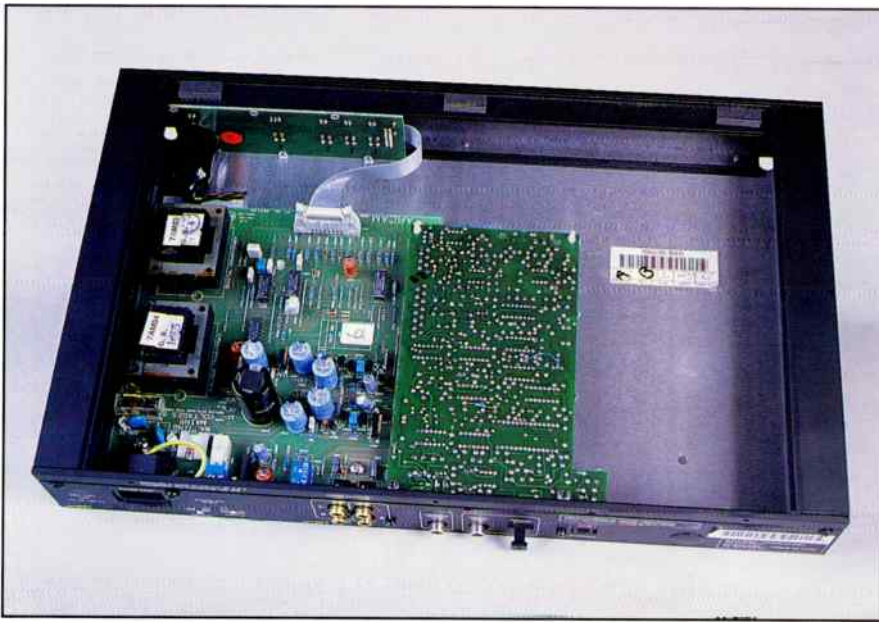
either optical or co-ax input at power-on. What with DCC now being with us, there's also a handy switch marked Monitor. What it does is switch to a digital output so a digital input can be fed to a DCC or DAT machine.

Last but not least is a Phase Inversion switch. Opinion is divided over the efficacy or otherwise of inverting absolute phase, with some listeners noticing no difference and others swearing by it. For myself, I prefer it on some recordings, can't tell with others, and dislike it on the rest. Having paid yer money, you don't have to use it, but it's good that it's there. It's also obviously there, a dual colour LED lighting green for normal, red for inverted.

In Arcam's generous way, Black Box 5 comes complete with a little support in the way of cables. Inside the box is an Audioquest Z co-axial interconnect and a

machine. Inserting Black Box 5, at first with the clock connection switched out, didn't diminish my liking for the player, but didn't provoke any cries of 'Eureka!' either. Switching in the Sync-lock, however, was a different story.

It offers a very convincing practical demonstration for negating the jitter-bug. Comparison of the same material, switching the Sync-lock in and out, had the re-clocked transport dominant every time. Just as it says in the literature, there was a sharper focus, and instruments and vocalists were both more firmly embodied, as though they had clearer outlines. On instrumental lines and solos - particularly noticeable listening to Orphy Robinson's vibraphone, among others - the music seemed to flow more fluidly, even move faster. There was certainly more precision in front-to-back placement



Arcam use separate mains transformers (seen at left) for the analogue and digital sections of the Black Box 5 converter. These lessen the possibility of mutual interference occurring.

musicians were more obviously spaced apart than was the case with BB5 'straight' Black Box 5 in fact demonstrated a mild sense of schizophrenia. Used straight, it showed off its hybrid nature more obviously. More forward, putting musicians in a flatter plane between the speakers, it whacked some percussion out into the room like a fast bowler aiming at the whites of a batsman's eyes. Meantime, there was degree of sluggishness to the bass. This was surprising, as it was in these realms that more of a punch might have been expected. Here we had a good, well-behaved DAC, a bit vague in detail and not incisive through the whole frequency range, but in with a chance with the competition. And, of course, cheaper.

Quite soon after the first taster of the clock connection, Black Box 5 was never turned back into an 'ordinary' DAC again. It's a commonplace of reviewing, to say that the music went on and the note-taking didn't, but it does happen. A whole weekend went by with friends dropping in and CDs going into the drawer and not a line written. My visitors are attuned to spotting the 'new boy' in the hi-fi, with ears ready-cocked to discover what sounds different this time. We had a case of the dog in the night-time: everyone, without exception, listened happily to Rock, Jazz, Chamber Music - the lot - without thinking to ask what was producing it until the midnight farewell coffee after everything fell silent.

Music flows fluidly, naturally and smoothly, with the Black Box 5 keeping a firm hold on dynamics and tempi as though there was practically no box in circuit. Imagery could be sharp as a pin and bright as a new one, but not brashly so. Informative without being overtly analytical, this DAC allows you to examine the parts of a recording without de-humanising it. Above all, it drives without thrusting the apex of a soundstage towards the listener's lap. This even spread is admirable; in a first demonstration, it might give the impres-

sion of being laid-back next to some rivals, but its gentle yet firm subtlety grows on you.

However, like all good things, it isn't perfection all the way through. Orchestral climaxes tended to muddle the brass sections or the string sections together, producing something of an amalgam, there also being some veiling; tonal colour on the Reference Recordings 'Beckus the Dandipratt' was deprived of some of its vividness. Again, on the Dutoit recording



The sync-lock signal is optically coupled to the transport through a glass fibre Toslink; it is identified as Clock Output, at right.

of The Three Corners Hat, while it was possible to work out - with some thought - the position of the fill-in mics, violins sounded slightly off-colour. Trying James' Seven, the fierce clashing, swashbuckling cymbals were muted in attack; there was a pretty detailed insight into the mix - except on a couple of moments of confusion when both synth. and vocals became somewhat muggy and the BB5 seemed as though it was missing a beat - or ducking a note. Inverting phase gave the whole a sharper edge but unfocused the vocal line. As is so often the case, inverting phase improves some aspects

and some recordings, but not others. All the same, I wouldn't want to be without it.

With this 'Sync-locked' transport/DAC combination, Arcam are definitely onto something. Focus on instruments is definitely sharper: insight into a recording is well above average for the price. All the same, there's a small price to be paid in texture: sometimes too coarse for Black Box 5 to really reach the heights. It hasn't many competitors in its price range and it's better supplied with input and output facilities than a good many more expensive converters on the market, so this new Black Box is worth auditioning ●

Measured Performance

Although Sync-locking is a new technique it has already been used by Deltec in their Deltran transport modification, a unit I have been living with for many months now. The benefit is primarily one of improved focus and sharpness, with events more clearly defined in the time domain.

Previously, the timing signal was mixed in with the music in what is called the SPDIF system of transmitting a composite (data plus music) digital signal. It is this system that designers are seeking to improve upon in their quest for better quality from CD.

The reduction in jitter is measurable and it has been shown that the new Arcam components do offer significant improvements in timing stability. However, it turned out that the importance of this development was overshadowed by the adoption for the first time by Arcam of a Burr Brown digital-to-analogue convertor (DAC) chip. Previously, Arcam have used Philips chips; the Japanese have preferred Burr Brown (an American company). However, in our rooting for technical information we contacted the UK office of this major chip manufacturer some time ago and learnt that, yes, they had noticed everyone in the UK used Philips chips and, yes, they would be doing something to compete. Burr Brown offer a superb range of convertors, from mega-top-end devices right down to cheapy chips for portables. It's only been a surprise to us that UK manufacturers have, to date, not been aware of either their existence or their products in Britain.

Black Box 5 is an inauspicious start to Arcam's industrial liaison with Burr Brown however. Expecting to see a nice, clean, distortion free trace of the sort I have become used to from top-end digital convertors, I was surprised when a forest of distortion spikes appeared on the spectrum analyser screen. I have to say I was even more surprised when Arcam said this was normal and that other Black Box 5s they had tested also produced significant distortion.

A figure of 0.09% at -30dB music level on CD, shown in the distortion analysis picture, is more than four times higher than that now expected from Bitstream and it is even higher than old sixteen-bit. The reason why this is so became clear when we unearthed the product specification for the PCM67P chip Arcam use. It is intended for 'low cost' portables and such like

- not for top end hi-fi products. Burr Brown coyly use different phrasing to recommend their top end chips; for example the PCM63P has 'ultra-low distortion' and is intended for 'high-end consumer and professional digital audio applications'. The absence of such qualifying statements within the PCM67P literature clearly signals that it was never really aimed at use in real hi-fi components like Black Box 5.

Of what importance is the distortion we measured? Well, chip manufacturers around the world have been seeking to eliminate distortion from CD in a determined attempt to negate criticisms of the technology and, of course, to improve CD's sound. It's a matter taken quite seriously. This type of distortion subtly changes the character of music, rather than being perceived as a discrete sonic effect, like a rasping sound, for example. I have found

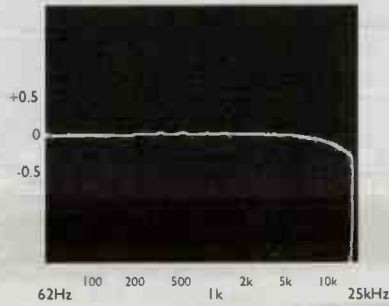
that slight coarseness can, over a period, be detected. There's a loss of smoothness, to strings in particular. It may well be that the subjective impact is less than one might imagine from looking at the figures, but it isn't inaudible, that's for sure. Sync-locking will clean up the sound in one way, but the distortion the PCM67P chip produces will detract from quality in another. It hardly seems appropriate for a top quality convertor.

In every other area, the Black Box 5, in conjunction with the Delta 170.3 transport, measured very well. It has good channel separation, a flat frequency response with just a slight treble roll-off (see the response analysis picture), virtually no spurious output and very low noise. What a pity about the distortion. **NK**

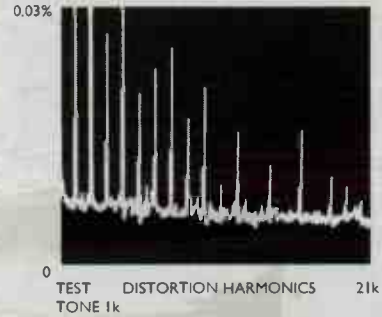
Test Results

Frequency response	2Hz-21.4kHz	
Distortion		
-6dB	0.007	0.005
-30dB	0.04	0.08
-60dB	0.9	0.8
-90	36	38
-90dB dithered	19	17
Separation	left	right
1kHz	-95	-92
10kHz	-92	-87
Noise		-100dB
with emphasis		-97dB
Dynamic range	101dB	
Output	2.3V	

Frequency Response



Distortion



Turntables

- | | |
|----------------|-------------|
| Basis | Kuzma |
| Pierre Lurné | Origin Live |
| J.A. Michell | Project |
| Wilson-Benesch | |

Cartridges

- | | |
|----------------|-----------------|
| AKG | Lyra |
| Grado | Transfiguration |
| London (Decca) | Shure |
| Sumiko | |

Speakers

- | | |
|-------------------|-------------|
| Apogee | Pentachord |
| Diamond Acoustics | Ruark |
| Dahlquist | Sequerra |
| Magnepan | Sonus Faber |
| Mytho | Triangle |

Cables and Accessories

- | | |
|-----------------|-----------------|
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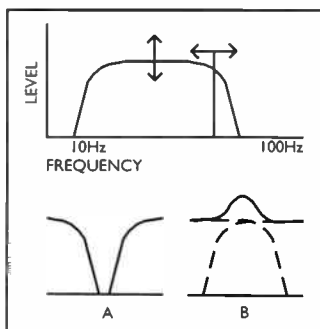
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...continued from page 17

All the same, we do try - like you suggest - to highlight really good value products and I can assure you it is certainly our interest to do so. But we are wary about declaring everything a "rip off". **NK**

BASS CASE

In response to the letter you published from Graham Holliman in your August '92 issue, claiming we had copied his



Both level and upper cut-off frequency can be adjusted on the REL subwoofer, allowing it to be matched accurately to any loudspeaker.

This avoids suckouts (A) which give a divorced sounding bass, and peaks (B) caused by output overlap which give one-note bass.

ideas for our sub-woofer, I would like to go on record to re-assure him that we have not, are not and will not be using his patents in any of our products.

The bit about his design requiring no additional amplification misses the point. We use an active bass filter and gain control, prior to an integral power amplifier, for room and system matching purposes. It is this essential matching element that allows us to guarantee clean, tight bass without "room boom", in any size of listening room.

With the usual sub-woofer crossover frequency up around 100Hz, there is every possibility of room related problems, particularly in the mid bass, irrespective of the actual technique used to generate the very low frequencies. In fact the presence of room boom will tend to mask the very low bass. Any discussion about the methods used to generate the very deep bass are then totally irrelevant compared to the basic necessity to integrate the chosen method effectively into the main system and to do so without messing up that main system's midrange. Only after this prerequisite has been met, is it worthwhile optimising the bass generator itself.

We firmly believe that in most modern listening rooms a

pair of very high quality miniatures, or panels, used with a REL sub-woofer will comfortably out-perform any large box speaker. Large speakers need very large rooms, any attempt to use them in smaller rooms creates problems.

Like the Editor, I was also amused by Mr. Holliman's claims that he originated the whole "infra-bass saga" (his quotation marks, not mine). There have been many others extolling the virtues of an extended bass for many, many years. It is only now with the advent of digital storage (CD, etc) that the advantages of a truly wide bandwidth system are able to be fully realized. With AV and surround sound, many recording studios are becoming aware of the benefits - hence the purchase of a REL sub-woofer by Chandos Records.

Believe me, once a truly wide bandwidth system is experienced nothing else will satisfy. You have been warned!

Richard Lord,
REL Acoustics,
66 Fairfield Road,
Bridgend,
Mid-Glamorgan

RAT-PROOF AMPLIFIERS

Any ideas where I can get hold of a copy of a manual for an Electrocompaniet '25' amplifier? The 'Electro' was made, under licence, by Norse Ecosse Electronics' who, regrettably turned up their toes some years ago.

Mine was nobbled by my son's pet rat which I discovered too late, had chewed all the sheathing off the cables. The resulting 'shout' after a deafening burst of sonic flatulence, cost the amplifier its right hand channel. Now my local repair shop cannot reinstate it without some help on the circuitry. So, help!

Tony Moore,
Walton-on-Thames,
Surrey.

Unfortunately, we can't help you directly, but if anybody has Electrocompaniet instructions, please contact the magazine.

In the meantime, the rat was obviously jealous of your hi-fi system, so I suggest you buy some special anti-rat cables. **AS**

Or a pair of Quad Electrostatics. Sinking his teeth into the 2,500V polarising supply will give your rodent a new outlook on life. **NK**

SIMPLY BETTER

Noel Keywood's remark (Kaleidoscope, March 1992) that the Leak Troughline valve tuner

provided a clarity, crispness and lucidity which is no longer present in modern solid-state tuners prompted me to do an A/B comparison between my father's 1957 Philco tuner (Model A3720) and my own NAD 4225 (reviewed Hi-Fi World June 1992). Lo and behold, I found the Philco to have a much clearer and more satisfying tone, plus a much tighter bass, despite only being mono.

This tuner is a design similar to the majority of FM tuners, radios and radiograms of the 1950s and therefore cannot pull in the more distant stations which the NAD handles with ease. However, since my father enjoys dial-combing we have now done a swap!

I agree with the comment by Mr Preston (Readers' Reply, June 1992) that an all-valve stereo decoder need not take up a wardrobe, since I have now designed and built one using just three valves, five coils and a handful of passive components. This solution uses the sum-and-difference principle and, unlike modern microchips, introduces no significant increase in noise even at very weak signal strengths. I now have a stereo image comparable with that of the NAD, but without losing any of the qualities which make the Philco so appealing.

I was born too late to enjoy the valve 'golden era', but why is it that today's hi-fi tuners don't sound as good as the ordinary valve radios of thirty years ago? Has progress been driven by measured performance and features rather than sound quality? Current AM sound is certainly a joke.

I was also interested to note Mr Preston's remark about direct coupling, something which I have employed in a triode push-pull amplifier with astonishing results. I suspect that direct-coupling contributes greatly to the transparency of the standard setting Ongaku. All this seems to reinforce a current principle in Hi-Fi World circles that the simplest solutions are the best.

Tim Mellow,
Guildford,
Surrey.

The prospect of an all-valve phase locked loop decoder conjured up visions of a wardrobe full of valves but it can be done more simply, as many have pointed out. Modern valve tuners will soon reappear, if Mike Creek, Tim de Paravicini and Malcolm Blockley of AMC have their way. Should be interesting. **NK**

'EAR 'EAR

Following the favourable reaction to the Mary Black CD, I thought your readers might be interested in a little background information.

Some time ago, Mary, a keen Sci-Fi fan, had the opportunity of meeting William Shatner (alias Captain Kirk of Star Trek fame). During the course of this meeting Mr Shatner related the story of how he was born with a third ear (a left ear, a right ear and a front ear), of his struggle for acceptance and of the third ear's eventual removal.

Mary was quite moved by her hero's story and three months later released the acclaimed album No Front Ears.

M. D. Murphy,
Kilkenny,
Ireland.

Back to the Blarney Stone with you, Mr Murphy! I suppose you know the hymn about a teddy-bear with poor eyesight called Gladly? You know, the one that begins 'Gladly, my cross-eyed bear'? **EB**

VOICES FROM THE PAST

The hum-nulling potentiometer circuit to which Guy Sergeant refers (Letters, August issue) is known to me, as he would have realised from my reference to the Williamson amplifier, the originally published circuit of which included this device.

The difficulty with the 2A3 was, and predominantly still is, the high filament current. Four in parallel push-pull, which I was using in the amplifier referred to in my letter, drew ten amps. The nulling pot in this amplification was not entirely effective, due I believe to induction from the filament leads into the grid circuits.

The use of 2 volt lead-acid cells seemed not so bizarre then as it does today. They were in very common use, and no-one knew that the inhalation of large quantities of sulphuric acid was lethal, so nobody died.

Mr. Sergeant presents an interesting case for the single-ended output stage, without reference to the reasons why the pioneers of push-pull thought the latter to be superior, e.g. the power/distortion advantage, cancellation of second-harmonic distortion (in the triode configuration) and relief from the effect of DC on core saturation.

Early push-pull circuits used a transformer between driver and output stages, and the phase splitter would have been seen as an improvement on this

comparatively expensive and far from perfect component. It might be argued that an amplifier using an inter-valve transformer of modern design could be made to give an improved performance over the phase splitter method!

The appreciation of D.T.N. Williamson contained a reference to the Hafler and Kerroe claim to have originated the so-called 'ultra-linear' circuit, which I would query. If the archive of Wireless World remains available, I think it would reveal a letter from one Graham Woodville, of the Marconi-Osram (GEC) valve company, in which he claimed this circuit as his own. The letter, if memory serves, was published in a 1952 issue, and it was in reply to it that Peter Walker wrote with reference to the more appropriately named distributed-load circuit, pointing out that Quad had for some time used a design in which part of the output transformer windings were in the cathode circuits.

Whether or not all this raking over of dead (?) ashes is of interest to more than a small percentage of your readers I rather doubt, but since valve amplifier development virtually ceased with the advent of the transistor, some information bearing upon the designs of the Fifties may assist designers of the current crop of chromium-plated room heaters, so that, at least, the performance standards achieved up to and during that decade might be maintained, or, should I say, rediscovered.

**Norman F. Butler,
Harrow Weald,
Middx.**

As we've said many times, valves are not dead. They need to be carefully reappraised and, in this, those in the East are as knowledgeable, or more so, about them - and certainly more open minded - as to their potential.

Whilst there may be few new valve circuits, component quality has improved enormously - and so have output transformers. I regularly test valve amplifiers, old and new, and I can assure you that many of those "chromium plated room heaters" actually meet most criteria for hi-fidelity very well and offer a level of performance greatly improved over a majority of old designs, so things have moved forward.

The best example of this is Tim de Paravicini's EAR549 which turns out 200watts with ease, at less than 0.1% distortion and has an enormous power bandwidth. It uses distributed loading (like Quad

and the big MacIntosh amps), but with Tim's own developments. I know of no other valve amplifier for domestic use that approaches its level of measured performance - and certainly none from yesteryear (although we would like to get sight of GEC's 1000 watter!).

So please don't think we are being indiscriminately romantic and misleading about valves; our eyes are open and our very-solid-state Hewlett Packard 3561A FFT spectrum analyser tells us the truth about what is going on. We carefully pit products against each other in our listening room and - yes - we've heard many mediocre valve amplifiers. But we've also heard valve amplifiers and tuners that blow solid state equipment out of the window and into the weeds. The reason why remains a mystery. **NK**

NOT SO SILVER LINING

I have yet to hear a Compact Disc player that will give a turntable a decent run for its money. Alright, they may be hiss-free, crystal clear, better for the lazy among us (as we don't have to keep getting up and turning them over) and have Skip, Search and Repeat buttons that provide hours of entertainment, but, to my ears, they do not present a convincing portrayal of the music, as it tends to lack



Modern valve design by EAR

depth, 'life' and the necessary bass to satisfy a bass-freak like myself.

I do own a Compact Disc player and I find it enjoyable (and fun to play with), but the sound of my turntable (the noble Garrard 301/SME/Shure combination) knocks it into a cocked hat, and I find it increasingly frustrating that I am being forced to buy either Compact Discs or cassettes because 'they who know best' decide not to release particular albums on vinyl, or else only put half the number of tracks on it that are found on the CD or cassette.

Anyway, I would just like to say thank-you for an excellent magazine that does not dismiss old junk as old junk but treats it with the respect it deserves, whilst still keeping up with the

latest technology. (As you may have guessed, I am an old junk . . . er, no, 'classic hi-fi' collector!)

In reply to Ian Marshall's letter (July '92) I would like to say that I find it horrific that anyone could subject over three hundred quid's worth of Technics SL1200 and cartridge to untold damage by spinning it backwards by hand - couldn't those idiots use something cheaper and nastier? Perhaps I should say that, although 18 years old, I cannot stand 'rave' music.

**Adam Smith,
Southampton.**

One of my own complaints about too large a proportion of CD players on the market these days is that the depth isn't all that, well, deep. But name more than one turntable/arm/cartridge combination that costs as little as the average £200 CD player. It's struck me very forcibly that you have to go fairly high-end for the qualities to match. All the same, portrayal of depth does seem to have sunk low in designers' priorities for some reason.

Mind you, don't you think your Shure cartridge could be bettered? Isn't that taking Retro-Fi a bit too far?

Briefly, on there being fewer tracks on LP releases than CD or cassette, it's usually purely because of pressing limitations. Cutting a thirty-seven minute side for an LP is possible, but not always successful as far as sound quality goes. Some releases come out as a single CD or double LP - but then the vinyl ends up costing the same or more, which doesn't help sales at all.

Lastly, on the side of the people who use decks like the Technics for disc-jockeying, they normally use a cartridge from the likes of Pickering which was designed to go into reverse. It's not recommended using a Lyra or an MC5000! **EB**

UNFAMILIAR LINGO

Although your articles are enjoyable to read, the man in the street is more likely to buy a well matched rack/stack system so they do not have to suffer the condescending attitude of some dealers.

I heard the classic Linn Ekos/OC9 against the Ittok/Karma, where it was obvious that the Karma was either worn out or, more likely, misaligned to favour the OC9.

Another dealer-cum-hi-fi-reviewer swapped my Ittok and Ekos on the two decks after trying to sell me a Lingo. The OC9/Ekos sounded so bad that

when I checked, the arm dressing and twist were incorrect, the arm height, cartridge overhang and side alignment of the cartridge were all out: if I was not familiar with the Linn I might have bought the Lingo!

Due to my experiences, I tune my Linn at times, though West Midlands Audio did a good job on correcting the first dealer's attempt on my Ekos/Ittok swap when they fitted a Lingo for me.

Like most people, I will pay out for a job well done, but resent the cowboy element. Linn, too, will not supply suspension rubbers direct to a customer and dealers I've found the same. For those sort of reasons, and because of poorly matched equipment, the majority of potential customers will never know the benefits of a carefully chosen system.

My brothers both use Dual CS505/Sansui/KEF Coda III and Tannoy Stratfords which seem pleasant and they are content to stay with them.

I believe you would increase your circulation if you did system comparisons. By this I mean:

- 1) Price bands of, say, £500, £1000, £1500, £2000 etc. and compared the best combinations, at these price points with clearer information on the advantages of the next price up.
- 2) Some information given on reliability and serviceability of product. Naim, Quad and Audiolab I have found extremely helpful. (This compares with Sony, for example, who are big, unhelpful and even ignorant of their own product.)
- 3) Your own views of equipment to be backed up by the views of a cross-section of the public listening to varying music.
- 4) The British manufacturers would be better served by this type of article which would encourage the man in the street to buy British without the risks (that I believe he otherwise perceives) of making his own judgement.

**Paul Field,
London E10.**

I too have heard similar tales; Linn would say that their recent dealer rationalisation should have made this kind of experience less likely. What is certainly true is that some of the more condescending dealers are finding their shops increasingly empty. I too don't think the ones who behave like the Irishman asked for directions - who said "To be sure, I wouldn't start from here" - do

Continued on page 46...

A clear, accurate mid-range, precise treble and high overall resolution of detail. I'm not talking about some high-end extravaganza, but about a new and very impressive budget loudspeaker, the Celestion I priced at £99.90. A mere six litres in internal volume, each stands just 274mm high, 160mm wide and 215mm deep, and weight 3kg apiece - not too much for any bookshelf. These new speakers are

miniatures are aimed at. In the end Celestion's approach is that of 'a best compromise', they told me.

The I's employ a 25mm two piece titanium dome tweeter to cope with the upper registers and a reflex-loaded bass/mid driver of the felted fibre variety to deal with anything below the 6.4kHz crossover point. Celestion's drive units appear to be of a high quality for the price, and cabinet construction is good also, making this speaker feel solid and businesslike. Styling is conservative, but not boring, with a pseudo Black Ash finish wrapped around the enclosure.

In terms of clarity and resolution of detail these are probably the best miniature loudspeakers in their price range. They produce a very lifelike and real sound, so real that bemused neighbours may have seen my face scouring the garden through the window, trying to see the bird that turned out to be on the Blue Aeroplanes' track 'Julie'. The Celestions also have an impressive ability to portray even the most complex arrangement of instruments as separate items all situated in their correct locations, a measure of their fine stereo imaging.

The only criticism that could be made about them would be their

Is this *the* One?

The new budget Celestion I loudspeaker captures Dominic Baker's attention.

small in both size and price.

Developing a credible small loudspeaker is a complex task. Either bass response or efficiency has to be compromised, the former making the speaker sound thin and weedy and the latter excluding low-budget amplifiers - exactly the market budget

Measured Performance

Celestion have come out of the corner fighting. This is a budget miniature that offers a serious challenge to current faves, namely the Mission 760i and Goodmans Maxim 3. I found it an interesting loudspeaker to listen to, peculiar in some ways, superb in others and in most respects performing much as its measured performance suggests.

The frequency response is a peculiar one. It has a bass peak that stretches from 125Hz up to 200Hz, but in practice this is modified by wall placement to give a balanced sound, with stronger deep bass than the response trace would have it, due to wall reinforcement.

There is also a strong mid-range peak centred at 1.25kHz, something that commonly brings vocalists forward, sometimes adding lispiness. It usually helps to project sound out and away from the box, so is generally a beneficial phenomenon.

Finally, treble peaks at 16kHz, a property I am wary of. As often as not this makes itself known as a sting in the treble, but in the Celestion I it translated differently. I noticed a lot of treble 'activity' as it were, with plenty of little tinkles and rings from instruments like cymbals, maracas and what have you. The nature of these was much as you'd expect from a damped metal dome: they sounded soft and silky, not hard and harsh. In fact, the

Celestion I doesn't sound overtly bright in the usual sense of the description when applied to loudspeakers, yet the influence of the treble peak can be heard.

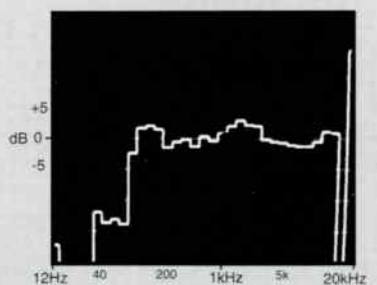
The little Celestion I doesn't have a ruler flat response and some of the undulations made themselves known in the sound. All the same, it gets from 100Hz right up to 20kHz with no more than +/-3dB of response variation, so this speaker covers the full audio range without wilting at either end.

The impedance curve swings around the median eight ohm value, dipping down to 5ohms at 300Hz and at low frequencies. All the same, the overall value was exactly 8ohms, so amplifiers will be able to cope, although those that wince at low loads are probably best passed by. I was disappointed to find that in spite of an impedance lower than most UK loudspeakers, this one was not especially sensitive, producing 84.5dB sound pressure level for one watt of input (2.8V). That's reasonable, but not wonderful. To go loud, I'd recommend a good 40-50watts.

This loudspeaker will go far. It throws a performance forward, well out of the box and it images superbly well, features that in conjunction make for a dramatic presentation. It reproduces vocals clearly and cleanly, having a captivating lightness and airiness to its sound, seemingly unencumbered by prosaic blemishes like cone quack and box thrum. There's a

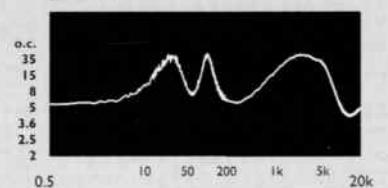
peculiar softness to transients, yet they are not dulled and here, I believe, the sudden 2dB drop in treble energy at 3kHz, seen in the frequency response trace, is making itself known. But although the Celestion isn't bright, neither is it dull, sounding balanced and 'mild' in its overall character. **NK.**

Frequency Response



Extended treble is seen at right.

Impedance



An overall impedance of exactly 8ohms.

slightly bright treble, but even this could be satisfactorily cured by replacing the grilles, which otherwise seemed to make little or no difference to their performance. When auditioning them it would be worth taking some care because they can sound too bright when partnered with the wrong amplifier. However, I found they never became aggressive - a significant plus point for a budget speaker.

Given this minor criticism the Celestions still have a very clear and detailed treble quality which is precise and free from grain or spit. They also have an extremely clean, well focussed midrange which is their strongest point and responsible for the realism with which they produce music.

Toed-in slightly, the speakers produce a full, believable soundstage coupled with excellent imaging and fast transient attack. Bass/mid and treble integrate well and the high 6.4kHz crossover point means that one driver sees its way through the critical speech and vocal frequency range, a factor that is at least partially responsible for the quality of the mid-band.

Probably the best miniature loudspeakers in their price range

Ideally suited to the replay of non-synthesised music (stick to your Cerwin Vega's for Techno Rave) such as Susanne Vega, REM and lighter Classical works the Celestion I's can produce exquisite sounds for such a low price. Their overall balance is one that is lean and tight with a sense of timing to match. The bass is dry and has a slightly boxy, almost hollow, character with a tendency to sound one tone in the lowest registers, but it is well defined in the upper region. A sense of urgency is conveyed due to a lack of strong deep bass making the music exciting and involving. In fact, you find your feet tapping to the faster beats of the higher bass/lower mid rather than the slower, deeper bass line capturing you in a trembling mass of excitement.

Although the bass is on the light side it is both tuneful and fast. This is preferable to having a heavy but thick bass which cannot be rectified by modest use of tone controls. Minor

tweaking of them can improve the overall response of this speaker without detracting from their overall quality.

Celestion's new miniatures represent the state-of-the-art in terms of clarity and detail for a budget price tag. Coupled with a precise, articulate treble and an excellent midrange free from congestion, the Celestions look like a bargain. They are not really loud enough for Megadeath fans, nor particularly suited to electronic music, but for the majority of people they will bring a level of music reproduction into the home which should amply satisfy even critical ears ●



The fine titanium dome tweeter that gives the Celestion I pleasant treble, seen at the top of the cabinet, is protected from inquisitive fingers by a grill.

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the Big *Push*

The powerful, pushy sound of Philips' new CD 950

Compact Disc player impresses Eric Braithwaite

Philips are launching a new 'Graphite Grey' coloured 900 series of separates, of which the DCC900 Digital Compact Cassette recorder is a part. Matching it is a range of similarly packaged CD players, of which the CD950 tested here is a part. Equipped with the most advanced DAC-7 convertor chip, this new player costs £349.99.

System-matching has taken on a different meaning in Philips' new 900-Series line-up. All the components share the same colouring, the ledge of controls below the fascia and the central display. In the CD 950, the loading drawer is also central, matching that of its fellow DCC recorder, the DCC900 which we reviewed last month. Although it is supplied with a remote control of its own, it can also be controlled via that of its partnering amplifier in the series which was reviewed in our August issue. Philips have obviously spied a market which wants armchair control, and carefully put together a group of hi-fi separates which 'talk' to each

other. Originally a trend in Japanese midi and lifestyle systems, the Dutch company is catching up.

Externally, if the 900 series is a radical new design to reflect the arrival of a new format, then inside the CD950 there is also the latest DAC-7 Bitstream chip to further bolster the new image. Well capable of a powerful, pushy sound, its inclusion promises something different.

Facilities for the armchair user are not lacking either, starting with the display, where the array of mobile dot-matrix messages is informative and readable: usefully, it will tell you 'Go To Stop', for example, if you try to set up a function which requires you to start before the CD is spinning. For those, like me, who find it too reminiscent of the indicators on the Underground, which tend to breed ill-temper as you worry about how late you're going to be, there's a small push-button on the control panel to turn it off.

These control buttons, for the now-usual multiplicity of functions,

including programming for Philips' 'Favourite Track Selection' are somewhat minuscule but spaced widely enough to avoid pressing two at the same time. For those of a nervous disposition, a tiny red LED lights above the 'Display Off' button to reassure the user a blank display panel does not mean the player has given up the ghost. Ergonomically, it's all fairly well laid out, with a headphone socket and associated volume control below the main blank fascia. It looks big, but the physical size is deceptive; this is a lightweight machine.

Philips have built in a quirk which could have awkward consequences. Look at the back, and while there are both optical and co-axial digital outputs, and a pair of phono sockets for connecting the CD player to other 900 Series separates for intelligent conversation, there is only one pair for analogue out. Output volume is variable, and only controllable from the Remote. Let the dog bury that in the garden - and it does look a bit like a hi-tech bone - and if the last thing

Oops, there goes the roof.



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you did was turn the volume down to catch a phone call, you are going to have to stick to headphones. Volume level is shown on the display in four columns of three horizontal lines each; graphic, I suppose, but I can't help thinking figures would be more memorable.

Combined with the CD 950's gift for displaying in words what you might need to do next and the well-written manual, commonsense and a few minutes' thought are all even a dunderhead like me needs to get started.

Anybody out there ever thought a pair of ESL63's could sound like disco speakers? Nor had I, or my neighbours, until I wired this Philips player up. It sounds big - very big! - and very beefy. Either Philips have decided on a new fast-sounding, perky, middle-weight boxer kind of sound for the 900 series, or the words 'bland' and 'subtlety' have disappeared from Dutch dictionaries lately.

This 950 gives the impression it's in fast-forward and overdrive. If you like painting analogies, Van Gogh was involved here, with this CD player painting a sound picture in big, broad, anxious brush-strokes. At first, this is all pretty impressive, pushing you back well into your seat, and leaving you gasping with the sheer speed of it all.

James' Seven, particularly came bounding through with a driving beat and a sharp cutting-edge that meant you could almost feel the strobes burning into your eyeballs. But then, the vocals, too had a sharp edge and the recording behaves as though the beat is all. Where electric guitars are supposed to swoop from the sides, they lurch; the drumkits and cymbals pounce instead of spreading across the mix.

