

HiFi WORLD

OCTOBER 1991 £2.50

**FIRST
REVIEW**

**KEF REFERENCE
103/4 LOUDSPEAKER**

**SIX COMPACT DISC
PLAYERS COMPARED**

**NEW ARCAM
ALPHA 3 AMPLIFIER**

**NEW MUSICAL FIDELITY
T1 MkII TUNER**

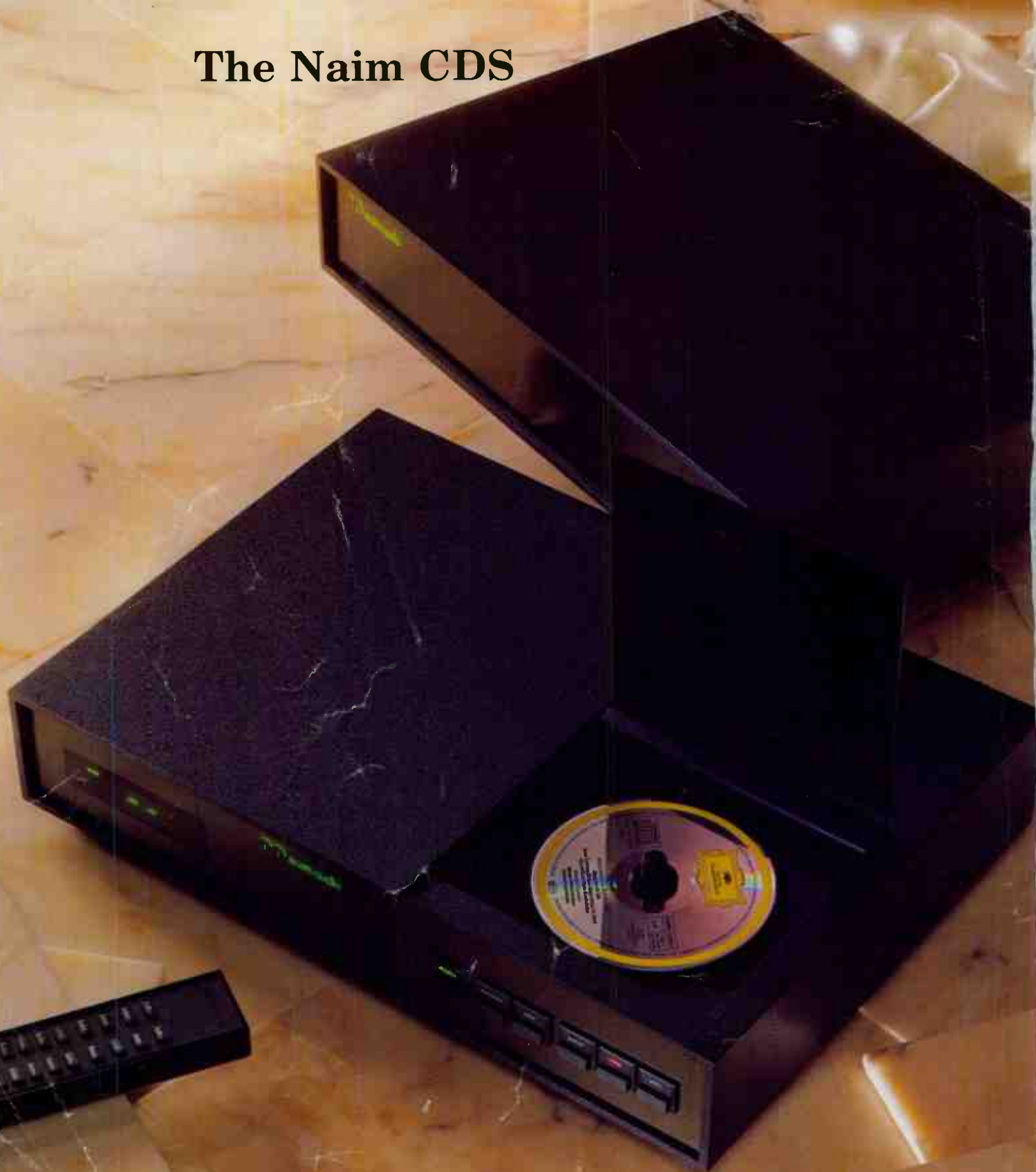
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A Refining Of The PRINCIPLE



Bettini stylus
from the A-T
Gallery collection,
Machida, Tokyo.



Little over 100 years ago Gianni Bettini became the world's first audiophile. As an Italian cavalry officer visiting New York in the late 1880's, he was intrigued by the newly introduced Edison wax cylinder 'phonogram' yet unsatisfied with its poor audio quality. Using his flair for things mechanical Lieutenant Bettini began to turn this business dictation machine into a device which would satisfy music lovers and to ensure the ultimate fidelity he opened his own recording studio on Fifth Avenue. There he made the first realistic recordings of famous contemporary opera singers and built up a fabulous collection of 'celebrity cylinders' including his holiness Pope Leo XIII. His 'micro-reproducer' phonograph was first in a line of successful models and today A-T salutes him as a true pioneer of high fidelity.

At Audio Technica we strive toward the same goal, using unrivalled micro-transducer 'know how' to reduce the weight of Bettini's original device to the mere few grams of our latest moving coil series. Below we proudly present our 'reference' specifications but add one small note of caution. At this level 'numbers' do not tell the whole story as component compatibility and musical taste come into play. We thus urge a personal audition at one of our hand selected A-T dealers to fully assess requirements.

Meanwhile, please contact the A-T sales office for a complete selection of press review copies.

	ART 1	OC-30	OC-10	OC-5	OC-3
Frequency response (Hz)	10 - 50,000	10 - 50,000	10 - 50,000	15 - 50,000	15 - 50,000
Output voltage (1kHz, 5cm/sec)	0.35mV	0.4mV	0.4mV	0.4mV	0.35mV
Channel separation (1kHz)	30dB	30dB	29dB	27dB	27dB
Output balance	1.0dB	1.0dB	1.0dB	1.5dB	1.5dB
Vertical tracking force	1.4 - 1.6g	1.25 - 1.75g	1.25 - 1.75g	1.25 - 1.75g	1.25 - 1.75g
Coil impedance (1kHz) / DC resistance	12Ω	12Ω	12Ω	12Ω	12Ω
Load resistance - Head amp/transformer	>100Ω / >20Ω	>100Ω / >20Ω	>100Ω / >20Ω	>100Ω / >20Ω	>100Ω / >20Ω
Coil inductance (1kHz)	50μH	50μH	50μH	50μH	50μH
Static compliance (cm/dyne)	30 x 10 ⁻⁶	35 x 10 ⁻⁶	35 x 10 ⁻⁶	35 x 10 ⁻⁶	35 x 10 ⁻⁶
Dynamic compliance	8 x 10 ⁻⁶	9 x 10 ⁻⁶	9 x 10 ⁻⁶	9 x 10 ⁻⁶	9 x 10 ⁻⁶
Stylus profile	Micro-linear	Micro-linear	Micro-linear	Bi-Radial	Bi-Radial
Magnet type	Special	Neodymium	Neodymium	Neodymium	Samarium-cobalt
Vertical tracking angle	23°	23°	23°	23°	23°
Dimensions L x W x H mm	22.2x16.8x17.3	25.7x16.8x17.3	25.7x16.8x17.3	25.7x16.8x17.3	25.7x16.8x17.3
Weight	9.5g	8.0g	8.0g	8.0g	8.0g

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From Tin Foil
to Stereo
- Read/Welch



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AIWA'S NEW INEXPENSIVE 3-HEAD CASSETTE DECK

The latest cassette deck from Aiwa, the AD-F810, is a three-head, twin-capstan device, for the princely sum of only £199.99. This follows in the footsteps of the £99 AD-F410, which we are testing in the next issue.

Aiwa seem to be aiming at disturbing the cassette market by producing up-market decks at down market prices. As befits cassette decks of this quality, the new AD-F810 has a range of facilities to match its specifications. These include automatic tape selection, bias and sensitivity controls, along with a button to switch the fluorescent meters off.

The AD-F810 also offers features such as three PC-OCC5N heads and a twin capstan transport which would normally be seen only in cassette decks costing far more than £200. Aiwa suggest that the low price is due to their experience in cassette deck design and mass production.



PROAC'S NEW TABLETTE II

ProAc's Tablette (and subsequent Super Tablette) have proved to be among the most consistently successful loudspeakers in the ProAc arsenal, with over 25,000 pairs sold worldwide over the past twelve years. Now ProAc have drastically improved the loudspeaker with the new £399 Tablette II, available from ProAc's dealers now.

The latest Tablette II features a mirror image offset placement drive unit layout, which is said to radically improve the breadth and depth of the soundstage. In addition, changes made to the resistive port are said to improve the speed and extension of the bass, while adding clarity to the midrange. At the same time, work has been performed on both the cabinet, to reduce box colorations, and the crossover network. This last has been tuned to aid detail and the sweetness of the tweeter.

trade winds

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

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CELESTION GO THREE WAYS

To Noel's delight, three-way speakers are back in fashion. The latest manufacturer to add three-way speakers to their range is Celestion with the £239 Celestion 9 and the £279 Celestion 11. The tweeter is a titanium dome, and both use new mid-range and bass drivers and hard-wired crossovers. The 4.5in mid unit common to both the 9 and 11 has a polycarbonate chassis incorporating a rear absorption chamber to separate bass and mid-range loading. Brand new bass drivers - 6in for the 9 and 8in for the 11 - also have a one-piece polycarbonate chassis but are fitted with a felted fibre cone. Benefits, say Celestion, are the elimination of directional beaming associated with two-way designs and a strong presence in the room with an openness of sound and superb bass articulation. We hope for a pair to review next month.



TECHNICS NEW RANGE OF INTEGRATED AMPLIFIERS

Technics have released their latest attempt to reduce amplifier noise, the £449.95 SU-VX800. Rated at 110W(RMS), the amplifier features what Technics refer to as 'Extended Direct Drive'. This uses a variable gain amplifier stage in place of a conventional attenuator, which is used to drive the power amplifier stage. This means that as the volume level is lowered, so too is the noise from the variable gain amplifier.

The amplifier also has professional pretensions. As well as the standard RCA phono inputs for domestic use, the SU-VX800 also provides balanced inputs for professional users. Because of its bias in this direction, the amplifier has a recording output selector to facilitate ease of recording. Finally, the amplifier features what Technics call an 'Active Servo' power supply, which is said to have good regulation and temperature stability.

Aside from the top model, the rest of the 'VX' range of amplifiers all feature Technics' own Class AA circuitry, improved peak current and 'PXS' capacitors using "bio-technology ultra-pure electrolyte". The range includes three other models, the £159.95 SU-VX500, the £199.95 SU-VX600 and the £249.95 SU-VX700. All the models in the 'VX' range should be available by September.



DAT FROM KENWOOD

Trio-Kenwood have announced two new Digital Audio Tape recorders. Multi-layer circuits and a reduced drum height have allowed Kenwood to pack in facilities such as track search and subcode editing into the palm size DX-7 portable at £499.95. A miniature wired remote is provided. An add-on A/D converter (for recording from analogue sources) and charger cost £149.95. The full-size DX-7030 (£699.95) employs one-bit converters, and Kenwood say a central tape drawer internal dampers and an extra thick base plate improves isolation from mechanical shock and vibration.

CABLE ADVANCES

New cables abound from two of Britain's leading cable tweekers. First, Analogue Experience have released a new 75ohm coaxial interconnect, known as Intershield. Priced at £12 per metre, it is unique in that it can be upgraded by the addition of a second length of Intershield for each channel.

Audio tweeker extraordinaire Graham Nalty has been busy on the Sonic Link cable front. His latest products include Pure Mains cable, the third mains cable from the Sonic Link camp. Priced at £20/metre, this is a three core cable made from 19 x 0.2mm diameter cores, of the same type used in the successful Violet cable.

Sonic Link have also launched their cheapest ever loudspeaker cable, the £8.00 per metre Sonic Link Grey. It is constructed from PTFE insulated, silver plated copper conductors of 0.9mm diameter, all covered in a grey PTFE sheath. As the diameter of the grey cable is only 3.5mm, it is well suited for applications where space is at a premium.

Finally, following the success of the Blue-Black digital cable, Sonic Link have announced a Brown cable, priced at £25 for 1m, terminated with gold phono plugs. This cable is said to improve low frequency audio quality, while its use of an external screen offers better RF rejection.

For details contact Analogue Experience on (0254) 676538, or Graham Nalty of Sonic Link on (0332) 674929.

TDK HAVE IT TAPED

The company with 42% of the U.K audio tape market have announced new formulations of D, AD, AR and AR-X cassette tapes which will have been in the shops from the end of August. The old favourite, AD, which has been in short supply, now reappears with a new 'High Precision' mechanism in C90 - and by popular demand - C120 lengths. High frequency sensitivity, and saturation levels have been improved on AR; AR-X also has improved HF sensitivity bias noise is 1dB quieter and it's also fitted with a 'Super Precision' anti-resonance mechanism. The packaging retains the distinguishing colours - red for D, blue for AD and so on - but the new formulations can be recognised by larger italic designations and a bigger TDK logo.

CULLAM ANNOUNCE NICAM DECODER

New to the hi-fi industry, Cullam Ltd. will be showing their new NICAM decoder, the £249.95 Interpreter, at the Hi-Fi Show at the Penta Hotel Heathrow, Sept 19-22. The unit, sporting the very latest in Philips NICAM chipsets, links the TV and Video recorder to the Hi-Fi system, putting a quality signal through the domestic hi-fi. It comes complete with an infra-red remote control and a series of presets to tailor volume, treble, bass and balance levels.

For those who are unable to get to the Penta Show, the Interpreter should be available country-wide soon, or failing that, contact Bob Massam of Cullam Ltd. on 0865 882 100.



HECO'S NEW BRACE OF LOUDSPEAKERS

The successful German company Heco have obviously been busy recently. They have unveiled no fewer than six new models this month. First comes the floorstanding Superior Forte 850. This model, retailing at £850, is far larger than its partner, the Presto 750 and features 2 x 225mm bass drivers as opposed to 2 x 175mm in the 750.

Following this, we come to the Superior range's new Fortissimo 950 loudspeaker. This stands 1.2m high, has an internal cabinet volume of 118 litres and uses 2 x 225mm bass drivers and 2 x 125mm mid-range units, all made from polypropylene. As with all models in the Superior range, the Fortissimo offers a bi-wiring option. The price of the 950 is £1000.

Moving down the scale a little, Heco have announced four new Interior Reflex models. All are reflex-ported cabinets with high efficiency (averaging 90dB/1W/1m) and range in price from £160 for the Reflex 10 to £350 for the floorstanding Reflex 35.

Finally, Heco have improved upon their Libero sub-woofer/satellite system. They have changed spring terminals to binding posts throughout and have redesigned the front baffle of the bass unit, as well as improving the appearance of the sub-woofer. This has meant that the unit has become less time consuming and therefore less expensive to assemble. The resulting drop in unit cost has been passed on to the customer, so that the Libero now costs £375, instead of its original price of £450.

NEW INTELLIGENCE FROM PROTON

Proton have added a stylish Bitsream CD player, the £249.90 AC-422, to their 'intelligent' 400 series of amplifier, tuner, receiver and cassette deck. All the individual items of the series can be controlled from one remote. Not only does the AC-422 look soft and rounded, so is the sound - Proton say it has a sweet spacious sound and the harshness often associated with CD has been eliminated. The succulent exterior design is the work of Chicago designer Reinhold Weiss, responsible for the Proton 300 table radio which is one of the few hi-fi products in the New York Museum of Modern Art's permanent collection.

ATC MONITORS THE UK SPEAKER SCENE

Better known for their professional loudspeakers, ATC are displaying their SCM range of loudspeakers at this year's Penta Show. In professional circles, ATC have an impressive following, with diverse recording companies (including the BBC) using their monitors.

Now, ATC are turning their attention back to the domestic market. In their ticket-only demonstrations at Penta, they will be showing their £1388 SCM 20 'baby' 2-way monitors and £4158 SCM 50A 350W active three-way loudspeaker.

ATC will be sharing the rooms with AVI, who will be showing their range of electronics. This includes their £499 midi preamplifier and £799 digital to analogue convertor, designed for both professional and domestic use.

PENTA SHOW FINAL NEWS

If you're jet-setting from Heathrow, drop in to the Hi-Fi Show at the Heathrow Penta Hotel. If you took your hols in Blackpool instead of the Bahamas, there are car parks available or a courtesy bus from Hatton Cross Underground station. Trade days are Thursday 19th and Friday 20th September; the Show opens to the public at 4pm on Friday and continues through Saturday 21st and Sunday 22nd from 10am to 6pm. BADA will have a stand in the foyer dispensing advice on hi-fi and will be giving away vouchers entitling the holder to a free home visit and consultation by their local BADA dealer. KEF will be demonstrating the R103/4's reviewed in this issue and a hundred manufacturers will be displaying their wares. So will the Hi-Fi World staff on Stand 15B, fresh (well, fairly fresh...) from their publicly acclaimed appearance at St. Ives earlier in the month.

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NAKAMICHI, PHEONIX,
PIONEER,
ROCKFORD FOSGATE

GROOVE TUBES HIT THE HI-FI WORLD

Mention the name 'Groove Tubes' to any aspiring guitarist and they will reel off a list of names of famous players, from the Allman Bros to ZZ Top, who re-valve their amplifiers with Groove Tube products. All the valves undergo a unique and intense selection process, with a very high rejection rate. Those that survive are then placed on a distortion scale between one and ten. This is what makes them well respected within the guitar playing fraternity, as they produce a sound that is at once consistent, reliable and capable of dramatically improving the original amplifier's sound quality.

Now, the Groove Tube experience is coming to the hi-fi industry. Mike Cooper, of Groove Tubes (U.K. Ltd), is set to put his years of experience in the guitar industry to the resurgence in the world of valves that is part of 90's hi-fi. Selected dealers throughout the country, starting with London's Vinyl Tube Audio, will be able to demonstrate just what can be achieved from changing a few valves. They are not cheap, but next month's issue of Hi-Fi World will see a more thorough evaluation of their worth. For those unable to wait, please contact Vinyl Tube Audio on 071-485 4854 or Mike Cooper direct on (0902) 674902.

GOLDRING'S NEW BLACK SATIN SUPPORTS

Not content with being the U.K.'s last major cartridge manufacturer, Goldring have announced their latest accessories, the Black Satin range of equipment supports. The range, designed to match Goldring's Black Satin loudspeaker stands, runs from basic turntable tables to five-tier shelving units.

The shelves are designed to be modular, so extra shelves can be added as you feel fit. Each shelf is also isolated on its own set of spikes. Finally, all the Black Satin tables come flat packed for easy assembly.



IN BRIEF

NORTHERN IRELAND HI-FI SHOW

This year's Northern Ireland Hi-Fi show is sponsored by Zeus Audio and the finest magazine in the whole universe, bar none: Hi-Fi World. Our show will run from Friday 25th October to Sunday 27th October in the Stormont Hotel, Upper Newtownards Rd, Belfast.

The show, now in its fourth year, will have exhibits from some of the world's finest manufacturers as well as equipment that is more down to earth. In addition, Hi-Fi World staff will be on hand for a friendly chat.

Opening times will be 2pm - 8pm Fri 25th, 10am - 6pm Sat 26th and 10am - 5pm Sun 27th.

SLATE AUDIO PRICE REDUCTIONS

Slate Audio have re-negotiated their price terms with their suppliers. As a result, they are now able to offer lower prices on all their custom work, as well as for any stands finished in white marble. In addition Slate Audio are continuing to develop new products, such as the Tableslab, designed to replace MDF shelves, and the Turntabletable for heavy-weight turntables which costs £363.86. For more details, contact Peter Soper of Slate Audio on (0525) 384174.

NATIONAL SOUND AND VISION SHOW

The twelfth annual National Sound and Vision show, sponsored by Cleartone, is taking place a week earlier than usual on the 27-29 September at the Last Drop Village, Bolton.

Apart from most of the manufacturers in the country appearing, there are said to be special 'show-only' deals, 0% finance on selected items, bars, refreshments and free parking.

Admission costs £1.50 per adult, but is free for children. Opening times are 12pm to 8pm Fri, 27th, 10am to 7pm Sat 28th, and 10am to 6pm Sun 29th.

MOREL LOUDSPEAKERS IN THE U.K.

Morel loudspeaker drive units, well respected within the hi-fi industry, are now being distributed by Clere Electronics, of Newbury.

Morel's domestic range of eighteen drive units, designed primarily for mid to high power handling uses, consists of six tweeters, two soft-domed mid-range units and ten woofers, ranging in size from five to twelve inch units. For professional applications, Morel also manufacture two 'Integra' coaxial loudspeakers of ten and twelve inch diameter and a soft domed, horn tweeter.

The majority of the drive units use a double magnet driving system and what is known as 'Hexatech' aluminium voice coils for maximum power handling. For more technical information contact:

Clere Electronics Ltd., Kingsclere, Newbury, Berks. RG15 8PN. Tel (0635) 298574

DYNAMIC DYNACO

I read with interest Richard Kelly's article concerning the Leak TL10. My own experience along similar lines may prove of interest to some of your readers.

In early 1990 I decided to seek out a used Dynaco Stereo 70 valve amplifier to replace my functional but not fully musical solid-state amp. Perusing the ads in the back of *Stereophile*, I phoned six or seven audio dealers until I located one who specialized in the sale of vintage gear. They had three for sale; I sent them payment for one and received the amplifier within the week.

Not unexpectedly, on switching on, the amplifier produced white noise instead of music. With a schematic, manual, and sundry replacement parts from DoReTech Audio Services in New Jersey, I reconditioned the power supply, replaced the sockets, some valves, the P.C. board, and numerous resistors and capacitors. In most cases, the replacement parts were of

relates to particular speakers or types of speakers I respectfully suggest that it is not strictly correct in the widest sense.

The speakers mentioned in my previous letter had originally been damped in accordance with the recommendations enclosed with the KefKit 3s. When first switched on the boom was deafening regardless of their positions in my listening room (20ft long, 12ft wide and 8ft high). My domestic circumstances necessitated having to place the speakers in corners, 20ft. apart, and I had no alternative but to try to conceive a method of controlling the bass. I did that by numerous experiments in structural and damping alterations over a period of twelve months until I was eventually satisfied that the bass was tightly controlled and devoid of perceptible colouration, especially boom, although, as previously mentioned the speakers are in corners and literally within one inch of the skirting boards.

I submit, and am confident that I could demonstrate to your satisfaction, that it is possible to construct speakers that will tolerate close proximity to corners and walls and consequently boom or other colouration is as much a product of inadequately constructed and damped speakers as of room modes.

Amateurs can overcome this problem and thereby encourage a more flexible placement of speakers which would provide a wider sound stage, and therefore more pleasure, than the stilted practice promoted by dealers, of placing speakers parallel and nine feet apart, and which requires listeners to sit in a rigid central position. Although the benefits of my methods were appreciated by commercial manufacturers, they were considered too labour intensive and therefore, too costly having regard to the profit margin taken by dealers. The two speaker manufacturers' representatives mentioned in my previous letter were mystified by the absence of colouration from speakers so close to corners, and were unable to offer a scientific explanation, although they appreciated the comfort of sitting in armchairs some six feet either side of the point of convergence of the speakers, without any loss of the advantages of a twenty-foot wide sound stage which I believe enhances the impression of realism from orchestral and operatic recordings.