Larger Than Life

This is also true of other recordings. Lou Reed, while with the correct graininess to his voice, was in a flat mix making him sound a bit like Zaphod Beeblebrox - as though his backing vocalist was perched on his shoulder. Instruments all came across as though they were of a similar size, something most noticeable in a Jazz quartet where the instruments were presented as though they were in large blocks, the flute the piano and the acoustic guitar all being of a similar size and the double-bass booming through them all.

It's all larger than life, brightly focussed in the middle. It can be advantageous when it's combined with some of the detail the Philips is capable of. Jim Lampi's Chapman Stick, for example, was so much larger

than normal it was thoroughly exciting, with great broad sweeps of technique issuing through the speakers. However, he was singing almost from between the strings, whereas he is actually recorded a little further back and to the left.

Turning to de Falla's Three Corned Hat produced the same abundance and full-frontal power. I've never heard that piece sound so brutally fast and explosive. It was almost over-excited, with the mellowing effect of the reverberant hall diminished, the strings hard and on the verge of shrieking. Timpani were forceful - and big. It was enough to make anyone get up and fling themselves around the room in a Fandango, but somehow I think more in the style of Queen than de Falla, Decca or Dutoit actually had in mind.

If you crave DAC-7 excitement, this is the player. If you want to equip a disco, this is probably the player for you, too. In other applications, DAC-7 has been known to offer this kind of forcefulness, but tempered with a more relaxed approach to detail and staging. A Classical music devotee myself, I found it too much of a good thing, but it sounds as though Philips' new slogan is going to be: "Rock On!" regardless ●

Measured Performance

I was surprised at some of the peculiarities this CD player displayed, especially in the light of the excellent performance of earlier models. The convertor seemed to be temperature dependent; its performance changed with time, producing a lot of distortion when cold; then almost no distortion after warming up; then a little distortion even when warm, tested a few days later. It was constantly changing its performance in fact, which makes objective reviewing pretty difficult.

In fact, the so-called distortion was not harmonically related to the test tone fundamental, which meant it fooled the spectrum analyser, which failed to read it. Calculation showed that level was around the 0.06% mark however, which is quite high. I'd expect this to add a tinge of coarseness to the sound at least.

The player also produced a lot of noise above 20kHz, due to the way its oversampling folds this up in frequency terms. However, noise at digital zero was non-existent, showing that the player mutes to disguise the problem. What the noise level really was on this player would be open to debate; I'd say it was high, even though in the range of human hearing it is low. The question is whether the noise has any impact upon sound quality. Whatever, third-order filtering would have removed it.

The measured dynamic range figure

was poor, mostly due to distortion at -60dB. Players usually manage better than 101dB, 104-110dB being a more common value nowadays.

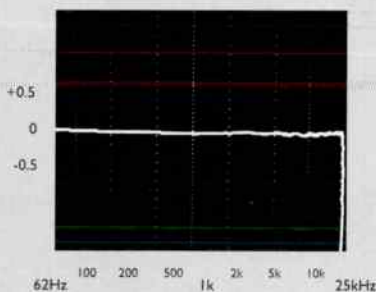
Frequency response, shown in the analysis, was very flat, a point in the player's favour. However, the way output is maintained strongly right up to 20kHz commonly results in a fairly bright, hard sound with many recordings. Channel separation was good and output normal at 1.9V.

Technically, the CD-950 we got for review displayed a measured performance worse than that of its predecessors. With Sony producing players that measure superbly and, now, are beginning to sound good as well, Philips need to spend some time reflecting on the need to keep up and how they might do it. The CD-950 isn't the most effective answer I feel, although the DAC-7 chip it uses has been applied with great effect by Deltec. **NK**

Test Results

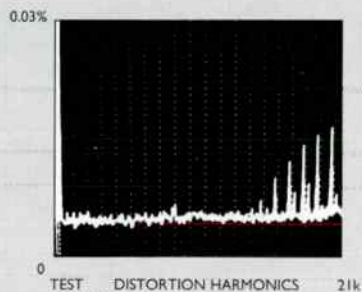
Frequency response	4Hz-21kHz	
Distortion		
-6dB	0.004	0.004
-30dB	0.018	0.02
-60dB	0.8	0.7
-90	35	35
-90dB dithered	2.7	2.7
Separation	left	right
1kHz	126	121
10kHz	127	120
Noise approx.	-100dB	
with emphasis	-100dB	
Dynamic range	101dB	
Output	1.9V	

Frequency Response



Very flat frequency response

Distortion



Spurious 'distortion' products

...continued from page 39

much more than alienate prospective customers.

As to system comparisons, we have recently done some budget and mid-range ones, but we acknowledge that such information is helpful and popular.

Product reliability is always a thorny subject, if only because of sample variation. Manufacturers will vigorously deny their products are unreliable. The only way to prove they are, for we cannot make unsubstantiated allegations, is to get reliable evidence on a representative sample, which might comprise 10-100 units. Only dealers can supply such information and, for fear of upsetting the manufacturer, whose agency they could lose, most are unwilling to do so.

In my pre-reviewing days I must say I had splendid Quad-like service from Yamaha, to name one Japanese company. **EB**

SILVER FLEECE

At least a couple of UK dealers are offering CDs at less than £10. Hopefully, the info may be of use to other readers.

The first one I came across was Music Exchange in Dudley (West Midlands) who are prepared to order CDs they don't have in stock. They charge £9.99 tops for cash or cheque, but if you wish to flash the plastic it'll cost you an extra 5%. Analogue freaks will be relieved to know that he also stocks acres of second hand vinyl at giveaway prices.

The second dealer is Just-in-Tapes of Sheffield. They placed an ad in our local free paper, presumably as part of a national campaign, offering CDs at £9.50 including postage. Has anyone had dealings with them?

I've always said that I'd 'see 'em in hell' before I paid over £10 for a CD but it looks as though that won't be necessary for a while yet!

At the end of the day though, Joe Public gets what he asks for. Colleagues in my office, and my brother's, are quite happy to pay close on £14 for the convenience of satisfying the 'I want it now' philosophy and can't be bothered to shop around. Especially if it means waiting for the shop to order it. And none of them take the CD back if it turns out to be appallingly mastered. There are some real dogs on the CD racks, especially amongst compilation re-releases. Anyone looking for 60s/70s/80s material could do worse than check out the 'Connoisseur

Collection' mid-price series, which are consistently very good.

The word out locally is that shops get the CDs for £6.80 trade. If that is correct then the shops, not the record companies, are fleecing the sheep among us.

**David Reynolds,
Kingswinford,
West Midlands.**

The word locally would be about right, as far as a full-price disc is concerned. Whether retailers charge full price depends on their overheads, and how far they are willing to squeeze their profit margins. For example, I know one small record retailer who had to sell at least two hundred a week at £10 just to pay for the wages of two staff and the lease, let alone buy more stock, or have anything left for himself. The ultimate consequence is that he now opens only on Saturdays, when he can keep costs down and employ staff for only one day instead of five or six. The marked difference in retail price between the US and the UK is said to be because of the radically different size of the market. **EB**

DIGITAL UP TO VINYL STANDARD

Stephen Clarke of Doncaster (Letters, August) might be interested that my Technics SL-P22A CD is much improved by the use of the optical output being coupled to my Meridian 203 DAC. CD is then brought up to the standard of records, played by an Ariston RD80/SME 3009 MkII Improved/Shure ME97ED cartridge/Crimson pre-amp/power amp of ten years' vintage and in excellent sound order.

**R. Ridley,
Tunbridge Wells.**

Not having heard that pairing, we couldn't ourselves either confirm or deny it, as they say. However, Mr Clarke will no doubt be able to! **EB**

MORE ON INTERFACES

Thank you, both for publishing my letter and providing a thoroughly reasonable reply. I was a little cross at the time, having destroyed a significant part of quite an elaborate installation through a moment's inattention, and you would have been quite entitled to reply in kind. Appreciated.

Now I am going to attempt to answer the points you made.

If you are imputing to me "a web of tenuous assumptions" then all I can say is: you are

conjecturally quite right. These thoughts don't usually spring forth fully-formed.

You can't claim that analogue recording media are never operated into overload. They always are, to keep the programme clear of the noise floor.

Now I can claim with very high confidence that your room will massacre an energy-time envelope because they all do, obviously to greater or lesser extent and, as you correctly point out, a speaker's polar response/frequency is quite crucial in the assignment of acceptable limits to this phenomenon.

When your speaker/room interface sounds exactly as clean as a really high quality hat (i.e. headphones), then you can prove me wrong - but only then. And then I think you will hear no glare from a good-quality, multi-bit CD machine.

Enclosed are a couple of photos of a loudspeaker I have designed. The tweeter bank is configured to handle top-of-the-range down to 800Hz. The boxes are a 'resistively-loaded band-pass' set-up whose behaviour is exciting me at the moment. Source is Arcam 70.2,



'Resistively-loaded band-pass' loudspeakers

pre-amp/active crossover is currently being built for me by Keith Tromans; amps are two Rotel RA870BX, now set up with everything else on a Target TT5 stand. Cables... well, nuff said. **Gerard Frykman,
Burton-on-Trent.**

Those things on tape recorders called Peak Level meters are there to discourage operation in overload. It may happen on peaks - this is allowable with analogue but not with digital - but to say that analogue recorders are "always" operated in overload is extreme.

Rooms do affect sound quality of course, but why you are still convinced that they all produce mid-range glare in CD alone is baffling. Recording techniques and equipment affect CD sound, as well as replay hardware characteristics. Seen our distortion and frequency response plots?

I didn't mention polar response, so much as ratio of direct to reflected sound, largely determined by how close one sits to a loudspeaker. My experience here, by the way, comes from in-room loudspeaker testing, where room effects can be seen.

Yes, good headphones (I currently use Beyer DT411s) can sound superb, but they do more than just get rid of room reflections. Their unitary, miniature, lightweight diaphragms and the absence of a box gives a cleaner transient response, better perceived integration at the ear, lower distortion and complete freedom from colourations, return echoes and all the other horrors of box-an'-cone loudspeakers. No wonder they sound cleaner! **NK**

RUN IN AND RUN OUT

Being a modest person, I have a modest hi-fi and, reading the magazine for the last eight months, I have read various comments, type and cobblers concerning warming up your CD before use.

Well, having just bought a new Sony CDP339ES, at first I didn't go a bundle on it, so I put it on repeat and lo and behold, after about fifty minutes just happened to come back into the room as the first track was about to play.

Was there a difference? You bet! So, all you people out there who don't believe, try it. I didn't believe, but do now. Trouble is, the upgrade bug has just bitten me. New amp or speakers, I don't know. Now where did I leave the magazine? I hasten to add my previous CD player is still in the rack but doesn't get much light of day now.

Mind you I did read in one mag - not yours - a right load of rubbish about one well known reviewer and the green pen saga. He happened to put a green ring on a vinyl record, claiming it sounded better.

**Pete Gibbons,
Exmouth,
Devon.**

I've heard that that particular Sony player does indeed benefit from running-in. There is a school of thought that says it should make no difference, but experience does tend to suggest otherwise.

No, the Green Pen saga won't die, will it? I do know about the greening of LPs, and ought to say that its proponent honestly believes it makes a difference. How, precisely, I can't see myself. For the

curious, you don't plaster green ink all over the LP - only the lead-in and/or run-out grooves. Don't blame me if it goes wrong and gunges up the stylus. **EB**

LINE TUNING

I was very pleased to read that, after fine tuning, the final sound quality and technical measurements of my IPL S3 kit loud-speaker came out so well. However, I was very puzzled to read of the slight confusion with regard to the crossover assembly, which led me to the conclusion that you must have been missing a page from the instruction pack which includes a circuit diagram of the crossover.

This is provided in addition to the scale diagram which you show in the article. The circuit diagram (a copy of which is enclosed) clarifies that the input signal must pass through the crossover before being directed to the drive units. If this was my omission I must apologise for this! I think this must have been the case because of the 100 or so S3 kits I have already sold, no one else has reported a similar confusion.

Although we are looking at the possibility of using batten guides or rebates to aid in the quick assembly of the cabinet kits I would still recommend that panels are glued and screwed together as no other form of fixing pulls the panels together as well thus ensuring a very strong and airtight joint. If the builder is cutting his/her own wood and finding that panels are not quite flush then it is a simple matter to remove any slight ledges with a drill and circular sanding disc which should be drawn smoothly along the ledge to produce a perfectly square box ready for veneering or otherwise.

Another subject I would like to discuss briefly is that of room and speaker interaction which is very important especially in the case of transmission lines and any large speakers producing low bass notes. There is a degree of tuning available in our speakers which, by the addition of wadding to the line, allows you to damp the bass, should you so require. It is interesting to note that in your room (16ft x 12ft), a small amount of wadding was required at the port entrance and immediately behind the driver.

I can confirm that this endorses our findings for smaller rooms or those with longer low frequency reverberation times. However, in many larger and acoustically 'cleaner' rooms we have found the best results

occur with only the Profiled Foam in place. However in either case there is wadding supplied with the kit to enable the builder to fine tune.

We agree that up to a little while ago, Dr Bailey's Long Haired Wool was the best stuffing for use in transmission lines. However John Cockroft, who has written many excellent articles on transmission lines for the American publication 'Speaker Builder', has done much work on suitable alternatives and has found that a certain grade of 'teased out' (drawn) Polyester fibre offers similar performance. This material, which we will be supplying with future kits, has a fluffy and cotton wool like quality. It also has the advantage of holding itself in place and not deteriorating with time or by moth!

Finally I would endorse your view that the S3TL works best with more powerful amplifiers. However, the S3 is not particularly insensitive in comparison with other speakers and they are happily driven by less powerful amplifiers (i.e. those in excess of 30 watts). We have achieved good results using many integrated amps including the Rotel amps, the Musical Fidelity B200 (60 watt) or even the Kelvin Labs Integrated (20 watt Class A).

**I. P. Leslie,
IPL Acoustics,
2 Laverton Road,
Westbury,
Wiltshire.**

TUNER TECH.

I greatly appreciate your reviews of tuners and especially of tuner technology. But Marantz 10B, Kenwood KT 7020, Naim NAT 01 and Leak as the top? What about Tandberg 3001A, Kenwood KT 917, L01T, L02T, KT1100 and the latest L1000T, Pioneer F91 and F93, Accuphase, Revox or the top Onkyo? Then there's Tandberg's wholly discrete decoder, the L1000T, Kenwood and Pioneer's partially-digital IF filter-detector-decoder technology, Harman Kardon's active tracking IF filters and similar developments that are emphatically suggested as objects of technical reviews in addition to the NAIM NAT 01. Anyway,

what makes the latter so great, aside from very careful alignment and, presumably, post-decoder amplification - components and/or circuit design?

How about an interview with Pink Triangle's Neal Jackson, the Aether tuner designer, about the above developments and/or tuner design in general? I understand the above to embody the very edge of tuner technology, but there are also 'broadcast' (?) tuners. What are they and how does their technology differ? Some of the Kenwoods are double-supers; Technics' ST-9030 had an 8-ganged front end, etc. Surely there cannot be a wholly new level of tuner technology?

Finally, a sad comment. I buy Hi-Fi World per copy, the first issue (Dec 91/Jan 92) and also from curiosity. I read the Table of Contents (TOC) and, so far, it has aroused my interest sufficiently. At home, excited, I flip through it, reading first the most interesting bits. But repeatedly, I have noticed a lack of satisfaction, so much that I first thought that I had overlooked some of the best. So I go looking for it. But no - from the TOC equipment list I expect an excitement, an enjoyment, that is not delivered.

**H. Transgaard,
(no address supplied)**

Your letter is something of a mystery to me. You fail to identify the reason this magazine disappoints you. If, as I suspect, it is because there are few explanatory technical articles, the reason is simply that there seems to be increasingly less demand for such things. We tend to get more complaints about publishing tech. pieces than anything else.

Perhaps you have a point about tuners and we should endeavour to get to grips with some of their technologies, hopefully in a manner that is generally understandable. Yet double IFs and such like are red herrings in audio, since they relate to advanced RF performance, usually achieved at the expense of audio quality. This is where tuner tech-talk becomes misleading.

The best sounding tuners are often the simplest, for good technical reasons. The Naim NAT-01 may not be a technological wonder in terms of its radio (RF) performance, one reason why Naim insist it be used with a decent aerial. It does deliver superb sound quality though, because Naim have optimised it to do so. They have the knowledge and the test equipment to build a better radio, but they also have the clarity of thought to realise that this isn't what is wanted.

I feel it is important to recognise the validity of their approach. It may encourage others to pay less attention to double tuned IFs (available on a chip) and concentrate more on better detectors, decoders and other things that affect sound quality. **NK**

HIGH LEVEL DISCUSSIONS

Now that the majority of our listening is done from line-level sources, I believe that the question of compatibility between the CD or tape player output and the preamplifier input needs to be looked at a little closer than before. The Quad 44 and older Radford SC22 preamplifiers that I use are both able to provide a 1Mohm impedance line input, a value which is considerably higher than the more usual 30-50K found in more recent designs.

I have noticed that my CD player in particular sounds more open and detailed in the upper mid and treble range when 'seeing' this higher impedance at the preamp. input.

It would be interesting to know if other readers have noticed the same kind of differences.

**Stephen Moyce,
Weybridge, Surrey.**

In theory, the output impedance of a CD player should be low enough at all frequencies to be able to feed medium or high impedance loads without any difficulty. In practice, perhaps differences are discernible. Inputs feeding a volume control direct, as most do, vary their input characteristics with control position, but they have infinite overload. High impedance buffered inputs, now out of fashion, have fixed input conditions, but also a finite overload threshold. These days it must be above 3 volts minimum to accommodate CD. Since cables have an influence theory cannot easily explain, perhaps buffered inputs do as well. **AS ●**



Top tuner from Naim

Creek's latest offering on the loudspeaker front is the CLS10, a budget miniature with a stylish presentation and a classy sound to match for a price of £119.90.

Though sharing the same external dimensions as the Goodmans Maxim 3's and their reflex-loaded polypropylene driver, the similarity between the two models stops there. Creek's new loudspeaker is not just a tweaked version of the Maxim 3; the modifications are extensive enough for there to be some distance between the two designs. The 'environmental' green of the tweeter is not just for style or to match the colour of Creek's logo. It is a special plastic coating which is said to produce a cleaner transient attack in the upper octaves.

Also different is the crossover, which has been engineered to give a smoother, warmer character to the

"fast and tuneful bass"

CLS10. Additionally, the 270x170x203mm cabinet is internally figure-of-eight braced to add stiffness to the enclosure and reduce the effects of box coloration.

Positioning these little boxes requires some care as the bass can tend to become overwhelming. A useful trick to note is that if they are to be positioned on stands close to a rear wall, or blue-tacked to a bookshelf, then a small foam bung placed inside the port at the back will reduce boom and tighten up the bass. The tighter the foam bung, the more controlled the bass will become. Experimentation is quick and easy and

can produce rewarding results.

Certainly not a 'bright' loudspeaker, the CLS10's could, if anything, be criticised for being slightly dull and lacking in sparkle. However, prodded with an extra dose of watts to what I would consider a loud level, they respond by jumping into life, producing an altogether more balanced sound.

On The The's 'Mind Bomb' album it became apparent that the CLS10's have a good sense of timing which, coupled with the speed that might be expected from the small light drivers used, produced very coherent results. I also noticed the absence of any serious box coloration, which allowed

View of a

Measured Performance

What surprises me about this little speaker is how similar it is to its progenitor, the Goodmans Maxim 3, in measured performance terms, yet how different its sounds. The frequency response of the Maxim 3 is almost ruler flat as loudspeakers go, which is quite remarkable. It sounds pretty balanced too and, as regular readers will know, we all regard the design highly. It's a fine budget miniature, one that gives outstandingly good results for the price.

The Creek is a modified version of the Maxim, as Dominic explains in greater detail in the main article. There has been only a small change in the frequency response though. Some slight emphasis has been put on the mid-range by strengthening output from 500Hz to 6kHz. Upper treble above 6kHz rolls away a bit more quickly and bass is just fractionally lighter, both features shown by the frequency response trace.

Vertical dispersion was good; listeners can sit over a reasonable range of heights and still hear the same tonal balance, on-axis positions being ideal. Like the Maxim, this speaker must be used close to a rear

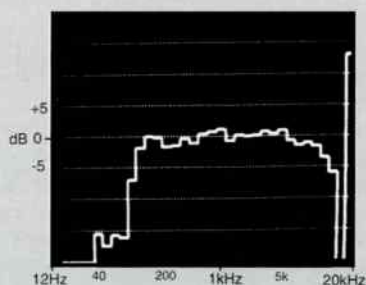
wall for deep bass to be apparent.

I would expect the CLS10 to be a bit more forward on vocals, but softer sounding and more laid back than the Maxim, since this has always been the Creek hallmark.

In all other parameters, the CLS10 measures like the Maxim. It has a very high overall impedance of 13ohms, meaning it is a very light amplifier load but, also, that by drawing little power it under-utilises good modern amplifiers, which is perhaps less ideal. This leads to insensitivity, the Creek being so-so in this area, producing 84dB sound pressure level for one watt (2.8V) of input. Ideally, budget speakers need higher sensitivity to eke more volume out of power-limited budget amplifiers.

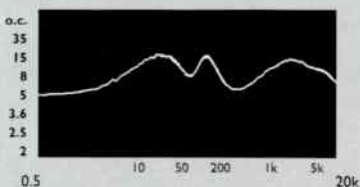
I have to say that listening to the CLS10 I was surprised at how much duller and muffled it seems in comparison to the Maxim 3. I went through a variety of material and could not find any ameliorating improvements, other than the loss of a slight rasp that the Maxim's occasionally show. The CLS10 was too laid back for me, but it may appeal to those who like an easy sound. **NK**

Frequency Response



Raised mid-range at 5kHz, but falling upper treble

Impedance



High overall impedance of 13 ohms, with 8 ohms as a minimum.



Green Creeks

Dominic Baker looks at Creeks' new bookshelf loudspeaker featuring a green tweeter.

them to create a sound bigger than their dimensions would suggest. Any doubts as to their constructional rigidity were dispelled.

In addition, stereo imagery was excellent, which is to be expected from a miniature as they are acoustically closer to being a point source than their bigger brothers. Their imagery is currently on a par with any loudspeaker in its class and could easily be all-conquering if a little more sparkle were to be added at the upper frequency extreme.

Moving on to Simple Minds' 'Street Fighting Years', earlier suspicions about the mid-range were confirmed. Jim Kerr's voice, which normally projects well, sounded as if he was singing through a thick grille, the effect being a slightly muffled character. The bass was surprisingly firm and tuneful,

successfully avoiding the one-tone bass drone normally associated with miniature bass reflex designs, down to a point where it rolled off rapidly due to physical size limitations. In fact, the bass was projected in a manner not usually associated with miniatures, being not only melodic and fast but also deep enough for all but the hungriest of bass freaks.

A change to the B-52's new album 'Good Stuff' provided a welcome surprise. Kate Pierson's voice really sings out on the CD, which was just what the Creeks needed. They jumped straight into a class previously out of their reach. Having intended originally to listen to one track only, I found it hard not to repeat the entire album a second time. The mid-range can be confused by more complex passages of music, but the CLS10's

fast and tuneful bass shines through, distracting attention from the mild confusion in the upper octaves, allowing the listener to follow the music with a good level of competence and a tapping foot.

Although the Creeks CLS10's are marred at the frequency extremes, they are worth auditioning by anyone on a budget or with space limitations. If you are a potential or existing owner of a Creeks amplifier, then an audition is mandatory. Unfortunately, I did not have any Creeks amplification available, but electronics from the same stable may produce a smooth, lucid and rich textured sound. I would have liked the mid-range to project with a little more force and clarity, but in the end this is a budget miniature and one which still manages to rate as good in its class ●

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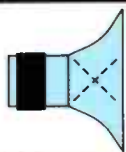
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Pioneer have introduced an audacious new technique for improving CD sound quality. They call it 'Legato Link'

A Bit Improved?

Pioneer is flipping the Compact Disc world upside down again, following their 'Stable Platter' CD turntable players, with a new notion: 'Legato Link'. The PD-S901, which replaces last year's PD-9700, at £399.95 stands in the middle of the new Legato Link range.

After the unprecedented success of the A-400 amplifier, Pioneer launched a range of novel CD players onto an unsuspecting world. These, unlike the A-400 in that they were designed for a world market, invert the CD drawer mechanism, so that the CD itself is played 'silver' side up. The 'label' side of the CD is laid face down on a freely spinning platter, or 'turntable', which is then read by a laser arm from above.

Pioneer suggest that this Stable Platter mechanism 'clarifies the sonic framework'. I'm not quite sure what that is supposed to mean, but last year's Stable Platter players did produce a sound that was smooth and coherent, if a little over-refined at times. The minimalist PD-9700 impressed me greatly, especially when acting as a transport for a digital to analogue convertor.

So what is Legato Link? The human ear is relatively insensitive to high frequencies. There are few men who can hear much above 16 kHz by their thirtieth birthday and I'm afraid

that it is downhill all the way for most of us from our twenty-first. Women fare slightly better at retaining the ability to hear high frequencies, yet there are still few people who go through life with their full high frequency hearing intact. As far as CD is concerned it was decided that signals above 20kHz can be cut off totally at the recording stage, without the loss being perceptible. This pointed to the use of a 44.1kHz sampling frequency, as by definition such a sampling rate can only restore signals up to just over 22kHz.

Legato Link operates in a different manner to most systems. The digital filter effectively synthesizes musical energy above 20kHz, giving musical program a more 'organic' frequency range. This extended, or more accurately 'enhanced', frequency structure then influences the transient response of the player.

Only the American high-end manufacturer Wadia has incorporated such an idea before, except that theirs involves sophisticated and expensive circuitry, whereas Pioneer have 'chipped' the Legato Link circuitry onto a single 28-pin Integrated Circuit to keep costs low.

Externally, there is little to differentiate the new player from the old. Only the new model name in the top left corner and the words 'Legato Link

Alan Sircom hears Pioneer's new low-bit Legato Link PD-S901 Compact Disc player. Noel Keyword tests it and listens in.



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Conversion' in the top right show that any change has taken place. They both have similar honeycombed chassis and both sit on five feet, with the fifth foot placed underneath the transport.

Both players are comparatively minimalist in outlook, with a front panel that offers the barest minimum of controls. To the left of the central CD drawer there is a Power button, together with switches that disable the display when playing music and the output selector, which allows the user to switch off the digital or analogue output of the player. Both can improve the sound quality, although I would also like to see some form of dimmer control for the display.

To the left of the PD-S901's centre drawer are the six main controls: Stop, Track Skip, Back and Forward are the smaller buttons along the top, with drawer Open/Close, Play and Pause along the bottom. Having lived with the PD-9700 for some time, I feel that the Stop and Drawer Open/Close controls should be swapped around, but this probably has more to do with my own preferences than ergonomics. The rear panel is once again identical to its predecessor's, with left and right analogue output phono sockets in the top left corner, digital co-axial and optical outputs below and a 'CD-Deck Syncro' socket, to allow a Pioneer cassette deck to 'talk' to it when recording. Finally, in the bottom right hand corner is a captive lead.

The manual supplied with the PD-S901 gave rise to some merriment in the office. The first few pages include

*"It is quick,
well focussed
and precise."*

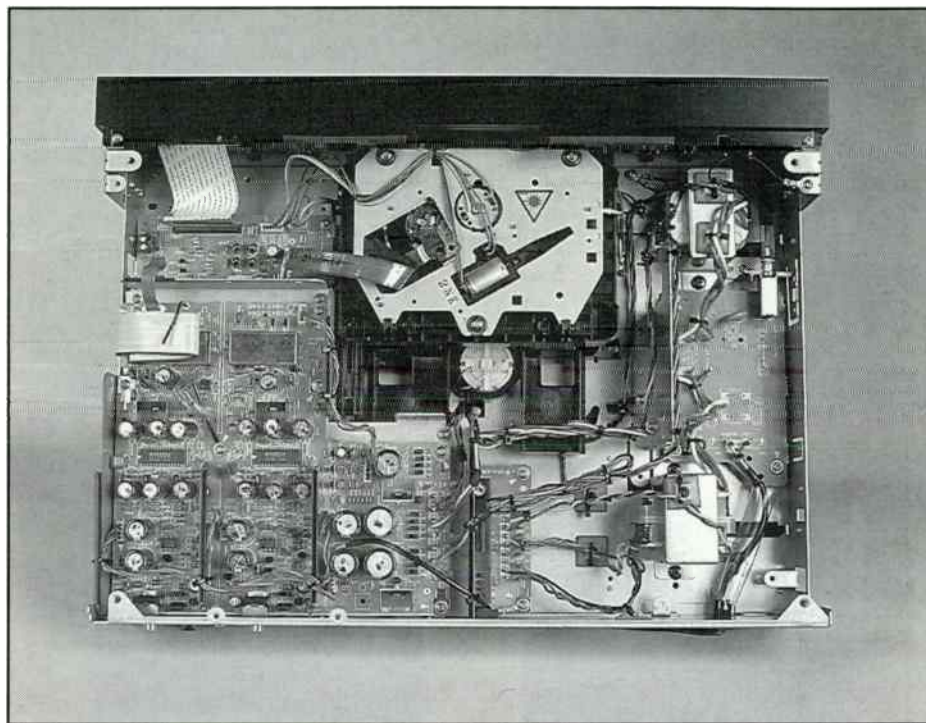
a series of safety messages, only appearing in English. The information regarding antenna grounding, mains and the like is useful and handy, but the section titled 'We Want You Listening For A Lifetime' goes a little over the top. It starts with "The following noises can be dangerous under constant exposure" and goes on to include thunderclaps, gunshot blasts and finally rocket launching pads at 180dB. Were I sitting on a rocket launching pad being shot at during a thunderstorm, I'm afraid that preserving my hearing would be low on my list of priorities. Apart from that, the manual is informative and easy to follow, but is sadly lacking in any of those Japanese-English mistranslations

so fondly remembered from Seventies or early Eighties booklets.

I found that the PD-9700 benefited greatly from good support and isolation, using Mana tables or the Townshend Seismic Sink. In addition, the one I have been using for some time has been powered up almost constantly. This is also beneficial, although once 'burnt in', the CD player seems less troubled by being switched off than most.

S901. It is quick, well focussed and precise. The only exception to this is in the bass which can sound stodgy and ponderous at times; nonetheless the new Pioneer sounds simply more musical than its predecessor.

Those new to hi-fi will find the PD-S901's overall sound very beguiling. On the other hand, many vinyl enthusiasts, especially those with Linn, Naim or Rega based systems, will probably prefer the sheer warmth and



It sounds as though there have been several years of development between the two players. The original 9700 avoids harsh digitalitis by sounding warm and woolly compared to the S901. Subtle information that aids the brain in determining instrument position, the environment in which the recording took place and the sense of musicianship behind the instruments, is abundant in this new player.

It continues in the PD-9700 vein; smooth and graceful, happier playing Bryan Ferry than The Cramps. Where it excels is in playing well-recorded discs like the new 'Pyrotechnics' British Jazz compilation. Here, the S901's superb detailing and soundstaging properties are displayed to the fore.

On such a disc, it is easy to catch the breathing of a clarinettist, the noises of a bassist's fingers on the fretboard or the stickwork of the percussionist. Although this clarity of detail and imaging verged on the 'hi-fi' at times it was still a stunning performance for a £400 CD player. The earlier player's soundstage was more forward as well as wider.

Music with dynamic range, scale and breadth comes across well on the

bloom of the Arcam Alpha. A closer rival, sonically, would be the Rotel RCD-965BX player. Here, I feel that the choice would be less clear cut. My preference would be for the Pioneer, because of its musical presentation. Many others would prefer the clarity of the Rotel, however, as well as the cheaper price tag. As the two sound broadly similar, only personal auditioning could determine the better of the two. What the PD-S901 shares with the Rotel and Arcam models is the ability to hold its own in some very high-end systems in the same way as Pioneer's A400 amplifier. Indeed, a system using such a CD player, an A-400 and a pair of £1500 Audio Note E loudspeakers can sound superb.

As I do not own a vast collection of Compact Discs, I have underplayed this medium in the past. Now, however, with its near total domination of the software market, CD has more importance and I feel that the Pioneer PD-S901 is one of today's front runners. Pioneer have made a positive step forward with Legato Link. Although such improvements are difficult to identify objectively, subjectively the difference is significant. Expect to be hearing more about Legato Link in the near future ●

Inside the Pioneer their "Pulseflow" converter chips sit on the circuit board at left.

See Measured Performance



Pioneer PD-S901 (contd..)

The PD-S901 is one of the most unusual CD players I have ever measured. Initially, bent over the instruments late one night, I looked at the analyser's pictures in dismay, got up in frustration and went straight down to the pub. "If that's what the Japanese are getting up to nowadays," I thought to myself, "the recession's taking a pretty bad toll!"

Any night in the Roripongi district in Tokyo, hordes of smart suited Japanese businessmen can be seen staggering around getting blind drunk. Last time I was there, one fell out of the lift at my feet - kerplunk! For some reason these images resurrected themselves when I measured the Pioneer; surely, some quirk of behaviour must have overcome the designers? Was it all down to a new, extra strong batch of The Famous Grouse hitting the streets?

Seriously, I suspect that Pioneer have

that's for sure, as the comparison of a pulse from a PD-9700 (Fig 1a), its predecessor, shows. In contrast the PD-S901 (Fig 1b) has none of the ringing - seen as wiggles in the trace - of either the PD-9700 or of other CD players (which give very similar results). But as a result, the '901 has a frequency response that reaches just 16kHz, as seen in Fig 3.

It was the plunge of the line off the screen at this unusually low frequency that had me up and off to the pub in despair. Scanning their literature later I found that this is an acknowledged property of the system, so at least I would be spared the obfuscation and faxes between London and Tokyo that normally accompany the discovery of something unusual and potentially embarrassing.

So the PD-S901 goes no higher in its frequency response than a VHF/FM tuner. It is difficult for the human ear to discern

of 44.1kHz - that, by conventional wisdom, are unwanted. The analysis in Fig 2 shows them clearly. At left lies the player's frequency response; over at right can be seen alias signals. They appear to smoothly extend the frequency response of this player up past 20kHz to almost 60kHz. But note that the energy above 20kHz comes from aliases, not from signals harmonically related to the music. Standing conventional wisdom on its head, Pioneer suggest that the spectrum is natural and effectively extends the output of the player smoothly up past the upper limit of the normal brick wall filter in an analogue-like manner. The suggestion that aliases should be used to extend the music spectrum is nothing other than startling and audacious (hand me another drink, James). It must have been hatched during a particularly riotous night in Roripongi. However, I have to say that since the ear has little real discrimination

Impulse response

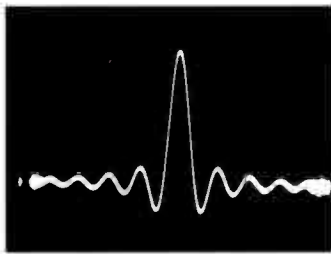


Fig 1a) Impulse response of a normal CD player, with ringing seen as wiggles along the bottom of the trace.

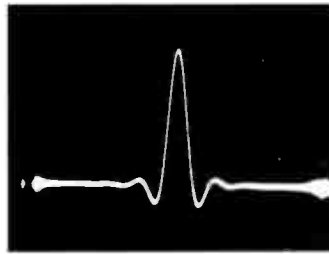


Fig 1b) Impulse response of the PD-S901. Ringing has all but been eliminated by the unique filtering.

Alias Products

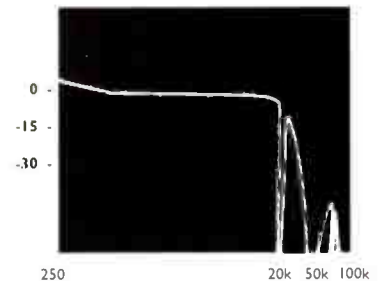


Fig 2. Alias products, normally regarded as unwanted, extended the player's output beyond 20kHz. Their contribution can be seen at right, in two peaks that lie between 20kHz and 60kHz.

said to themselves "We must be truly innovative, or even eccentric, to capture the high-end market more successfully" and have taken a gamble with this player. Naughty British manufacturers like Deltec and Arcam have taken liberties in the past by rolling down the high end a bit, not too much, to get a softer and more amenable sound from CD, but that's about as radical as UK companies usually get.