**G.A. Jolly
Hockley, Essex**

That planar surfaces such as walls and floors reinforce low frequencies, and that where they come together gain is maximum, is accepted acoustical fact for a monopole (box) loudspeaker. Corners are points of high acoustical impedance and also the only place where all the room modes can be driven most effectively.

This isn't to say corners cannot be used - they were commonly used in the days of mono for corner horns and such like. However, your experiences are not broadly applicable; they relate to your own room and your particular loudspeakers. You have well staggered room dimensions that result in room mode resonances of 28Hz along the length of the room, 47Hz across the width and 70Hz floor to ceiling. Someone with, say, a near-square room would have all the resonances at or around one frequency, causing terrible room boom with corner placement.

Wall and corner placement can be compensated for, by reducing bass output and increasing acoustic damping of the drive unit. However, the loudspeaker then suits only a wall or a corner. Put it on stands out in the room and it will sound dry and bass light. Stand placement is generally preferred because it gives best imaging, especially in the front-back plane. This is why monopole loudspeakers are commonly optimised for stands and therefore don't suit corner or wall placement. It's not all due to some plot by dealers - this time they're innocent! NK

TAPES AND TESTS

Thank you for another fine issue (July). I took it on holiday to Canada, and it was a constant companion for bedtime reading throughout our stay after a hard day of travelling and sightseeing. I found the cassette tapes review and the four receiver tests to be particularly interesting and informative. A previous comprehensive tapes review which I have kept on file is the *What Hi-Fi* supplement of November '89, which is very detailed but getting rather out of date now. Later ones from that source have opted for the more usual purely subjective test which is much less useful. I note from your test figures an all round improvement in tape performance in the last couple of years, but I am particularly pleased that you

show all the parameters.

Regarding receivers, one aspect I never see mentioned is the compatibility between the average external input levels, and the fixed internal radio input.

Last December whilst in Germany I purchased a Fisher Hi-Fi receiver (RS-909) which I planned to use upstairs in a second system for cassette tape dubbing etc. However, at the moment it is installed downstairs in the main system on a 220 volt supply (no 240 V tap) instead of my usual amp and tuner, and it performs very respectably.

Fisher is still a big name in Germany whilst having disappeared here, but as we all know it is only a re-badged Sanyo and nothing to do with the original American Fisher Radio Corp. (My father currently has and runs my original New York Fisher in his system.) However one disconcerting aspect of this receiver which had to be attended to was the vast difference in level between radio and any other input. When reverting to radio after listening to disc, say, the sound would crash out, and it was a nuisance to have to remember to reduce the volume each time. On the bench, the radio was found to be 7dB above the average of all my other gear. Although the input sensitivities proved to be the standard 150mV/2.5mV (line/phon), the radio output was 800mV RMS. Though I don't use the loudness facility, to have turned up the volume control to pot. tap point (12 o'clock position) where the loudness circuit ceases to have influence, would have meant a ridiculously loud volume of sound, much greater than that required for the onset of any form of tonal compensation. I had to add a couple of resistors to reduce the output prior to the selector switch.

One other thing I observed was a liberal sprinkling of 220pF capacitors on all inputs and outputs which must presumably have an aural effect. Phono measures 440pF, tape monitor 700pF, and CD/aux. 900pF. The power amp is an STK4171 Mk5 hybrid (Sanyo or Sanken), which I realise is not praised for absolute sound quality but which, as I say, seems reasonably good.

Thanks again for a very interesting magazine.

**C.G. Doman
Bedford**

Tape testing is a rare pastime that I find interesting. Believe it or not, as far as I am aware, only Paul Miller and I are

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Hi-Fi World Letters
Page, 64 Castellain
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London W9 1EX.**

tighter tolerance and higher quality. My total expenditure was \$270 - \$170 for the amp., and \$100 for various parts and valves.

The result is a very cost-effective, reliable 35w Valve amp that is capable of very musical performance with efficient loudspeakers.

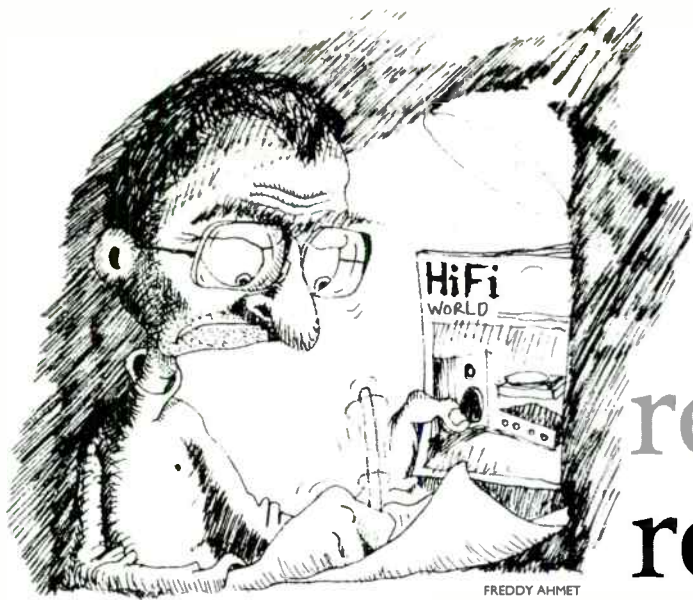
Try it - you'll like it.
**Byron Minter,
Summit, New Jersey U.S.A.**

We have and we do! NK

POSITIONS

I have read your article 'Positioning your loudspeaker'. I am prompted by my own practical experience to question your pronouncement that 'Firstly, placement against a wall or worse, in a corner, drives one or more of the main room modes very effectively resulting in the boomiest sound possible'. Whilst I do not doubt the correctness of that statement so far as it

capable of testing tapes to necessary IEC Standards. We use the same set of tests. What Hi-Fi? feel that the complexities of measured performance are inappropriate for their readership; many readers do seem to find technicalities a turn off. The tape companies like to see their products tested diligently however, and I know many readers appreciate a considered and consistent approach. You may be interested to know that Paul Miller and I collude to ensure our measured results correlate, to avoid confusion. His test figures can be directly compared with mine. **NK**



readers' reply

TEST MATCH

I purchased the last two issues of Hi-Fi World at my local news stand and was quite impressed by the quality of the reviews - with one exception, more on that later.

My main reason for writing to you is to ask if it is possible to get from you a set of schematics & PC board layouts for the Quad ESL-63/Celestion 6000 Woofer combo which was mentioned in the correspondence columns. I have had a pair of ESL 63's since '81 (SN 1700s!) and have never felt the need to change. Yes, I have listened to Apogeess and Magneplanars, et al but find them lacking in transparency. By the way, why do the Apogeess appeal to the UK market so strongly? There is little doubt that the balance is quite bass-heavy with a subdued treble. To say that the bass is under controlled is an understatement.

Regarding the review of cassette tape in the July '91 issue, this was not done right. You should have used a deck with variable bias and record eq. and set up each tape before taking measurements. The old Revox 710 had these adjustments. Roughly, one first sets bias to give minimum mid-range distortion (or similar) level, then adjusts the record eq. to give flat HF response to some sensible frequency. I'm sure you know this, but perhaps your conclusions are not a true measure of the merits of the tape itself, but rather a combination of the deck/tape quality. It is true that most decks don't have variable internal eq., but that should not have prevented you from doing it right. As it stands your tape review is valid only for owners of the deck which was used, and the order of merit would be quite different if another make, having different factory settings

for bias/eq., were used.

A.Lal
Long Island City, New York

I regret to say there is no more information on the crossover at present but it is unlikely to be made available as plans or a kit.

The tapes are tested broadly to requirements of IEC94 Standard. As you suggest, a standard and fixed 'Test Bias' is used, which is based upon the typical bias levels used in Japanese cassette decks, namely Ferric: +3dB, Chrome +3dB, Metal +4dB. These figures are gathered from a statistical sample of MOLs taken from our cassette deck tests. The Nakamichi ZX-9 test deck therefore has its bias set to be representative of real life product.

The test technique I use eliminates the need for a real-life flat frequency response and, therefore, the adjustable record-EQ you speak of. The tapes under test are compared with IEC Primary Reference Tapes by mathematical processing in an FFT spectrum analyser, the US made and thoroughly excellent Hewlett Packard HP3561A. What we publish is a difference response, which is what you would get were you to use any of the tapes under test on a deck set up for commercial equivalents to IEC Primary Reference Tapes, like TDK D and AR, TDK SA and TDK MA.

So our tests very accurately depict the situation encountered by users when they buy tapes. But the test procedure is too complex to explain each time we run such a review. **NK**

OLD AND LOVELY

The Revox G36 article was of special interest to me. I owned one of the last to be produced. It gave me lots of pleasure for 25 years, until reluctantly I let it go to a musician to record guitar.

The pleasure is not only in the sound reproduced but also owning such a well designed and quality manufactured article. Except for blowing up the small leaf switch - my silly fault - which Hammonds repaired F.O.C. even after I told them what happened. Nice style of service, similar to Quad and Leak.

Whilst I have owned all these lovely bits of equipment and still use the Quad with its A.M. overseas tuner which pulled in Brazil radio, the wonders of CD and modern equipment must be appreciated also.

Incidentally I parted with my Leak Troughline for the Sony 5000 tuner - now that is a real tuner! Even better than Yamaha 7000.

Keep up the good work.
John Sullivan
Nuneaton, Warwickshire

REVOX RESISTORS

Just one point arising from Noel Keywood's review of the Revox G36 tape recorder in the August issue.

He mentions the mismatch between the tape recorder and the external amplifier which, initially, led to a lack of bass. The reason for the bass cut when fed into a modern amplifier with an input resistance of, say, 10kohms was presumably coupling capacitors which were too small in value. Inserting 100kohms in series in the tape recorder output would re-instate the bass but it could well cut the treble at

the same time.

The reason for this is the fact that there will be capacity to earth after each 100kohm resistor, and this forms a low pass filter. This capacity comes mainly from the coupling cable - sorry, interconnect - and the input impedance of the amplifier. I would guess that this capacity would be not less than 100pF, probably more, and 100kohm into this will have a measurable effect at 20kHz. But, of course, it wouldn't have been measured under these arrangements.

The best solution would have been to increase the coupling capacitors in the Revox output; however, if resistors had to be used, they should have been put at or in the amplifier, not in the tape recorder.

This problem can also arise if one is trying to attenuate a signal coming from a unit before feeding it to an amplifier. I once did this by fitting a series 1Mohm resistor in the output of a tuner and wondered what on earth had happened to the treble.

Many thanks for the subjective and objective approach used in Hi-Fi World and keep up the good work.

Mike Grieve
Cockermouth, Cumbria

Yes - and no! You are right to make the point that this could be a problem, even though it wasn't in our case, since we were aware of the possibility. The reason for not simply increasing the size of the output capacitors, which are too small, is that there are following compensation networks that may depend upon their value being maintained. We didn't have time to analyse the circuit

Continued on page 83...

I'm beginning to suspect we are about to see the return of the 'three-way' loudspeaker. Manufacturers have started using the words enthusiastically again, putting it over as a new, worthwhile feature, something we should all listen to. For me this is wonderful news, because I have always preferred a (good) three way to a two way. They've got a raft of advantages that should help to bring better sound quality to enthusiasts, in some cases at a very competitive price.