Design on impulse

Pioneer have easily surpassed them. They have looked not at the frequency response of the player, but at its time domain equivalent. Instead of saying "Let's design the digital filter to get a flat response to 21kHz," they've said, "Let's design the filter to pass an impulse without ringing." Obviously, there's a different set of priorities here. It is their single minded pursuit and optimisation of this end that so surprised me; it sets the PD-S901 apart.

The player does produce a clean impulse,

information at very high frequencies and most people have difficulty detecting tones above 16kHz. However, we seem to be able to hear the difference between a system band limited to 16kHz and one not band limited at all. This is a paradox that remains unresolved and I note that Pioneer refer to it in their literature, as justification for their radical design approach.

In my experience, a reduced upper response limit alone will be discernible, being heard as a lessening of scratch and sting in the sound, at least, when strong high frequencies are passed through the system. It is quite conceivable that to most people a CD player with a 16kHz upper limit will sound quite all right, at least if everything else is working well, but there's more to it with the PD-S901. Information is added in above 16kHz to extend the player's output right up to higher frequencies, as I'll explain.

Signals in a digital system produce aliases - image signals around the sampling frequency

at high frequencies (i.e. above about 12kHz), yet seems to be able to 'sense' supersonic energy somehow or other (in justification, Pioneer state new research shows that cilia in the ear can detect energy up to 90kHz), I am reluctant to dismiss this heretical notion.

However, there is another, more conventional way of seeing such a thing. The alias tones above 22kHz that Pioneer say act as extended music energy can be given another name: intermodulation distortion. A 16kHz tone, for example, produces a 44.1-16 alias, or a 'difference' tone at 28kHz. Since this is not harmonically related to the fundamental, there isn't much that is musical about it and, in the past, many have suggested that intermod. is nastier sounding than other forms of distortion. In addition to difference tones, there are sum tones of the music signal and the sampling frequency (e.g. 44.1 + 16).

So does the PD-S901 sound worse for producing strong supersonic intermodulation

Measured Performance

distortion? Or does it sound better because the ear detects this energy, but doesn't in any discriminating fashion really resolve its relationship to the music, and is therefore fooled into thinking it is part of the music, as Pioneer suggest?

Quite frankly, no one really knows or can tell. The only way to judge whether Pioneer are on to something in this highly imaginative piece of CD engineering is to listen to the player, which we did - thoroughly!

Other properties of the PD-S901 player must be taken into the equation when looking for underlying properties that will also affect overall sound. For example, it produces almost no distortion at all. A dithered -90dB signal, with the dither noise stripped away by synchronous time averaging, displays just 0.4% distortion, the lowest distortion value I have yet to measure. And where other players produce 0.2% or so distortion at -30dB music

SOUND QUALITY

Fascinated by the technology, I looked forward to listening to this CD player, expecting to hear some radical change in musical presentation, and possibly a great leap forward. Sadly, it wasn't to be. What I heard was obvious strengths balanced by equally obvious weaknesses.

If there's one feature of the PD-S901's sound I would highlight it is its lucid mid-band, always most obvious when resolving vocals. From Siouxsie Sioux through to Steve Earle, singers were strongly projected, an engaging sense of closeness and an easy and natural tonal balance conspiring to breathe life and believability into their performances.

On this matter, there was a contest between the Pioneer and the units against which I judged it, a Deltec Bigger Bit sync-locked (Deltran conversion) to a Teac transport. Although double the cost of the

However, with complex, high level material the PD-S901 started to show some unsettling problems. I couldn't help but notice how in contrast to the Deltec it appeared to be little able to resolve the texture and real character of high frequency signals. Apart from the rounding effect on the response roll off was having softening out the sharp edge of the steel strings in Steve Earle's pedal steel guitar for example, their resonant twang and its modulation was rubbed over, becoming tarnished and unattractive. At times I heard a wiriness verging on a grittiness in the treble that seemed divorced from the music and this, I strongly suspect, was due to the out-of-band alias products making their presence known. The Pioneer was peculiar for sounding at once, dull and sharp; steel strings were dulled, yet a sharpness could be heard.

Grey and wiry

In contrast, the Deltec stayed glassily clean and clear, sorting out complex music strands beautifully and keeping me right on the edge of the seat. It delivered hair-trigger transients almost with venom, but they sounded crystalline, where the Pioneer sounded grey and wiry in comparison.

On general speed, precision and timing, the Deltec again showed it a clean pair of heels, but then, being sync-locked helps. Its cleaner transient behaviour and strong, dry bass also contributed to a sense of control the Pioneer lacked.

With a lot of programme material, the PD-S901 puts up a convincing and entertaining performance; it certainly has some significant strengths, ones I found I could well appreciate. It was when the going got tough, with high levels, complex programme material and lots of treble energy that the blemishes became apparent. Then, this player started to produce more than just the music - and it didn't sound very good. **NK**

Frequency Response

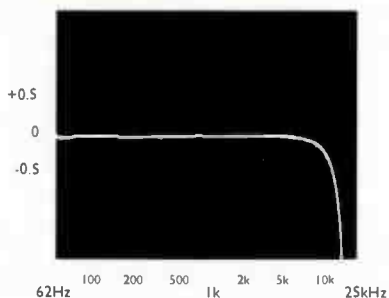


Fig 3. Frequency response extends up to 16kHz, above which it rolls off smoothly.

Distortion

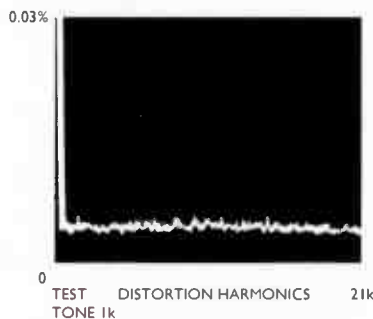


Fig 4. The Pioneer produces no distortion at ordinary music levels, and none with dithered signals too.

level on disc, the PD-S901 produces 0.005% on average. The distortion analysis in Fig 4 shows this as a complete absence of spikes along the horizontal part of the trace. The Pioneer is an ultra-low distortion player and this too will have some bearing on the sound. In my experience, there usually is an appreciable smoothness and ease in the sound of low distortion CD players that is beneficial.

Output is +2dB up on other players at 2.4V, so in a comparative shop demo the Pioneer will sound subtly more forceful. This should be borne in mind if an A/B demo is organised.

By conventional wisdom, the PD-S901 has limited audio bandwidth and throws out a lot of unwanted alias products that act as intermodulation distortion. Or, if Pioneer are right, this player artificially reconstitutes pulses and music to a more natural form than digital allows during recording. If they're right, I think I'm due for a riotous night in Roripongi.

Pioneer, the Bigger Bit represents the best of (affordable) conventional technology, also having minimal distortion, but brick wall filtering and no unwanted products above 21kHz.

With vocals, the Deltec convertor displayed a lighter, sharper view of a singer, although not one lacking insight or atmosphere. In view of other findings, I'm not sure the Deltec was wrong in its portrayal, but the Pioneer did usually sound more natural (an 'unnatural' sound may be accurate, revealing microphone treble lift for example).

The doubt I have about accuracy of portrayal comes from other experiences. There's no doubt that the Pioneer has a 'soft' sounding tonal balance, due to its treble roll-off. Yet at the same time it can sound a bit sharp and wiry, being something of a chameleon in character. Generally, I found with simple, untaxing material it was at its best, lucid across the mid-range, a bit muted in its treble and with a satisfactorily strong bass performance, albeit of mediocre definition.

Test Results

Frequency response	2Hz-16kHz	
Distortion	left	right
-6dB	0.007	0.006
-30dB	0.004	0.006
-60dB	0.35	0.35
-90dB	29	29
-90dB dithered	0.4	0.4
Separation		
1kHz	119dB	124dB
10kHz	102dB	108dB
Noise		-110dB
with emphasis		-114dB
Dynamic range		111dB
Output		2.4V

Distortion? Surely it sounds nasty, you might think. In reality there are many different types of distortion and - yes - many do sound nasty. But quite a few don't; some even sound nice!

In what I hope are simple, understandable terms I want to describe what types of distortion there are and, in so far as it is possible in print, what they sound like. The sort of rasping, crackling distortion you might hear when say, a transistor

For example, if a 1kHz sine wave is distorted, the first distortion harmonic up the frequency scale lies at 2kHz and it is known as the 'second harmonic'. The next is at 3kHz and is known as the 'third harmonic' and so on. (Fig.3)

These are the most common distortion harmonics. Second harmonic is sometimes accompanied by more distortion products at 4kHz, 6kHz, etc, called 'even order' distortion products.

DISTORTION

What is it and what does it sound like? Noel Keyword explains

radio is turned up too loud, is officially called 'non-linear' distortion and my concern is with this phenomenon. Engineers, for the sake of correctness, sometimes refer to 'linear' distortions, of which the best example is a non-flat frequency response. But it is not the average man's idea of distortion, so I will not be covering it here.

Let's take the example of an amplifier to explain what distortion is. One that distorts does not evenly amplify every part of a signal. Crossover distortion in the output stage, for example, puts what is commonly termed a 'glitch' into the waveform, shown in Fig 1. This glitch is a non-linear distortion. As the diagram shows, if a pure sine wave (a signal of just one frequency) goes in, it comes out with bent portions in the waveform at the zero crossing point.

When a sine wave (or any signal, for that matter) is distorted, although it appears from the diagrams that we have one signal that has become misshapen, in fact additional signals are produced. It is these additional signals that, combined with the pure signal, produce the misshapen appearance. So distortion adds signals - ones that are unwanted in the case of hi-fi. In radios and electronic instruments distortion is called modulation, being used to good effect.

The best illustration of how one wave may in fact be two or three is seen in Fig 2, where two views of the same situation show roughly how it may be seen differently. Imagine that when taking a time domain view the second and third distortion harmonics are added to the fundamental, producing a composite waveform that looks distorted.

With harmonic distortion the harmonics are at multiples of the basic signal frequency (i.e. the fundamental) and so they are termed 'distortion harmonics'.

Third harmonic can be accompanied by further products at 5kHz, 7kHz etc, known as 'odd order' distortion products. So a distorted signal has extra tones added to it by the distortion mechanism. These tones are always higher in frequency, at least in harmonic distortion. Lower tones can be produced by intermodulation distortion, but I won't cover intermodulation here.

So harmonic distortion adds tones to a signal. This isn't quite magic, because the energy for the tones comes from the main signal; there is a conversion process going on. When distortion gets really strong the level of the fundamental falls and the main signal actually becomes compressed.

THE SOUND OF DISTORTION

So much for what harmonic distortion is. Now let's talk about how we hear it. The ear can discern signals of differing frequencies when they are spaced well apart. For example, as a train approaches we commonly hear a dull rumble. When it blows its whistle, we hear the whistle and the rumble. Neither sound disappears, nor do they merge into a single, homogeneous sound. The ear can clearly discrimi-

nate between them.

What the ear cannot do so well is discriminate between frequencies that are close together and this is where the matter of aural perception gets more complicated. When distortion comprises just second harmonic, the harmonic that is closest to the fundamental, only the timbre of the sound is altered; the ear does not hear two discrete tones or sounds. It hears a change of character in the main tone.

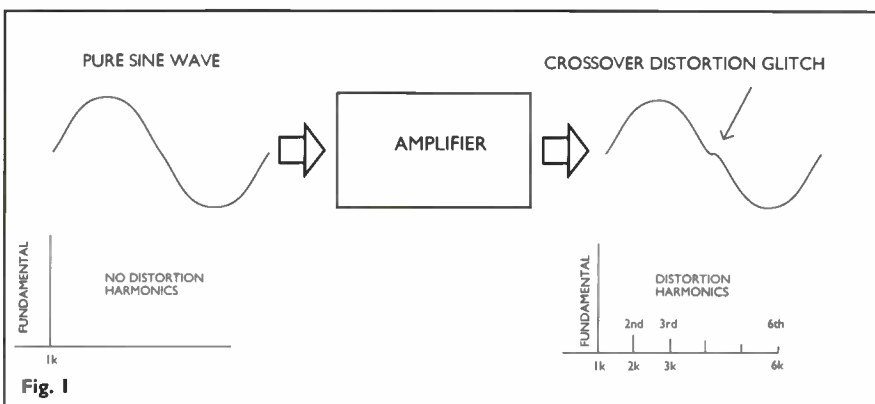
Loudspeakers do this when they 'double', as it is known (i.e. produce strong second harmonic distortion). The strength of a deep note is apparently diminished and a lighter quality is brought to the main note (i.e. the fundamental). Second harmonic distortion only alters the perceived quality of the fundamental, lightening it in timbre. It is an effect that becomes obvious when the second harmonic exceeds a level greater than 5% or so of the fundamental - which is quite a lot of distortion.

Small-coned loudspeakers produce a lot of second harmonic distortion at low frequencies (10% or more at high volume) and it can, I assure you, be heard. But we don't recoil at something that sounds nasty, we only hear a lightening of timbre. This is one of the reasons why small loudspeakers apparently do not produce real bass power; feed in a strong low frequency signal and a lot of its power gets translated upward into second harmonic, helping to diminish the real 'weight' behind the note.

So with second harmonic the ear hears distortion as a change of character. It doesn't hear an unpleasant noise of a sort that would cause most people to say "Ouch - that's nasty distortion". It is commonly said that second harmonic distortion is benign; if you keep increasing its level at no point will it ever sound nasty.

Not only do loudspeakers produce second harmonic distortion, so do valves. This explains why their form of distortion is neither obvious nor annoying. It might seem contradictory that 'distortion' can be identified and then apparently dismissed as subjectively unimportant in such a fashion, but it is valid, I can assure you.

Without the ability to measure, by the way, the presence of distortion cannot be known and, when benign, it won't even



be guessed at. This is one of the great drawbacks to subjective-only reviewing. Distortion will subtly alter the timbral quality of a signal, yet the phenomenon can pass unidentified and unmentioned.

ABOVE SECOND HARMONIC

As the harmonics of distortion rise they move further and further away from the fundamental in terms of frequency and become increasingly obvious to the ear as

cheap CD players, which sounded gritty and hard. Another problem area was and still is old digital recordings made in the late Seventies or early Eighties. Here, in quieter passages, especially with violins, the sound becomes a sea of shaky distortion, great swathes of coarse, jittery noise (known as quantisation distortion); it's something quite horrid. It's also the reason why, by the way, I never buy early digital recordings. Only by the late eighties

had this problem been identified and eradicated.

The great difficulty CD has had to overcome is that for it to be subjectively free of distortion manufacturers have been obliged to produce silicon convertor chips that have unusually low distortion.

Listening tests

show that less than 0.05% is necessary before the tinge of roughness finally disappears. It has taken Bitstream to get down to these low levels.

Now on to another category of distortion - that which enhances. So far I have talked about benign distortion (i.e. second harmonic) and 'distorted' distortion (i.e. the nasty stuff that makes you want to dive over the back of the settee). Now for a third category: euphonic distortion.

If there is a harmonic that can enhance it is third harmonic. In music when this harmonic is present it is said to 'sharpen' a note. In practice it seems to have this affect with hi-fi too. The most cogent example was the Decca London cartridge, which produces large amounts (9% or so) of third, due to its strange, non-linear stylus motion. If the Decca has anything

in its sound, it is real speed and incisive; it has a highly precise, sharp sound. The presence of large amounts of third harmonic distortion is contributory to this.

Another interesting example is to be found with amplifiers. Those that produce third harmonic distortion, even in very small amounts (0.02%), invariably sound brighter and sharper than those that produce second harmonic distortion. The

latter commonly sound very smooth - over smooth for some people's taste. Third harmonic is a non-linear distortion that, on its own and in small amounts, is able to enhance.

These observations are necessarily basic, by the way. The mechanism that produces the distortion may be more important than the distortion itself. It also produces intermodulation distortion for example, which is potentially even more unpleasant psycho-acoustically than harmonic distortion. However, I suspect from measurement and observation that it is the way distortion is itself modulated, correlated to programme or not, that affects its audibility most. The modulation of distortion and the audibility of the modulation envelope is, I'm afraid to say, beyond the scope of this little piece.

So distortion doesn't have to sound nasty; it can be undetectable (second harmonic) or even brighten things up a little (third harmonic). The idea of 'euphonic distortion' is not one widely accepted, either because people are not willing to believe that they can be easily deceived, or because it seems like a dubious contradiction in terms. In truth, it is very easy to fool the ear and the brain in certain ways, and distortion is capable of doing it. This leads to the notion, sometimes used (or misused) by design engineers, that their product sounds worse (i.e. less characterful) than others because it is so good! This sort of thing can form the basis of lively discussion of course.

In practice also, you have to bear in

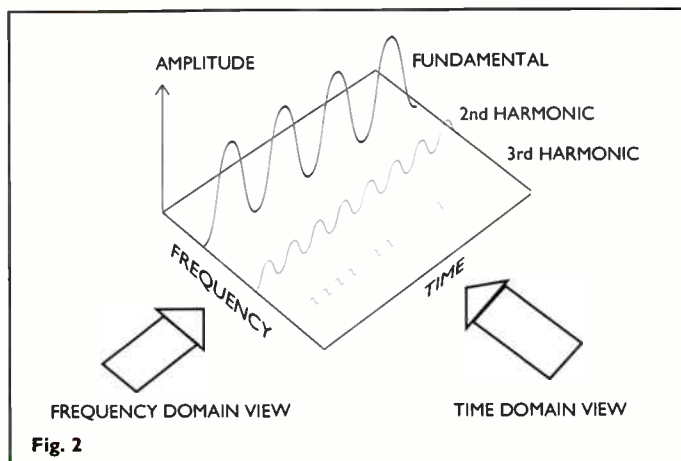


Fig. 2

separate signals. They also take on a different perceived nature, one that is less pleasant and more obtrusive.

Only second harmonic sounds benign. Third harmonic adds brightness and sharpness. Past this, harmonics rarely in practice exist alone so their individual impact cannot be described. We tend to get spectrums of distortion harmonics - and they can be really nasty sounding. As the harmonics rise and rise, so the ear hears them as something entirely different and additional to the main signal, yet related to it.

The example of the transistor radio being turned up so high it runs into gross overload is a good one. You hear the grunge and the roughness as a separate, nasty sound, the sound of distortion. Yet you also know that it is related to the music being played. Distortion like this has harmonics extending upward to at least ten times the basic signal frequency - often more.

Now for more examples. Let's start with extended harmonic spectrums. As I said, they sound nasty and are easy to detect. Where do we find the worst? Compact Disc. Yep - didn't you know it! In truth I should say, from the digital-to-analogue signal conversion process. Whenever digital signals are produced from analogue, or back again, distortion is generated. Unfortunately, the nature of this distortion (twenty harmonics or more!) is such that it is easy to detect and sounds unbelievably horrible. As a result it must be suppressed much further than second or third harmonic to fade below annoyance. This makes digital more critical than analogue in its distortion behaviour: it has to have low distortion to be acceptable.

The best example used to exist with

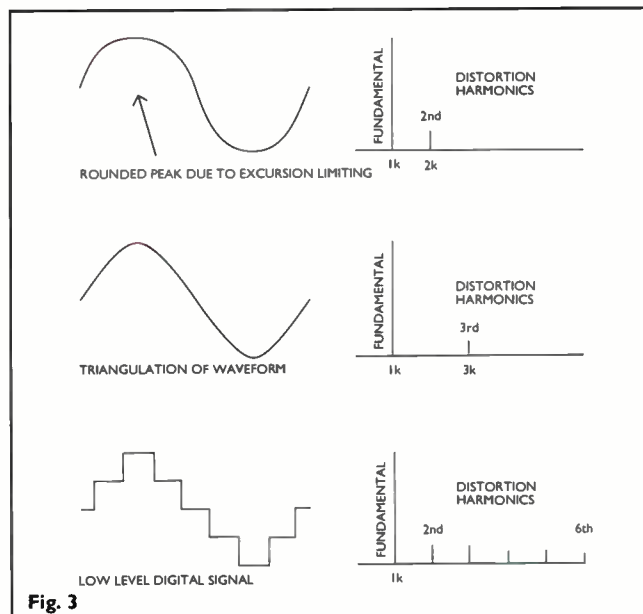


Fig. 3

mind that the distortions I have mentioned rarely exist on their own. They are accompanied by other effects that modify their subjective impact. All of which makes the subject very complex. Although it is important to be able to detect distortion by measurement it is equally important to listen, to hear what it sounds like. Only by this method can we say whether it sounds nasty or nice ●



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A Tune in Time

Rogers new P22 loudspeakers utilise 'time-aligned' drivers. Eric Braithwaite listens for the tunes.

Rogers' floorstanding two-way P22 doesn't - as they admit - look much like a Rogers loudspeaker. Thanks to their larger BBC-type designs, a Rogers is expected to look like a large, oblong box, understated to the point of anonymity as far as external design flourishes go. Rogers have traditionally sold not on their appearance, but a conservative yet truthful tonal balance and refined presentation that the British appreciate. Their association with the BBC reinforces this set of values, giving the company credence amongst 'serious' listeners.

Admittedly, one of the three loudspeakers in the P series, the stand-mounted P20, is a square-ish box, but the two larger ones mark a distinct design departure, at least for Rogers. While the 200mm clear polypropylene bass/mid driver and 25mm aluminium dome tweeter of the £1,100 P22 are familiar from other Rogers loudspeakers, they are mounted on a sloping baffle which takes up the top third of the box.

Time aligned

This is to cater for the 'time aligned' school of thought, which places the radiation plane of the two drive units in vertical alignment. That is, it's the business end further back behind the cone of the bass/mid-range unit that must be vertically aligned with the tweeter's dome. Claimed benefits are improved stereo imagery and presentation of depth.

In the case of the P22, the sloping baffle is also used to increase cabinet rigidity and minimize internal standing waves, the sort of building work which, neglected in some 'time-aligned' designs of the cheaper variety in the Seventies, devalued the concept. In the interests of firmness, the P22's come with spikes for rigid coupling to the floor and, in the interests of a bass response down to 50Hz, there's a large-ish reflex port round the back.

Also round the back are two pairs of solid and chunky gold-plated binding posts; now Rogers have taken the plunge with the bi-wirable

classic LS3/5a, the P22 also comes with the crossover internally divided for bi-wiring. Behind the veneer, which extends neatly round the back, the crossover even uses star-earthing. It's impossible to avoid a sneaking admiration for those manufacturers who fail to succumb to the temptation just to paint the back black, though if you are bored with Black Ash, the P22 is available in Walnut wood veneer as well.

Dimensions are quite domestically acceptable at 850mm high, 260mm wide and 300mm deep. In the manual Rogers - and this is something of a rarity - give the listening axis as well. A listener's ears should be 700mm from the floor. They are designed to be used between 300 and 500mm from a rear wall and well clear of side walls. Amplifier power of 15-150watts is recommended.

This is not a new speaker, at least it won't be to our readers across the channel. We Brits are notorious for consumer conservatism: since the P22 and P24a don't conform to the boring-box school, Rogers launched them in Europe a year ago. Now in the caring Nineties, maybe our conservatism is being tempered, and the water temperature is being tested on this side of the channel. Over on the other side, the P series has achieved some degree of popularity, apparently. In fact, it was a phone call about them from a French reader which aroused our curiosity.

"They sound loud," said a friend who dropped in when the P22's had been installed in my listening room. That's certainly true - apparently. It's partly a function of the Rogers' extremely tight soundstage: less expansive in width than one might expect,

more forward in their central perspective than this company's more sedate designs, and with a sensation of muscle behind them.

Not that this is achieved without some tender loving care. In a room with a 'live' acoustic rather than my usual listening room, another listener felt they were characterless. They need space to breathe: I had them a good eight feet apart before an otherwise somewhat compressed centre-stage opened up. Bi-wiring also loosened up their dynamics a little, filling out the tone of wind instru-



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ments. On one recording, single-wired and the speakers, as it turned out, too close together, a solo flute had a hard, flat metallic sound; so much so that until the P22's were more fully run-in, bi-wired and the grilles put back on, it was christened a 'flumpet' (a cross between a flute and a trumpet). Yet the double bass in the same recording had a full, deep, dark tone with a realistically defined size.

A good bash with Classical orchestral music showed that the P22's had good portrayal of depth, reverberation and general ambience; instrumental colour was reasonably well catered for over the range, though with a brightness to the violas' register that tended to mix them in with the violins, although the sections were clearly separated.

Orchestral sections, in fact, while separated in space, were diminished in scale at the left and right extremes, a trait that gave vocalists and centrally-placed instrumentalists in Rock recordings a strong sense of presence, but at the cost of a breadth of performance, squeezing the image.

Nonetheless, the forcefulness with

which the music comes out of these P22's is admirable, with enough inner detail to portray a performance, if not with the finer degree of subtlety that tells you what mics a singer or a player had in front of them. Plenty of detail was evident in the way of fingers on frets and brushwork on cymbals, for example. A Chapman Stick turned from a recording into a full, wide-ranging instrument in my living room - a fairly rare event - sounding much more like the instrument I heard the same musician playing live a few months ago. Through Rogers' P22's it was one of those rare occasions when I felt I could hear both its full tonal qualities, its whole range and count its strings as well.

Vocals, however, hit a register where singers' tone was lightened and thinned a degree, Lou Reed for

example, singing less throatily and chestily than I've heard.

Bi-amped instead of bi-wired, the Rogers opened up that little bit more, tonal colours filling out, a degree more of sweetness spreading more evenly through the upper registers and the lower end sounding tighter and firmer, though with less dryness than would be ideal in the lower bass. Singers developed a slightly larger chest cavity, with more resonance, which was also welcome.

These P22's have a good deal of energy and vibrancy and detail to commend them, but since they reach their peak of performance bi-amplified rather than simply bi-wired, and cry out for a sizeable listening room, this could make them a difficult proposition. Price has to be taken into account as well, unfortunately; running them as I did, with a pair of 100watt stereo power amps, brought out their best points, but it's not exactly inexpensive. Worth trying, but not, perhaps, if your bank manager has an anxious look or you've been investing in the Nikkei lately ●

"a good deal of energy and vibrancy"

Measured Performance

I used the Rogers P-22s before measuring them and attempted, from what I heard, to guess their characteristics in advance. They struck me as sounding basically amenable, with an easy, almost warm sound, fine clarity and over-generous bass. Positioned as Rogers suggested, within 0.5 metres from the rear wall, the bass sounded inflated and overpowering in a 16ft x 12ft room. The solution to this problem was to pull the speakers out, further away from the rear wall, usefully lessening the bass. All the same, the P-22s remained on the full side in their bottom end behaviour.

The third-octave frequency response analysis clearly shows raised bass output below 150Hz and it does tend to peak, suggesting light damping and a resonant behaviour that would produce the sort of plumminess I heard. I wonder why Rogers have waded this through; I suspect it is to appeal to the many souls who want 'lots of bass' (a common cry). Unfortunately, the 'lots of bass' obtained by this means is also of so-so quality. The lower bass limit is 40Hz, so the P-22s go as low, but no lower, than any good speaker of their size.

Bass peak apart, frequency response was pretty flat, although there is a smooth but noticeable rise in treble output up to 12kHz, after which level starts to drop away. I heard no sharpness or peakiness and the tweeter has no measured peak in its output either, so there's good correlation here. Rogers invariably make 'civilised' sounding speakers, mild mannered but essentially truthful in presentation, and the reason why the P-22 has such a sound is reflected in this frequency response

characteristic. The speaker's insight and sense of clarity is mildly enhanced by the steady treble lift; the smoothness is largely a function of the peak-and-discontinuity-free response characteristic. Furthermore, the response shown here held true over a wide range of vertical listening positions, unlike so many loudspeakers, which change their sound according to the height at which you sit.

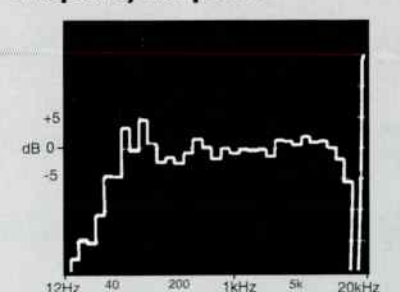
Overall impedance measured 10 ohms. Over most of the audio band it remains at or above 8 ohms, sinking to a minimum of 6 ohms at low frequencies. The 10 ohm figure is a good, valid guide to what an amplifier 'sees', meaning the P-22 is - like most UK speakers - an easy load. All the same, high efficiency results in a high sensitivity of 87.5dB being achieved. This is rare, since high impedance commonly results in mediocre sensitivity, although I do notice a trend recently in UK speakers toward obtaining both. Then you get the best of both worlds - a speaker that is easy to drive, and one that goes loud with little power.

Being sensitive, the P-22 goes pretty loud without needing large amounts of power. It's impossible to be too specific about exactly what it does require, because

room size enters the equation, but with 87.5dB of sound pressure from one watt of input (2.84V in truth), somewhere around 60 watts is enough to go loud as far as most people are concerned and with 100 watts the P-22s would be getting seriously loud.

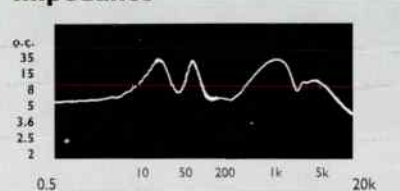
These speakers measure well, bass characteristics apart. However, kept away from walls and well out into the room (by at least 1m) the problem is held sufficiently in check to be acceptable to those (e.g. me!) who prefer not to experience a good, low frequency cudgelling. Eric says bi-amping improves the situation. As a load the P-22s are easy to handle and they go loud with amps of modest power. **NK**

Frequency Response



Emphasised bass is seen as a hump at left.

Impedance



Overall impedance is high at 10ohms.

SHARPENING THE IMAGES

I have a respectable set up (I think so) which consists of Linn Lingo, Ittok, Asaka, Naim 62, Naim 160 (upgraded by Naim this year) feeding Linn Saras Mk1 plus a Nakamichi 582 tape deck.

My listening room (lounge) is typical semi-detached 11' by 12' with a bay window, alcoves either side of a chimney breast, the floor is wood and is carpeted, and in addition to the hi-fi it contains a three-piece suite as a concession to the distaff side of the family.

I feel that the loudspeakers could be improved upon, particularly the imaging, but I do not have the space for units which demand a lot of freedom from walls etc., so they have to go in the alcoves.

I would appreciate your advice in this matter. I have thought along the lines of Naim IBL, Linn Kaber, KEF Q90, but have not heard these yet, since the most reputable dealers are some fifty miles distant and before I arrange an audition I would like your thoughts.

My musical tastes are fairly catholic: Folk, Country, Classical, no Rock though - I'm too old to enjoy it.

**J.E. Fraser,
Billingham-on-Tees,
Cleveland.**

You have mutually conflicting requirements in wanting wall standing speakers and good stereo imagery. One compromises the other, to a greater or lesser degree, according to the polar pattern of the speaker used. Both KEF and B&W make compact loudspeakers that image very well and will go close to a wall without serious degradation.

The KEF 101/2 (£495) is a baby monitor that may interest you, since it fulfils your various requirements well, being a smooth sounding 'boundary' (i.e. room boundary) design.

Alternatively, for a livelier sound with more analysis and projection, but bigger-to-boomy bass against a wall, try a B&W Matrix 805. This is really a small Rock monitor, but don't for one minute think that it won't handle other types of programme, since a good monitor should reproduce accurately - and the 805 does.

An Epos ES11 is another compact and sweet sounding speaker you might like to consider, although wall standing will raise its bass somewhat.

Strangely, the Sara's are really best for Rock - and so are all the other speakers you

list! This leaves me slightly bewildered about what you really want. Naim IBLs and KEF Q90s are fine speakers, but consensus would have it that a softer, less dynamic sound is usually better appreciated by Classical buffs. If possible, have a day out at a dealer's and try to acquaint yourself with these fundamental differences. And bear in mind that a loudspeaker not specifically designed for use against a wall will sound bass heavy and vague in imaging if put in such a position. **NK**

NOSTALGIC BACK NUMBER?

First of all, I only discovered your mag a couple of issues ago and wondered if there are complete sets of back numbers available?

Secondly, I have an old but good condition Quad 22/II set-up with both the AM and FM tuners and a pair of original electrostatics. The units have been recently overhauled by Quad and I now realise how poor my ancient Garrard SP25 with its Goldring G800 pick-up is.

I have some money saved and as I like the Quad was hoping to improve the turntable. I'd like to go for a moving coil on the front of something like a Linn/Ittok. This combination with an Ortofon MC30 sounded right to me when I auditioned them in a local BADA dealer's a couple



Accurate reproduction from B & W's 805

of weeks ago. The only problem is that the Quad 22 isn't sensitive enough for the MC30's low output.

Can you advise me about step-up devices - are they designed to perform the RIAA equalisation and increase the signal to a suitable level, or are they merely 'voltage increasers', and to what level do they increase the output? Do they connect to a line input or a traditional phono input. Also, in the fullness of time I suppose I shall have to accept CD as a viable source of classical music as my collection of vinyl is not likely

to grow much more, as it's getting harder to find. Is the Quad compatible with the current CD players, and what's best for around £450?

Lastly, the Quads are mint - am I living on nostalgia or should I get something else to replace them to make these queries unnecessary? I do like their sound though.

**Quentin Rowlands,
Bath,
Avon.**

Sorry, but all back numbers of Hi-Fi World prior to September 1991 are now sold out: see, however, the Back Issues order form in this issue.

Now to the step-up transformer for a moving-coil. There are two ways of going about it.

One is to use a simple transformer which increases the voltage of a low-output cartridge by a factor of ten or thereabouts and then feeds the signal into the RIAA stage of the amplifier through the standard moving-magnet input. A relatively cheap example is the Ortofon T7, at £75; Ortofon themselves suggest the T20MkII at £150 for an MC30.

The other route is to use a head amp like the NVA Phono I or Michell Iso. Both step-up the output voltage of the cartridge and feed it through their own RIAA stages. The output from the head amp is equivalent to any line level source, and can be fed into the Auxiliary input of the pre-amp. This route is much more expensive, at around £400, and of course it restricts the number of sources that can be plugged into the back of the pre-amp.

As far as CD is concerned, we also hit the problem of diminishing inputs: it would have to be fed into the Auxiliary input, not the Radio one, and Quad advise an in-line attenuator. This can, however affect the sound. An alternative, but an awkward one, is to use a good passive pre-amplifier - the Moth Series 30 Passive, for example, between a CD player and the power amplifiers, ignoring the Quad 22 altogether. Of course, this means swapping the interconnects between the passive and the 22 when you want to listen to another source, which is easy but not as quick as just pressing a button.

By all means stick to the ESLs, especially as they are mint. That's not nostalgia, it's downright sensible!

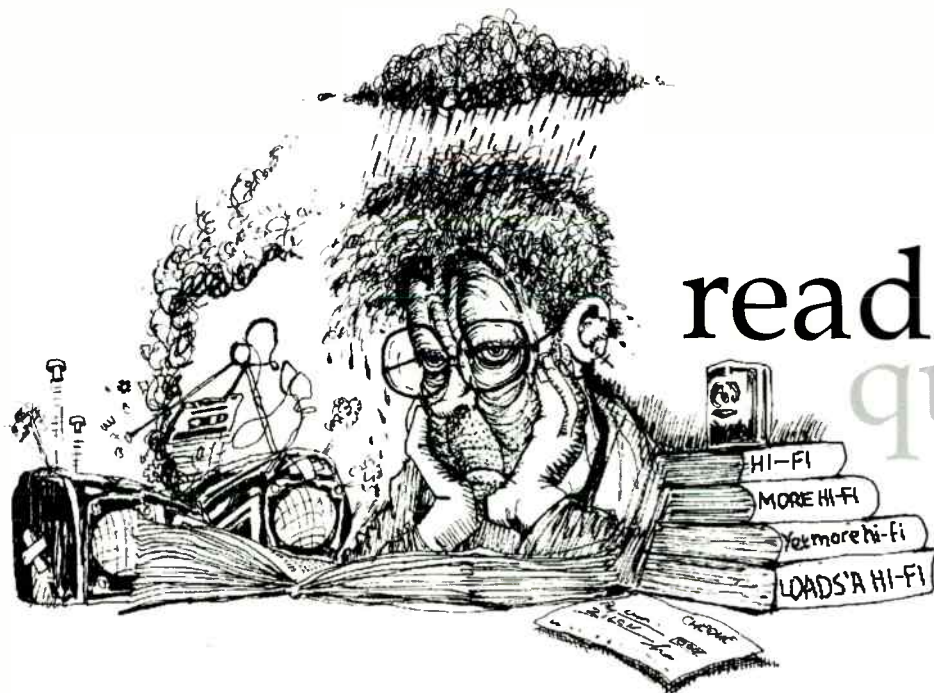
Now to the turntable. I'm not surprised the SP25 was not up to scratch; the Linn LP12 would definitely be a revelation! Don't ignore, however, the Michell Gyrodec with SMEIV or 309; Pink Triangle's PT Export with Roksan Tabriz-zi and Corus Black; Pink Triangle LPT with SME 309 or Roksan Xerxes with Tabriz-zi arm. Also worth consideration is Nottingham Analogue's Spacedeck with Space Arm. All these come to about the same price.

For the future, however, I would very seriously consider replacing the pre-amplifier, perhaps with one from Concordant. **EB**

Listen carefully - **DON'T GET RID OF YOUR QUAD ELECTROSTATIC LOUD-SPEAKERS!** They're acknowledged worldwide as one of the finest loudspeakers ever built. Reposition them, stack them with another pair, have them serviced and even consider replacing your 22/II, but don't get rid of those speakers! Yet another two people have told me recently how hearing these Quad's working properly was virtually a religious experience. Man who listens to Quad doesn't easily go back to box loudspeaker!

I did once possess a 22/II set up but decided that its low output (around 10watts) was impractical, irrespective of the fact that it had a sweet sound. Solid state amplifiers like a Quad 306 or Deltec DPA50S will drive your Quad's and they just may be what you are looking for. Since power output and volume don't appear to be an issue, you could even try a small budget beauty, like a Harman HK6150 or a Sugden A25B as an interim measure, the latter possibly being nearer what you are used to. Please try for an audition first, since going solid state may just not suit you. If it does though, then your choice of source will be eased. And as Eric says, old valve preamps often don't sound so good. Consider retiring your 22/II, but don't junk it.

I have some reservations about the LP side of things. If you have played your LPs a lot with the Goldring, then it will probably have a worn stylus. This, in conjunction with the generally mediocre quality of the cartridge and turntable, may have produced groove damage. A good cartridge and deck will give you superb reproduction - in fact, you'll



readers' queries

probably be stunned at how good your system will become with vinyl - but you will also notice the groove damage more. I have a record collection that goes back to prehistoric times and the rock on the end of a branch that I once used to play early records has indelibly left its mark.

This leaves you in a quandary - to get the best out of your LPs by buying one of the decks Eric rightly recommends because it matches in quality terms, or to compromise and get a CD plus an adequate new record deck. A Rega Planar 2 plus Goldring 1020 cartridge is one possibility. This will feed the 22 preamp direct, or it will work with any other amp. Again, I can only suggest you try and audition such deck and make up your own mind. If your records are lightly used and in good condition, then a better deck will be justified and you should ignore my alternative advice.

We've just reviewed the new Philips CD-950 CD player which has a variable output whose setting is not lost at power-down. This could be pre-set to match your Quad 22 preamp. Whether the sound will suit you is another matter; it is a bit forceful. Softer sounding presentations come from Arcam CD players in particular. They might appeal to you if you decide to retire the 22/II. **NK**

FREE BIRD

I am returning to the UK at the end of the year with about three grand to spend on a CD, amp, plus speakers and am having great difficulty with allocation of funds. The old rule of thumb (put the most on the front end)

has, I feel, less relevance to the CD than the turntable and I had decided to give roughly equal amounts to each component. After auditioning a variety of equipment in the UK prior to leaving, I had almost settled on a Meridian 206B, Audiolab 8000C/P and a brace of finalist speakers which included KEF 103/4, Spondor SPI or Linn Kabers.

What's the problem? Since I left there has been a plethora of new products including a DAC7 Meridian 206B, and for that matter a DAC7 203 convertor, new convertors by Audiolab and Deltec (Bigger Bit), and now the superb-looking, and by all accounts sounding, Roksan transport/DAC. Oh yes, and the Naim CDI is just within reach too, just to add to my misery.

If I spend the extra on one of the "higher-end" CDs that only leaves half my proposed outlay for speakers, and for around 500 quid I can only think of the Epos ES14s or the KEF Q90 as anywhere near adequate.

This will be my only major purchase for some time, though I hope to be able to upgrade in a few years if needed. I listen to mainly female vocalists e.g. Aretha Franklin, Ella Fitzgerald, but have a penchant for classical piano and violin, and the occasional need to blow my mind with Lynyrd Skynyrd. At this price I think a system should be able to play them all extremely well. I'm looking for realism, good definition of instruments, tight bass and a clear, not harsh treble.

I can't listen to them all, it would take months. Surely it can't be that difficult? Please help!

Dr Tim Ward,

Write in with your problems to Hi-Fi World, 64 Castellain Road, Maida Vale, London W9 1EX. Our panel of experts will endeavour to solve them or at least offer some practical advice.



KEF 103/4 - a good choice

Brisbane, Australia.

I'd be tempted to spend up to £1300 or so on the 'speakers, 'cos while the front end is vital, the back end is more variable. And things haven't changed that much since you were last here. KEF 103/4 loudspeakers are still a good choice, especially because KEF have well established agents worldwide.

Furthermore, KEF speakers are bomb-proof and reliable, and they go very loud (and one of the chief designers, Dr Dick Small, is Australian!). It is very difficult for us to make a final selection on your behalf, because taste comes into it so much. The 103/4 is smoother sounding than the Q90 by the way. And don't choose a small-cone speaker like an ES14 for mind-blowing exercises, 'cos you'll end up cone-blowing instead.

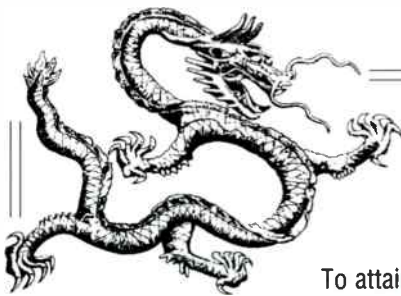
Audiolab amplifiers are a great bet for reliability too; their reputation for quality will again serve you well I suspect. A KEF/Audiolab 8000C/P system should keep trucking 'till the end of time, just like a Quad system, repaying its price of just under £2,000 many-fold.

That now leaves you with £1,000 for CD. And CD is in an unresolved turmoil at present. Manufacturers are turning to new DAC chips from Crystal and Burr Brown, to find an alternative to Philips, just so they can differentiate their products one from another more clearly. And sync-locking is proving to be a potent improvement.

Unfortunately, many of these new convertors are underwhelming and too many UK manufacturers still insist on using cheap op amps, usually a 5532/4, with them. So the new designs are not necessarily better.

I continue to use a Deltran'd (sync-locked) Bigger Bit and am happy to do so, 'till Eric brings the PDM1 Series III back or I can again get my hands on a PDM II (in my opinion, one of

Continued on page 70...



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Make the whole thing sound bigger, more exciting," said the client to the recording engineer. With a wry smile the engineer thought how sad it was that this customer asked for the excitement to be generated during the mix-down rather than asking for it from the musicians and vocalists. In response he patched in an audio exciter which works by deliberately adding controlled amounts of harmonic distortion to the signal. It can be used to add life, but can sound harsh and strident if over-used. It also tends to exaggerate noise. So he patched in a single-ended stereo noise reducer after the exciter.

"Yes, that's better, there's more air around the vocal but it still needs more balls," said the client.

"How much more LF equalisation can this guy, let alone my monitoring system, stand?" thought the engineer. He could already feel a gentle breeze from the main monitors on his face with each kick-drum beat. But he added a few dB extra bass boost on one of the drum channels and the client beamed.

"Good - but do something about that snare, it sounds boxy. It needs to sound big - like the mix."

The engineer reached for the computer mouse, selected a few different snare samples and tried each one in turn. The client liked SNAR4 the best, especially once the engineer added a little more reverb. Now the only trouble was that the track seemed to drag slightly during the chorus so they tried advancing the drum samples with respect to the beat during this section. That did it, the track was beginning to come together.

"I love the piano sound you've got in the intro," said the client. The engineer glanced at the small package of electronics that produced such a beautiful 'authentic' piano sound and remembered the days when he first set up his studio and the hassle with moving in the very expensive overstrung upright. The piano was still there but he had neglected it and it was now unusably out of tune.

"I agree, those guys sure have the edge when it comes to piano synthesis," said the engineer.

"Can you compress the whole mix a bit more - it needs to sound seamless, closely integrated - like it's knit together?" asked the customer. The engineer obliged and the client stopped talking. The engineer thought that was a good sign, anticipated the end of the track and drew back the main faders to simulate the final fade.

"That's great!" said the client. "I only wish the track started with a chorus rather than a verse. Could we edit it?"

They mixed the track and



become a skilled artisan in a complex, electronic workshop producing tape as its final product. In a way he had neglected his audience too, so that they had become in his mind a market to be serviced with glossy well-packaged audio product. Worst of all, his factory was now producing shoddy goods. With the zeal of a man who has seen the light, he leapt from the chair to get the phone book. "I'll get that piano tuned tomorrow," he thought.

The purpose of my caution-

recorded message

Left by Richard Brice

loaded the song onto the computer editing system. Employing a 'cut and paste' technique like a typist using a word processor first they tried a chorus to start, followed by a verse then another chorus followed by the 16-bar sax break, then another chorus. Finally they arrived at the best medley of sections.

"I'm not sure if we'll get much radio play but the hook falls at the end of the chorus and the radio stations won't play more than three minutes," explained the client. The engineer tidied up some biscuit wrappers and drank a Coke whilst the computer sat quietly doing the huge number of calculations necessary to time-compress the audio data by five per cent without altering the music's pitch.

When the session ended, the engineer took a cassette copy of the mix home to see what it sounded like on his home hi-fi system. It sounded worse than he could possibly have feared. The top-end was brash and shrill, the whole mix was over-compressed and the bottom end was unbearably dominating. Furthermore there was a poor edit where the level dipped slightly. He hadn't noticed these problems in the studio and he hoped now that the client wouldn't either. He comforted himself that the mix was the way the client had wanted it and he would never have been able to offer the

opportunity of rearranging the whole song at such a late stage and in so little time without the use of MIDI and the hard-disk editing system. Nevertheless it hurt professionally that his hi-fi system had revealed faults in his studio set-up.

Then with a dawning apprehension, in his mind he compared his home system, with its carefully selected components and directional interconnects, to his studio installation. He thought of his old, oxidized patch bay, of the distortion-producing exciter and transient-clipping noise gate. He began to wonder why he unwittingly trusted the studio's tawdry cables plucked hastily from the cable rack when he had spent careful hours selecting one pair of leads for his home system. He reflected on the hard-disk editor squashing the audio into a convenient three minute package and of the sonic carnage that must inevitably result from such manipulations. His mind flashed to the piano module, sampler and drum-machine, silent electronic boxes with no more real sound than the speakers used to give them voice.

And then the truth began to dawn upon him. As the years had progressed he had forgotten to regard the original signal from the microphones as something precious to be cherished and preserved and treated with respect. He had

any tale is to demonstrate how our fictional engineer was seduced by the flexibility and power of the signal processing available to him in a modern recording studio only to be caught out by his home hi-fi. In a home system a CD player's signal may pass through one, maybe two, operational amplifiers on its way to the power amplifier. In comparison, the audio signal path in a modern recording studio will certainly pass through patch bays and tie lines and effects units, noise reducers and audio sweeteners. The sounds themselves may never have existed because they were digitally generated in the first place.

It's possible to argue that the more power to manipulate and change, distort and re-arrange the better. But power, as the saying goes, has a nasty habit of corrupting. The absolute power afforded to today's musician and engineer to control, manipulate and even generate sound is having the effect of corrupting absolutely every sound that is captured on modern records. The age of what I can only describe as 'audio Cubism' is nearly upon us when nothing we hear will be as it really is. And as a hi-fi enthusiast I am saddened by it. For when, and if, it finally comes, it will be impossible for us to say whether our hi-fi systems are producing lifelike results or not ●



POINT-TO-POINT

**Alan Sircom finds an affordable thoroughbred -
the Sumiko Blue Point cartridge.**

A one hundred pound cartridge is unlikely to inspire a reviewer who has access to the very best, but Sumiko's Blue Point is an exception. At £99.95, imported by Path Premier, it is little short of marvellous.

At first glance, however, this cartridge is the stuff of reviewers' nightmares. The Blue Point is designed for use in a P-mount (midi system) tonearm, but comes supplied with a clear plastic adaptor to allow fitting to a conventional hi-fi headshell. Worse still, it is a high output moving coil design which will feed a moving magnet phono input. Although this means it suits most amplifiers' phono inputs (traditionally, the moving coil stage is the weakest link in an amplifier's circuit, although there are exceptions), I have found high-output moving coil designs to be less than successful in the past.

Still, the Sumiko comes in a nice little sandalwood box, surrounded by dark blue felt-covered plastic. The cartridge itself is rather long in the body, looking like a stretched blue Rega Elys. It also has a clear plastic stylus guard, one that is not the easiest to remove, but worth the effort involved.

Also supplied with the Blue Point is a standard cartridge mounting kit, complete with little white stylus brush. Finally, there is a general Sumiko instruction manual. It is

as informative as most cartridge booklets, which is not very, but then again, there isn't much to say about fitting a cartridge.

The cartridge tracks in a range of 1.25g to 1.7g, with the review sample performing optimally at about 1.5g. The Blue Point did not seem too fussy about tracking force, or bias adjustment; there was no magical 'correct' tracking force, and bias sounded right anywhere around the tracking force norm. As this cartridge will be used in a variety of arms, from the cheapest to the most expensive, this unfussy set-up character is most welcome.

Unlike most at the price, the Blue Point's tonal balance was very believable. In comparison to more expensive cartridges (like the Lyra Lydian), all that differentiates the two is detail and subtlety; tonally they stand toe to toe. This is not to suggest that a prospective Lyra, Kiseki or Koetsu buyer will be swayed towards the Blue Point, any more than a Porsche owner would trade in a 930 Turbo for a souped-up Mini; these luxury cartridges breathe music at the first sight of vinyl. But, the Blue Point has the ability of being very close to the top league, without a silly money price tag.

To continue with the motoring analogy, it gives you the impression of Formula One racing, but on the kind of money associated with go-karting. The

Blue Point is neither tonally uneven, nor harsh, bright or dull. It is not magically transparent, but neither does it add too many of its own colorations to the sound of the turntable.

It has a very adaptive nature. Put it on a Systemdek or a Rega and it will not show up any flaws. Place the same cartridge in a top-flight deck and it will not hold the turntable back. Such qualities are very rare; try putting a Koetsu in a Systemdek, or an Audio Technica AT-95E on a Gyrodec and the problems quickly manifest themselves. Unless fitted into a turntable at the price extremes, the Blue Point will work happily - but I cannot imagine many owners of £11,000 SME Model 30s fitting a £100 cartridge in their pride and joy.

Romantic Virtues

Being very picky, one can point to a touch of 'tubbiness' about the bass, but this is comparatively minor and such criticism is churlish at this price. Only the DL-304 comes close, yet the Denon cartridge demands the best turntable, arm and quiet moving coil input to perform successfully. The Blue Point is not that fussy. Sonically, it tends toward the romantic, while the Denon DL-304 sounds more analytical. At its price, however, I have yet to encounter a cartridge that can better the Sumiko's well-balanced virtues.

The Blue Point favours no musical genre to the detriment of another; I played New Wave from Gang Of Four, Jazz from Lee Morgan, The Black Crowes breed of mainstream Rock, the classic Walter/Ferrier mono recording of Mahler's *Das Lied Von der Erde* and new digital recordings of Beethoven's late Piano Sonatas.

What is more important, however, is the Blue Point's ability to convey the music behind the hi-fi artifice. This is the sort of cartridge that doesn't live on the cutting edge of detail, speed, or neutrality, but when the music is this good, why worry?

I loaned the cartridge to a Rega Planar 3 owner. While it is slightly too deep, needing the full complement of arm spacers to correct for VTA, his reaction was one of near total rapture, losing a weekend to its seductive charms.

My only hope is that the American after-market aluminium mounting bracket becomes available, to replace the flimsy plastic one. I can imagine that this would turn the Blue Point from outstanding to, well, seriously-deeply-outstanding! Finally, there is also a sort of 'go-faster' Blue Point available, one that has its body removed à la Lyra, but sadly these are very rare beasts.

While it sounds very Zen, the Sumiko Blue Point cartridge simply is. It does its job of transcribing the information on the disc without fuss or bother. Most of its peers command much higher prices, making it excellent value for money. It is a good workhorse, with the breeding of a racehorse - but it doesn't sound like a carthorse ●



**Another big
Sixties Stateside valve tuner,
the McIntosh MR71, arrives for Noel Keyword's delectation.**

BIG MAC

No fewer than twenty one tubes and superb sound quality made the Marantz 10B tuner I reviewed in June 1992 pretty impressive. Although a product of the mid-Sixties, it puts modern tuners to shame, probably because there isn't an integrated circuit in it.

In response to the Marantz review, a McIntosh MR71 drifted in through our front door under the arm of Tim de Paravicini who, like us, is more than a trifle fascinated by the sound quality obtainable from a good valve tuner. This means he's designing one (of course!) and it will be available in the next six months, joining his range of EAR valve amplifiers and the gloriously tweaky Leak Troughline valve decoder we featured recently. But all that's another story; in this one we suddenly found ourselves in possession of a McIntosh MR71 valve tuner, a top end audiophile product designed for a market affluent enough to be able to afford such a complex and expensive piece of engineering.

The McIntosh MR71 is an oft-

quoted rival to the Marantz 10B. It too is a product of the Sixties, built at a time and a place where the word 'transistor' was held in awe, offering a vision of things to come. The valve had all but come to the end of its days, under pressure from other smaller, lighter and less power-hungry devices, which included not only the transistor but also a short lived but interesting mini-valve called a Nuvistor.

The U.S. defence industry was the main influence behind these developments, since Tim de Paravicini was too young to be designing all-valve Sputniks (apologies to the U.S. Mercury programme) with a sound as spacious as their surroundings.

Ideal Superlatives

The McIntosh MR71 is a trifle less ambitious than the Marantz 10B, even though its makers would have us think otherwise by their liberal use of superlatives and buzz words in the handbook. It made the Mac a little less convincing to me; someone had their

eye firmly on the 'marketing' aspect, it seems. In contrast, the Marantz looked more like a product of untrammelled dedication, designed to provide an almost unrealistically high standard of performance, rather than appealing to a particular 'market'.

All the same, while the 10B seemed almost too ambitious a device for the home, the MR71 looks altogether more user-friendly and sensible. It has no on-board oscilloscope for checking signal condition from the aerial for example, but 'magic eye' indicators instead which are easier to interpret. In McIntosh terminology these are 'electron ray tubes'; their copywriter must have been a Dan Dare enthusiast.

In addition to the electron ray tubes, the handbook also proudly mentions the existence of a Nuvistor and "a unique circuit using a transistor". "The research staff of McIntosh laboratory," the handbook says, also developed other new "tuner circuit improvements" for the MR71. One was to drive the 'electron ray'

High Fidelity magazine, August 1991

the
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SEE THEM AT GOOD HI-FI STORES

multipath indicator that nestles behind the tuning dial, giving a bright two-segment blue display that closes up when a high quality, multi-path free signal is received.

A similar arrangement of indicators is used over at the right hand side of the dial, with a stereo beacon based on another 'electron ray' indicator, with a tuning accuracy meter beneath it. Tuning scales were a matter of great concern once upon a time, before solid state frequency counters replaced them. I noticed the Marantz scale was truly linear, with equal distance spacing of the frequency markers. The McIntosh scale is a bit cramped over at its left end, but it is sufficiently long for adequate resolution to be available all the same. A spin wheel tuning drive is fitted and it worked nicely, the flywheel giving a well weighted feel to the tuning knob, whilst good bearings provided a smooth action.

Facilities

The four knobs beneath the tuning dial select stereo or mono working, control of output level, adjustment of automatic frequency control (AFC) and the switching of inter-station noise muting. The noise muting level can be adjusted internally. Of these facilities, only the need for AFC has passed into history. It was used to prevent a tuner drifting off station, but modern synthesiser tuners are so stable, they have dispensed with it. A problem with AFC was its tendency to pull a tuner off a weak station and

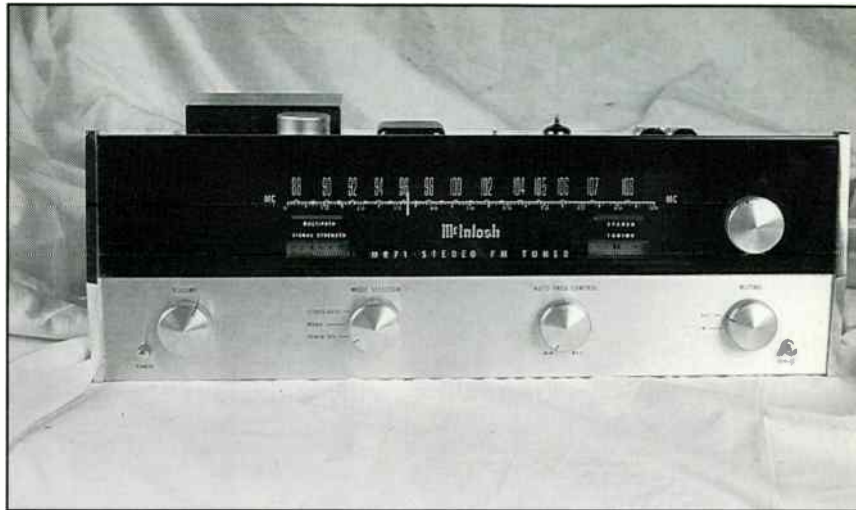
onto a stronger one nearby. McIntosh made AFC adjustable so owners faced with this difficulty could reduce its pulling power.

Measurement indicated what sort of performance McIntosh managed to provide around twenty five years ago. Details are in the Measured Performance section. Our sample needed alignment, but making certain assumptions about the improvements this would bring, the MR71 differs little from modern tuners in its basic audio performance. It has a wide, flat frequency response that means good tonal balance is achieved. Distortion was low and channel separation adequate.

Vintage valve tuners can be surprisingly quiet if given a strong enough aerial signal. The MR71 was satisfactorily quiet; hiss was all but inaudible even with uncompressed Classical programme from Radio 3. It matched a good, modern budget tuner in this respect.

Listening to the MR71 showed it had a gloriously open sound stage with great contrasts across it, giving a 'dark' background as it were, on which full-bodied images resided. It is in this crucial area that valve tuners are

especially strong as a breed and the MR71 proved a fine example. Modern solid state designs can set up clearly defined images, but they are unconvincingly flat or two-dimensional; it's a wallpaper of sound. The McIntosh also had especially sweet treble and was both detailed-sounding and insightful. It possessed in strong measure all the qualities of valves that make them so easy to sit in front of when music is being reproduced.



Although this tuner isn't as impressively complex as the Marantz 10B, it does have a superb sound, reminding me that in hi-fi simplicity rarely acts against sound quality. We certainly need an alternative to integrated circuit tuners, one that offers a more enjoyable presentation of the music being broadcast ●

McIntosh's 'electron ray tubes' act as . Multipath and Stereo indicators, situated above the Signal Strength and Tuning meters on the fascia

Measured Performance

The frequency response analysis picture shows the MR71 had no imbalances, reproducing all frequencies equally from 11Hz right up to 14.5kHz (its -1dB bandwidth). This specification fully matches that of modern, solid state tuners. As the picture shows, there is a slow roll-off in high treble, above 10kHz, then a sudden notch at 19kHz (at right in the pic) introduced by the MPX filter to remove pilot tone at this frequency. The absence of a treble peak or perturbation shows that McIntosh terminated their filter properly, something that others subsequently bothered less about. That's why the MR71 gives an even and natural sounding tonal balance. The filter removes unwanted signals from the output too, pilot measuring a low -56dB and sub-carrier (38kHz) -53dB.

Channel separation on our sample was mediocre at 20dB or so, but this is enough for a wide sound stage to be perceived on stereo. Tests showed that pilot tone phase needed adjustment within the tuner to meet McIntosh's quoted spec. of 30dB.

The spectrum analysis of distortion clearly shows that only second harmonic exists. At 0.2% this particular harmonic is undetectable, since it has a very benign impact upon sound. So in the crucial matter of distortion, this model is again comparable with modern designs in subjective terms.

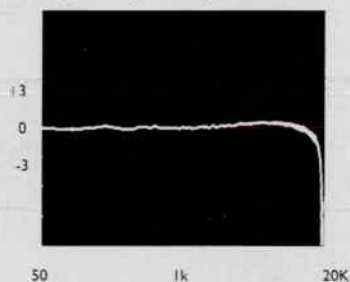
With tuners, hiss is a common problem. However, this is usually because the aerial signal is too weak. Solid state tuners are generally more sensitive than old valve designs, but they are not substantially quieter in themselves. The MR71 we tested had an 'ultimate signal-to-noise ratio' of -72dB, which is good even by modern standards. Good budget tuners manage around -72dB, at which level hiss is effectively inaudible, even during Radio 3 silences. Insensitivity means that no less than 5mV minimum is needed to achieve this, five times that of a modern design. An effective outdoor aerial array is a necessity with a performance like this.

Valve tuners were inferior in their RF performance compared to modern types, but this probably helps them to sound better too, since mediocre selectivity does help improve sound quality. Whatever, the McIntosh MR71 is a tuner from a different era, equipped with electronic components that would have found use in America's fledgling space programme of the Sixties. Yet it still holds its head up high amongst tuners of the Nineties; that's 'progress'.

Test Results

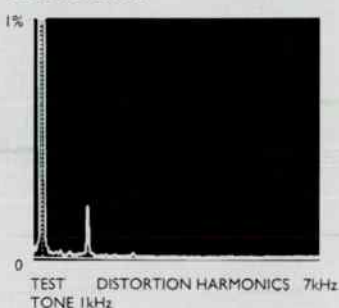
Frequency response	11Hz-14.5kHz
Stereo separation	20dB
Distortion (50% mod.)	0.2%
Hiss (CCIR)	-72dB
Signal for minimum hiss	5mV

Frequency Response



Flat frequency response with smooth treble roll off above 10kHz

Distortion



Some benign sounding second harmonic distortion

Continued from page 63 the best DACs available by a significant margin). I would therefore suggest you buy a Bigger Bit with a Teac Deltran[®] transport. This is a sync-locked, DAC-7 based convertor, so you'll be getting the latest technology with all its benefits for around £600, leaving just enough for the Teac transport. This system'll play Freebird really well - and loud! **NK.**

STEREO 20 SENSITIVITY

I am in need of some technical advice regarding the Leak Stereo 20. I own a U.S. version of this unit which I have totally reconditioned by replacing all the resistors with metal films and polypropylene caps. I also replaced the power supply caps with three times the original capacitance, although I was careful not to stress the GZ34 rectifier by keeping the capacitance at the first stage at the original value of around 30-40µF.

My problem is with sensitivity. The amp now has a 250k ohm load at its input compared to the original 1M.ohm. A 100k ohm series resistor was also added to the input grid of the first stage ECC83. With this arrangement, the sensitivity is around 80-90mV to full output, using Chinese 12AX7 which are noted for high gain. The best compromise I have made was to use 5751 (US military spec. version of the ECC83 which has a slightly lower gain) driver tubes, wherein the sensitivity was reduced to 150mV for 10w output. I also tried altering the feedback resistor by changing the original 12k ohm down to 6.2k ohm but then the amp started oscillating.

Is there another way of reducing the gain to about 0.4 to 0.6 volts sensitivity? By the way, I do not know whether my amp is still performing up to specifications. I get pretty good square waves at 100Hz, 1kHz and 10kHz. With both channels driven at 1kHz I get around 10 watts of power per channel before the amp starts clipping in the 'scope.

The amp already sounds great using 5751s and Sovtec 6BQ5s. I have compared my unit to a friend's unmodified version and there is a marked improvement. My unit has more definition and dynamics. Somehow the 5751 valves are more neutral compared to Chinese ECC83 and Telefunken 12AX7. The original Mullard ECC83 is the closest match to the 5751. It is more like a trade-off between neutrality and warmth.

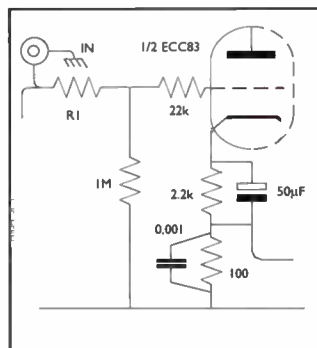
I look forward to more

technical articles and/or reviews of older British-made valve equipment. In the past I have been collecting mostly American designs. Since I am also a subscriber to Glass Audio, an American publication which I heartily recommend to anyone who is interested in valves, I realised that most amplifier designs were based on the work of D. T. N. Williamson, who was an Englishman. I am now working on a pair of monoblocks which will utilize his original design using old Dyna transformers.

**Joseph Emilia,
San Juan,
Manila.**

Since the Stereo 20 has overall feedback from the output transformer secondary winding to the cathodes of the input ECC83, any change in internal gain will alter the feedback too, the outcome of which we cannot predict without experiment, which is impractical. As you have found, increasing feedback to reduce gain will take an amplifier into instability, which is the opposite to that expected by many people, but it is simply explicable and is accounted for by Nyquist stability criteria.

The best way to reduce gain



Leak stereo 20 input

is simply to insert a series input resistor - believe it or not - or turn the volume down! Since the input, according to our circuit diagram, sees 1M to ground, then 22k into the first grid, 1M on the input line will act as a potential divider, reducing gain by half. This seems the best solution.

Sadly, in the U.K. hi-fi business few people have heard of D.T.N. Williamson, let alone know about his work. The Williamson 0.1, designed around 1947, was considered a classic design, from which many audio amplifiers were subsequently derived. The original circuit was published in *Wireless World* (now known as *Electronics and Wireless World*). Their address is L333,

Electronics and Wireless World, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS; fax 081-652-8956. I believe they can help with reprints and info. **NK.**

SECOND TIME AROUND

I have for some time considered purchasing a system based on the Audio Innovations Series 500, having been very impressed by the sound at a friend's house.

Unfortunately, I recently heard the Audio Innovations Second Audio triode amplifiers which sounded marvellous, providing exactly the type of sound I have been looking for. The only problem is that, despite re-appraising my budget, I feel that the Second Audios are still realistically outside my price range. (I could stretch to them, but would have to compromise on speakers.)

Can you advise on a lower priced compromise which will still have much of the sound of the Second Audios? Also with regard to speakers, what would you recommend for these amplifiers, other than either Snell/Audionote loudspeakers or Impulse horns - are there any lower priced designs that would be a reasonable match but still give good bass performance and dynamics as an interim measure?

Lastly, do you know of anyone supplying either plans or kits for a good horn-loaded speaker as this might solve my problems.

**D.J.W.,
Cockfosters,
Herts.**

You could go for the Second Audios, together with either the Audio Innovations Series 200 preamplifier, or even one of the new Audio Innovations L-series preamplifiers, together with a pair of JPW AP2's, modified by Definitive Audio in Nottingham (Tel: 0602 813562) and fitted on Huygens stands. Although this would not have the gut-wrenching bass of the Impulse or the Audionote E's, it would still be a fine interim measure.

Alternatively, the other option is the stereo First Audio power amplifier, together with the preamplifiers mentioned above. This comes very close to the performance of the Second Audios, although at a tad over seven watts it needs a very efficient loudspeaker to produce decent levels. While the JPW's and smaller Audionotes or Snells work successfully, it really needs a loudspeaker of the calibre of the Audionote/Snell E

or one of the Impulse horns to really give its best.

Finally, Lowther (081-300-9166) could help supply kits or plans for horn loudspeakers, but do not expect these to be a cheap solution to your plight. **AS**

Since the Second Audio's are very distinctively 'valvey' in their sound, producing a superb sense of ease and space untarnished by other problems (they're one of my favourite valve amps). I would suggest you stick with them if possible.

A speaker that suggests itself as suitable in terms of sensitivity (89dB) and load impedance (exactly 8ohms under measurement) is the new KEF K140. However, I must stress that to date we haven't tried the '140 with valve amps and I have residual fears about its input capacitor reacting with the output transformer to produce some possibly unpleasant effect. So you must audition the combination first. Who knows, it could be very successful.

Will you use LP or CD as a source? CD players have enough output to drive the amp direct, so all you would need in between is a passive preamp like the Moth or a CD player with remote control of volume.

Although a horn loudspeaker seems to be the likely solution to all problems, in practice it must be massive if it is to work properly. Small (truncated) horns are a something of a compromise, having a relatively high cut-off frequency that prevents them getting down lower than 80Hz or so without going a bit wonky in bass quality. They are not as efficient as a full size unit either, so don't give up on modern loudspeakers. What we really need is greater efficiency from current designs. **NK**

REEL PROBLEM

I have an old reel-to-reel tape recorder, a Tandberg 354IX, bought in the early Seventies. It still works, but needs maintenance, a new belt and maybe a new motor since it seems 'tired' and does not work on rewind.

Can you suggest a company which could do this please?

**E. Paul Tuddenham,
Felixstowe,
Kent.**

Wharfedale 505.2s via Naim NAC A5 cable.

In the main, I am very impressed with the sound of the system which has a great vibrant 'live' sound. (My tastes are Hendrix, The Jesus and Mary Chain, Doors and 'Garage Band'

Companies which are willing to service reel-to-reel decks are increasingly hard to find, but help is at hand from Azimuth Electronics of Bethnal Green in East London, Tel: (071) 739 5940. They will offer a free estimate, with the customer paying for postage and packing. The problem could be expensive to fix, since Tandberg spares are not easy to find now, but it might be possible to solve it by rotating the tape guides, which would not be too costly. Even so, after this amount of time I would suspect that new heads would be required too, which will involve more outlay. Azimuth tell us they will also service high quality three-head cassette decks, too. **EB**

CARTRIDGE CONUNDRUM

My system consists of Linn LP12, Naim ARO tone-arm and Linn Lingo power supply and Linn K18 cartridge. Amplification is a Naim NAP 32.5/Hi CAP/NAC 140 with Linn Kan loudspeakers and Naim NAC A5 loudspeaker cable.

My stylus (K18) is due for replacement soon and I would like a change or upgrade without having to spend a lot of money.

The system sounds very good and I like listening to records a lot, but sometimes I get the feeling the K18 sounds a bit bright and I noticed a few times on certain music it can mistrack. At first I put this down to faulty pressings, but lately I bought another Hi-Fi magazine and one of the reviewers who was testing Linn turntables said that he had to change the K19 for a Goldring because it was mistracking, which made me think again.

I thought about getting a Roksan Corus Black, although I haven't heard it yet, or the Audio Technica AT-OC5, but I don't know whether it sounds bright and I have never used a moving coil before.