What's a three-way loudspeaker? Quite simply, one with three drive units. It isn't always the case that the more drive units you have, the better. Quite the reverse in fact: more drive units often produce more problems. No, three drive units,



kaleidoscope

Reflections from Noel Keywood

at least in a multi-unit design, are close to a magic number in my view. Any more and the problems become too great. Any less and another problem takes over. OK, so the real ideal is just one drive unit, but that is in a notionally perfect loudspeaker. The way things stand, I prefer to see three drivers. It represents the best compromise of all.

'Human hearing is most acute across the mid-band. Not unsurprisingly, we have evolved to possess superb aural discrimination over the band of frequencies the human voice occupies. This extends from around 300Hz up to 3kHz. Sibilance (the 'sss' sounds) contains higher frequencies that reach up to 8kHz or so and deep male voice has elements (chest boominess) that goes down to around 150Hz, but both are random and sporadic effects. Since our hearing is most acute in this region it is wise to pay it most attention when designing a multi-driver loudspeaker. It is here that the popular two way starts to run into problems that the three-way can avoid.

Two way loudspeakers commonly cross over at around 3kHz, the big drive unit handling all the lower frequencies and the smaller tweeter all the higher ones. And it is the big unit that is

the problem: it has too much work to do. Apart from acting as an air pump to produce deep bass, it has to handle the critical human voice as well. There's a balance to be struck here and whichever way it is arranged, the outcome is unsatisfactory. Make the cone big so that it moves a lot of air easily and gives good bass, and it will start to 'break up' at no more than around 800Hz. This is too low to cover the region of the human voice. So the cone is made smaller, typically around 8in (200mm). It then has problems producing good bass, which we all know about, but the performance is just about acceptable.

A good, synthetic 8in cone will just about get up to a few kHz before its output starts to get ragged, above which it is not allowed to go by the crossover. This is the compromise now so popular, particularly in Britain. It is very cost effective, but it is also barely satisfactory. The cone starts to behave in a random and uncontrolled fashion, over the upper frequency range of the human voice, from around 1kHz up to 3kHz. Modern synthetic cone materials have helped minimise this problem, but it hasn't gone away by any means. Just how prevalent and influential it is you only realise after hearing a three-way. A better performance would be possible if the

cone diameter was reduced to 6in, but then the bass really cracks up.

Good two-ways are a balancing act. Most don't work very well, but some do in certain areas and have gathered a good reputation. The general standard though is quite low. I am hoping the three way will raise this.

The great advantage the three-way possesses is a mid-range unit that can and should be dedicated to covering the range of the human voice. As you might guess, this means using a smaller cone, around 4in being a common diameter. A good, synthetic mid-range unit will reproduce human speech and vocals with grace and ease. It will also handle a wide range of musical instruments with alacrity.

The difficult spectrum

back damping, free from all the low frequency energy that bounces around in the cabinet behind any two-way driver. Now Celestion tell us they have three new three-way designs, one costing £239 (see Trade Winds) and the other £900. I asked them to send the less expensive one straight away. You can understand why.

EMC

Alan Sircom wandered into the office muttering about how bad the Philips FA890 amplifier (tested in this issue) sounded with LP. He made it sound so bad that I became suspicious. There's been talk about new Europe-wide regulations designed to prevent hi-fi equipment from being sensitive to radio transmissions. The hi-fi must not act as a transmitter either. Apparently, the idea is to make sure that in the future, when we all have mobile radio phones (ye Gods) and everything becomes remotely operated by any form of transmission you can think of, from long wave to light, all around will stay calm and unaffected.

The part of every amplifier most sensitive to radio frequencies (RF) is the disc stage. A moving magnet pickup cartridge acts as an aerial, feeds the signal into the first transistor, where it gets rectified at the base-emitter junction. From then on, it becomes an audio signal that gets amplified by the rest of the signal chain and - presto - your hi-fi has become a radio.

The usual way of defeating this is to put a small capacitor across the said junction, shorting the RF to ground. However, the new IEC Regs. are so tough that even this is not enough, Arcam tell me. Like Philips, they have to meet the regs. for the German market, where they already suffer from imposed EMC (Electromagnetic Compatibility) requirements. "We have been carrying out tests with Naim," they said, "to see if we could both come up with a system that would meet the requirements but not affect the sound so much. It is virtually impossible, but we have managed to minimise the problem. A simple capacitor won't do. Proper line filters with inductors must be employed. Some German hi-fi manufacturers ship their products out with the components installed and the dealer then snips them out later," I was told. Not Philips dealers it would seem! ●

extremes, the low frequencies and high frequencies, are each dealt with by a drive unit more dedicated and better able to cope with them. The bass unit can have a whopping great cone to move large amounts of air with ease. This greatly reduces bass distortion and, because it is a better air load match, it gives (or should give) faster, more dynamic sounding bass. The tweeter has less work to do, but there is less obvious benefit at high frequencies. It is in the bass and the crucial mid-range that a three way can really knock the spots off a two way.

One of the last good three ways was the Leak 2060, phased out in the mid-seventies I believe. It had a superb mid-range unit. The white plastic cone had a rear damping layer applied to it. Sets of radial holes were used to break up standing waves. Designed by Alex Garner, now Technical Director at Tannoy, that loudspeaker would still put many modern designs to shame.

I was reminded of it by the new Heybrook Sextet ('orrible name) tested in this issue. The Sextet really sings across the mid-band, like no speaker I have heard for a long time. In part, I put this down to the fact that the mid-range unit is not trying to act as a bass unit as well. It has its own little chamber with

Space Aliens stole Richard Brice's column two months back, only to replace it with the one we printed the previous month. We felt it would only be fair to give him a bit extra this time round. I drew the short straw, so I get the short column. Still, at least it cuts the meandering down to a minimum.

Why do we spend hundreds or even thousands of pounds to listen to music? What makes us willing to pay a fortune to reproduce our favourite Bauhaus, Bartok or Bacharach pieces? Why am I employed? You can tell it's summer when hi-fi scribes go all philosophical.

The reason for this musing is two products that passed across my aural portals this month. The first is a smallish black box that is sitting at my feet as I write.



Feedback from Alan Sircom

sircom's circuits

Before you all turn the page to avoid an advertorial, let me say that this piece of equipment has long been discontinued, objectively is dreadful and the rarity of software would bring a smile to anyone still trying to collect new classical LPs.

The box is an old mechanical His Master's Voice portable gramophone which can only take ten-inch discs. To operate it you have to crank the handle that sets the clockwork in motion. There's a lever to engage the brake on the clockwork motor, a speed adjuster that allows the user to speed up or slow down from 78rpm and a true metal tone arm that amplifies the signal from the disc prior to its entering the built-in folded horn. Apart from the lid, which acts both as record storage and as a baffle to aim the sound in the listener's direction, and a small receptacle to hold used needles (ideally you should change the needle after playing every record), that's it.

How does it sound? Crackly and a bit tinny, I grant you, but the Inkspots sound better on it than anything else I can imagine in today's marketplace, and in some ways I might consider it superior to its modern equivalent, the Personal Stereo.

What sound it does produce (mostly mid-band) is genteel and

refined. It's less wasteful and more cost effective in batteries - clockwork doesn't use any. It goes loud enough for your picnic party to dance the Charleston without drowning other sun-worshippers in ill-controlled bass and it's perfect with a glass of well-chilled Chablis brought from your Tourer by your manservant, don'tcha know?

Little things like this, which my girlfriend found in a junk shop three years ago for fifty pounds, provide a great deal of listening pleasure on a level that we're all guilty of avoiding. The hi-fi snob, always first off the mark to criticise somebody who has only spent £20,000 on their system, has forgotten how much pleasure can be gained from a modest sounding system.

Lest this should sound jaded, I should now introduce the second audio gem I experienced this month. At last year's Penta Hi-Fi Show, Max Townshend displayed the most hugely dramatic loudspeakers one could imagine. Standing over five feet high, they sported no less than sixteen drive units each and cost about £7,000 a pair.

At the show in paper thin rooms packed full of people these speakers failed to give their all. Nearly a year later, I got a brief chance to spend an evening

with them, installed in the home of John Bamford, ex-editor of Hi-Fi Choice, now with Pioneer U.K Ltd.

Following last year's show, John was charged with looking after these Sir Galahads until a buyer could be found. One has been, so he was saying farewell to them. I understood why he was so sad at the thought of their departure within seconds of hearing them.

They seemed to portray music with an incredible intensity and without any sense of strain either on the part of the listener or the system. Recordings such as Frankie Goes to Hollywood's 'Three Tribes' are now impossible for me to play on my home set-up because of the information they revealed.

I digress - this isn't a review. The point is that we often become divorced from why we interested ourselves in hi-fi in the first place. Both these pieces of audio equipment had one important thing in common. Both made me want to listen to music more than the average midi system could ever inspire me to.

In one of my most frightening nightmares, I walk into a hi-fi shop, tell the assistant about my ludicrously expensive system, and ask what my next upgrade should be. The assistant cockily says, 'Records.' I reply, 'Oh I tried that once, but it did nothing for me.'

If that ever comes true, please, someone, just take me outside and shoot me ●

speakers too many!

Some of you may have already heard one of the new systems, the Roland Sound Space Processor, when it was demonstrated on 'Tomorrow's World' on the 21st of March this year (BBCI television with NICAM stereo, simulcast on Radio 1). The RSS system attempts to position sounds not only all around the head of the listener as in quadrasonic, but at angles above and below too. Theoretically the listener can hear sound anywhere within a three-dimensional space completely surrounding them.

Conventional recordings rely for their stereo effect on level differences between the left and right loudspeaker. The extreme

recorded message

Left by Richard Brice

The recording industry is buzzing with interest in new surround-sound technology. Manufacturers are hoping that they will overcome the hurdle that beset quadrasonic, because they have developed two-channel systems which only require an un-modified stereo hi-fi to enjoy it. Roland and Q-Sound have learned that, even for the most ardent music lover, four loudspeakers is two loud-

cases are obvious: If all the sound comes from one or other loudspeaker it is obviously perceived as emanating from a point within the loudspeaker. If both channels are producing equal amounts of power, the source appears to come from a point mid-way between the loudspeakers. Clearly different ratios between these two extremes will produce all the intermediate positions.

When a record is recorded, the artist, producer and engineer work to construct the stereo image by 'steering' each particular instrument, vocalist etc. into a stereo position by means of a special control on the recording studio mixer called a 'panoramic potentiometer' or 'pan-pot'. This control works in a similar fashion to the 'balance' control on an amplifier. If the engineer rotates the pan-pot clockwise, the impression when sitting between the two loudspeakers, is of the particular instrument (say a hi-hat cymbal or guitar) moving left to right across the 'sound-stage'.

The stereo system seems simple but it is also very subtle. It was invented by Alan Blumlein at E.M.I. and was the result of a good deal of development of the simplest and earliest form of stereo which was obtained by placing two microphones within the ears of a 'dummy head'. If a stereo signal is recorded in this way and subsequently listened to on headphones, the listener's ears are transported to the positions of the two microphones. This technique is known as 'Binaural' stereo and is capable of really amazing results. However if the two signals are reproduced on loudspeakers, the stereo results are very poor and E.M.I. knew most people wanted to listen to loudspeakers.

Corollary

Blumlein solved the problem but the corollary is an obvious one: Listen on headphones and the signals are inappropriate - the stereo image is within your head (technically the image is said to have 'lateralised') with a tiny bass

guitarist playing in the position of your olfactory lobes!

The Roland Sound Space system aims to produce, via loudspeakers, sounds which the listener would have experienced from true Binaural stereo but without the bother of wearing headphones. It goes further than conventional stereo in that it takes account, not only of level, but of the time differences of the signals reaching each ear. And it simulates the effects of the flappy bits of skin of the peripheral auditory system that surround the auditory canal. Technically they are called the pinnae and they are not simply there so that Van Gogh could cut one off as a sign of devotion or to provide somewhere to anchor your reading glasses. We know now what Blumlein did not: that the pinnae play a very important part in our ability to localise sound.