**W. Debono,
Plumstead,
London.**

Because the ARO tonearm has a geometry designed for the Linn Asaka/Karma/Troika moving coil cartridges of the late 1980's it precludes its use with a number of cartridges on technical grounds. The distance, on the same axis, between the stylus tip and the mounting holes is approximately 7mm; with most cartridges, this spacing is nearer 10mm. There are a couple of

notable exceptions to this, however. Although cartridges like the Ortofon OM range suit the mounting arrangement, I would plump for the Sumiko Blue Point. It has a mounting geometry close to that required and in addition has an even balanced sound that is very satisfying. As it is a high output moving coil design, it will operate into the moving magnet input boards on your 32.5, although there may be some drop in volume between it and the K18.

Although reviewers who use the ARO have had some success with the AT-OC5, if you are worried about undue brightness then neither it, or the Roksan Corus Black, are for you. Both are highly detailed and impressive cartridges, but can tend toward brightness in the wrong system. Stick with the Blue Point, instead. **AS**

IMAGE EQUATION

My system consists of the following: Pioneer A400, Philips CD 850 MkII with Deltec Bigger Bit. My speaker is Equation Ø connected to the A400 by Audioquest Type 4.

I found the system is not very involving and so I plan to upgrade the amplifier and the speaker cable. I am thinking of Deltec amplification. I am looking for an amplifier which is capable of providing a wide soundstage, with a pin-point, three-dimensional image. Of course, it must be involving.

My budget is about £2000. Please remember that I do not have to spend the whole £2000 because later on, I want to add a REL Stygian sub-woofer and Deltran-convert my Philips CD player.

Can you shortlist some amplifiers for me to listen to? I mainly listen to Classical music.
**Anthony Chung,
Oxford.**

I am afraid that I do not know much about the loudspeakers that you are using. Assuming that they are efficient enough to be successfully driven by the A400, then the likes of the DPA 50S amplifier will suit well. Using this amplifier, without the phono stage, brings the price down a fair amount, but this system, with good DPA cables, will bring little change from £2000.

Otherwise, I would suggest trying the LFD Audio Line Stage LSI and Power Stage PA I or the Moth passive preamplifier and model 100 one hundred

watt monoblocks. I have also heard great things of the YBA Intégré, in the aspects that you mention, but as yet have no experience of it, first hand. One of these amplifiers, however, would free enough of your budget to Deltran the Philips CD player.

Finally, if the loudspeakers are not in the same league as the amplification described, try loudspeakers such as the Epos



A better image from DPA Digital?

ESI I, Triangle Comete, Scalene or Graphite, ProAc Studio One Mk II or Response One 'S', Heybrook Sextets or the B&W Matrix 805. All of these can create stunning imagery for box loudspeakers. **AS**

Your source and amplifier should image well; they're not deficient in this area. I don't know the speakers either, but I strongly suspect that they are the problem and that you listen to some good at imaging. I would endorse Alan's selection in this respect, the Sextets being something of a favourite with me, since they have Quad ESL-63 levels of imaging from their Tonigen ribbon tweeter. However, they are not everyone's cup of tea. The Deltec amp remains in a class of its own technologically and will image superbly, but alone it may not solve your problem. **NK**

DITTON DIFFICULTIES

I recently inherited an old pair of loudspeakers - Celestion Ditton 15's.

However, on connecting them to my system for use as an auxiliary pair of loudspeakers, it is obvious that they have been badly damaged. The only sound they produce emanates from the tweeters, no sound at all being produced from the mid/bass drivers. Being a relative newcomer to the world of hi-fi, I am assuming that the mid/bass drivers have been irrevocably damaged.

My query is really three-fold:
1) Am I correct in assuming

that the fault is with the mid/bass drivers or have the crossovers also been damaged?

2) Would it be possible to restore the speakers to working order by replacing the damaged parts and if so where would I find suitable replacement parts for an old speaker design such as this?

3) Even assuming they can be repaired, is it worth the cost? I have no idea of the potential musical quality of these speakers.

I should mention that my aim would be to use these speakers as an auxiliary pair and that although my amplifier at the moment is an old Rotel RA1000 integrated I am hoping to upgrade fairly soon to a more modern integrated amplifier design - probably the Audiolab 8000A.

**Trevor Phillips,
Tunbridge Wells,
Kent.**

My answer is similarly three-fold:

1) Yes, it is likely that only the driver is damaged. It is possible that the crossover circuits have been damaged in an accident, but as you make no comment of external damage, this is unlikely. The crossover is seldom hurt by anything, unless it was plugged into the mains. To check, tap the bass cone; it should give a sound similar to a bass drum. If the cone is 'fried' it will be solid and the tapping test will produce a higher frequency note.

2) Yes, they can be repaired and Celestion can supply replacement drive units.

3) The Ditton 15 loudspeakers were not the finest loudspeakers ever made, having a tendency to boom in the bass, but for the cost of the spares, you are unlikely to find better. As a main pair of loudspeakers, they would not be my first choice, but as a second pair of loudspeakers, they would be fine. **AS**

I remember the Ditton 15 well; it was a fave of the early seventies. Personally, I'd throw the things away and buy a pair of the latest Celestion 1s for £99. It'll cost a bit more, but the lack of hassle and gain in quality will be well worthwhile. **NK**

HEAVY ON THE HENDRIX

My current set-up is a Systemdek IIXE/900, with the acrylic platter, Roksan Tabriz-zi arm and Corus Black cartridge. This is fed through a recently acquired Ion Obelisk 100 amplifier into

rock - Pixies, Dinosaur Jr., Nirvana, etc. . .). This sound I attribute in no small way to the Ion, which conveyed more drive and growl than the costlier Audiolab 8000A, Linn Intek and Linn Nebula, which sounded anaemic in comparison. However, there is some room for improvement in that on some LP's the treble can be fierce and 'shriek'. Also, at lower volumes the bass seems suppressed and reduced in the overall soundstage.

I have £500.00 (stretching to £600.00) to overcome these problems and am considering several options.

Firstly the speakers could be upgraded. These need to be reasonable close to a rear wall and the KEF Q60's have had promising reviews. Which stands would best partner these, should I bi-wire with another run of Naim cable or use a solid core



Goldring Elite - a good £200 cartridge option?

design? Are there other speakers to consider also?

Alternatively, with the trade-in price of my Systemdek, I could upgrade the turntable to a Xerxes, Gyrodec or the PT Export (the Tabriz-zi and Corus Black being retained). Which product would suit my tastes best and would the Wharfedales be up to reflecting the improvements?

Another route would be to convert the Ion to line-level-only operation and add the Michell Iso head amplifier. When switching to a moving coil cartridge, should I select a model around £100 (Ortofon MC15 Super, Goldring Eroica LX, Denon DL103 or Audio Technica OCS) and then also add the Townshend Damping Trough? Or should I go for the £200 price bracket (Ortofon Quattro, Goldring Elite or Denon DL304) - earring in mind the cartridge will be tracking Jimi freeforming on the Isle of Wight, rather than Pavarotti pouring sweat at the Albert Hall!

Lastly, can you offer a suitable mains cable that would

eradicate the occasional click and pop which is preventing me from leaving the Ion permanently powered up?

I will not be able to pursue all the above options at one dealer (especially the cartridge options), and would appreciate your views on which route would best solve my problems, before I lace on my marching boots and head for my local dealers.

Ian Johnson, Sheffield.

P.S. I suggest you listen to the Buffalo Tom (let me come over) and Black Crowes (the Southern Harmony and Musical Companion) albums for your music reviewers.

I think that a change of speakers is in order, too. The KEF Q60's would suit your system well, placing them close to a rear wall on sand-filled Mission or Alphason stands. In the distant past, I experimented with a NAC A5/DNM Rainbow hybrid cable with some success and I feel that it may help to ameliorate some of the residual brightness in the turntable.

The next step would be to invest in a Mana Reference or even Phase 3 table, preferably with a power supply table underneath for the Systemdek's little PSU box and a second table for the Ion amplifier.

Only then would I suggest looking at a change of turntable. My preference here would be for the neutral PT Export, as it improves upon the acrylic plattered Systemdek's finest qualities. You may prefer the sweetness of the Michell Gyrodec or the excitement of the Roksan Xerxes, however.

Until you are at this point, I would hesitate in adding the Iso head amp. It is capable of being highly revealing and could lay bare any faults in the system. It is also for this reason that I would suggest fitting a quality cartridge of the Quattro or the DL304 level, or above, and even the Townshend Trough before installing an Iso.

Finally, thanks for the tip about the Buffalo Tom LP, but I'm afraid we beat you to the Black Crowes. A most excellent and bodacious album, dude! **AS**

BIG BASS, LESS SPACE

Having decided to upgrade my ageing JVC stack system (!) I chose an Audio Innovations Series 500 valve amplifier as the heart of the new system (as a guitarist, I've been a 'valve man' for donkeys' years!) The CD player is the Teac CDP3000 and

I'm happy with the combination. The speakers are also quite old, Celestion Ditton 15XR. These have eight inch drivers with eight inch 'sympathy' units, so the bass response is actually quite good. But I want more. I want to rattle the floorboards a bit more. I thought of Mission's 763 or Cerwin Vega's AT40s, but when my wife saw the size of them - no chance. She wants more bass, but smaller speakers. Don't we all?

Anyway, what do you think of this idea? Bose Acoustimass subwoofer system with the satellites (or similar), smaller speakers like Celestion DL4's with Wilmslow Audio subwoofer CPP. (You mentioned this unit when reviewing the CDVC unit last October.) The CPP has two ten inch speakers back to back. Or even wiring this subwoofer with my present speakers. (Plus Linn K20 cable?) I play mainly Rock and Blues and my room size is 26' x 12'.

A. G. W. Nurse, Ruislip, Middlesex.

There's a common misconception about satellite/subwoofer systems. They don't, despite appearances, generally go any lower - or go lower any better - than medium-size 'ordinary' loudspeakers. You would, I think, be disappointed.

I would recommend using a pair of high quality small loudspeakers - like ProAc Studio 1's or Response IS - combined with a REL subwoofer if the budget will stretch that far. The prime advantage of the REL designs is that they can be 'tuned' to match the partnering speakers and the Wilmslow subwoofer cannot. If the budget is a bit tight, Noel is an admirer of the Stadium subwoofer with Goodman's little budget Maxim 3s. I doubt that the addition of any subwoofer would improve the bass from the Dittons; by current standards they are rather slow. **EB**

Yes, you've started out badly by getting a valve amp of limited power and then expecting the system to shake the house. Good, modern, hi-fi valve amps are all about subtlety, holographic imaging and complete sonic neutrality, not thundering floor boards. Methinks a REL Stadium subwoofer, which has a 100 watt MOSFET power amplifier on board, is your only solution. Combine it with Maxim 3's as Eric says or, now, you could choose the remark-

able new Celestion 1s. This way you'll hear the delights of the Audio Innovations Series 500 valve amplifier, whilst simultaneously being assaulted by all the bass you choose to dial up on the subwoofer gain control. **NK.**

BACK WITH A WINNER

After steering me way beyond Nirvana and Valhalla, thanks to my prize of the Pink Triangle Anniversary last year, I am still striving for the ultimate sound. I have recently taken the next step by purchasing the Heybrook Sextets and am now looking for a suitable amplifier.

I auditioned the Sextets using the Heybrook C3-P3's which I did not like at all - very flat and lifeless. Changing over to Noel's favourite DPA 50S pre/power improved things vastly - full of punch and emotion.

My main problem is a lack of space to site the amp and also that I wish to use Heywire speaker cable run under carpet to eliminate an eight-meter run around and over an archway. These restrictions virtually rule out the Deltacs because of their physical size and use of special speaker leads.

I would like your comments on the Ion Systems SAM 40 system. Also having heard some Croft valve amps last year that almost made CD sound good, I was wondering if the Copland integrated valve amplifier would be a good performer in my set-up. Any other suggestions gratefully received. Also what interconnect would you recommend between the Pink and the new amplifier?

Brian Horswill, Haverfordwest.

As you like the sound of the Croft amplifier, the Copland would be an excellent integrated to aim for. Unfortunately, its comparatively low power may make combining it with the Heybrooks less than successful. It may be a better idea to go for a Croft Super Micro 'A' preamplifier with a solid-state Musical Fidelity P180 power amplifier. This will combine the smoothness of the valve preamplifier, with the grip and power of the P180.

Alternatively, Noel has found that the Audiolab 8000C preamplifier and 8000M monoblock amplifiers combine with the Sextets to form a cohesive and balanced sounding package; however you may find the balance similar to the Heybrook C3/P3. The Ion Systems SAM 40 would be another option here, trading

some of the neutrality and cohesiveness for life and punch. I have not tried the Ion Systems amplifiers with the Sextets, however and they may not integrate together well and could make the Sextets sound harsh and clattery.

Moving over to the cabling, I would strongly suggest trying another kind of cable to Heywire. Although Heywire is competent, there are many other flat cables that offer better performance, such as DNM Rainbow, LPC from Kimber Cable and F14 from AudioQuest. Although more expensive, they offer better performance, from both a sonic front and a durability standing.

Finally, the interconnect between Pink and amplifier. In descending order of price, I have found the Furukawa 7N PC-OCC (c.£900), FA-2010 (c.£250), Audioplan MusiCable Super X Wire (£168.50), Moth Ley Line Black (£100), Furukawa FA-1010 (£95) Sonic Link Violet (c.£60) and DNM cable (c.£35) to suit the PT in a number of respects. I favour the Audioplan MusiCable above all, although it may not suit every system. If in doubt, the Furukawa is a good safe bet. **AS**

Ooh! You do have sensitive ears. Deltec users seem to agree that if that's what you want, then Deltec do it best. You'll not easily or cheaply find an alternative to a Deltec in terms of sound quality, since its technology is radical. It strikes me that you might site the power amplifiers next to the speakers and run the preamplifier feeds under the carpets.

Deltec as a company has been wound up, but Rob Watts, designer and head honcho has set up DPA Digital Ltd., Unit 7, Willowbrook Technical Units, Crickhowell Road, St. Mellons, Cardiff CF3 0EI (tel: 0222-795621). They continue to manufacture the full product range, sans the 100S amp. He says your local dealer is Audio Excellence of Cardiff.

We discussed your problem and he confirmed my suggestion, saying that preamp cable can be longer than speaker cable before signal degradation becomes noticeable. Up to 10 metres of preamp cable can be used to link a DPA preamp to a 50S power amp. If at 4mm diameter it is too thick, then we suggest that lifting the floorboards is a not-too-difficult solution.

Good luck. We're all pleased you like the turntable. **NK**

STEPPING UP

I am the owner of: Audio Innovations Harmonie 500 Valve Amp; Linn Axis, Akito+K9 turntable; 3A Midi Master loudspeakers + Cardas Twinlink cable.

Step by step I want to change the whole system. At first the speakers because unfortunately I have a small, square room. I have to put the speakers very close to the wall. That's why I ask myself if I should take small speakers or big ones. By small ones I think about the Linn Kan 2, the KEF 101/2, the Neat Petite - I don't know if I have the right room for that - and how about the 3/5a from Spondor Rogers or Harbeth. (Maybe also the new HL-P3.)

The bigger ones I think about are the Naim IBLs, the KEF 103/4, the B&W matrix 805, the Heybrook Sextet, the Celestion 5000, the Monitor Audio Studio 5, and as the most expensive the Linn Kaber.

Please don't think that I'm mad because I have so many speakers in mind, but in Germany it is very hard to hear some speakers and it is better to have only two or three you want to listen to. I hope you can give me advice which I pick out of the list as favourites to listen to! Maybe you can give me counsel for the best position to use the speakers in my room? Which stands, cable and plugs (manufacturer?) should I use for the chosen speaker?

Next I want to buy a new CD player. The maximum money I want to spend is about £1000. I think about players like



**Cohesive sounding:
Audiolab 800M monoblock**

the Meridian 206B, and the Arcam Delta 170 with Black Box 3 or 5, Deltec Little Bit with power supply or the Audio Alchemy v. 1.0 (maybe also with power supply). Or is it better to spend the money on other equipment and to buy a Arcam Delta 70.3 or an Ariston?

Then I want to improve my turntable. I can get a Roxan Xerxes + Artemiz very cheap from my brother. If not, I want to buy a Linn Sondek LP 12. But which power supply is best? The Naim Armageddon, Pink Triangle's Pink Link or Linn's own Lingo? Which arm is the better one the Naim Aro or the Ittok LVIII?

And then the cartridge. At first would a reasonable one be a K18 or a Audio Technica AT-OC5 or Roksan's Corus Black? And later as an upgrade the Linn Asaka, the Audio Technica AT-OC10 or Lyr's Lydian?

In the past I have had some problems with my Harmonie (but now it works - that's why the amplifier is the latest) and so I'm searching for a good and very solid (read: 'reliable') alternative! I think about the Linn LK1 + LK280, the Audiolab 8000C+P and the Naim 62 or 72 (what is the difference between them, and which is better?) + NAPI 40.

I think it is very important to know which amplifier to choose because all the other stuff should fit. I have forgotten one speaker I heard a few days ago. It is a small one which is called Linaeum LFX. It sounds very fine. Have you heard it?

**Gerhard Greipel,
Munich,
Germany.**

Any of these combinations are going to result in radically different kinds of sound. Having looked at the drawing of the room which you enclosed with your letter, I think you might

be best advised to go for smaller scale in terms of equipment. However, bearing in mind that the Heybrook Sextets can be used close to a rear wall and have a narrow footprint, Noel has

found them and the Audiolab 8000C/M pre/monoblocks a cohesive sounding musical package; I find the combination a good compromise between the detailed and thoroughly upfront sound that your shortlist swings between.

The Linn LK1 and LK280

are being phased out and replaced by the Kairn/LK 100, which with the Kans would give a clean, up-front sound which is very big for a small speaker - and ones which need to be against a wall.

Moving over to the Naim amplifiers, the NAC 72 is a later development in Naim preamplifiers. As such it has subtle, yet significant improvements over the NAC 62, especially in terms of overall clarity and refinement. The 72 preamplifier, allied to a NAP 140 or later NAP 180 power amplifier and a pair of Linn Kans or Naim IBL's would produce a rhythmic, precise and dynamic sound, that is rather more forward than the Linn amplification mentioned above.

Now here we have to remember that speakers like the LS3/5a and HLP3 are quite different, the BBC's aim with the 3/5a having been to create a mainly mid-range near-field monitor of great detail and clarity. Unless you are looking for a more delicate and less 'large' sound than your shortlist of other components leads me to believe, they are not going to produce the sound you appear to be looking for.

Given that the whole system so far is opting for vivacity, then of the CD players I suspect the latest Arcam Delta 170.3 with the Deltec Little Bit or Bigger Bit+The Power is a very viable option, the Meridian being rather calmer and cooler by comparison and suited more to a system with fine detail as its raison d'etre. Deltec, now known as DPA Digital Audio Ltd. will shortly be bringing out a sync-locked transport, or you may be able to obtain a Deltran conversion. Sync-locking gives a noticeably improved sound from CD, cleaner and more precise.

As far as vinyl front end is concerned, we are in a similar dilemma. While the Linn LP12/ARO would be my own preference, the combination does restrict the choice of cartridge. The Lydian is certainly a cartridge to aspire to, and would probably suit an Ittok better than the Artemiz - also a limiting factor as far as other cartridges than Roksan's are concerned. I would suggest that you start simply, trying the Roksan as a front end - since you can presumably borrow it from your brother to try - then try to arrange demos from there on, focussing your attention on the type of overall sound you want. I haven't heard the Linaeum LFX so I feel unable to comment. **EB**

Hi-Fi World SPECIAL MAIL ORDER



ANTI-STATIC RECORD SLEEVES

Translucent antistatic record sleeves from Nagaoka, according to availability. A surface treatment makes them anti-static, lessening dust attraction. This helps keep records pristine. They are supplied in packs of fifty. We suggest you regularly change sleeves in order to prevent trapped dirt contaminating records, especially after cleaning. The record label is clearly visible through these sleeves, an aid to easy identification.

LP SLEEVES (50)PRICE £7.50

NAGAOKA CD CLEANING KIT

As with cassette deck cleaning kits, we don't recommend the 'cogs and wheels' cleaners and choose not to sell any of them. Tests we have carried out with a Cambridge CD-I CD Quality Control Unit clearly show that careful manual cleaning is the most effective way of removing all types of surface contaminants without causing damage to the disc. Remember that CDs must not be scratched - even finely. Tests showed that the Nagaoka kit was the best all round cleaner. It has a solvent and a chamois leather pad which, together, bring the CD surface back to almost as-new condition.

NAGAOKA CD CLEANING KIT £10.50

NAGAOKA ROLLING RECORD CLEANER

The big drawback with most record cleaners is that they fail to remove all types of dirt. Brushes pick up fluff, but they redistribute fine dust around the grooves, causing noise build up. Nagaoka's rolling record cleaner actually lifts dirt from the bottom of the

groove - even fine dust. It uses a peculiar form of sticky coating on a soft foam backing. Dirt of all types - especially fine dust of the sort left by brushes - is removed completely. It is lifted from the record's surface, and no deposits are left behind. This is an effective way to dry clean a record.

ROLLING RECORD CLEANERPRICE £10.20

AUDIO TECHNICA GREEN CD RING STABILIZER

These are detachable green rings which are fitted round the circumference of the Compact Disc. The non-slip material allows the disc to be picked up without touching the playing side and leaving fingermarks. It also raises the disc slightly from any surface it's placed on, avoiding scratches if you don't replace it directly in the jewel box, as you should! It also adds a tiny but significant degree of mass to the outer edge of the disc, improving its stability and reducing vibration when it rotates at high speed inside the CD player. Green absorbs stray red laser light, so reducing random reflections within the disc, much like a green pen. So the rings perform many useful functions - and they are removable too! Improvements to the sound include better focussed and firmer images, plus a generally denser and richer sound.

GREEN RING STABILIZER (5)£6.50

AUDIO TECHNICA RECORD CLEANING SYSTEM

The Audio Technica Record Cleaning System removes both dirt and static. When you lift the pad from the record, dirt comes off with it. A tiny amount of cleaning agent inside the handle provides just enough humidity to dissolve

fingerprints, oils, and film. A bottle of special fluid and pad brush are included.

AUDIO TECHNICA RECORD CLEANING SYSTEM £10.50

AUDIO TECHNICA CD LENS CLEANER

Here's a product for smokers in particular. However, seeing the peculiar haze that can coat

safe too. Just rest the stylus on its high speed vibrating brush and watch dirt get driven off automatically.

ELECTRONIC STYLUS CLEANER£19.95

CD JEWEL CASE

To house and protect your CD.

CD JEWEL CASE£1.00



windows even when there are no smokers about suggests this clever little gadget is a necessity for one and all. It is a laser lens cleaner for your CD player, beautifully made by Audio Technica. Contained in the pack is a disc with fine brushes on it. Each brush takes one drop of cleaning fluid, then it is inserted and played. The brushes gently clean the laser lens, removing oil, grime, dust and other airborne deposits like nicotine (ugh!). Audio Technica recommend use once a month

CD LENS CLEANER £16.25

AUDIO TECHNICA ELECTRONIC STYLUS CLEANER

Scared of damaging your stylus when cleaning it? Try this amazing little device - an electronic stylus cleaner that vibrates gunge right off the tip! Powered by a small AA battery, it's a doddle to use and

AUDIOQUEST LASERGUIDE

There are many factors that can undermine the process of converting the pits on a Compact Disc into a digital signal to feed your CD player's D/A converter. How efficiently your player's transport can send laser light into a CD and then accurately read the reflections is crucial.

The surface of the CD itself is often a problem. The clear polycarbonate may look smooth to the naked eye but viewed under a microscope it is quite rough. This leads to unwanted random refraction and reflection of the laser light, causing additional jitter on the recovered digital signal.

Laserguide is a carefully engineered silicone based treatment which has a reflective index close to that of the CD's polycarbonate surface. It helps



AUDIO ACCESSORIES

smooth out that surface resulting in a claimed 50% reduction in refracted stray light. It is suggested that this improves stereo depth and openness. Video Discs also benefit with a sharper picture and less noise.

Just apply to the surface of the disc surface and wipe clean. One bottle treats approximately 300 CDs.

AUDIOQUEST LASERGUIDE £14.95

LASAWAY GREEN PEN

When red laser light hits the silvered reflective surface of a disc, some of it scatters and is later reflected back off the disc edges, causing optical interference. Because green is far removed in the light spectrum from red, an opaque green coating effectively absorbs this scattered light, reducing interference signals reaching the laser and improving sound quality. The green coating is applied to outer and inner edges. It has been formulated by one of Japan's largest companies, Mitsubishi, to be harmless to the CD itself.

LASAWAY GREEN PEN ... £8.50

HI-FI WORLD DRY STYLUS CLEANER

A method of keeping your stylus sharp and bright for perfect tracking without using fluid. We're offering a whole sheet of card with an aluminium oxide micro-abrasive coating. Cut a strip off, about the size of the striker on the side of a matchbox, and draw it gently under the stylus from the back to the front. It removes the gunge that builds up. One sheet should be more than enough clean your stylus at least forty times.

DRY STYLUS CLEANER .. £1.95



PIXALL MK II RECORD CLEANER

Simple in both function and design, and made in the U.K, this uses a roll of sticky tape which lifts the dust out of the record groove. Three or four passes will clean the record very effectively, and can reduce static at the same time. After each pass, the dirty length of tape can be peeled off and thrown away, reducing the risk of any gritty particles picked up being ground back into the vinyl. When the tape roller runs out, a replacement is



simply clipped in. This is one of the most effective ways of cleaning an LP.

PIXALL MARK II .. PRICE £10.75
REFILL ROLLER £2.75

ON STYLUS CLEANER

Here's another simple but effective



cleaning kit. It consists of a stylus brush and cleaning solution. Use carefully to keep your pickup cartridge stylus and cantilever clean.

STYLUS CLEANING KIT .. £2.50

TDK CLEANING KITS

A comprehensive range from TDK for cassette Decks, Compact Discs and even connectors. The CK-A1, head cleaning kit includes two bottles of fluid for heads and rubber pinch wheel, and cotton buds for applying it. The CK-TB pack has a single bottle of dual-purpose liquid.

TDK offer three cleaning pens. Each with a soft double-ended replaceable shaped tip. The Audio Head Cleaning Pen for cleaning cassette heads, the CD Cleaning Pen for removing finger marks from CDs, and the AV Connector Cleaning Pen for polishing up audio plugs and sockets.

The CD cleaning kit contains a bottle of fluid and a cloth which can be used for removing grime and stains. Finally, a dandy CD



cleaning tool for applying the cleaning fluid and drying the CD off afterwards.

TDK HEAD CLEANING KIT CK-A1 £5.50
TDK HEAD CLEANING KIT CK-TB £4.65
TDK AUDIO HEAD CLEANING PEN CP-AH1 £5.00
TDK CD CLEANING PEN CP-CD1 £5.00
TDK A/V CONNECTOR CLEANING PEN CP-CR1 .. £5.00
TDK CD CLOTH CLEANING KIT CD-C2TP £6.50
TDK WET AND DRY CD CLEANER CD C1TB £8.75

RECORD STORAGE CUBE

This cube has been designed by us to hold roughly one hundred LPs. It has an internal width of 37cms. Internal height is 32.5cms and depth 32cms. The cubes can be stacked or placed alongside each other to increase storage - and they can even be used as seats!

Strongly made from 15mm medium density fibreboard (MDF),

the panels are milled to have strong side joints. We have specified a durable black paint finish to give it a smart, yet unintrusive appearance. The screws are self-starting, but clearance holes are pre-drilled. It comes in a flat pack with screws and Allen key for easy home assembly.

RECORD STORAGE CUBE PRICE £42 EACH

FREE!

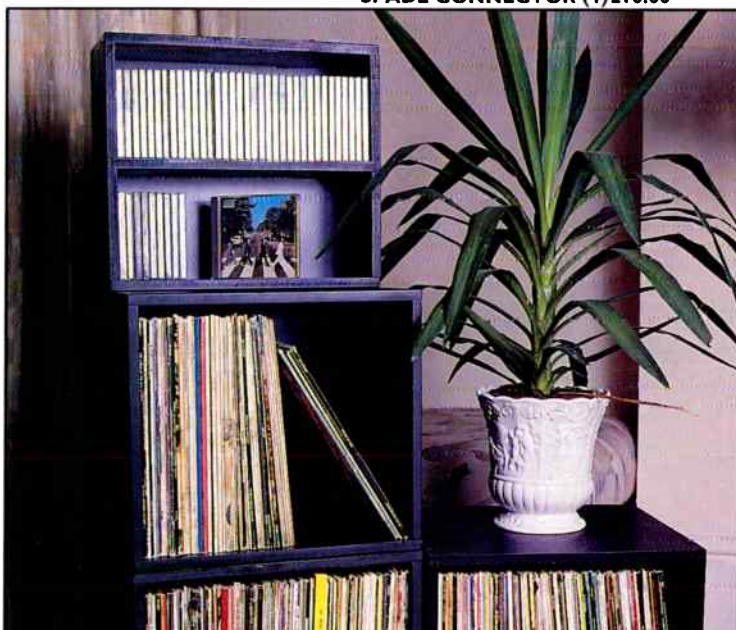
20 RECORD SLEEVES WITH 2 CUBES
50 RECORD SLEEVES WITH 4 CUBES

FOR 6 CUBES, JUST PAY FOR FIVE (£210)
FOR 8 CUBES, JUST PAY FOR SEVEN (£294)

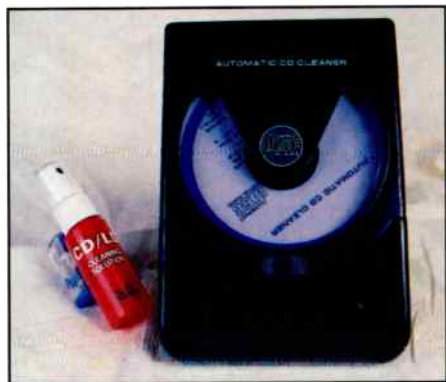
GOLD PLATED SPADE CONNECTOR

For amplifiers with loudspeaker screw terminals, here is a heavy, duty gold plated spade connector. It has the same unique axial clamp connector as the 4mm plugs described above.

SPADE CONNECTOR (4) £10.00



Hi-Fi World SPECIAL MAIL ORDER



AUTOMATIC CD CLEANER

About the size of a portable Compact Disc player, this black battery-operated CD cleaner spins the disc while two sponges clean the disc with a radial motion. A bottle of cleaning solution is supplied: simply spray the CD, insert into the CD Cleaner, press the 'Start' button and in twenty seconds the cleaning cycle is over. An automatic shut-off facility operates if the lid is opened while the disc is spinning. The cleaning pads can then be replaced with a dry pair to dry the disc with another spin.

The Compact Disc Cleaner is supplied with washable foam cleaning pads and cleaning solution. Batteries (two size HPII are required) are not included, but the Cleaner can be powered through a standard transformer - like those for many personal cassettes - which has a 3v DC 350mA output.

AUTOMATIC CD CLEANER £21.95



SWEATSHIRTS AND T SHIRTS

A whole new range printed with "Hi-Fi World" and our slogan "The Magazine for enthusiasts" both front and back to prove to everybody you read probably the best hi-fi magazine in the universe.

SWEATSHIRTS £12.00
HOODED TRACK-TOPS £15.00
T-SHIRTS £7.99

SORBOTHANE CD FEET

Four big, round rubber feet, 50mm in diameter and 18mm deep. Made from a soft, slightly sticky feeling form of artificial rubber known as Sorbothane, these feet have the peculiar ability to soak up vibrational energy, due to their high internal kinetic losses. Some people go nuts with them, swearing they improve everything, from the TV to the fridge! We sell them for use (as intended) with CD players, turntables and various other hi-fi components that might be sensitive to vibration. They improve sound quality by providing a more stable platform. Well-nutty and a lot of fun.

SORBOTHANE CD FEET £27.95



AUDIOQUEST OPTICAL LINK Z

This is a wide bandwidth, ultra high performance optical cable for digital links, made by Audioquest. The most common use is linking a CD transport to a digital-to-analogue convertor. It is available in 1 metre and 2 metre lengths with conventional TOS-link connectors.

OPTICAL LINK Z
(1M) £69
(2M) £99

AUDIOQUEST QUARTZ INTERCONNECT CABLES

A fully balanced analogue signal cable with heavy duty, gold plated phono plugs and advanced Quartz Hyperlitz cables using polypropylene insulation. The Quartz cable we have chosen from our own experience as a fine sounding type. It uses FPC-6 ultrapure copper (99.99997%) and the plugs are welded.

AUDIOQUEST QUARTZ CABLE
1METRE LENGTHS £79/PAIR
2METRE LENGTHS ... £120/PAIR

ARCAM RCA PHONO PLUGS

Specially made in Japan to Arcam's specification, this heavy duty phono plug will accept audiophile cables up to 7mm in diameter. The 36mm long body is nickel plated and the contacts gold plated. Superbly built, we supply in polarised pairs with one/two ring end identity to allow send/receive ends to be established to take into account directionality. These plugs must be soldered with care to cables.

RCA TYPE PHONO PLUGS (4) £15.50

MICHELL ENGINEERING PLUGS

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There's nothing like a multi-band radio receiver for encouraging a short attention span. Put one button labelled Short Wave and another called Tuning under anyone's fingers and they'll dip in and out of those crackly, whistling glimpses of Australia, Alaska, Vladivostok and all points of view around the compass.

When you tire, if you ever do, of dabbling in the thousands of broadcasts cluttering up the ether on Short Wave, then the Roberts RC818 World Radio allows you to seek the sheltered calm of Radio 3 or 4. In stereo, too, if you have headphones - there is only one internal speaker.

Re-joining the fray, there's a variety of controls to fiddle with; the three band selector switches for SW, AM and FM are straightforward enough, as are the calculator-type numerical keys for either keying in a frequency direct or for accessing the memory. This will hold nine stations each from the FM, MW and LW bands, and eighteen from the SW bands. Frequency display comes up on a flat LCD display, along with the time, alarm and sleep symbols - the RC818 can be set to switch off after fifty-nine minutes and wake you with either an electronic buzz or electronic music, depending on your preference and which station was last tuned in. The display is backlit, but as with many LCD panels, the radio has to be tilted bodily for it to show as anything but a sultry pale green glow.

Three small round plastic knobs offer coarse tone control, RF gain for AM and 'fine tuning' for receiving Single-Side Band or amateur voice transmissions on Short Wave - a constant source of linguistic fascination. I found the RF gain, albeit coarse, worked well, allowing the internal ferrite rod aerial to bring in a variety of stations reasonably clearly, though birdies and interference couldn't be totally diminished. There's also a Narrow/Wide selectivity switch - which also doubles as a Mono/Stereo selector for FM - to reduce interference between closely-spaced stations, though use this unnecessarily and it muffles the AM sound.

Reception on Short Wave requires the telescopic aerial to be fully extended. It reaches a height that is liable to put a hole in a low ceiling, and though effective at pulling in the stations, at full stretch it feels as though it might not remain too firmly attached with long usage. Externally, more recent Roberts radios have lost some of

the cachet this old-established company once had. Harry Roberts and Leslie Bidmead went into partnership to make portable radios in 1932; they are our sole indigenous radio makers. Or, I suppose, would be, were it not that this RC818 is manufactured in Taiwan and in a somewhat disappointingly bulky and ordinary plastic case. It's a far cry from 1959, when the Roberts RT1 was available covered in mink, pony skin or leopard skin - even suede encrusted with jewels. There was even a model finished in real gold plate. All of which makes their modern finish seem a trifle prosaic.

be; though AM can, with effort, sound moderately acceptable, with a portable like this it's best to feel the bandwidth and not worry about the quality too much. If you expect to hear a studio acoustic, the gentle creak of a door closing, on Long Wave transmissions, there are not many around these days that will offer it. Very few have ever attempted this kind of transparency.