Time difference information and the pinnae's subtle and complicated filtering of the sounds arriving from all the various directions, are synthesized using digital electronic delays and filters within the RSS unit. The RSS control unit augments a standard studio mixer. Each channel has a dual 'pan-pot' control which allows the engineer to steer a source all around, and above and below the listener.

If these 'transaural' techniques have a fault, it is that perceived source positioning is occasionally erratic. This is true of binaural stereo too. The trouble is God created all men equal but He also gave them differently shaped pinnae and ears a different distance apart. Any transaural

system which is intended for mass entertainment must assume an average head and we humans are not used to listening using different ears.

There's no doubt that many two-channel surround-sound recordings will become available in the next few months and, I'm sure other transaural products will follow. The Roland system is expensive so it will only be productions with a hefty budget that will use it until the technology becomes cheaper. Of course, there are the purists who say all this is simply a gimmick. I thought the demonstration was very impressive; so what if it is an illusion or a trick - the gramophone itself was a parlour-toy once upon a time.

Primitive

In the meantime, you can try a primitive form of stereo surround-sound yourself. The effect works best for sounds which have little precise imaging - a mono source works well in fact. Sound effects are very suitable, so try to get hold of a LP or Compact Disc of library sounds. I can recommend 'Essential Sound Effects' (BBC Records BBC CD 792). Listen to track 3 on this C.D.; it is a good mono recording of seagulls calling and crashing waves. Now reverse the phase of one of your loudspeakers. This only involves swapping the wires over on the rear connectors of just one of your loudspeakers.

With this modification, your speakers will provide your ears with huge amounts of phase, or timing, information just like they receive in real life or in binaural

stereo. All of it is bogus of course - the phase carries no real information about where the sound should come from. But for an atmospheric sound effect where the sounds come from is irrelevant - it's only necessary that you should feel part of the scene. If you try it, I think you'll be amazed. The sea crashes behind your head, the wind whistles about your ears. It's most entertaining. 'Garden in Springtime' (Track 6) works well too. The gentle breeze seems to fill the room and birds twitter from all directions.

If this whets your appetite, the circuit in Fig. 1 can be interposed in the signal lead from the C.D. player to the amplifier. The changeover switch allows instant comparison between the in-phase and out-of-phase condition. I recently used this technique when I produced a record of children's music. I used conventional effects mixed with out-of-phase effects along with conventional stereo music tracks. As part of a conventional stereo 'mix' the out-of-phase effects tracks fill the room while the business of the music goes on in front of you.

Try the out-of-phase effect on headphones too. You'll notice that the snare drum will cease bashing away in the centre of your pituitary gland and will fill your head. It may even appear to move outside it into an imaginary sound world beyond ●

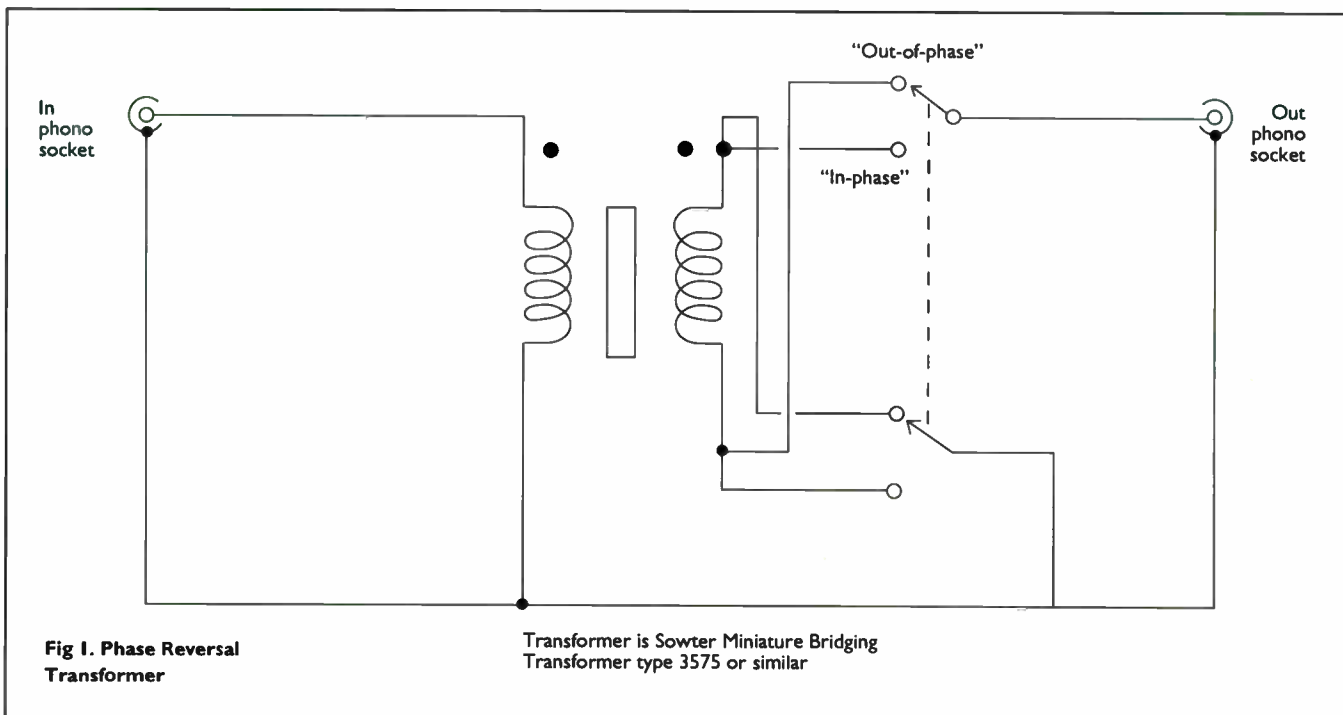
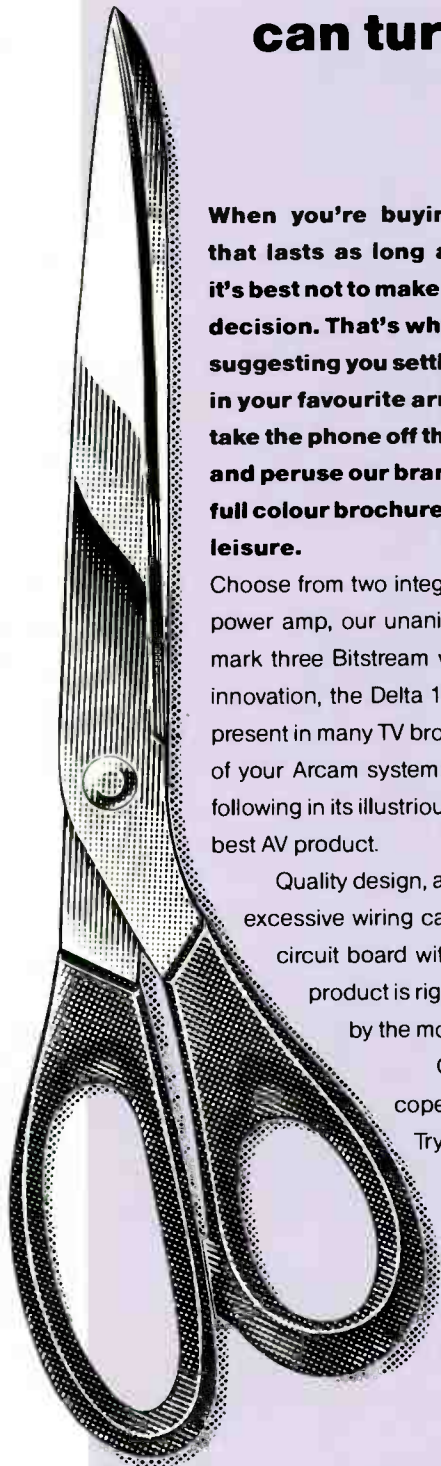


Fig 1. Phase Reversal Transformer

Transformer is Sowter Miniature Bridging Transformer type 3575 or similar

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



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

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

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

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

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



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audiophile products

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IN THE USA: AUDIO INFLUX CORPORATION, PO BOX 381, HIGHLAND LAKES, NEW JERSEY 07422-0381, TEL. 201-764-8958 IN CANADA: AVALON AUDIO LTD, UNIT 17, 975 FRAZER DRIVE, BURLINGTON, ONTARIO L7L 4X8, TEL. 416 333 4633

WorldRadioHistory



downmarket to players around the hundred to one-hundred-and-fifty pound mark.

It is now perfectly possible to buy for two hundred pounds a player of a quality that would have cost twice as much a few years ago. It's also possible to hear sounds that would be cheap at half the price! With that in mind, we picked our carefully selected half-dozen. Also, we compared the current crop against the winner of our CD comparison in the April 1991 issue, the NAD 5425 (at the time of this test, only the identical but remote control-less 5420 was available). Six months on, have there been any major steps forward in the budget CD market?

We adopted a different methodology for this group review. The Royal 'We' in these pages isn't used out of genteel politeness. Alan Sircam sat in on the listening session, while Noel did the measurements. Both Eric and Alan have quite different systems at home - Alan's a box loudspeaker user, but Eric's an electro-static fan - and we wondered whether we might fall out. We didn't! And just to give grandma the acknowledgment she deserves: she didn't die rich, but she died solvent.

Recordings used:

- The Jam: Compact Snap** (Polydor 821 712-2);
- The Cult: Electric** (Beggars Banquet BEGA 80 CD);
- Seal: Future Love EP** (ZTT Zang 11 CD);
- Tracy Chapman: Tracy Chapman** (Elektra 960 774-2);
- Echo and the Bunnymen: Ocean Rain** (WEA/Korova 240 388-2)

compact collection

**Eric Braithwaite tests six Compact Disc players
and finds a week's wages can land a bargain.**

My grandmother, being a thrifty Yorkshire-woman, had a guiding tenet about spending money. It was 'Never spend at one go more than you earn in a week.' This wise saw is worth bearing in mind for this month's survey of six Compact Disc players. They range from the Philips CD618, at a penny under £170, to the Pioneer PD-7700 at £250. All of the others sit a few pounds either side of the £200 barrier. That's the price bracket that relates comfortably to the average weekly wage, so granny would have had no qualms about opening her purse for any of these players.

Manufacturers are fighting hard in the marketplace for their share of what might

be termed the 'upper-budget' end of the CD world. This area is the one that attracts people moving up from a midi system. Buyers will happily spend such a sum of money, but not an amount that will frighten the bank manager. Inevitably, the product has to be made to sell at a low budget, and sometimes it's bound to show.

Only two or three years ago, almost any CD player at two hundred pounds practically came with a health warning. With a few noble exceptions, their sound could be characterised as brash and brittle, with a screamingly sharp treble; listening could be painful. Today, that poor quality of sound has moved much further

- Ornette Coleman/Pat Metheny: Song X** (Geffen 9 24096-2);
- Cesar Franck: Three Chorals/Peter Hurford** (Argo 411 710-2);
- Stravinsky: Dumbarton Oaks/English Chamber Orchestra, Colin Davis** (Decca 425 622-2);
- Walton: Facade/Peggy Ashcroft, Jeremy Irons, London Sinfonietta, Ricardo Chailly** (Decca 421 717-2);
- Schubert: Octet D803/Academy of Ancient Music** (L'Oiseau-Lyre 519-2);
- Harp Music of the Italian Renaissance/Andrew Lawrence-King** (Hyperion CDA 66229).