On FM stereo, the Roberts was also acceptable, but not in the upper class for purity and clarity. Apart from casual listening while teaching rubber ducks to swim in the bath or tossing a green salad

New World Order

Eric Braithwaite orders up stations from around the globe on the Robert RC818 World Radio.



in the kitchen, the limitations of the internal loudspeaker made headphone listening mandatory.

I've often regretted, when I've had my interest grabbed by a programme on a foreign station around one-o'clock in the morning, that recording it meant leaping out of bed to my main hi-fi system. Even worse is to hear a trailer only to discover that it's going to be broadcast at 4 a.m. It's remarkable how quickly interest wanes after that. Roberts solve the problem by proffering an integral cassette recorder. Useful, this; it solves the 4 a.m. problem, especially as it can be set to record at the right time. It cannot,

however, be programmed to switch off - it will carry on to the end of the tape.

However, the cassette section, with a relatively narrow frequency response compared to hi-fi separates, is more suitable for recording Short Wave or AM broadcasts than a Prom concert in FM stereo. For this purpose, with manual selection for ferric or chrome tapes and an automatic record level it performs well enough.

In terms of access to the airwaves, easy-to-use controls and portability, the Roberts does well. Facilities range over everything that is necessary for wide-spread AM and SW listening. Nonetheless, at the same £200 price level, the competition, particularly from Sony, can offer smaller, equally specified machines with a more up-to-date appearance ●

I do a good deal of my radio listening late at night, and of late - while I sort out a valve AM tuner I picked up for a song in the Portobello Road market a little while ago - that has meant a lot of the World Service on a cheap personal cassette-radio. In the early hours, the plethora of phone-ins on FM stations drives me to despair. It was a delight to be able to scan the wavebands to discover the latest row in the Canadian Parliament, or problems in Polynesia. There's an awful lot happening out there; a receiver like this opens a whole range of doors like an Escher drawing. You don't need a programme on World Music to hear new, and startling sounds - there are thousands of broadcasters out there for whose listeners it's natural.

Mind you, a listener has to make allowances. This is not hi-fi, and never can



ucts were poor by modern standards, yet some possessed certain important properties that went unrecognised at the time and - most importantly - can be instructive to us now.

Ever since this magazine was launched we have regularly selected, measured and reviewed vintage items that, for one reason or another, we feel possess some particular strengths. Perhaps in highlighting their strengths, we have not adequately explained their weaknesses. Nothing in hi-fidelity offers a perfect performance, although the superb results that can, with a lot of practical forbearance, be had from some current pieces of

appreciate, say, the original Quad Electrostatic, or is there more to it?

A curious coincidence of events has awakened interest in the Westminster. Tannoy recently upgraded the standard Westminster to 'Royal' status to strengthen its position in the Japanese market (it has never seriously been sold in Britain, but this is about to change). At the same time - and I imagine by coincidence - whilst this ultra-sensitive horn, which needs little power to drive it, was being brought up to a modern standard of performance, a spectacular amplifier of very low power - the Japanese single-ended triode Ongaku valve amplifier, wired throughout with silver and carrying a price tag of just £34,000, was announced. Put the two together and you have a dynamite combination, one that brings together 'vintage' products that are in fact very modern. Furthermore, contrary to what some old sceptics think, neither product is real retro. Both might use old principles, namely single-ended working and horn loading, but they do so with modern aims in mind. These items are not replicas, they are not copies of old designs.

Not Vintage, not Cheap

Our reviewers have both heard the Ongaku and, not unsurprisingly, they both now power their new loves with Britain's affordable equivalent, the Second Audio triode valve power amplifier, a unit that delivers a massive (!) 15watts. A Westminster with a Second Audio is a frighteningly powerful combination, yet a serenely natural and spacious one at the same time. But they are not vintage, nor are they cheap. Here's the other side of the coin, the reason why horn loudspeakers, triode valve amplifiers and old radios could bring you only misery, not the ecstatic joy that hi-fi hacks share amongst themselves and seem to expect readers to be able to attain with equal ease.

An enormous amount of research has been carried out on horn loudspeakers, so their physical limitations are well known. The biggest is mouth size versus low frequency cutoff; an 80Hz cutoff ideally requires a mouth area of 16sq. ft, which is enormous. The horn behind it has to be very long too, making for a big

cabinet. A horn has to be big to be good. Size for size, an ordinary box loudspeaker goes much deeper than a horn, believe it nor not. The wonder of a horn is its efficiency and the way it drives a room. This gives its bass an impact unmatched by other loudspeakers; a good one will virtually blow you across the room - even when driven by a 15watt amplifier. As audio goes, this is the iron fist in a velvet glove.

And so to valves.

The problems of valve amplifiers are many. Reliability is one of them. Valves age and as they do so the output stage of an amplifier goes progressively out of balance. Having designed, built and repaired valve amps I know that components have improved enormously in quality and reliability over the years, making modern designs much better than traditional ones. There's a world of difference between an old Leak Stereo 20 and a modern valve amp.

Old tuners and amplifiers need to have many or even most of their components replaced before starting to really sing. Tuners in particular need to be re-aligned, a task that requires a lot of knowledge and some complex RF test equipment. Without it, for example, an old Leak Troughline picked up for what, these days, is an increasingly high price, might be effectively useless.

The trouble comes in finding one in good condition in the first place (little chance) or being able to repair it and then align it. Oh, and after that, by the way, it is so insensitive that you'll need a good outdoor aerial or hiss and poor sound quality will greatly annoy you instead of that hoped for clarity and spaciousness.

It takes a lot to restore one of these tuners, so they may be cheap initially, but not if you want to hear their full potential. Though the restored unit is expensive, it is utterly convincing in its abilities and remains good value.

However, I still suspect that most people would be better served by buying an Aura TU-50, a neat little modern tuner priced at just £220. I know it's less fun, there's no challenge and none of the excitement that comes from getting something going yourself but believe me it's more practical ●

Reflections from Noel Keywood kaleidoscope

Everyone here was surprised to learn that a reviewer known for his staunch support of Linn and Naim products suddenly declared changed allegiances. His new love? - Tannoy Westminster Royals!

Hell's teeth, they might be (literally) overwhelming to listen to, but as an everyday loudspeaker they are as far as you can get from reality or practicality. These things are the size of broom cupboards, take three men to lift and cost £10,000. Regular readers will know we adore them, but then people adore the Pyramids, yet they don't want a pair in their front room.

I thought this change of outlook might be one person's aberration but no, now another reviewer has decided that Westminster Royals are the things to have. With increasing numbers of readers asking us where they can get plans to build horn loudspeakers, and also where they can get duff Leak Troughline tuners purchased for over-large sums repaired, the whole vintage craze is beginning to look like it's getting out of control.

At the same time I notice that some of our older readers, a small caucus, have little time for what they see as blind nostalgia, believing solidly and wholly in the benefits of 'progress'. A lot of old prod-

ucts employ archaic methods of operation are helping stoke the fires of enthusiasm.

In response to some hi-fi reviewers going truly cosmic in their choice of a system, and to readers getting increasingly distraught as they try and breathe life into electronic corpses that passed away at least twenty years ago, here's the other side of the coin. Here's what's wrong with horn loudspeakers, old radios and such like. Here are the grim truths that will confront you and, possibly, defeat you., should you wish to follow such a winding and difficult road. The superficial attraction appears to be the promise of audio Nirvana on offer at car boot sale prices; the truth is somewhat different.

Let's first examine the case of the intrepid reviewers, those who have decided that one of the world's largest, most impractical and expensive loudspeakers, a model that has existed almost unrecognised by the hi-fi press for decades, is now all of a sudden the speaker to use. What has caused this new realisation? Is it true that horn loudspeakers are in themselves overwhelmingly better than all other types? Have people never really recognised their abilities, as they have failed to really

The Pops Music

Edited by
Eric Braithwaite

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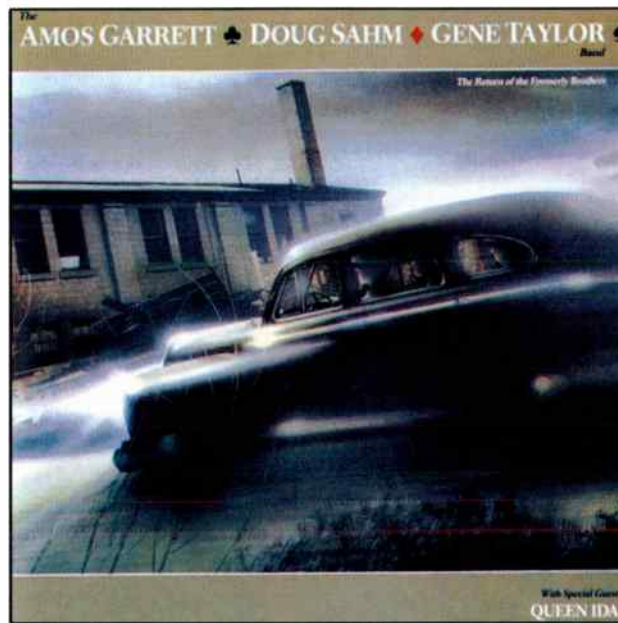
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**For satisfaction this month
ignore the youngsters and
look to the forty-
somethings for music with
verve and vitality.**



**THE AMOS GARRETT,
DOUG SAHM, GENE
TAYLOR BAND**
**The Return of The For-
merly Brothers**
RYKO RCD10127

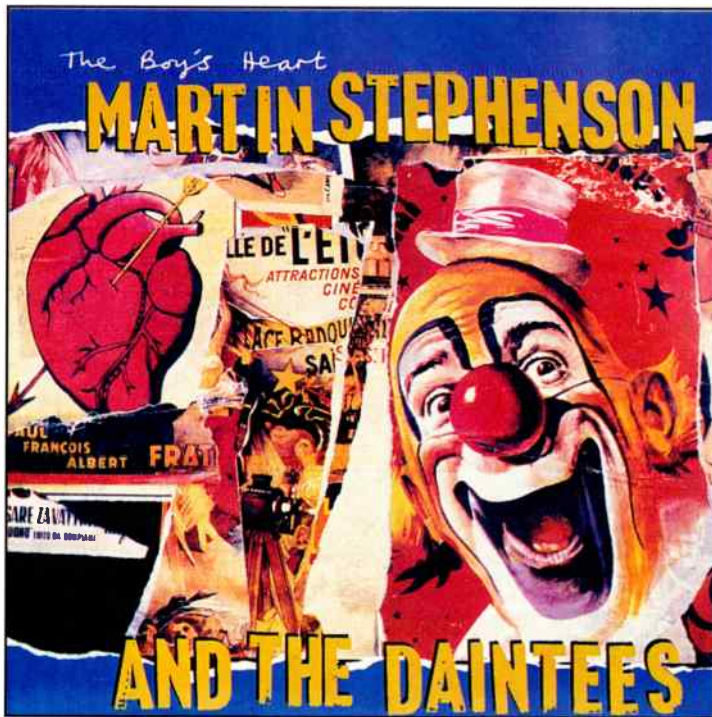
● The name The Formerly Brothers has jokingly been applied to this trio because of their previous associations. Singer/guitarist Garrett played with Maria Muldaur and Blues ace, Paul Butterfield (in a band that featured Muldaur's husband, Geoff, called Better Days); guitarist/organist Sahn was the founder of the Sir Douglas Quintet (remember 'She's About a Mover' from 1964?); and pianist Taylor worked with Big Joe Turner, Canned Heat and Rick Nelson. A chance meeting at a festival in 1986 put the trio on stage together and the Formerly Brothers became an ad-hoc band. They're joined on this disc by Bohdan Hluszko on bass and Kit Johnson on drums, with Cajun players Queen Ida, Chili Willy Lewis and Stephanie Davis helping out on a

couple of tracks.

The band's music encompasses many American roots and styles and so there's plenty of variety on this twelve-track disc. It starts with guitar and piano-based boogie-woogie, shifts to a bayou strain, then continues taking in country ballads, bar-room

blues, and R'n'B on the way. Along with self-penned compositions there's a selection of songs from noted writers like Terry Allen, Hank Williams and Bob Dylan. I get tired of hearing Dylan covers but the band's version of 'Just Like A Woman' is quite refreshing; I just wonder if the day will ever dawn when I'll hear this song performed without any quasi-Dylan, 'fingers up the nose' vocal mannerisms.

Again, however, I feel obliged to sing the praises of record label Rykodisc for releasing music that isn't commercial in the accepted sense. The label, like a handful of others, is prepared to entertain music that has more merit than mass-market appeal. It's a safe bet that The Formerly Brothers won't turn up on Top of the Pops but that's no reason for people not to be allowed to hear them. The band are pros and it's apparent once they've reached the fourth bar of the first song that they love what they're doing. And there's little that's as satisfying as hearing musicians enjoying themselves.



**MARTIN STEPHENSON
AND THE DAINTEES**
The Boy's Heart
KITCHENWARE 828324
Also available on LP

● This is Stephenson's fourth album and should finally put paid to the notion, still held by some, that he's a folk singer. One day it will dawn upon the world that strapping on an acoustic guitar doesn't mean you're a folkie. Stephenson's frail, softly-spoken vocals don't help dissuade people, of course. He doesn't belt out lyrics like Axl Rose or Paul Rodgers but then neither is his voice in the Dick Gaughan or Martin Carthy mould.

Nor are his background and influences those of a classic troubadour. Growing up listening to Elvis Presley and Diana Ross, then joining a punk band as a guitarist after hearing The Cure's 'Seventeen Seconds' is hardly a traditionalist's route into music. His choice of producer for *The Boy's Heart* wouldn't meet with approval from the folk aficionados. Ex-Patti Smith guitarist Lenny Kaye takes credits here and he's given the album a spacious, uncomplicated feel. With many of the tracks he apparently stuck with the basic arrangements used to demo the songs.

The minimalist approach is well suited to Stephenson's songs, whose strength lies in his delivery of their intensely personal lyrics. They don't need bolstering with dense musical

backdrops or claustrophobic layering. Stephenson presents his own, individual, view of the world to the listener and the spartan arrangements allow him to communicate his



thoughts succinctly.

The Boy's Heart hasn't the immediate appeal of my favourite of his albums, the Paul Samwell-Smith produced *Gladstone, Humour and Blue* but it's a definite grower. Each playing reveals more and as I go through the process of getting into it some particularly powerful songs are emerging: 'Sentimental Journey' and 'Sunday Halo' are currently high on my playlist.

The album, like Stephenson's voice, is unassuming but insidious. It might not strike you as noteworthy the first time around but give it time.

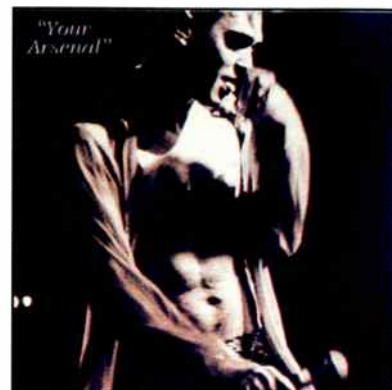
MORRISSEY
Your Arsenal
HMV 0777 7 99794 | 7
Also available on LP

● Neat title, Mozza. So much more inspired and subtle than *Uranus!* This new Morrissey album was hailed by the accompanying press release as the Mancunian singer's "fourth and greatest". That really doesn't say much for the other three. The former Smiths frontman might have employed the services of ex-Bowie guitarist Mick Ronson as producer but even that doesn't hoist *Your Arsenal* up to the status of any of the albums he made with the band whose demise I mourned grievously.

The opening song, 'You're Gonna Need Someone On Your Side', which ought to be overtly attention-grabbing, is, like others here, one whose potential seems curiously submerged, rather bland. It washed over me, almost passing by unnoticed. Matters improved little as the record player's stylus circled inwards.

Morrissey's lyrics seem as barbed and witty as ever but sit unhappily within *Your Arsenal's* cloying arrangements. The album's first side lacks colour and dynamics, the vivid contrasts that make you pay heed to songs. The fourth track, 'The National Front Disco' was the first that threatened to disturb my impending slumbers. However, once shaken I soon found my attention wandering again: this initially promising song never reached the peak I hoped it was trying to attain. I flipped over to the second side and first track, 'We Hate It When Our Friends Become Successful' seemed hopeful and my ears pricked up (with apologies to Joe Orton). The second, 'You're The One For Me, Fatty' also rose comfortably above blandness.

Ultimately, however, I found *Your Arsenal* disappointing, tired and uninspiring. And I'm not a Morrissey-knocker. I used to defend him when people told me that he couldn't sing, that he was a miserable, affected bastard, etc. etc. The conclusion to which I'm inexorably drawn is that in the same way that Fred needed Ginger, that Little would be less





But it's no good being academic about Heavy Metal. You either take it at face value or you find yourself entangled in all sorts of intellectual contradictions. The fact is that Motorhead play Metal with more balls and brio than any number of permed, spandexed, Harley-Street-cared-for pretenders to the bass-bin-destroying throne. There's nothing pretentious or faked about Lemmy's stomach-churning bass riffs or his singing that he refers to as howling. Zoom and Wurzel's guitar work cuts straight to the bone: there's no two-hands-on-the-neck twiddling interrupting the flow of power chords and searing, sustained six-string grind. Motorhead's music is vestigial, heads-down, no-nonsense boogie: Status Quo for the unwashed, Guns'n'Roses for thirty-somethings, ZZ Top for real men.

Having heard March or Die I'm sorely tempted to go and see Motorhead play live. I don't fancy the preparation, though. A week without a bath or shave, a diet of vodka and drugs, swapping my car for an ape-hangered BSA, my Docksiders for jackboots, I can live with. But cutting the sleeves off my twelve-year-old Levi jacket? On second thoughts . . .

without Large, and Gilbert would have been up a gum tree without Sullivan, Morrissey needs some input from Johnny Marr. Once a formidable team, their individual projects haven't been exactly ablaze with fireworks.

There's not one song here that I think bears comparison to classics like 'Suffer Little Children', 'The Hand That Rocks The Cradle', 'Shoplifters Of The World Unite', 'This Charming Man', 'The Queen Is Dead' or a myriad others. Your Arsenal suggests explosive happenings, but it's better filed under whimpers than bangs.

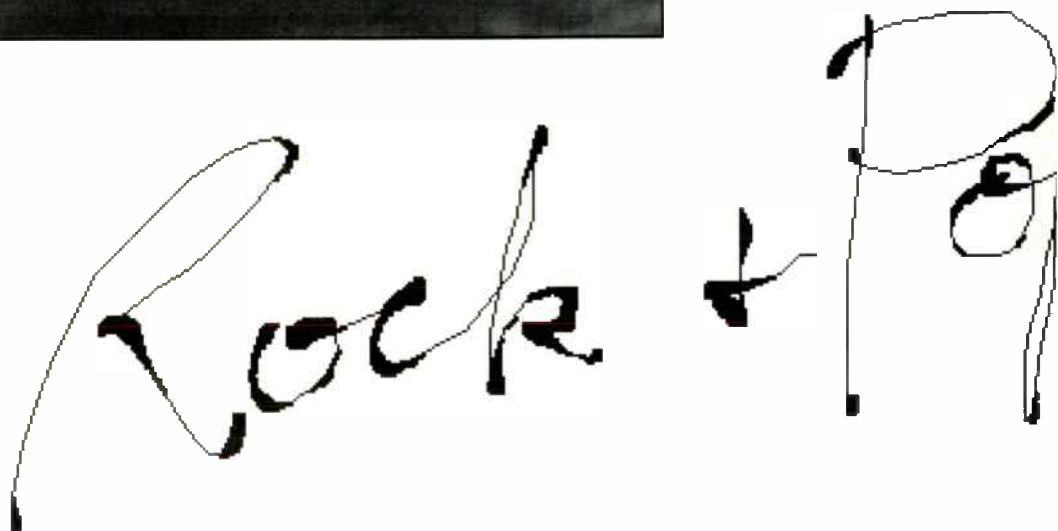
singing about sweetness and light. The sawn-off Levi jackets, tattoos, hair, skull'n'crossbones, jewelry, and lyrics about the AntiChrist and Jack The Ripper are all parts of the uniform of a nasty, hard-rockin' dude. The aspect that I find worrying is whether any sad individuals who enjoy the music honestly believe the rest of the credo's diesel-drinking, demonic drivel.

MOTORHEAD
March or Die

WTG (SONY) 471723-2

● Years ago I was working in a studio complex when a quietly spoken, polite chap tapped me on the shoulder and said "Excuse me, but I think you're wanted on the telephone, John." Without looking to see who had spoken I replied that I wasn't John and that he was in the next room. "Oh, I'm sorry to have troubled you then," said the gentlemanly voice. I turned to discover that I was being addressed by none other than Lemmy Kilmister, Motorhead's alleged vodka-swilling wild animal of a bass player. My mind switched into double-take mode. That couldn't be Lemmy. Where was the quart of vodka? Why hadn't he got a brace of leather-skirted blondes draped over his arms? Why did he sound like a Radio 3 announcer?

It was hard to equate that genteel, urbane reality with the contrasting image presented by Motorhead albums like the recently released March or Die. I listen to him sing 'I Ain't No Nice Guy' and wonder who he thinks he's kidding. But such song titles are the very bread and butter of the Heavy Metal myth. They are necessary to perpetuate Heavy Metal's Marlon Brando biker iconography. You can't play to an audience of headbangers if you're wearing a suit and



Although on the very periphery of the hi-fi scene, CD-I is reputed to have the sound quality of Compact Disc together with the picture quality of LaserDisc and the fun quality of Nintendo or Sega games. As such, the CD-I system should offer a more all-round entertainment package than the 'visionless' existing hi-fi media, such as CD or cassette.

Certainly, if the recent expansion in home entertainment system sales is anything to go by, CD-I has arrived at just the right time. Currently, Super Mario, the pasta-mad Italian plumber who has come to symbolise all things Nintendo, is the most recognisable popular icon among children worldwide. In just ten years Mario has beaten all other pop heroes, including an ageing Mickey Mouse, the Coca-Cola bottle, the Teenage Mutant Ninja Turtles and even Michael Jackson in the popularity stakes.

The Nintendo/Mario craze started life about ten years ago in the hero of a mis-named arcade game - Donkey Kong, which, according to legend was originally named Monkey Kong, but changed species somewhere over the Pacific Ocean. Today, Mario has his own TV show and sponsors teams in the US sports arenas.

For the Fickle Pocket

Much of this revolution in home entertainment has come about due to the Nintendo Game Boy, a small hand-held game console with interchangeable games. The sales of Game Boy have been staggering, especially when contrasted with the slump in the 7" singles market and the comatose CD singles market. These software media are essentially fighting for the same buyer, the fickle teenager pocket.

The problem is that they are hardly educational. People have argued that computer games improve hand-eye co-ordination and that there are some skill-learning benefits, but, as a measure of intelligence, it is best not to judge the person by their level of skill in playing games, but by their threshold of boredom. Those who fail to abandon their games rapidly, not seeing the futility of such a repetitive action, must ultimately have questionable higher brain

functions.

Philips have created an interactive video system that has the capacity to teach the user. At present, the majority of the tutor packages are designed for the pre-school/primary school age child, but Philips' ultimate intention is to develop tuition packages for all levels via CD-I.

CD-I games, with their massive, quick access CD-Read Only Memories, introduce far higher levels of interaction between user and program, than was thought possible in a domestic system.

Interactive computer programming, so beloved by



Feedback from Alan Sircom

sircom's circuits

science-fiction writers, dates back to a system known as ELIZA that was developed during the late Sixties and early Seventies. ELIZA was a program designed to respond to key words and phrases in set patterns; for example, it would find the phrase "Fine, thank you" as the response to seeing the words "how" and "you" in the same sentence.

As both programs and programmers developed, so levels of syntax and grammar were included, together with a capacity for learning and random choice of a range of responses for a given input. While it was possible to catch the system out, it was sometimes capable of stunning near-Freudian insight, albeit by accident.

Today's computers are awash with successively higher levels of interaction, or 'user friendliness'. Those who cut their computer teeth on Commodore Pets, Sinclair ZX-81's and Apple II's are more than surprised when they encounter today's Macintosh, Amiga or Atari. The CD-I machine, with its variety of recorded responses, goes one stage further and actually talks to you.

Apart from the interactive aspect, the CD-based system has the ability to store text, photo and computer-generated images, as well as moving pictures, music and speech. All

of this combines in CD-I, to give it the potential to create far more flexible and believable scenarios than the best of the console computer games.

Anyone who can switch on a television and operate a CD player would have no difficulty in operating a CD-I machine. In time-honoured advertising jargon "It's so simple, even a small child can use it." (Here, I'm tempted to add the equally time-honoured Marx Brothers reply: "Then get me a small child. I can't make head nor tail of this.") As both the machine and the games themselves offer copious amounts of help if needed, it would be near impossible to get into difficulties with the player.

As it has a set of phono sockets, CD-I is designed to be a part of a larger AV system. Some CDs are coded with graphics and these can then be played through the monitor screen, while you listen. It can easily be plugged into a hi-fi system and indeed could double up as a standard Compact Disc player, although sound quality is not in the highest league.

Looking at the CD-I objectively then, the player offers a great deal of future potential, especially for those with small children. When fitted with the large roller-ball controller, the CD-I machine

becomes the Fisher Price toy of the audio industry. It is a very useful pre-school teaching aid, as long as you can live with the Sesame Street Americanisms, and I can see it rapidly taking hold in classrooms throughout the world.

Where I have doubts is in its application for those over the age of about seven. Until the level of software improves, children will rapidly tire of this machine in favour of the more accessible Game Boy packages. Those who want to use CD-I for more intellectual pursuits are, at present, rather short changed. It does provide fascinating insights into places

like the Smithsonian Institute and does have the ability to teach the uninitiated the basics of Classical music appreciation, but we are still a long way from the CD-I Open University course.

Maybe I am setting CD-I's targets too high. Its approach is set to appeal to the 'global' family and it looks set to achieve its target. The first flush of software titles are well thought out and cover a broad spectrum, together with a hardware package that has no noticeable glitches. Titles that follow will probably enhance its appeal, as long as the software designers do not insist on casting Australian voices to play Robin Hood and Ivanhoe.

The growth of the video game, a market almost solely consisting of teenagers, has proved that there is a need for a medium such as CD-I. Unfortunately, I also believe that this need has been taken up by the Nintendo and Sega market leaders, followed by home computer systems. CD-I, a system that has the potential for so much more than mere video game playing, may not be able to survive against fierce competition. If it fails, it will have nothing to do with the system, or even the software. CD-I's downfall could be that little imaginary Italian pasta loving plumber, Super Mario ●

Rock & Pop

**Twenty years on,
Dr John returns to
his Louisiana roots,
and it's an album
worth rooting for.**

Eric Braithwaite

**DR JOHN
Goin' Back
to New Orleans**
WARNER BROS. 7599 26940-2

● Mac Rebennack aka Dr John is back. Back to the spectacular flamingo plumage of Indian dress that was once his trademark (handmade, this time by Chief 'Smiley' Ricks, says the sleeve note) before the brief spell in the Eighties when he deserted the flamboyance for a tweed jacket, beret, piano and clubs. Back to the Bayou-invested sound of the great album of 1968, *Night Tripper* *Gris Gris*, but touched with a quarter century more of feeling - and now a more grainy Blues intonation in his voice than ever. And, as he writes in the notes, back to his roots in the music of Louisiana and New Orleans again.

He's been there before - it was evident in the rhythms and the unique style of songs like 'Gris Gris Gumbo Ya Ya' or 'I Been Hoodood' on that '68 album, and especially - and deliberately - in the *Gumbo* album of R 'n' B oldies of '72. Now, twenty years on, *Goin' Back* is a history tour of the sounds of New Orleans. Sixties voodoo-hoodoo dispelled, the Blues strain and the styles of King Oliver and Satchmo absorbed, respected and turned out of a pure Dr John mould.

Here still are the harmonies, the Bayou air, the Funky Butt piano, the drumming of new Orleans street



parades - 'My Indian Red' begins in the style of the old New Orleans Marching Bands before it takes on a funkier edge - and memories of Jazz founders like Buddy Bolden. 'I Thought I heard Buddy Bolden Say' is Talking Blues with a lilt and a tribute to a style we can never know filtered through the hands of Jelly Roll who knew him. Here as well is the Mardi Gras glory in 'My Indian Red'. It's tight, vivid, and sweeps you into a whirl of carnival light-headedness. The point is, you can't do this kind of thing without respecting the original styles and emotions and being musicianly. Otherwise it becomes sad plagiarism and pastiche. Even when Dr John turns to 'Good Night Irene' - spoiled now by becoming a pub closing time song this far from New Orleans - it never becomes pastiche, it stays just one step on from Leadbelly who wrote it.

"Most of the songs are not moon and swoon and croon, gushy love songs, they're real-life story songs about livin' and dyin', gamblin' and murder and whorin', messed up love affairs, real stuff," as the man says. Even 'Basin Street Blues' - like others, re-written with sense and sensitivity - touches chords, and how many times

has that classic been slaughtered? *Goin' Back To New Orleans* has been one hell of a journey, via thirty or forty years of hard graft and even a spell in a Federal Penitentiary and only a single hit - catalogued in Dr John's notes to the songs - you don't get the words and you don't need them. It's a spangled display, backed with brilliant playing and dam'

good arrangements. (The line-up includes Malcolm Stewart's fave Neville Brothers, and Danny Barker, who goes way back to the Twenties and played with Louis Armstrong.) If you're a fan of the Dr John Creaux persona, you're let in gently with Dr John's own 'Litanie des Saints' loosely based on a piece by Louis Gottschalk, New Orleans' own Classical composer. Then it's into 'Careless Love' as fresh as I've ever heard it, and after that you stay listening.

"When I was growing up in New Orleans, just a little weed-hopper from the Third Ward, I used to think 'Oh, man, this music makes me feel the best!'" writes Rebennack in the introduction. And how!

Rock

Jazz

Simon Hopkins

This month, labels, both of style and record. Zorn again! Now on his own new label of promise. And from the very new to the old: some very different Jazz from German ECM and some ESP from the long neglected cult New York label.

**NAKED CITY
Heretic - Jeux des Dames Cruelles
AVANT/DISC UNION AVANT001**

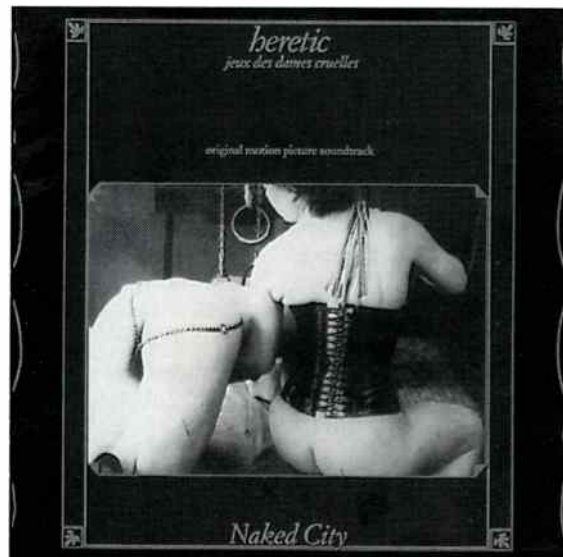
● John Zorn gets mentioned almost monthly in this column, and if that's disproportionate to his role in contemporary Jazz then I obviously don't mention him enough. Over the last dozen years or so the alto saxophonist, composer and *auteur* has emerged from the confines of the New York East Village scene to become widely recognised as the most potent voice in the new jazz. And beyond. Get this: in a recent NME article on the general state of the Indie scene (yawn) one astute writer had the acumen to point out that any true alternative chart should quite naturally include Zorn alongside,

say, the Malian singer-songwriter Salif Keita. Quite so.

Which isn't to say that there's any great hegemony of belief over Zorn. For every Jazz critic that feels like me on this, there are ten queuing up to throw tomatoes - or worse - and our friend at the NME is in a desperately small minority in the wider rock press. And now Zorn's got a new fabulous toy with which to annoy everyone: his own record label. Avant is a new Japanese label whose A&R (i.e. artist roster decisions) Zorn will directly oversee and whose upcoming releases are mouth-watering: a half-dozen albums by his own group Naked City; unreleased live material by New York's legendary No-Wave improv-rockers DNA; Davis Shea's montage composition 'Shock Corridor', based on Sam Fuller's 1963 B-movie masterpiece; and new albums by, among others, 21-year-old avant-metal guitarist Buckethead, Japanese classical-hardcore terrorists Haino Keiji, and New York composer Anthony Coleman.

First up, appropriately enough, is *Heretic*, the long-awaited pure-improv album by Naked City. Zorn assembled the group in the late Eighties, following the success of his large collage pieces 'Spillane' and 'The Big Gundown' (the greatest tribute ever to Italian Spaghetti Western composer Ennio Morricone) and the Omette Coleman cover-version project 'Spy vs. Spy'. The group was assembled from the vast pool of musicians with whom the altoist had worked over the years, and has remained constant since: guitarist Bill Frisell, one of the Eighties' most important innovators on the planet's most overplayed instrument; former British art-rock and guitar experimenter Fred Frith on bass; composer/keyboardist Wayne Horvitz, leader of his own group The President; and the explosive master-drummer Joey Baron. On *Heretic* they're joined by a long-time associate of Zorn, vocalist Yamatsuka Eye, leader of hardcore extremists The Boredomes, Japan's legendary answer to The Butthole Surfers (and more). With the exception of one track (the hugely funky 'Club Scene' on which the entire band - sans Eye - get down, albeit in their own noisy, elliptical way) the album consists entirely of short freely improvised trios and duos, exploring the various permutations of the band members.

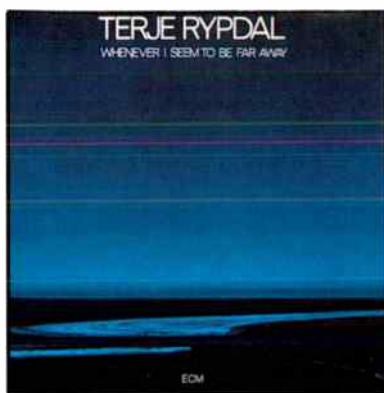
Which may come as a bit of disappointment to fans of both the Naked City sound and Zorn's incomparable compositional techniques. Fear not, friends: later promised Avant Naked City releases include two albums of cover versions of music from surf to Ellington, an ambient 'drone-oriented' album based on the effects of the psychedelic drug absinthe, and an album of NC transcriptions of Messiaen, Debussy,



Scriabin and Ives. In the meantime *Heretic* pretty much dispenses with any reference to written material at all (and in this sense is perhaps the most 'jazz' of all NC's albums). And it's also quite brilliant.

All these musicians are natural improvisers in that they create whole new sound worlds on the spot. None of your dry, introspective improvising here. On 'Heretic I' Zorn (on alto through electronic effects) summons up the sound of hell, for at least thirty seconds, a lot better than eternity in my books; on 'Slaughterhouse/Chase Sequence' Frisell turns in some of his best Heavy Metal riffing to date; on 'Dominatrix SB' Baron explodes like ten jazz drummers on PCP beating up a high school band, with Horvitz' cheesy B-movie synths smirking quietly in the background; and on and on, throughout 24 wholly different improvisations, each a glimpse of some private or shared horror/joke/fixation. (Of the latter, Zorn's are particularly scatological; the song titles - 'Coprphagist Rituals', 'My Master, My Slave', 'Sex Games' and so on - are appropriately, and beautifully, illustrated by the CD artwork's copious S&M film stills.)

So, *Heretic*: the most exciting Jazz release of the year, for what it is - the most extreme, virtuosic and shocking improvising of the Nineties and what it promises - a whole new label of trouser-wetting possibilities. Watch this space.