Measured Performance

The XC-900 uses a Philips Bitstream chip (SAA-7350), just like the XC-700, with which it has much in common. The '900 is an improved '700 in fact, rather than a completely different design. Our review sample unfortunately suffered distortion, as the analysis below shows. The spikes are distortion products and quantisation noise, giving the XC-900 a similar measured performance to the XC-700, tested in our July 1991 issue. The odd feature about this is the fact that the SAA-7350 chip usually gives somewhat better results, at least when used properly. I strongly suspect this player has layout problems, Philips' true one-bit system being more critical than three-and-a-half bit systems. Distortion on low level signals was higher than that of many players, although little worse than the budget Philips CD618.

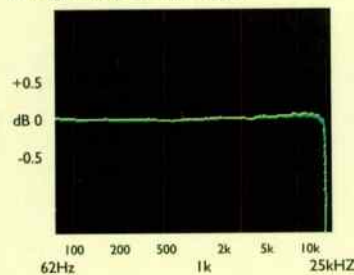
Aiwa have given the upper echelons of the frequency response characteristic a slight plateau lift, which is marginal in audibility. It is difficult to be adamant about it affecting sound quality - but it may to some slight degree. Slight treble lift can add a sheen to the sound, or even some glassiness. Only listening tests can determine this.

Noise was low, channel separation wide and output healthy at 2.3V. There was little in the way of high frequency distortion or spurious high frequency outputs above 21kHz. The XC-900 looks much like the XC-700 in overall measured ability.

Test Results

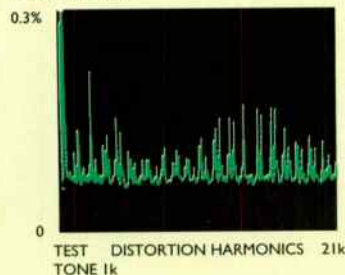
Frequency response	4Hz-20.9kHz	
Distortion		
-6dB	.008	.008
-30dB	.036	.03
-60dB	.9	.83
-90	41	44
-90dB dithered	14	17
Separation	left	right
1kHz	-103	-108
10kHz	-79	-93
Noise	-98dB	
with emphasis	-98dB	
Dynamic range	101dB	
Output	2.35V	

Frequency Response



Very slight plateau treble lift

Distortion



Distortion spikes clearly visible

AIWA XC-900 £219.99

The XC-900 sits on a rung just above the budget XC-500 and '700 players, reviewed in our July 1991 issue. The Philips equipped XC-700 in particular proved good value - an act the '900 has to follow. Here, it is in the company of some stiff competition.

Aiwa use a large case with that most recent piece of ingenuity from Japan - a moulded plastic fascia that all but perfectly mimics a brushed aluminium extrusion. I won't tell which costs the most. There is a slight loss of flatness and lack of depth to the gloss of the plastic version, but it takes a trained and critical eye to spot this sort of thing. Aiwa include a twenty button numerical keypad on the player, but this gets reduced to ten buttons on the remote control, to make it manageable I presume.

The XC-900's front panel is not littered with facilities and it lacks some of the complexities of the Technics, but it does have a fair range, all the same. Amongst them is a calibration tone set to -8dB, which these days is a bit low to show true peak levels. It does give a good idea of where to place 0VU however. A peak search facility will set the player to scan an entire disc at high speed and then read out the level of the highest peak encountered in dB below full output. This commonly shows -2dB or thereabouts, 6dB above the calibration tone. Good cassette decks can just about cope with this over a short period.

Remote control of volume is not fitted, but there is an optical digital output. The front panel has a headphone output with its own volume control and a large, blue fluorescent display that shows track number, time, index number and a track calender.



Sound Quality

Walton's 'Facade' began the listening session. This recording became a favourite of ours, since it showed up any shortcomings in depth, imagery, timing and colorations in voice to boot. Inserted in the Aiwa, it gave us something of a shock from the first squeak (and it did squeak!) of the piccolo. Peggy Ashcroft's voice seemed to plod rather than lit - much of her marvellous rhythm and timing was subdued.

The Cult's drumkit was ill-defined and the overall mix somewhat muddled, parts of the mix receding. "It sounds as though Ian Astbury's singing from way behind the microphone," said Alan. In Omette Coleman's 'Song X', the drumkit, albeit complex and difficult for all but the very best players to delineate, also seemed amorphous. The saxophone playing was by no means as raunchy as it could - or should - be.

We turned next to Tracy Chapman, but found her voice was too nasal. It was also recessed in a soundstage which did not give an impression of being particularly wide, and was limited very clearly by the outer edges of the loudspeakers.

A quick burst of harp failed to enthuse us much more. I thought it sounded synthesised and Alan commented that if he hadn't known better he might have thought it was an electric lute! Peter Hurford's organ recording showed the bass to have something of a squashy quality. All the pipes except the higher ones tended to merge into one another in a welter of sound which is not actually typical of this recording.

Summary

This was a cruder presentation than we would have expected, bearing in mind the success that Aiwa have had with the less expensive XC-700. But that player is some thirty pounds cheaper than the XC-900. The higher price of the XC-900 is not so easily justified, since it offers little improvement.



KENWOOD DP-5030 £199.95

Although conventional enough in basic style, the Kenwood is nicely detailed and neatly finished. It looks a touch sharper and just a bit better made than the others. Use of a real aluminium extrusion for the front panel helps, giving a smooth, even surface finish with a deep sheen. Some visual interest has been added to the basic physical layout of buttons, display and disc drawer by the addition of ledges and grooves, to pick out the different areas. Undereath it all, the DP-5030 is conventionally made, differing little from the other players in this group.

One reason the player itself looks



relatively unencumbered by facilities - twenty button keypad apart - is that many have been confined to the remote control unit. This carries a peak search facility, track or selection repeat and A-B repeat, where any excerpt can be selected and repeated. The track-time display can be toggled to show remaining track time or disc time. Kenwood have a predilection for flashy (literally) displays. Using peak search, the machine finds the track containing the highest peak, replays it continuously for level setting purposes before recording and sequentially flashes all the numerals of the calendar. All this flashing makes it look like a fruit machine. Pressing Random play induces another fit of flashing from the calendar, this time with the numbers flashing on and off in pseudo-random sequence.

Remote control of volume is carried out by a motorised volume control. A small red LED on the control knob flashes

as it turns. This is one of the best ways of providing the facility.

Sound Quality

The Kenwood, alas, was in need of a little more of the civilising influence that has been brought to bear on the sound of many other £200-ish players over the last few years. Music had a sheen to it, bass was big but plummy and voices had a metallic tinge. This was particularly noticeable on the Tracy Chapman CD, where her voice sounded thinner and more pinched than it should. It seemed as though there was a trace of midband coloration, which 'hollowed out' the musicians' surrounding acoustic. While there was an impression of depth, on closer inspection this was vaguer in specific details than we heard from some of the other players.

Both soundstage and imaging were fair for the price, but the overall impression was of an element of incoherence, as though the strings holding together any complex textures were looser than they could be. This was particularly obvious when playing both Echo and the

Bunnymen and Ornette Coleman. On the latter's 'Song X' CD, admittedly a difficult one to resolve, it took concentration to tell what was going on or where. Music generally took on something of a ponderous feel. The overall tonal balance, while not as accurate as other players in this group managed, was not overly fierce or unpleasant. Alan said of the higher frequencies: "There appears to be a shiny band of treble - and the rest somewhere below it."

Summary

The Kenwood lacked the smooth integration over the frequency band which we found in nearly all the other players in this group. Alone, perhaps it would not have been so noticeable, but better overall control and an easier sound to listen to is available in the same price range from other manufacturers.

Measured Performance

The frequency response characteristic displays a small rise in high frequency output, seen below, which is possibly enough to be audible as a slight emphasis of treble. This can result in a divorced sounding high frequency region, which compromises the sense of cohesion that it is important to have in music. Because of this likelihood, rising treble is a property best avoided in CD players and, these days, manufacturers are successful in doing so. Even companies like Pioneer and Philips seem to have got the message, first exploited by Cambridge and then by Arcam. Kenwood have not engineered with the wisdom of experience here.

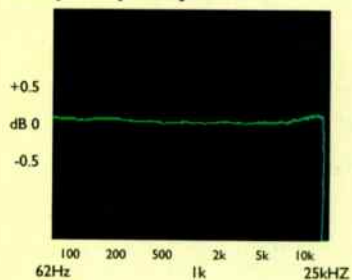
Overall distortion levels were low right through the dynamic range of the machine. At -30dB music level a low 0.007% distortion was returned, a small amount of third harmonic being responsible. This can just be seen as a small blip at left in the distortion analysis. At lower levels, resolution of the signal proved effective on both channels and good signal symmetry resulted in relatively low distortion, especially in the presence of dither. Distortion on a -90dB dithered signal measured 6%, a low value - if not the lowest.

In all other areas the Kenwood measured well, but unusually low noise figures suggest muting at digital silence. They are not a true measure of noise.

Test Results

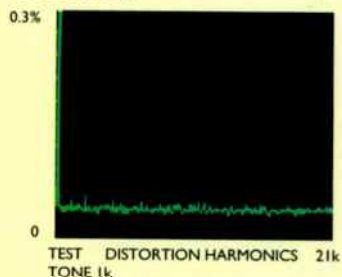
Frequency response	4Hz-21kHz	
Distortion		
-6dB	.005	.006
-30dB	.007	.007
-60dB	.7	.7
-90	44	44
-90dB dithered	5	7
Separation	left	right
1kHz	-109	-113
10kHz	-84	-88
Noise	-128dB	
with emphasis	-128dB	
Dynamic range	105dB	
Output	2.06V	

Frequency Response



Rising treble

Distortion



Some third harmonic distortion

Measured Performance

The Marantz has a ruler flat frequency response right up to 20kHz, as the analysis shows. Marantz don't tend to be much worried about such matters, unlike Technics and Meridian, for example. Such a characteristic does invariably result in an even perceived tonal balance however, which has its advantages. It tends to ensure that neither warmth nor brightness colour music, both being minor inaccuracies.

This is a Bitstream player, but it uses an inexpensive grade of chip. Less accurate than higher grades, measured distortion was higher than that of many rivals in this report and the analysis picture below clearly shows the spikes reaching 20kHz. Measured level was not overly high all the same, at 0.028%. Distortion at this level is not high enough to be obvious, but it can just tinge music with the slightest of roughness or add just a small amount of muddle. Such things are only discernible by long comparisons though. Low level signals were resolved satisfactorily.

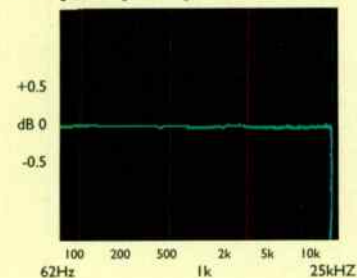
Channel separation was wide and unwanted spurious outputs above 20kHz minimal. Marantz have used effective filtering. I was surprised at the amount of audio band noise. It measured no less than -86dB, suggesting use of an SAA7321/3 chip. Luckily, at this level hiss does not become obvious; Compact Disc has a lot of leeway in this area.

The CD-52 does not have the near perfect measured performance of the Technics, to name but one example, but it was satisfactory.

Test Results

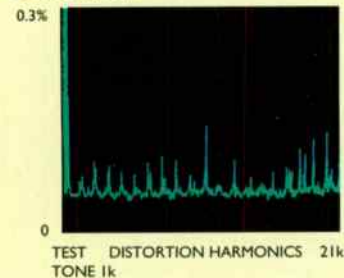
Frequency response	4Hz-21kHz	
Distortion		
-6dB	.006	.005
-30dB	.027	.028
-60dB	.9	1.2
-90	28	31
-90dB dithered	9	11
Separation	left	right
1kHz	109	108
10kHz	85	88
Noise	86dB	
with emphasis	88dB	
Dynamic range	102dB	
Output	2.3V	

Frequency Response



Very flat frequency response

Distortion



Distortion spikes up to 20kHz

MARANTZ CD-52

£199.90

It would appear that Marantz have taken a second look at their styling and have decided that they could do better. I would agree. The radiused edges and full width convex ridge of earlier models have been reduced in prominence, the display greatly improved by increasing its visibility and some of the blandness removed by some ridges and depressions. The last is most effectively used on the power button - a big, square object with the words Compact Disc Digital Audio moulded into the front face in the style of engraving.