TERJE RYPDAL
Whenever I Seem To Be Far Away
 ECM ECM1045/843166-2

● The Norwegian guitarist Terje Rypdal emerged more or less contemporaneously with the American Jazz Rock we touched on last month, and used pretty much the same essential tools - cranked-up, distorted guitar, exotic harmonies, schizoid drumming - but came up with an altogether darker and (apologies for the crassly obvious) more Nordic proposition. 1974's *Whenever...* is perhaps one of the guitarist's most Gothic outings, second only to *Odyssey* in its isolated grandeur. The album consists of three pieces: two by a small electric group and a third massive piece for electric guitar, strings, oboe and clarinet. The latter piece is the album's most ambitious, with ascetic, Bartokian string writing underpinning Rypdal's scorched earth guitar, a combination so desolate that it's never in danger of indulging in the horrendous bombastics of Seventies orchestral rock (thank you Deep Purple). But the small group - guitar, bass, mellotron (deployed more Gothically than anywhere this side of King Crimson), French Horn and Jon Christensen's brilliant drumming - is one of the most memorable of all Jazz Rock, damn near justifying the entire genre all by itself.

JAN GARBAREK/ARILD ANDERSON/EDWARD VESALA
Triptykon
 ECM ECM1029/847321-2

● Rypdal's countryman Garbarek is another regular in this column. His plangent, yearning tenor and soprano saxophone and folkish writing have provided the template for myriad proto-World Music/Jazz collisions, but this 1972 classic showcases a very different musician. *Triptykon* sees Garbarek still wrestling with the Jazz demons of his youth - Coltrane, Albert Ayler and even Ornette Coleman - and the freedom and energy of their music infuses this. He is supported by bassist Andersen and drummer

Vesala, both of whom would go on to play in and lead more structured sessions (in the latter's case the most structured of all, leading his own big band) but the music is pure spontaneity here.

Nonetheless, where so much American improv, from the Ayler of a decade earlier to the Naked City of two later, is primarily an urban offering this Free Jazz never moves far from the earthbound beauty of North European folk music. Seminal stuff, and deeply moving.

BARRE PHILLIPS
Mountainscapes
 ECM ECM1076/843167-2

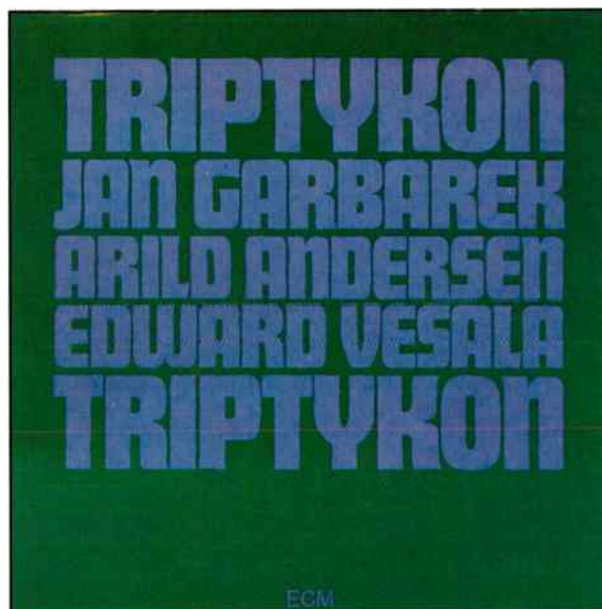
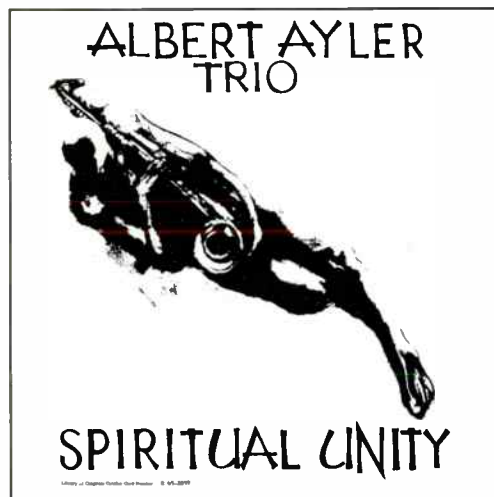


● Bassist Phillips, baritone saxophonist John Surman and drummer Stu Martin had been one of the most popular European Free Jazz groups of the late Sixties/early Seventies; in 1976 they reformed, albeit momentarily, to record *Mountainscapes* on which they were joined by the extravagant synthesizer player Dieter Feichtner and (on one track only) American Fusion guitarist John Abercrombie. The resulting music was very different from that of the earlier trio: ambient, folkish, heavily electronic. (Indeed, it was thought at the time, naively perhaps, to herald a new

way forward for the marriage of electronics and Jazz.) It nonetheless remains a great moment in European Jazz, and a turning point for Surman and Phillips in particular; their later work - much of it also on ECM - draws heavily on the lessons of this session and is always fresh and thoughtful.

ALBERT AYLER
Spiritual Unity
 ESP DISK ESP1002-2

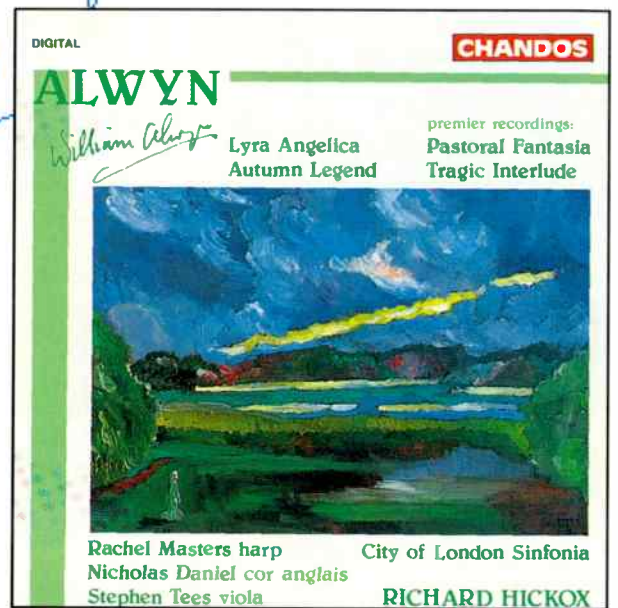
● And a far-too-brief mention for the most important record here. ZYX Music in Germany are about to reissue much - if not all - of the catalogue of ESP, the cult New York label that documented the Sixties 'New Thing' movement. *Spiritual Unity* was probably their finest moment; certainly that of the raging, wildly free tenor saxist Ayler, here with his finest band - drummer Sunny Murray and bassist Gary Peacock. Without this music undoubtedly *Triptykon* and *Heretic* would sound very different, if they would exist at all. Excellent sleeve notes, all the original artwork, fine remastering. Out now on CD: the moment Jazz imploded! More ESPs next time.



Classica

Peter Herring

What were Ferdinand and Isabella listening to while they waited for a postcard from Christopher Columbus? What did Beethoven's piano sonatas sound like to Beethoven, before of course he was tragically denied any sound at all? What would Schubert's symphonies have sounded like to Schubert, if he had found an orchestra willing to play them? And which composer managed to make the sweetest sounds out of that deliverer of damp Sunday dirges, the harmonium? Answers below.



**WILLIAM ALWYN
Autumn Legend/Pastoral
Fantasia/Tragic Interlude/
Lyra Angelica**

Rachel Masters, harp; Nicholas David, cor anglais; Stephen Tees, viola; City of London Sinfonia; conductor, Richard Hickox

CHANDOS CHAN9065 (DDD/63.51)

● William Alwyn, who was a contemporary of Britten, Walton and Tippett, was one of that group of English composers - I would also number George Lloyd among them for example - who eschewed whatever happened to be the fashionable avant-garde style and instead wrote the music that they felt moved to write even at the risk of being described as anachronistic in many quarters. I dare say Alwyn's music breaks all the 'rules' of contemporary music by being in an immediately accessible musical language; by requiring the players to simply play their instruments in the time-honoured tradition; by following the conventions of rhythm and harmony; and by revelling in the richness, warmth and romanticism of fine melody.

Alwyn, who died in 1985, had his first orchestral work premiered at a Promenade Concert in 1927. His ensuing career produced five symphonies and three concerti grossi along with a host of other orchestral compositions and a wealth of chamber and piano music. Yet it was as a composer of film music that his name became known to a wider audience, with over sixty scores to his credit.

Two of the works here date from the Fifties, a decade of great creativity for the composer, while the other two belong to the years immediately preceding the Second World War and this Chandos issue represents the first recorded performances.

Evident from all the compositions here is Alwyn's firm belief that each instrument had an inherent 'colour' of its own and that such colours should not be tampered with if the fundamental character of the instrument was to

be preserved. This fine understanding of the nature of orchestral sound can be fully appreciated throughout these performances, beginning with the achingly poignant cor anglais of Autumn Legend and continuing with the superlative writing for that 'Cinderella' of string instruments, the viola, in the Pastoral Fantasia, a work written in 1939 and regularly included in the wartime lunchtime concerts which Alwyn - a flautist of some note - gave with colleagues at London's National Gallery.

Alwyn would have been at home in the Gallery, even though it was denuded of paintings at the time. He was a talented painter himself and an avid art collector, especially of the work of Dante Gabriel Rossetti. The Pre-Raphaelite artist and writer was - in Alwyn's own description - the "onlie begetter" of the Autumn Legend and the score is prefaced by a quote from Rossetti's 'Blessed Damozel'. The music springs in an almost freely improvisatory fashion from the words of the quotation.

It is the horns - two of them - that give the Tragic Interlude of 1936 its plaintive pungency, while Lyra Angelica ('Angel's Song') belongs to the harp - or rather the interweaving of harp and strings in the most luminous web of silken sound. It is music of the most sensuously beautiful kind and exquisitely played here by Rachel Masters.

As with Autumn Legend, the inspiration for Lyra Angelica is literary: the English metaphysical poets of the Seventeenth century - Herbert, Crashaw, Vaughan, Donne, Traheme and, most especially, Giles Fletcher. The four elegaic movements are each headed with a line from Fletcher and Alwyn openly set out to capture the potent imagery and mystical fervour so redolent of Fletcher and his contemporaries.

Up to now, the torch for Alwyn's music has been carried by the Lyrita label - where else? - with, to my knowledge, eight LPs issued including, importantly, all five symphonies. Now it's the turn of Chandos and the

ubiquitous and indefatigable Richard Hickox; this is a very auspicious start to what I believe is a projected series. The works here represent a good introduction to Alwyn at his most colourful and beguiling and it is especially heartening to welcome the Pastoral Fantasia on to record with Stephen Tees a richly expressive soloist.

The sound is suitably lush and full, with a pleasantly rounded string sound. Some of the balancing between soloists and orchestra struck me as exaggerated but the effect is softened by the sheer scale of the sound picture. All-in-all, a very promising start to a series which, while not replacing those superlative Lyrita recordings, should nicely complement them.



LUDWIG VAN BEETHOVEN
Piano Sonatas No 16 in G Major Op 31 I No 1; No 17 in D minor Op 31 No 2 'Tempest'; No 18 in E flat Major Op 31 No 3

Melvyn Tan, fortepiano
 EMI REFLEXE CDC 7 54337 2 (DDD/70.12)

● This is an interesting triptych of works from the canon of Beethoven's piano music, principally because they were composed in the immediate aftermath of what was an especially troubled time in an angst-ridden life. 1802 was both a year of crisis for Beethoven and a turning point. It was the period of the heart-rending Heiligenstadt Testament - what amounted to a suicide note - and the subsequent, self-professed (at least, according to Czemy) 'new start'.

If Beethoven did consciously attempt a fresh start to his career, then the Eroica symphony was surely its first manifestation. But more than a foretaste of that revolutionary dramatic style is to be heard in the D minor sonata published in 1803. Where the G Major sonata, for all its lively charm, speaks with an Eighteenth century voice and not an especially original one, the D minor is 'authentic', idiosyncratic, unmistakable Beethoven. The former is comfortable in the past; the latter plunges into the future. When asked about the 'meaning' of the D minor

sonata, Beethoven's terse reply was: "Read Shakespeare's *Tempest*" and, inevitably, the nickname 'Tempest' has attached itself to the work.

I enjoyed Tan's performance of the D minor. He has something to say about the music and articulates it cleanly and precisely. He judges the tempos well, refusing to be hurried and playing the adagio quite beautifully. The haunting, hypnotic *moto perpetuo* of the allegretto finale is equally effective.

The E flat sonata Op 31/3 has little of the dramatic power and underlying tension that colours its predecessor, though it is a tautly-argued work whose exuberant scherzo could also be interpreted as a sign of that 'new start'. The bustling, frolicsome finale, with its unashamedly *gauche* main theme, is again so characteristic of Beethoven, and is played with a satisfying mix of precision and high spirits.

It is a measure of Melvyn Tan's playing throughout this recording that he invests these sonatas with a fresh interest and is able to highlight facets of the scores in a way that transcends mere authenticity. This is not period performance for its own sake; the use of the fortepiano - by Derek Adlam, after an 1815 Viennese instrument by Anton Walter - naturally contributes to the character of these performances but is not the dominant reason for acquiring them.

Many performers play Beethoven; only a few not only play Beethoven but have something to say about him. Increasingly, I feel Melvyn Tan belongs to that elite band.

The sound for this generously-timed recital was engineered by Sean Lewis in St George's, Brandon, Bristol and is exemplary in terms of presence, tone and detail. Recordings of the fortepiano have come a long way since those early clattery efforts!

FELIX MENDELSSOHN
Symphony No 2 in B flat Major Op 52 'Lobgesang' ('Hymn of Praise')

Cynthia Haymon, Alison Hagle, sopranos; Peter Straka, tenor; Philharmonia Chorus (Chorus Master, Simon Halsey); Leslie Pearson, organ; The Philharmonia; conductor, Walter Weller
 CHANDOS CHAN8995 (72.57)

● In 1840, Germany celebrated the four-hundredth anniversary of the invention of movable type by Johannes Gutenberg. Though there were appropriate events in Gutenberg's home city of Mainz, the principal centre for the festivities was Leipzig, whose first-class symphony orchestra, the Gewandhaus Orchestra, was under the direction of the thirty-one-year-old Felix Mendelssohn.

For the occasion Mendelssohn composed what he described as a



'symphony cantata', a work whose form - three orchestral movements preceding a choral finale - self-evidently owed much to Beethoven's Ninth Symphony but whose content was quite different from the humanistic urgings of Schiller's 'Ode to Joy'. Beethoven's brotherly love was replaced by love of God. Even in its instrumental movements, the Hymn of Praise assumes a strongly sacred character: the sweet cantabile of the third movement is actually marked *adagio religioso*. A chorale-like theme on the winds graces the second movement and the motto theme of the first has clear plainsong affinities.

The first British performance of the work took place in September 1840, after which Mendelssohn extensively revised the score, making many changes to both the scoring and the dynamics. The revised version was premiered in Leipzig on December 3, 1840, and published the following year.

If Mendelssohn was dissatisfied with elements of the work, then for the ensuing century-and-a-half so have the critics. It is flawed in its conception, but magnificently so and it is easy to hear why the work became a favourite of amateur choral societies throughout Victorian England. Unfortunately that association immediately suggests something gloomily lugubrious and cloyingly sentimental and that the Hymn of Praise is not. It does, though, require sympathetic handling to be persuasive and that is what the work receives at the hands of the Austrian conductor, Walter Weller. With first-rate choral singing and orchestral playing from the Philharmonia forces, Weller builds a performance of great nobility and grandeur, but not at the expense of momentum.

Approach this interpretation without preconceptions and I'll wager you will be surprised at just how fresh and vibrant Mendelssohn's inspiration can be. The impact is aided in no small measure, I should add, by Chandos's glorious recording, made in the superb acoustic of St Jude's Church in North London. How it allows the choral sound to effortlessly expand into the acoustic space, and how clear it remains throughout. The perspectives are convincing, and the sound picture most satisfyingly balanced, including the three uniformly excellent vocal soloists. At last a modern recording that does justice to this most neglected of Mendelssohn's symphonies.

CARL MARIA VON WEBER
Piano Sonata No1 in C Major
Op24/Piano Sonata No2 in A
flat Major Op39
 Martin Jones, piano
PIANISSIMO PP20792 (DDD/57.59)



● A second recording from the new Pianissimo label, or - to be accurate - a reissue since this tape engineered by Bob Auger in the concert hall of the University of Wales in Cardiff in 1982 first saw the light of day on the Oriana label. It remains, though, a first-rate piano sound.

As with the Chabrier last month, it is further rarities from the piano repertoire which receive welcome exposure, in this case two of the four sonatas composed by Carl Maria von Weber. Weber's career paralleled an important period in the development of the piano itself, from the five-octave instrument known to Mozart to the six-and-a-half octaves available late in his career to Beethoven. And history records that Weber himself was a player of formidable power and technique. There is certainly much in these first two sonatas to tax the performer but Martin Jones copes with the demands fluently and confidently

and successfully overcomes the interpretative problems posed by Weber's scores. His playing of the quicksilver rondo finale of the Op24 sonata is breathtaking and it is easy to see why this bravura piece attracted arrangements by both Brahms and Tchaikovsky.

Both sonatas are strongly individual in character, Weber exploring both form, texture and sonority in the quest to express his ideas. The second is the finer of the two, with its deeply pensive andante and finely-wrought opening allegro and, in the dashing presto assai of the menuetto capriccioso, Martin Jones again shows his virtuosity. Clearly, on the evidence of this recording, Weber's piano music rewards exploration. I for one would relish the chance to hear the other two sonatas; perhaps Pianissimo, dedicated as it is to broadening the piano discography, will oblige.

RECORD OF THE MONTH

There are those who still maintain that Nineteenth century music should be off-limits as far as period instrument performance is concerned. I met one at a concert the other week - of Bach, Telemann and Handel, for God's sake! - who complained at length about the scratchy violins, the squeaky woodwinds and the squealing trumpets. In truth, the sounds being produced by this particular period instrument ensemble were not quite as euphonious as they might have been. In general, though, despite the inescapable tuning difficulties, period performances these days are every bit as polished as those of conventional modern-instrument ensembles.

As for letting the gut strings and valveless trumpets loose on the Romantic repertoire, in my experience the gains have more than outweighed the losses. And several of the recordings I would cite to support that argument are the work of Roger Norrington and his London Classical Players on EMI's Reflexe label: the Beethoven Pastoral Symphony was revelatory, as was their Berlioz *Symphonie Fantastique* (the first occasion, frankly, that I've fully enjoyed and appreciated the work). More recently there have been the Mendelssohn *Scottish* and *Italian* Symphonies, the Brahms *First* Symphony - a real challenge to preconceived ideas - and a selection of Rossini overtures.

Now it's the turn of Schubert, and two symphonies where the well-rounded figure of Rossini figures quite largely.

FRANZ SCHUBERT
Symphony No4 in C Minor
D417 'Tragic'/Symphony No6
in C Major D589

The London Classical Players; conductor, Roger Norrington
EMI REFLEXE CDC 7 542102 (DDD/60.23)

Schubert's first six symphonies, in the main, are carefree, sunny works, orthodox in structure and bubbling with melody and high spirits. Echoes of Rossini, who was enjoying quite an impact on Viennese musical life at the time, are everywhere, even in the



Fourth Symphony to which - for reasons known only to himself - Schubert gave the title 'Tragic'. If this work does have its dark clouds, it is only in the opening movement and then hardly the gathering storm of Beethoven's Fifth with which the symphony shares the key of C minor. Thereafter, the Fourth is full of the lyricism and sparkle that is Schubert at his most unfettered.

Like the Fourth, the Sixth Symphony of 1817-18 would have been intended for performance by amateur or semi-professional orchestras and, again, the sheer joy of music-making overrides any grandly meaningful gestures. Robert Schumann once compared listening to Schubert's music to a walk through

beautiful countryside and, listening to these symphonies (and it must be added, the even finer Third and Fifth), it is easy to hear what he meant.

Yet, as with so much of Schubert's music, neither of these symphonies was published during his lifetime; indeed, it took more than fifty years for these scores to become publicly available. The composer never heard the Sixth performed at all.

While Norrington's interpretations of the Fourth and Sixth are not particularly revelatory in the sense that the Berlioz was (it isn't that kind of music), they nevertheless capture the spirit of the symphonies in the most agreeable way. Tempos are suitably brisk and buoyant; the touch light, recognizing the true character of the music, rather than the character that 'serious' music has sought to place upon it. The playing, too, has an authentic style and sparkle, with not a scratchy violin or squeaky woodwind to be heard. The woodwind playing here is something to savour, thanks to the transparent textures available from the size of orchestra appropriate to these works.

There must be praise, too, for the recording, engineered in Studio One at Abbey Road by Mike Clements. This too has a refreshing openness and translucency that allows the detail of the scores to shine out, but in the most natural way. The combination of weight, clarity and lively presence strikes me as exactly right both for the music and the style of performance.

Certainly, early Schubert (allowing that anything you do can be classed as 'late' when death comes at the age of just thirty-one) can only benefit from the attentions of the authenticists. It is going to be interesting, though, to discover what Norrington makes of the 'Unfinished' and the 'Great C Major'.

DARIUS MILHAUD
Sonata for violin and
harpichord Op257
SAMUEL ADLER
Sonata No2 for violin and
harpichord
EDMUND RUBBRA
Fantasy on a theme of
Machaut for flute,
harpichord and string
quartet/Cantata Pastorale
for tenor solo, flute, cello
and harpichord Op62
WALTER PISTON
Sonatina for violin and
harpichord
BOHUSLAV MARTINU
Promenades for violin, flute
and harpichord
ANTONIN DVORAK
Bagatelles for string trio and
harmonium Op47
 Charles Castleman, violin; Bonita Boyd, flute; Barbara Harbach, harpichord; Julie Gigante, violin; Virginia Lenz, viola; Pamela Frame, cello; Tony Boute, tenor
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● I am not usually enthusiastic about this kind of musical pot-pourri which, superficially, sets out to showcase the talents of the performers and pays only secondary attention to the real value of the works being performed. This particular collection, however, is a distinguished exception. True, it does display to the full the dazzling talents of the instrumentalists taking part. But more importantly and valuably, it contains a variety of quite fascinating music, most of it new to me and well deserved of the 'worthwhile discovery' accolade. There is constant pleasure both from the wide range of styles to be enjoyed here and from the unusual and colourful instrumental combinations.

The only pieces I had heard before were Dvorak's Bagatelles and even these have a distinctive character. He composed them in 1878 purely as 'hausmusik' for the enjoyment of friends and the only keyboard instrument available to them was the harmonium. Combined with a string trio, it produces a wonderfully warm, rustic quality, full of easy charm. Although these pieces may not number among Dvorak's major compositions, the melodies are unfailingly from the top-drawer,

engaging and infectious. The opening melody of the first Bagatelle could only be Czech and could only be Dvorak.

The other works here are all twentieth-century and include two fine compositions by the Northampton-born Edmund Rubbra. The Cantata Pastorale of 1956 sets two anonymous medieval texts and one by Plato in a poignant pastoral idyll. The music is lush, rapturous and Eastern in flavour (a product, perhaps, of Rubbra's time under the tutelage of Gustav Holst). The Fantasia on a theme by the fourteenth century French composer Guillaume de Machaut also dates from the mid-Fifties and proves a noble work, wholly and effectively in the style of the Renaissance fantasia.

In sharp contrast, the Milhaud is an unashamedly sensuous synthesis of all those American influences which so affected the composer: jazz, blues and dance rhythms. The neoclassicism of Stravinsky is the clear model for Walter Piston's Sonatina of 1945, here recorded in the composer's preferred arrangement for violin and harpichord. Martinu's Promenades date from seven years earlier. Outwardly, they are deceptively jaunty pieces, with their spiky rhythms and cheeky tunes, but the adagio speaks eloquently of bitterness and regret. That same year, 1938, Martinu had seen his Czech homeland conquered by the Nazis and probably surmised that his adopted France would soon follow.

As you may have gathered, it is an interesting programme and a generous one. Vividly recorded (an analogue taping from 1983) and enthusiastically played, this is a feast for those who enjoy making a musical discovery or two.

MUSIC FROM THE TIME OF COLUMBUS

Catherine Bott, soprano; New London Consort; director, Philip Pickett
LINN RECORDS CKD007 (DDD/56.48)

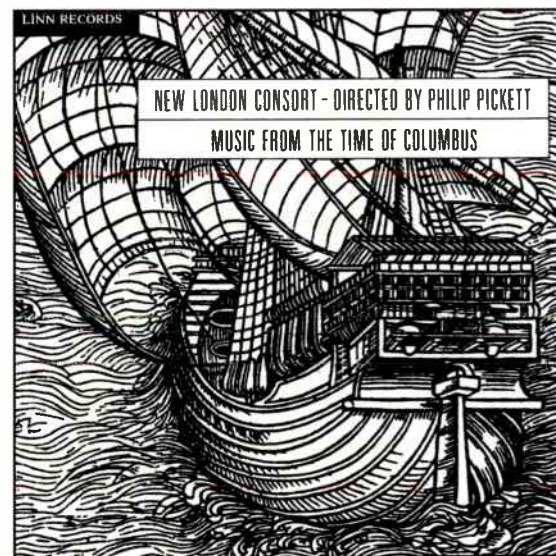
● Regardless of the topicality of its appearance, this is one of the finest and most enjoyable recordings of early Renaissance music I've encountered for some time. Philip Pickett has had a long and distinguished association with the performance of early music both in Britain and elsewhere and in his seven colleagues the New London Consort has some of the finest exponents of the repertoire of the Fifteenth and Sixteenth centuries. That comes over clearly from the instrumental pieces included among the nineteen recorded here.

But the dominant reason for adding this to your collection has to be the constant delight of the voice of Catherine Bott. How imaginatively and sensitively she characterizes these pieces: compare the tongue-in-cheek wit of Perdi la mi rueca, for example, with the sensuous lament of Ay triste que vengo. And how vibrantly alive the songs of five centuries ago become. If you ever believed music from this

period to be the stuff of dusty libraries, hear the vivacious conclusion to this recital, Dale si le das, which has both Catherine Bott and her instrumental colleagues having a whale of a time!

As his sources for this collection, Philip Pickett has turned to the two most important volumes of Spanish music from the time of Columbus (or, more accurately, his patrons, Ferdinand and Isabella), the Palace Songbook and the Cancionero Musical della Biblioteca Colombina, a volume of music discovered in the library of the bibliophile, Fernando Colon, who just happened to be the illegitimate son of Christopher Columbus. The mix of elegant stately courtly dance and the vigorous earthy humour and high spirits of folksong reflects the declining Moorish influence in Spain at the time and the impact of the artistic traditions of Flanders and Italy. It also produced the most colourful of music, the villancicos.

Both voice and the instrumental combinations of vihuela, guitar, harp, fiddle, rebec, viols, recorder and percussion are beautifully caught in Philip Hobbs' recording from the Temple Church in London. There is an almost tangible presence and the balance and impact of the sound is perfectly judged to my taste. Well done Linn Records for producing what, for me, I'm sure will be the most enduring souvenir of this year of Columbus.



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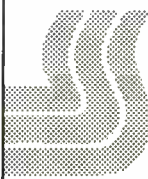


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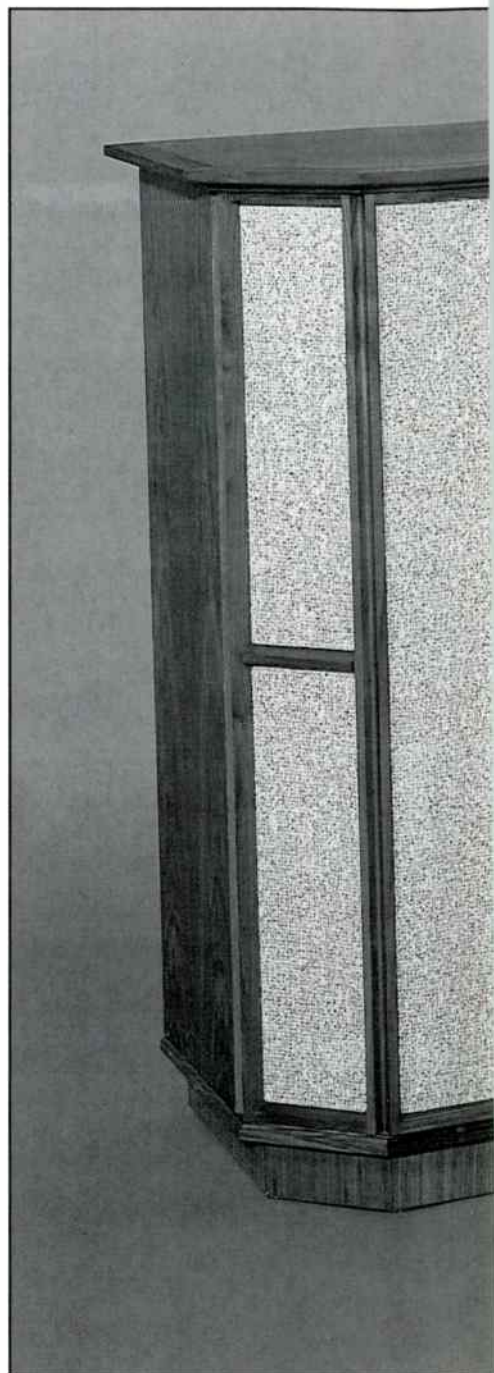
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HI-FI WORLD OCTOBER 1992

MUSICAL FIDELITY COMPETITION WINNER

The response to the P170/P200 amplifier competition was enormous: our editorial files brimmed over with entry forms. The meteorological tie-breaker meant that the office was filled with a few mumbled chants of "Tornado-Cyclone-Cirrus-Thunder-Hurricane" as we searched for a winner. We even had an effect on the weather, with a spectacular thunderstorm or two as the closing date approached.

There were a surprising number of piscatorial references, such as the Fish power amplifier with CHIPS power supply. In addition there were Tuna tuners, John Kestley Signature amplifiers, Kipper Tie interconnect cables and even the occasional curious reference to knitted

tank-tops and bad-taste sweaters.

We particularly liked R. Dunmore's 'Scorcher' Class A amplifier and heavyweight 'Depression' power amplifier, so called because of the depression it makes in the floorboards. Also of note was the entry by John Moorcroft, of Birmingham. He must have heard of Anthony Michaelson's love of Maserati cars as he suggested the M.F. Bora preamplifier and Khamsin power amplifier.

Finally, however, the editorial weathercock settled on the 'Forecast' Digital to Analogue Converter and 'Richter' loudspeakers, as suggested by Giles Parker of North London. Our congratulations to Mr. Parker and our thanks to all those that entered.



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COMPACT DISC PLAYERS

SONY CDP-497	£160	Superb starter CD. Packed with facilities.	Aug 92
DENON DCD-580	£180	Advanced Interpolative 20-bit based player. Rather 'grunty' and rough-edged, but with a good sense of rhythm and fun.	Dec 91
TECHNICS SL-PG500	£200	MASH player. Simply one of the finest CD players on the market, packed with life and detail. Astonishing value.	Aug 92
MISSION DAD5	£300	Bitstream based player. Very even handed, with forceful bass. Some lack of spaciousness.	May 92
PIONEER PD-8700	£300	Single-bit player, with 'stable-platter' CD turntable. Fast and pacy, with good dynamic range.	Dec 91
ROTEL RCD-965BX	£300	Bitstream based player. Calm, open and sophisticated performer.	Oct 91
PIONEER PD-9700	£400	Advance on the PD-8700 listed above. Very smooth and sophisticated sound, tonally even. Well built.	May 92
ARCAM ALPHA	£420	Offers a warm, full-bodied sound with a big, rich bass.	May 91
CREEK CD60	£500	16-bit player. Excellent rhythmic properties and a superb bass performance.	Apr 92
CARY CAD-855	£900	16-bit Rotel player, with Cary-designed valve output stage. Packed with ambience and musicality.	Feb 92
MARANTZ CD-94 II	£900	16-bit player. Superbly built, with deep bass and extremely full instrumental colour.	Feb 92
SONY CDP-X77ES	£1000	Low-bit player. Very clean, smooth and analytical. Well built, but lacks enthusiasm.	Feb 92
MICROMEGA SOLO	£1350	Philips Bitstream chipset, with distinctive transport mechanism. Very light and musical, but with a deep, well controlled bass.	May 92
NAIM CDI	£1598	Single box, 16-bit player. Close to the two box CDS, very disc dependent, has vital tingle factor.	Apr 92
TEAC X-1	£2300	Superb 20-bit player. Convincing, idiosyncratic and characterful. Has plenty of flair.	Jun 92
NAIM CDS	£2937	Two box, sixteen bit player. De rigeur for Naim-based systems. Musically informative, has both punch and delicacy.	Sep 91

COMPACT DISC TRANSPORTS

ARCAM DELTA 170.3	£650	Smooth. Draws the listener into the performance. Improves on all the strengths of the 170.	Jul 92
TEAC P-500	£650	Can be too restrained for some tastes, but subtle and highly detailed.	Feb 92
MERIDIAN 602	£1500	Well built, near silent in operation. Strong sound, but tends to blandness with the wrong DAC. Matches 606 DAC.	Mar 91
MICROMEGA DUO	£1745	CD-ROM based transport. Defines refinement and air, but without sacrificing impact.	Nov 91

DIGITAL TO ANALOGUE CONVERTERS

QED DIGIT	£125	Based on Philips Bitstream. Excellent value, with no rough edges. Co-axial input for CD only.	May 92
MICROMEGA MICRODAC	£299	Philips Bitstream-based. Typical Micromega sound, very musical and refined, lacks the cutting edge of detail.	Mar 92
MISSION DAC 5	£299	DAC7 based. Clean, forward mid-range, capable of portraying real subtleties. Bass lacks firmness.	Jul 92
ARCAM BLACK BOX 3	£360	Fine sounding DAC. Now looking a bit tired against stiff opposition.	May 91
AUDIO ALCHEMY DIGITAL DECODING ENGINE	£376	Tiny Philips Bitstream-based DAC. Very broad and smooth presentation.	Feb 92
SUGDEN SDA-1	£650	16-bit Philips based. A wide open window for the transport to flow through. Very neutral.	Jun 92
AUDIOLAB 8000DAC	£695	Philips Bitstream-based. Well built and flexible. Typical Audiolab sound, very silent and neutral.	Jan 92
MERIDIAN 606	£1221	New DAC7 version. Rather laid back, but also easy going and possessed of a very natural sound.	Jan 92

TURNTABLES

SYSTEMDEK IIX-900 (NO ARM)	£190	Suspended-chassis turntable, easy to set up. Surprisingly natural sound, if not as detailed as some. Suits Rega, Moth and Helius arms.	Aug 91
PROJECT 2	£245	Czech built turntable with much to offer above the Systemdeks and Regas. Very coherent.	May 92
REGA PLANAR 3	£250	Built to last. Transparent and lucid, although can sound bass light. Sets the standard to beat.	Aug 91
THORENS TD166/VI/UK	£270	Fitted with Rega RB 250 arm. Good basic deck, with tweakability.	Jun 92
MICHELL MYCRO	£397	(with RB300 arm, £539) Falling between the Synco and the Gyrodec, the Mycro has superb mid-band clarity and poise.	Apr 92
PINK TRIANGLE	£449	Neutral sounding turntable with excellent soundstaging and decent bass. Best with a Linn, Rega or Roksan arm.	May 91
LITTLE PINK THING		Improved GTi version also available.	Nov 91
ROKSAN RADIUS	£550	(with arm) Isn't tripped up by unsettling music, the Radius acts a good mid-price turntable.	Nov 91
THORENS TD-3001BC	£650	Arm-less Thorens, good match for Rega RB-300 or Naim ARO. Easy to use turntable that gets very close to the Linn LP12.	Apr 91
PINK TRIANGLE EXPORT	£676	Terrific soundstaging properties, good bass and a neutral performance that considerably improves upon the LPT.	Jun 91
VOYD VALDI	£699	Similar to the Pink Triangle, the two-motor Valdi is an expressive performer, best suited to Audio Innovations equipment.	Jul 91
ROKSAN XERXES	£785	Highly analytical and exciting turntable. Can be almost CD-like in its presentation.	May 92
PT ANNIVERSARY	£1200	Very neutral turntable, but with a lot of magic. Excellent imagery and detail. A natural partner to the SME V.	Sep 91/May 92

TO NEARMS

MØRCH DP-6	£665	'Unipivot plus' tonearm. Plays music with a silken and rich quality. Perfect match for the Da Capo cartridge.	Jul 92
SME SERIES IV	£828	Scaled down version of the legendary SME Series V. A precision measuring instrument only bettered by the V.	Mar 92
SME SERIES V	£1232	A masterpiece of precision engineering, with a confident sound.	Sep 91/May 92

CARTRIDGES

GOLDRING 1012	£45	Excellent value. Well balanced performer, rich and full without warmth. Very spacious and clear.	Apr 91
ORTOFON MC15	£100	Moving coil cartridge at moving magnet price. Has a tight grip on rhythm.	Jun 92
ROKSAN CORUS BLACK	£110	Moving magnet cartridge, based on Goldring design. Exciting and detailed, with great speed.	Sep 91/May 92
SHURE V5T-V	£150	One of the finest moving magnets currently available. Excellent tracker.	Jul 92
GOLDRING ELITE	£200	British made moving coil. Good value, smooth and detailed, but can sound a trifle brittle at times.	Apr 92
GOLDRING EXCEL	£499	British made high-end m-c. Refined and lyrical presentation, slightly dull at times.	Oct 91
LYRA LYDIAN	£500	Scan-Tech designed moving coil cartridge. Magical sound, even better nude!	Aug 92
MØRCH DA CAPO	£500	Scan-Tech designed moving coil cartridge. Musical and accurate, without any flaw.	Feb 92/May 92
AUDIONOTE IO	£1295	Very low output cartridge, with high silver content. Needs step-up transformer. Very musical, can show up how poor most cartridges are.	Nov 91

CASSETTE RECORDERS

TECHNICS RS-BX404	£130	Terrific value and good sound for the money.	Sep 91
TECHNICS RS-BX606	£170	Three head deck. Superb value, capable of seeing off much more expensive machines.	Nov 91
SONY TC-K570	£200	Three head deck. Difficult to tune tapes, but prerecorded tapes reproduce with clarity; excels with premium tapes.	Feb 92
SONY TC-K677ES	£240	One of the first low-cost three head decks. Can be grainy and slightly bright, but makes for stable recordings and playback.	Sep 91
JVC TD-V541	£280	Three head deck. Good for both recording and playback, especially of prerecorded tapes. Easy to use.	Dec 91
DENON DRS-810	£300	Drawer loading cassette - just like CD. Sweet sounding, but a bit expensive.	Jan 92
NAKAMICHI CASSETTE DECK 2	£350	Makes fine recordings with metal tape. Excellent with pre recorded tapes. One of the finest two head machines about.	Mar 91
CASSETTE DECK 1.5	£500	Scaled down version of the Cassette Deck 1, without rivals at the price.	Jan 92
CASSETTE DECK 1	£600	In the light of the 1.5, this fails to be such good value, but still a sound three head deck.	Apr 91
PIONEER D-500	£600	Very smooth sounding DAT deck, but still slightly coarser than the original source.	Apr 92
TEAC V8000S	£699	Dolby 'S' deck. Easy to use. Very stable sound, with instrumental textures close to perfect.	Jun 92
ARCAM DELTA 100	£850	Dolby 'S' deck. Excellent sound quality, close to the original source. The best Dolby 'S' deck around.	Apr 92
NAKAMICHI CR-7	£1500	No 'S', but auto tape tuning that copes with anything. Probably the best analogue recorded sound available.	Aug 92

TUNERS

DENON TU-260L	£110	Excellent budget AM/FM tuner. Easy to operate, good all-rounder with a fine sound.	Mar 92
NAD 4225	£160	Warm sounding, but detailed budget AM/FM tuner. AM poor, looks dated.	Jun 92
AURA TU-50	£230	Superb FM-only tuner. Produces a delightful, three-dimensional sound. A cracker	May 92
YAMAHA TX-950	£260	Fine all-rounder, with a good AM section.	Jul 92
KENWOOD KT-7020	£270	Silky smooth sound, but very insensitive and needs a good aerial.	Feb 92
MUSICAL FIDELITY TI Mk II	£270	Sweet, delightful FM performance. Distinctive sound, lags behind on insight and can be too warm.	Oct 92
ARCAM DELTA 80	£340	AM/FM analogue tuner. Realistic sound quality, but slightly insensitive.	Jan 92
NAIM NAT-02	£853	Little box, big money, dead good. Try and find better unless it's a . . .	May 91
NAIM NAT-01	£1377	The best tuner currently available. All else is mere artifice. If you want better radio reception, go and live in the BBC's studio.	Mar 92

INTEGRATED AMPLIFIERS

NAD 3020i	£150	Budget classic, although its crown has slipped a bit of late. Typical warm NAD sound.	Aug 91
HARMAN-KARDON HK6150	£159	Good sounding starter amplifier. Great dynamic range. Excellent bass.	Jun 92
DENON PMA-350	£170	Packs a lot of punch for the money. Phono stage lags behind the line inputs.	Mar 91
PIONEER A300	£180	Slimmed down A-400. Poor phono stage, bit brash, but exciting and glossy.	Apr 91
SUGDEN A25B	£203	Surprisingly warm and well rounded for the price. Worth seeking out.	Dec 91
ARCAM ALPHA 3	£200	Lean and lively, with an astonishing amount of detail. Excellent line stages.	Oct 91

MISSION CYRUS ONE	£200	An excellent all-round performer. Equally good on disc or line stages.	Mar 91
CREEK CAS 4140 S2	£230	Bit soft and rounded, but with a pleasant character. Easy on the ear.	Nov 91
PIONEER A-400	£240	The amplifier that shook up the UK hi-fi industry. Very hi-fi sounding, but can sound good with high-end equipment.	Nov 91
AURA EVOLUTION VA-100	£270	Full of refinement, although not the best measuring amplifier around.	Jul 92
ION OBELISK 100	£299	Plenty of detail and ambience. Good imagery but not the warmest sound.	May 92
MISSION CYRUS 2	£380	Best with PSX power supply (£300). More powerful, dynamic and well balanced than almost any of its price rivals.	May 92
AUDIOLAB 8000A	£430	Very neutral and superbly built. Good bass, great imagery, but can be sterile.	Apr 92
SUGDEN A48B	£460	Gentle performer, but never masks the music with warmth. Tonally very even.	Apr 92
AMC CVT-3030	£500	Valve hybrid amplifier. Has valve and transistor virtues in a reasonably priced package.	Aug 92
AUDIO INNOVS. SERIES 500	£990	Sweet sounding valve design. Good looking, but a little system dependent.	Jun 91
AUDIONOTE OTO	£1250	12w valve amplifier. More in tune with music than hi-fi. Superb dynamic range.	May 92
TUBE TECHNOLOGY UNISYS	£1299	Superbly built chrome valve amplifier. Pacey and musical.	Aug 92
COPLAND CTA-401	£1495	Solidly built Swedish valve amplifier. Very refined and unfatiguing sound.	Feb 92

PREAMPLIFIERS

NAD 1000	£180	Wonderful value. Relaxed, smooth and easy on the ear. Best with 2100 power amps.	Jun 91
QUAD 34	£336	Civilised, smooth and unintrusive. Not especially transparent, but relaxing and built to last. Clever tone controls.	Jun 91
AUDIO INNOVS. SERIES 200	£349	Valve preamplifier. Good value, rather colored but very dynamic. Best with Innovations equipment.	May 92
AUDIOLAB 8000C	£375	Superbly made solid state pre, without flaw. Clean sounding, if a touch sterile. Excellent all-rounder.	Jun 91
CROFT SUPER MICRO A	£649	Valve preamp. Great mid-band. Good soundstaging properties, a bit warm & euphonic.	Oct 91
MICHELL ARGO+ISO	£687/£393	(+£155 for optional Hera PSU) Pure detail, incisiveness and the beauty of the highest of high end, at a median price, especially with the Hera power supplies. Line-level only, hence an Iso required for vinyl replay.	Oct 91/Jul 92
CONCORDANT EXCELSIOR	£900	Valve preamplifier with MM phono + 2 line stages. Magical and realistic sound quality, deep soundstage. Superb for recordings.	Dec 91
JOHN SHEARNE PHASE ONE	£1099	Attractive preamplifier with matching power amplifier. valve-like lucidity and sweetness. Suits neutral equipment.	Aug 91
ALCHEMIST FREYA	£1150	Line level preamplifier, with distinctive styling. Detailed and commanding sounding, may sound too bright in some systems.	Oct 91
LINN KAIRN	£1295	Remote control preamplifier. Flexible, but can sound too forward. Best suited to Linn equipment.	Aug 91
FINESTRA	£1399	Very transparent op-amp based pre, which features absolute phase integrity in design to produce superb imagery.	Feb 92
E.A.R. G88	£5246	Exceptionally solidly built valve pre, with a 'bolted down' sound to match. Can sound awesome.	Nov 91

POWER AMPLIFIERS

NAD 2100	£290	Matches 1000 pre above. Powerful (150 watts), yet relaxing sound with big bass. Easy to bridge by adding another 2100.	Jun 91
QUAD 306	£395	50 watt stereo solid state amplifier, well suited to the ESL-63 loudspeakers. Beautifully built, smooth sound, but can lack bass and transparency.	Jun 91
CONCORDANT EXULTANT	£500	Modified Quad II mono amplifiers. Colder sounding than the original. Good value. Good match with Excelsior preamp.	Jan 92
AUDIOLAB 8000P	£545	Powerful solid state stereo power amplifier. Clean, natural sound with a slick styling to match. Very well made.	Jun 91
CROFT SERIES 5	£548	Stereo 25 watt valve amplifier. Can be bridged. Rich, warm sounding. Good with ProAc loudspeakers.	Oct 91
QUAD 606	£570	100 watt stereo solid state amp. Very smooth and civilised. Similar to 306, but with more power and deeper bass.	Jun 91
LECTERN	£699	50watt solid state power amplifier, designed to match the Finestra. Superbly transparent.	Feb 92
MF P180/CRPS	£799/£499	Stonky power amplifiers. Powerful and refined, especially with CRPS supply.	May 91/Jul 91
JOHN SHEARNE PHASE ONE	£1199	Matching power amplifier to Phase One preamp above. Attractive finish, sweet sound.	Aug 91
AUDIOLAB 8000M	£1190	150 watt solid state monoblocks. Typical Audiolab look, build and sound; crisp and clear but can also be clinical.	Sep 91
ART AUDIO TEMPO	£1398	20 watt triode monoblocks. Attractive looking, vibrant sounding, ambient and subtle.	Dec 91
ALCHEMIST GENESIS	£1400	100 watt valve monoblocks. Powerful sound. Very cable dependent but with plenty of dynamic range.	Oct 91
AUDIO INNOVS. SERIES 1000	£1499	50 watt valve monoblocks. Great looks, powerful sound. Shows just how loud fifty watts are!	May 92
ART AUDIO MAESTRO	£1927	Pentode/Triode switchable valve monoblocks. Beautiful looking, sweet and involving.	Jun 91
E.A.R. 549	£4372	Massive 200watt valve monoblocks, designed for studio use. Awesome sound can be too intense for some, but can produce uncanny solidity of images.	Nov 91
MUSICAL FIDELITY SA-470	£6000	Massive powerhouse that appears to have no limits whatsoever (unlike those who try to lift it).	Jun 91

LOUDSPEAKERS

GOODMANS MAXIM 3	£110	Excellent budget small box. Forward sound, without undue box coloration.	May 92
MISSION 761i	£169	Not a perfect loudspeaker, but is full of bass and a lot of fun and entertainment for the money.	Feb 92
MISSION 780	£180	Not without flaws, but the accent is on the music. Good small design.	Sep 91
B&W DM610	£200	Very competent and musical. Loads of life and energy.	Sep 91
ROGERS LS2a2	£209	So far the most correct loudspeaker we have discovered at the price. Sweet and even-natured. A bargain.	May 92
HEYBROOK HB1 Mk III	£249	Powerful, efficient loudspeakers. Loads of welly, loads of bass, but somewhat unrefined.	Apr 91
TANNOY 609	£250	Cheapest Dual Concentric loudspeaker in the range. Fast and fun, but occasionally a bit unsubtle.	Jan 92
NAD 8100	£300	Fine floorstanding loudspeaker that goes deep and loud. Terrific sense of fun.	Aug 91
EPOS ES11	£330	Two way reflex loudspeaker with a civilised but giant-killing sound quality. Excellent imagery.	Apr 91/Jan 92
TRIANGLE COMETE	£375	Highly efficient small box loudspeaker with a superb mid-band. Great for valve amplification.	Apr 92
WILMSLOW FOCCUS	£400	Kit loudspeaker, based around DynAudio drivers. Very transparent and detailed for the price.	Feb 92
KEF 101/2	£495	The baby of the KEF Reference range. Very system dependent.	May 91
CELESTION 100	£499	Two way box, with metal dome tweeter. Need powerful amplifier and careful positioning, but has insight and good tonal accuracy.	Dec 91
NEAT PETITE	£525	Baby two-way. Tight, fast, great stereo and good dynamics. Few little boxes come close.	Aug 91
PENTACHORD	£534	(£1059 with subwoofer) Finished in real wood, these Bandor-based units are superbly transparent. With the sub-woofer, they go deep too.	May 91
PROAC STUDIO I MK II	£612	Two-way reflex loudspeaker. Easy to listen to and well-balanced, although somewhat colored.	Aug 91/Jan 92
KEF Q90	£649	Uni-Q design with ABR. Efficient, dynamic and capable of going very loud indeed.	Jan 92
REL STADIUM SUBWOOFER	£695	Mono, self-powered subwoofer that works! Very flat frequency response.	Jun 92
B&W MATRIX 805	£795	High quality small monitor loudspeaker. Detailed and fast and capable of playing very loud. Used at Abbey Road.	Jan 90
AUDIOPLAN KONTRAPUNKT	£799	Small box loudspeaker. Very smooth and sophisticated sound, great with a valve amplifier.	Apr 92/May 92
AUDIO NOTE AN-J	£799	(£999 for silver wired version) High efficiency loudspeakers using paper cones. Good soundstaging with a very convincing, natural sound. Derivative of Snell design.	Jun 91
HEYBROOK SEXTET	£899	Revealing, lucid floorstandings. Not smooth, but tight and fast-paced. Need careful partnering.	Oct 91/Feb 92
PROAC RESPONSE ONE 'S'	£918	Excellent small box design. Can convey the spirit, drive and passion in music in a small room.	Jul 92
KEF 103/4	£995	Capable of showing up every detail and defect in hi-fi or rording, the 103/4s image well and go very loud indeed.	Oct 91
MAGNEPLANAR MG1.4	£1190	Electro-magnetic planar design. Needs long room. Can create an open, relaxed and easy musical performance. Lacks detail.	May 91
APOGEE CENTAUR MINOR	£1200	Hybrid ribbon design. Great imaging and detail, good value for panel fans.	Jul 92
ATC SCM-20	£1388	True monitor loudspeaker. Requires powerful, high quality amplifier but virtually indestructible and full of high speed insight. Could be too intense for some listeners.	Jan 91
CELESTION 700SE	£1399	Small box, carved from Aerolam. Excellent imagery, transparency and detail. Needs power and careful positioning.	Mar 92
TDL STUDIO 4	£1499	Need a large room, but can move a lot of air. Best with organ music, the 4's can sound impressive, awesome and frightening.	Jul 91
DYNAUDIO CONTOUR I.8	£1589	Floorstanding two way ABR design. Highly detailed, studio monitor sound. Need a big power amplifier.	May 92
PENTACOLUMN	£1795	Active floorstanding loudspeaker using Bandor metal drivers. Best with valve amplification on treble. Stunning imagery, excellent detail. Speakers that excel at everything.	Dec 91
QUAD ESL-63	£2072	(Pro version, £2240) Legendary electrostatic loudspeakers. Can lack bass, dynamic range and volume but have detail and imagery impossible to better.	Apr 91
TANNOY GRFM	£3500	Giant horn loudspeakers. Capable of awesome sound. Need good valve amplification.	Jul 92
NAIM DBL	£6127	Huge active loudspeakers, capable of producing immense sound pressure levels. Not for the squeamish.	Mar 91
MERIDIAN D6000	£7500	Meridian's statement in active loudspeaker systems. Effortless power and dynamics, but can sound bright.	Aug 91

MISCELLANEOUS

AUDIOPLAN DIGITENNA	£55	High-tech coaxial cable, for CD to DAC connection. Highly focussed sound.	Jul 92
AUDIOPLAN MUSICABLE	£VARIOUS	Superb, high quality cables that represent the finest in European cable.	Mar 92/May 92
BEYER DT411	£54	Excellent 'studio' quality headphones. Deep bass, powerful sound, if a bit splashy at times.	Jun 92
CELESTION DLP 600	£349	Digital signal processor for the Celestion 600 series loudspeakers, sounds like a £400 upgrade.	Jun 92
FRANCINSTEIN	£79	CD stereo enhancer, which adds crosstalk to make the sound more 'analogue'.	Jan 92
FURUKAWA FD-11 CABLE	£85	Coaxial cable, for use between CD and amplifier. Good quality, utilitarian cable. Safe choice, easy sounding.	Jan 92
FURUKAWA 7N PC-OCC	£900/£350	per mono metre. Very expensive cables. Highly detailed, sounds like an equipment upgrade.	Jul 92
KONTAK	£22	Space age contact cleaner. Upgrades your system at a single bound.	Mar 91
LASERGUIDE	£15	Coating for a CD surface. Is said to improve clarity, focus and spacioussness.	Dec 91
MANA TABLES	£VARIOUS	Unique glass and L-section frame supports that can transform a system.	May 91/Jul 91/Feb 92
SONY ICF-SV7600	£150	Superb 'world' radio. Good reception, simple to use, even has a clock!	Aug 91
SONY WALKMAN WM-DD33	£90	Simple to use, high-quality playback only Walkman. Excellent, stable sound quality.	Aug 91
SONY WALKMAN WM-D6	£260	The famous 'Pro' Walkman. One of the finest cassette recorders at any price, but portable. Superb value, if a little 'touchy' at times.	Mar 91
SONY WALKMAN TCD-D3	£500	Better known as the 'DATMAN', this small, sophisticated DAT portable is a technological wonder.	Aug 91
TECHNICS SL-XP700	£200	Portable CD player. The thinnest and most stylish of the breed, just happens to sound the best.	Nov 91
TDK NF-C09	£10	Designed to lessen Radio Frequency Interference in cables. Works too!	Feb 92

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Cambridge P110 Int., mint, boxed	£85-00
Cambridge T55 tuner, mint, boxed	£75-00
Heller DH 101 MC, preamp	£120-00
Heller DH 110 preamp	£175-00
Marantz PM4 Class A Int.	£299-00
Mission 772, v. heavy 200wpc poweramp	£249-00
Pioneer TX 9500 MkII tuner	£75-00
PS Audio M.C. headamp	£80-00
Robertson AG10	£450-00
Quad 33 pre	£80-00
Quad 303 poweramp	£100-00
Quad 405 poweramp	£120-00
Quad FM3 tuner	£80-00
Quantum 102 pre, 402 psu, 202 power	£125-00
Radford FMT2 tuner (matches SC22)	£85-00
Richard Allan A41/C51 Class A pre power	£180-00
Sugden A21 MkII Class A integrated	£85-00
Sugden A21 MkII tuner	£150-00
Trio L05, 100wpc monoblocks	£179-00

MODERN VALVES

Beard P505, pre	£295-00
Conrad Johnson PV8, pre	£449-00
Croft S III 130w monoblock DTL power amps	£2500-00
Croft 20 valve, 4 psu, ultimate head amp for M.C.	£1200-00
Croft Micro, solid state regulated valve pre amp	£139-00
Croft Micro, valve regulated valve pre amp	£189-00
Croft, full range available new from	£175-00
Luzman LX33 integrated	£375-00

VINTAGE VALVES

Chapman, integrated, 8wpc	£85-00
Chapman 205, pre power 10wpc	£149-00
Decca MkIV Deccola	£150-00
Dynaco PAS, American pre	£149-00
Dynaco SCA 35, American 17 wpc integrated	£199-00
Fisher X-101-C, American 27wpc integrated	£229-00
Futterman HG1C, DTL power, rebuilt by Croft	£750-00
G.E.C. '912' power amp, boxed, as new	£180-00
Leak STEREO 20, power amps, rebuilt from	£150-00
Leak TL12+, pair black power amps, mint	£300-00
Leak TL10, pair gold, mint	£250-00

Leak Troughline* tuners from	£100-00
Quad II pair	£300-00
Quad FM II SD tuner	£80-00
Radford STA 15 III power amp	£375-00
Rogers CADET III Int.	£85-00
Scott 130, American pre	£120-00

TAPE RECORDERS

Akai 4000DS, 7" open reel	£99-00
Alwa ADF 660 cassette	£99-00
Ferroglyph Series 7 open reel	£125-00
Hitachi PCM-V300E, PCM recorder VHS format	£399-00
Revox G38, valve open reel 1/2 & 1/4 from	£250-00
Revox A77, open reel 1/2 track	£300-00
Revox 877 MkII 15/16 & 1 7/8 open reel	£250-00
Sony EL7 ELCASET**	£250-00
Sony TC 177 SD 3 head cassette	£150-00
Sony TC 159 SD portable cassette	£85-00
Sony TC 500 valve open reel	£85-00
Sony WM D3 (new) Walkman	£100-00
Sony WM D6C (new) Walkman Pro	£175-00
Tandberg 64, valve open reel	£99-00
Tandberg 3000X, open reel	£85-00
Tandberg TCD 340 MkII cassette	£85-00
Technics 7500 ELCASET very rare**	£250-00
ELCASET tapes available	

TURNTABLES & TONEARMS

AR Legend/Linn LVX	£150-00
AR XB, original suspended deck	£80-00
Decca FFSS pick up arm and head	£50-00
Decca Professional FFSS pick up arm and head	£75-00
Garrard 301S, SME 3009 SII	£180-00
Garrard 401, no plinth	£85-00
J. F. Le Telec STAD S, boxed, weighs 8 1/2 stone!	£550-00
Madrigal Carnegie 1, not even run in	£500-00
Thorens TD150 from	£50-00
Thorens TD160 BC	£75-00
Thorens TD124 MkII/SME 3009 SII	£175-00
Thorens TD125	£75-00
Pioneer PL12D	£50-00
Rega Planar 2, RB200	£75-00
Sansul SR222 MkII	£75-00
SME 3009 prototype	£75-00
SME 3009 S2 arm	£35-00
SME 3009 S3 ARM TUBES	£25-00
SME 3012 prototype	£100-00
SOTA Sapphire MkIII, vacuum platter, SME V arm	£1900-00
Trio KD 2055 rock plinth	£125-00

ACTIVE CROSSOVERS

JR subwoofer X-over and amplifier	£170-00
Nytec EXO 102-3 X-over for ARC 202	£45-00
Nytec EXO 1032-3 X-over for Linn D.M.S.	£45-00
Sony ESPRIT X-over	£400-00

LOUDSPEAKERS

Acoustic Energy AE1, black piano finish	£575-00
BBC LS 2/5 monitors, large	£120-00
Cambridge R40	£150-00
Castle Conway II	£150-00
Decca Ribbon/Volts, special X-over, medite stands	£850-00
Decca Ribbons OK30, for home constructor	£80-00
E.S.S. AMT4. Heil air motion transformers	£299-00
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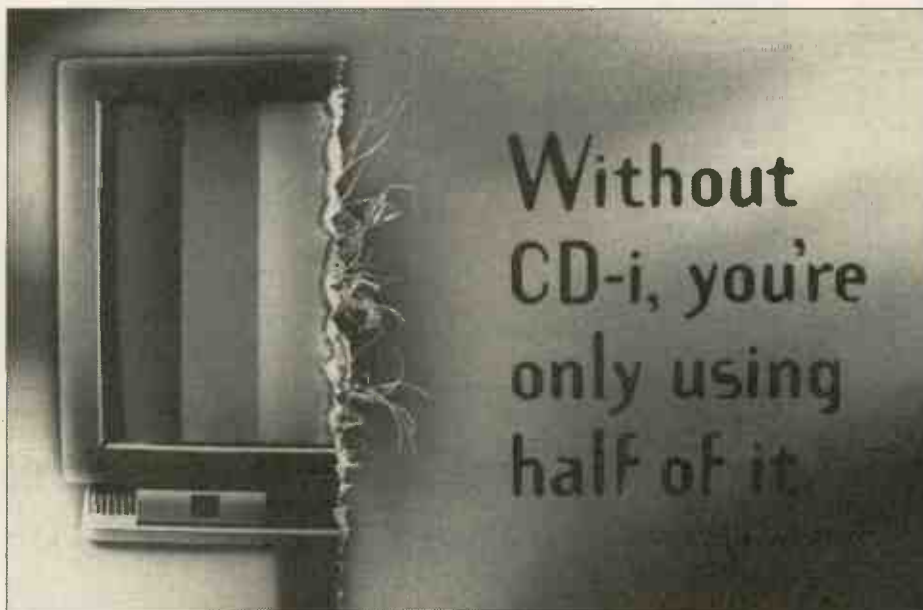
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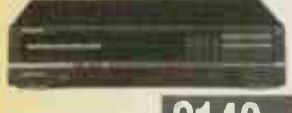
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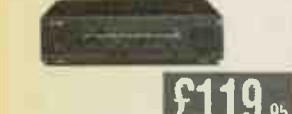


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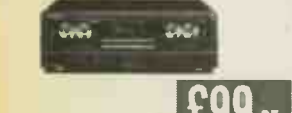


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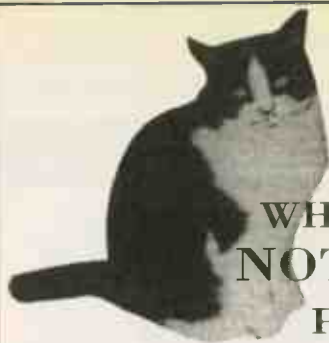
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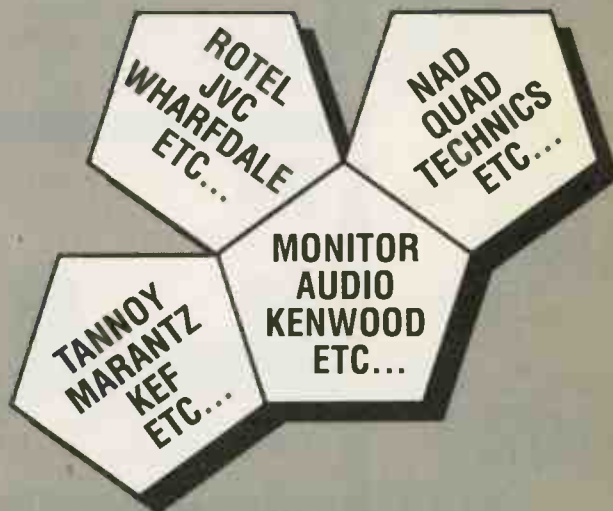
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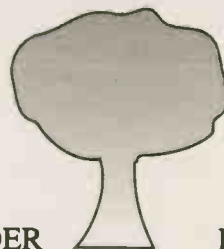
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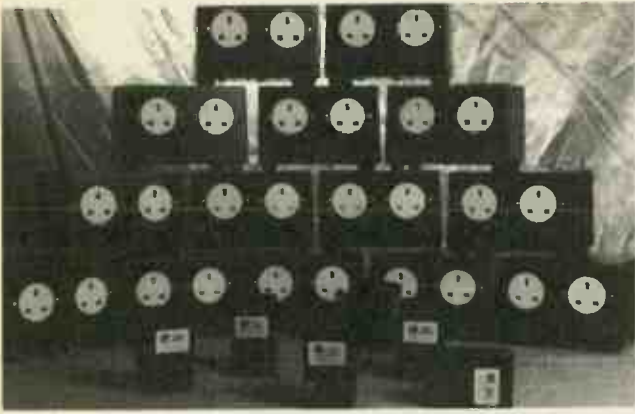
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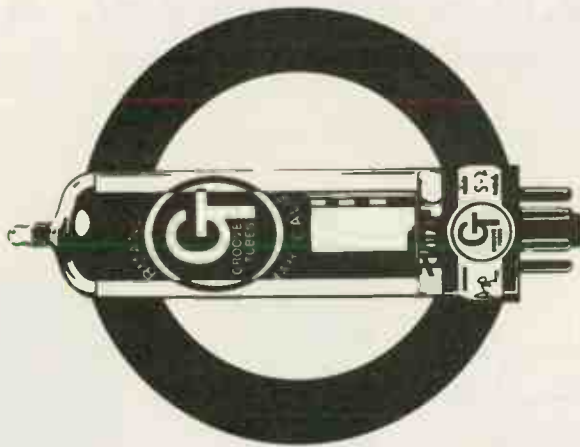
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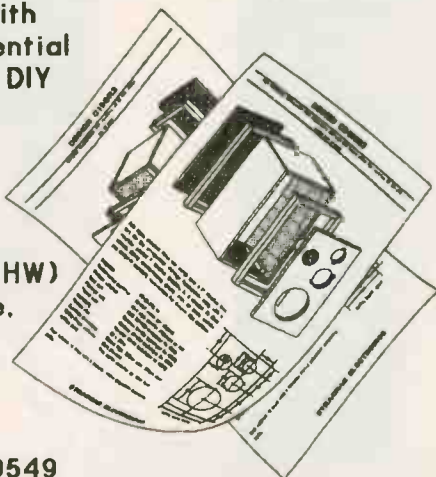
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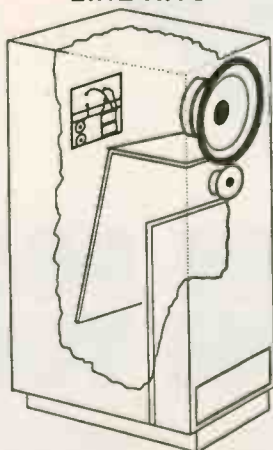
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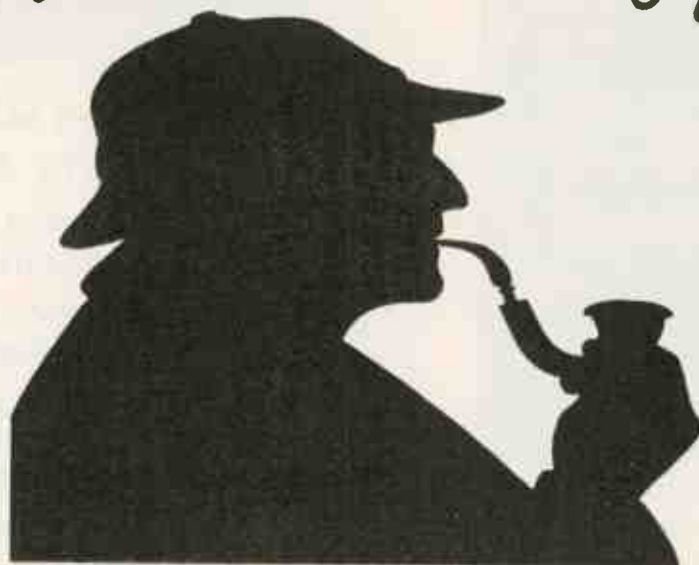
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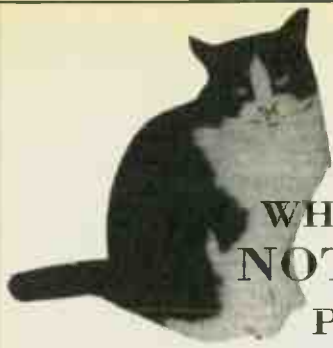
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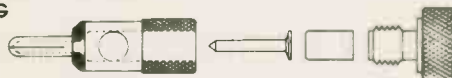
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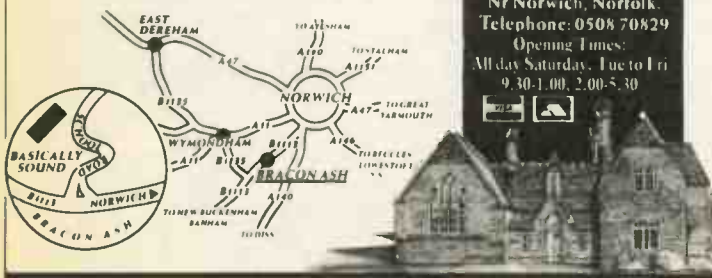
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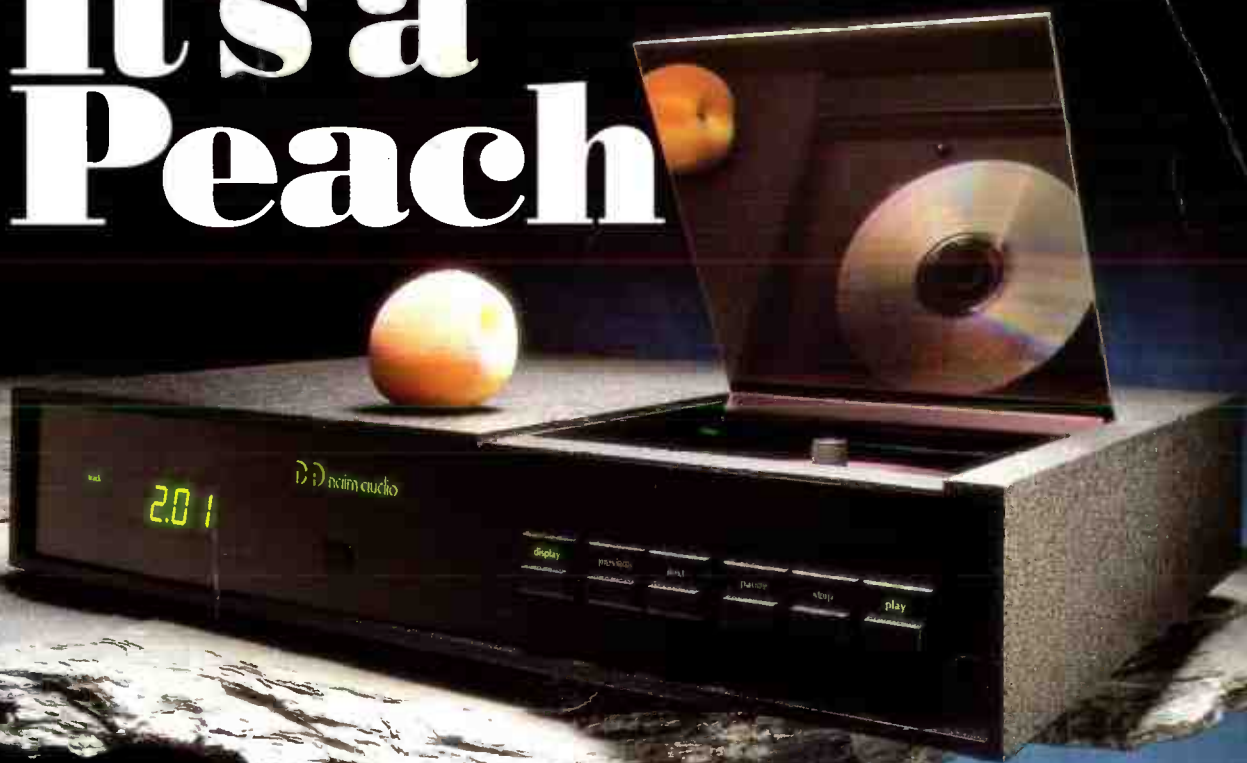
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The Naim CDI incorporates all of the technological innovation and expertise gained from the development of the CDS. Designed to be the best in its class and devoid of gimmicks, here is an affordable player capable of providing true musical enjoyment.

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