Before, I seem to recall, Marantz used a garish blue fluorescent display with unusually small symbols on it.

Now they have swung round to big numerals, easily legible at a distance. Both track number and time are more easily discerned as such than is common on rival players. Marantz now being an arm of Philips, the CD-52 has FTS, or favourite track selection. This recognises discs and plays pre-selected tracks only.

The main transport buttons have been increased slightly in size, now being adequately large. They are well placed in the most accessible position at top right of the fascia, falling to hand easily. The player has a ten button keypad and so does the remote control unit. The programme memory will store up to thirty tracks and can repeat one, many, or any number between selected points (A-B).

The headphone output has a volume control and an electrical digital output is included on the rear panel. Fast search has two speeds, which can be convenient.

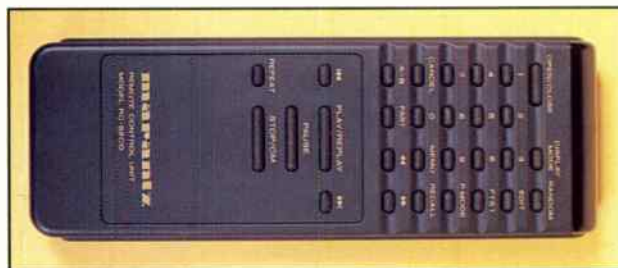
Sound Quality

We began with Jam's 'Down in the Tube Station at Midnight', and discovered that this player had authentic, tight bass. Guitars were clean and voice had real

presence, rare in players at this level, though we felt it was a little harder than it might have been.

There wasn't a great amount of true depth, when compared to the reference. Vocals in The Cult's album were a bit further back in the mix, but images were extremely stable and an appropriately 'dirty' sound prevailed. The elements of the various Rock mixes were clear, defined and well-presented. In addition, there was perceptible and distinct 'air' around the performers.

Overall tonal qualities were excellent. Feeling enthusiastic, we tried Ornette



Coleman. For the first time in the test, Coleman's sax sounded dynamic; while the individual elements of the drumkit were still not as separable as they could have been, we could recognise where the bits and pieces were! Pat Metheny's guitar was precisely placed and distinguishable. This is a cruel CD, for it's complexly stranded free jazz, and there's no 'tune' to hold on to. The Marantz portrayed the performance successfully, making it enjoyable.

'Facade' sounded both sweet in tone and realistic, with the instrumental timbres and the mutes on the brass all present and correct. Peggy Ashcroft has the ability to 'swing' her voice, changing inflections and the rhythm line by line. While this wasn't as clearly articulated as the best players can manage, there was more than enough to produce an enjoyable performance.

Summary

Clear, clean and articulate, though lacking some depth, the Marantz is an honest player, if more analytical than would suit some tastes.





PHILIPS CD618 £169.99

This is a budget Bitstream player, right at the bottom of the price range, but supplied with a simple remote control all the same. Philips keep the fascia simple, perhaps because they have to, but the CD618 is no worse for it all the same. A 0-10 keypad for instant track selection is fitted to the player, as well as the remote control. I was surprised to see lack of fast search or programming on the RD6830 remote control handset. This is where cost cutting does become noticeable. The player itself has two speed search in-



cluded, and it will store up to twenty tracks in the memory. Repeat of a single track or a selection of tracks is possible, as usual, and so is repeat between user selected points (A-B repeat).

What this player lacks is a peak search facility, now to be seen on the more expensive Japanese models and the Marantz (now an arm of Philips). It does not have remote control of volume or any other facility to aid tape recording, such as Edit. None of these facilities are essential; whether they are useful depends upon individual user requirements.

The blue fluorescent display panel has very large numerals showing track number and elapsed track time. A time display option allows remaining track and disc time to be shown as well. Philips include a 15 track disc calendar, which shows graphically how many tracks are left on a disc. The whole display was one of the clearest and most legible in the group.

With large main transport buttons at

top right, where they fall easily to hand, the CD618 proved easy to operate. At bottom right there is a headphone socket with a small manual volume control. The rear panel carries normal analogue signal outputs and an electrical digital output.

Sound Quality

This one had our feet tapping. Tracy Chapman's CD had bass that went low very nicely, if a trifle warm and boomy. It was, however well integrated with the rest of the frequency range. This gave the feeling that the Philips had power and push behind the music-making. It was not perhaps ultra-dynamic, but more than acceptable. The mid and upper ranges were tuneful, clear and articulate.

"This is a good, easy sound to listen to," said Alan. "No quirks or quiddities," I added.

The Cult's CD had good depth, if slightly shallower than the Marantz, but the overall presentation could only be described as bouncy.

It was difficult to believe, but both pairs of feet moved to Ornette Coleman. The sax playing was suitably fierce, with real intonation and a tangible feel of both Coleman and the band working hard. Some parts of the drumkit seemed a little dulled and the bass notes indistinct, but it was easy to follow the instruments and their musical strands. This is no mean feat on this recording.

The last three CDs into the drawer began to show up a slightly 'soft' treble. Woodwind in 'Facade' was accurate and the rhythm and timing of Peggy Ashcroft's voice made us sit up and take notice. Stravinsky's 'Dumbarton Oaks' displayed the ambience of the venue unmistakably.

Summary

There is a certain fakery in reproducing music with a warm bass and a soft treble, but it does make the Philips both 'listenable' and 'expressive.' We weren't sure which of us said which word; they came out together!

Measured Performance

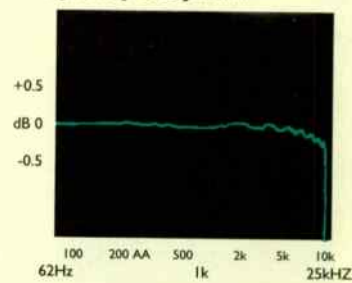
The frequency response of this player looks peculiarly dated, with digital filter ripples and a slowly falling high frequency output. This used to be common some years back, but nowadays something more closely approaching flatness is usually achieved. The roll off is enough to ensure a complete absence of treble sharpness, prominence or glare, but it is not quite enough to produce obvious dullness. In the engineering of a CD player, or perhaps I should say the final trimming of its subjective properties, when such a process is indulged in, rolling down upper treble by just a small degree is generally a wise move. So no criticism of the Philips is implied; rather the characteristic suggests that Philips have made a conscious decision to response-tailor for the sake of it.

Budget Bitstream usually throws up some small amounts of distortion, more than that encountered from differentially operated twin-chips. This was the case with the CD618; there are just a few anharmonic distortion products, seen in the analysis below. Overall energy levels in distortion products was not high though, so I would not expect any undue coarseness from this source. The player did not resolve low level signals very effectively, a -90dB dithered signal possessing around 30% distortion. However, this is acceptable at the price.

Test Results

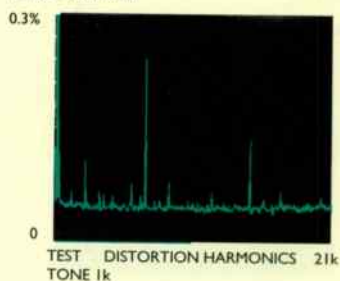
Frequency response	4Hz-20.6kHz	
Distortion		
-6dB	.004	.004
-30dB	.03	.02
-60dB	.85	1.1
-90	29	35
-90dB dithered	28	30
Separation	left	right
1kHz	91	93
10kHz	87	92
Noise	97dB	
with emphasis	100dB	
Dynamic range	100dB	
Output	2.07V	

Frequency Response



Treble rolls off

Distortion



Small amounts of distortion visible

Measured Performance

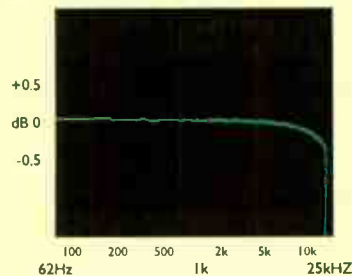
It is not possible to measure jitter on the analogue output of a CD player, so the effect of the turntable cannot be directly quantified. However, Pioneer always employ a technology that measures well in a conventional sense, like Technics, so it was no surprise that the PD-7700 produced no measurable distortion at the -30dB test level. The distortion analysis below shows this as an absence of spikes along the smooth noise floor. This standard of performance was maintained at all signal levels, right down to -90dB. In the presence of dither, distortion at -90dB falls from 30% to 2.5%, the latter being almost as low as possible. So the PD-7700 is a linear, low distortion design.

A small downturn in the treble end of the frequency response trace, clearly visible in the analysis below, usually results in a certain smoothness of treble character and an absence of even the slightest form of glare or feeling of detachment. Filtering above 21kHz was extremely good, removing unwanted supersonic products effectively. There was little in the way of measurable rubbish put out by this player. The player almost certainly muted at digital silence, since no output noise was measurable. That's known as cheating! I suspect that Pioneer might be trying to hide some supersonic noise, since low bit digital to analogue conversion systems are often noisy.

Test Results

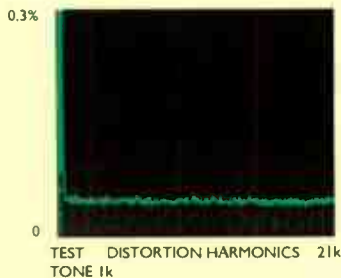
Frequency response	4Hz-20.8kHz	
Distortion		
-6dB	.004	.004
-30dB	.005	.005
-60dB	.58	.42
-90	31	29
-90dB dithered	2.5	2.3
Separation	left	right
1kHz	-105	-107
10kHz	-79	-82
Noise	-118dB	
with emphasis	-126dB	
Dynamic range	108dB	
Output	1.96V	

Frequency Response



Slight treble fall

Distortion



No distortion

PIONEER PD-7700 Typically £250

Pioneer have captured imaginations by the use of a turntable within a CD player. It doesn't have a pickup arm however, nor belt drive. It does mimic LP in one sense though, by supporting a disc across its entire surface area in order to prevent vibration and resultant jitter of the digital signal. This does require owners to insert discs 'upside down', so that the label side rests on the black rubber mat of the turntable (no, we didn't try a felt mat). This makes the shiny reflective surface face upward which, if you insert CDs in their cases the usual way around (shiny face down) leads to a juggling act before insertion. It's a problem easily solved by reversing all the CDs in their cases of course.

Keen to show buyers the wonder of a CD on a turntable and, perhaps, to add an analogue feel to the player, Pioneer equip the disc drawer with a small, clear window through which the spinning platter can be seen. This is to perhaps ensure incredulous owners that turntables can exist within CD players and that the whole scheme is not a sham!

Above the peculiarly shaped disc drawer, which reminded me of the prow of a Greek trireme, sits a blue fluorescent display panel, showing track number, time, index number and track calendar. The numerals were on the small side for distant viewing. To its right lie no fewer than twenty track number buttons, a feature also to be found on the remote control unit. Like many of the others, this player will scan a disc for the highest peak. The strength is not noted but the excerpt at which it occurred is replayed repeatedly until stopped, allowing record level to be set. Remote control of volume is provided, using an electronic attenuator, but an alternative fixed output is not provided. An optical digital output is fitted.

Sound Quality

The Pioneer made a good impression from the beginning. Classical brass and strings were well rounded, but somewhat thin. Although the oboe and clarinet in Schubert's Octet were easily distinguishable, the 'authentic' strings of the Academy of Ancient Music, dry at the best of times, sounded definitely lean. Walton's 'Facade' showed the voices to be a trifle more lightweight than they ought to be, but they were well placed in the acoustic. Despite a touch of jangliness in the upper treble, the overall presentation was both delicate and refined.

Perhaps too much so: a quick check against the reference on Tracy Chapman's eponymous disc showed that though the bass was controlled, it wasn't as tight as



possible and could even be plummy at times. Other recordings showed the mid-band to be light, but clean and airy. Our only quibble was that classical music particularly sounded subdued. While tonal balance was never in question, we never became as involved in the music as we would have liked to have been. Inner detail was very good for the price range, but the soundstage was shallower than ideal. This turned out to be common among our batch of players. The overall impression was one of being 'Civilised' in the good sense of the word.

Summary

This player has both positive and negative attributes about it. If the Pioneer is used as a palliative, to settle down a raucous system, its calming influence will be well received. In more conventional surroundings, however, the Pioneer's dry, polite nature may prove too urbane.





TECHNICS SL-PG400A £179.95

Technics products long ago settled into a certain house style. It isn't radical, but it is distinctive enough to distinguish them from the rest. A gunmetal grey finish of lighter hue than the blacks normally used helps in this regard, added to which is a display of pale blue, with red numerals. And the display has a surprise feature of great interest to tape enthusiasts: a music level display. It's probably included to capture the attention of buyers en masse, but in this instance the flickering lights do have a purpose. They inform of peak

panel headphone output has a small manual volume control. An optical digital output is provided at rear, plus a fixed analogue output. Remote control of volume is not provided.

The player is well finished, but build quality was no better than usual. Some hollowness in the case and flimsiness in the disc drawer are obvious. Technics use Japanese MASH low-bit technology to minimise distortion. Measured performance was good, with the exception of some crosstalk at high frequencies.

Sound Quality

The piccolo at the beginning of Walton's *Facade* frightened us for a moment by being sharp and piercing, more than it should be, but the mid-band soon showed up as both sweet and gentle. Voices were a little laid back, but Peggy Ashcroft's voice retained all its wide variety of inflection and intonation. The brass instruments were definitely using mutes, though this could have been more obvious. The Decca recording of Stravinsky's *Dumbarton Oaks* came across well, with a fair grip on dynamics, though it was

obvious from the double basses and cellos that bass response was lightweight.

Moving over to the rock programme, Seal's 'Future Love Paradise' also turned out to be lacking in life. While the bass was quite well defined, if a bit overblown, there was no power behind it. This made tracks from *The Cult* lack 'graunch' - "Makes 'em sound like Simon and Garfunkel", intoned the Neanderthal Sircom. Tracy Chapman's CD showed bass to be lagging - as though it popped up out of a hole, realised it was tardy, and then put its head down again to wait for the next time. That mid-range was very clean and tidy, though; it's a pity that music like *Echo and the Bunnymen's 'Seven Seas'* lacked so much in terms of punch and vibrancy.

Summary

While the facilities are interesting and useful, the Technics' inability to drive music hard overshadowed its delightful mid-band performance, and in the end failed to keep our attention on the music.

levels likely to be encountered when recording, as well as showing what level exists on the CD itself. To enhance the usefulness of this for recording, a clever peak detection system has been included. Press a button marked Peak Search and the player will scan a disc at high speed to find the maximum level encountered. It then goes back to the point where the peak occurred and replays it continuously in Repeat A-B mode. It's a pretty neat trick, and useful too.

The display panel also shows track number, track time and index number simultaneously, plus a 'calendar' of tracks remaining to be played. Beneath lies a horizontal row of buttons for track number selection, repeated on the remote control unit of course. Over to the right lie the programming buttons, which relate to a twenty track programme memory. Technics seem to have placed more emphasis on recording from CD though, including a host of functions for assessing track allotment per tape side, assessed by total playing time. The front



Measured Performance

This machine has a very flat frequency response, as the analysis below shows. It extends from 4Hz right up to 21kHz, before dropping away rapidly. This gives the player an even tonal balance.

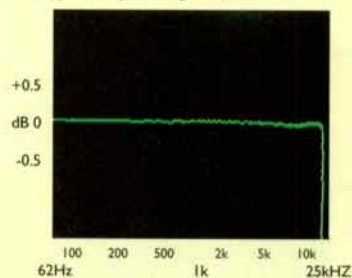
Technics use a single MN6474 digital convertor chip which, like the Philips SAA7350, configures two DACs per channel in distortion-reducing differential mode, making four in all. This accounts for the abbreviation MASH on the drawer front, and the legend 4DAC below. The outcome of this is lower distortion than any other player in the group - and very low distortion by general CD standards. The analysis shows that harmonics were not detectable at -30dB music level from a disc. At other music levels, distortion was commensurately low in comparison to other players, especially when the signal was dithered. The worst case result was then just 1.7% at -90dB.

Channel separation was wide in the mid-band, but deteriorated by an unusual amount at high frequencies. However, at -62dB worst case, it was still far greater than that from cassette and LP; stereo imaging was not compromised. There was little in the way of unwanted outputs above 20kHz, showing that Technics use effective filters. Noise was very low too.

Test Results

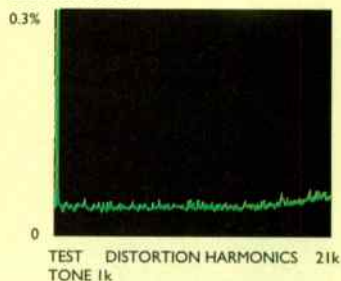
Frequency response	4Hz-21kHz	
Distortion		
-6dB	.006	.006
-30dB	.004	.004
-60dB	.36	.37
-90	23	22
-90dB dithered	1.7	1.7
Separation	left	right
1kHz	-99	-101
10kHz	-62	-62
Noise	-107dB	
with emphasis	-111dB	
Dynamic range	109dB	
Output	2.05V	

Frequency Response



Very flat frequency response

Distortion



No distortion at -30dB

CONCLUSION

Inevitably, a group test of this kind turns into a contest. On this occasion there was one clear winner, a very close runner-up and two trailing behind well after the tape had been broken.

We took no account of the price of these CD players - in fact we didn't even ask the manufacturers - until the listening session was over. Nor did we do a 'bells and whistles' count. This was so that we wouldn't be swayed by any artificial value-for-money considerations and could concentrate on sound quality alone.

When CD players are displayed on the shelves in the shop, a range of facilities suited to the buyer's purposes is obviously going to sway the final decision. One extremely useful adjunct which even the cheapest player possessed was a remote control. This provision is 'market-led' as the advertising men would have it. It seems that we're all becoming lazier, losing the use of our legs, or we've become so used to controlling so much in the home from the comfort of our seats that a remote is indispensable.

It is worth saying a word or two about the remote handsets. These days it's not uncommon to end up with four or five lurking down the back of the seat, while some poor soul tries to switch the television to Channel Four with the control that belongs to the cassette player. It does help if they are distinguishable from one another. The Aiwa, Kenwood, Pioneer and Technics controls were the usual black colour, oblong, and palm-size, with the normal plethora of small buttons. All grouped the most used functions together below the programming buttons.

Quibbles

There are two quibbles here. Pioneer and Kenwood both provide numerical keys up to twenty for programming track replay, with a 'Plus' or 'Greater Than' button for higher track numbers. Philips and Marantz offer a simple calculator-style keypad which I think makes entering double figure tracks easier and keeps the remote relatively uncluttered.

The second quibble is the provision of

'Drawer Open/Close'. Since you have to walk over to the player to put in and take out a disc anyway, I can't help but feel this is unnecessary frippery, adding one more button to the clutter. Like any new toy, the fun of seeing the drawer open and close from a distance wears off quite rapidly.

The remotes offer all the available facilities and everyone except Philips include the natty new 'peak search' facility to aid home taping. The Marantz and Philips remote control handsets are most easily distinguished within this batch, but curiously the Marantz, in common with the Kenwood, omits one piece of identification: neither has a Compact Disc logo on it. Programming buttons on the Marantz handset are set into grooves, which is a useful application of ergonomics. The user's fingers are less likely to slip from one button to another. The Philips control, finished in grey instead of the pervasive black, is easily the simplest, but the player is also the cheapest of the group with fewer facilities than the others. To my mind Philips remote handset is the most elegant. Being slimmer and gently curved, it fits easily into the palm and, cleverly, 'Previous' and 'Next' buttons are arrow-shaped, instead of using cassette deck type symbols like the others.

In the sound quality stakes, bringing up the rear were the Aiwa XC-900 and the Kenwood DP-5030 players. The Aiwa was a disappointment, especially as it uses the same chip as the XC-700. It was reminiscent of the £200 players of two or three

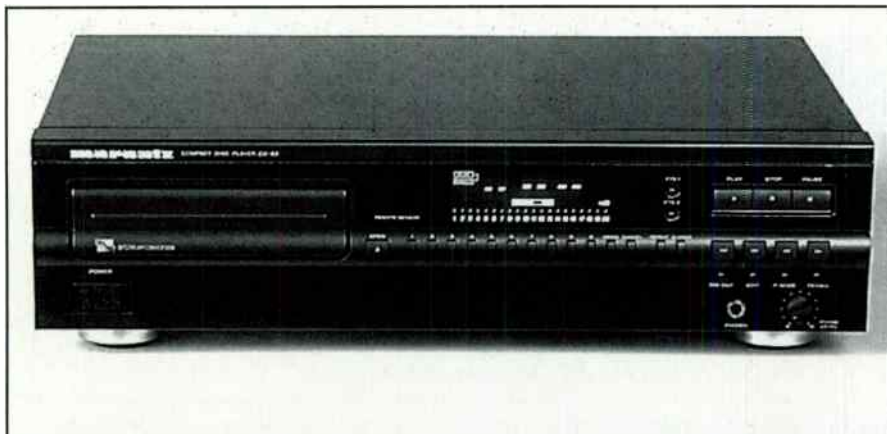
years ago. The best that could be said for them was - they played discs. Both mid-range and bass were hollow, without real substance; the soundstage was neither particularly wide, detailed nor defined. Without being as offensive as the older players at this price level ("as long as you don't like listening to harp or piccolo," said Alan) the XC-900 was simply unrefined.

Mid-range coloration also put the Kenwood DP-5030 out of the running in this company. "Not vexatious," Alan commented about its overall character, but the glassy, metallic sheen to the upper mid also reminded us unfavourably of past budget players, though it was not as fierce. While tonal colours were not outrageously altered, this player's overall diffuseness made it somewhat uninteresting. It's ability to turn itself into a fruit machine when Random Play was selected did add interest, though it did nothing for the sound quality.

In Front

In front of the Kenwood was the Technics SL-PG400A. Its most striking quality was the sweetness of the mid-range and treble. This was a player which treated music gently, and gained our respect in this regard. In some areas, such as inner detail and definition, it was up with the best and could equal the front-runners. It did nothing wrong - except in its rather anaemic bass which drained the punch and life out of performances. "It can't put the boot in where it's needed," I said in our original listening notes. This would not necessarily be a disadvantage, if carefully matched with the rest of the system, but care would be needed. We were both much taken with the tape level and CD peak-level bar meters, which kept us amused in the way computer games do, and could certainly come in handy for (sssh!) home taping.

Firmly in the middle was a player whose weaknesses were also, paradoxically, its strengths - the Pioneer PD-7700. This is the player that pokes a toe into the realm of the LP - its disc drawer is equipped with a turntable! The sound was both delicate and refined, and came close to the top players. Bass, though well controlled, did turn a little plummy low



"Here is a player which offers superlative styling, virtually unbeatable sound quality and is something of a bargain... without doubt the finest sounding CD transport I have yet tried"

Chris Frankland, Hi-Fi Review, Dec '90.

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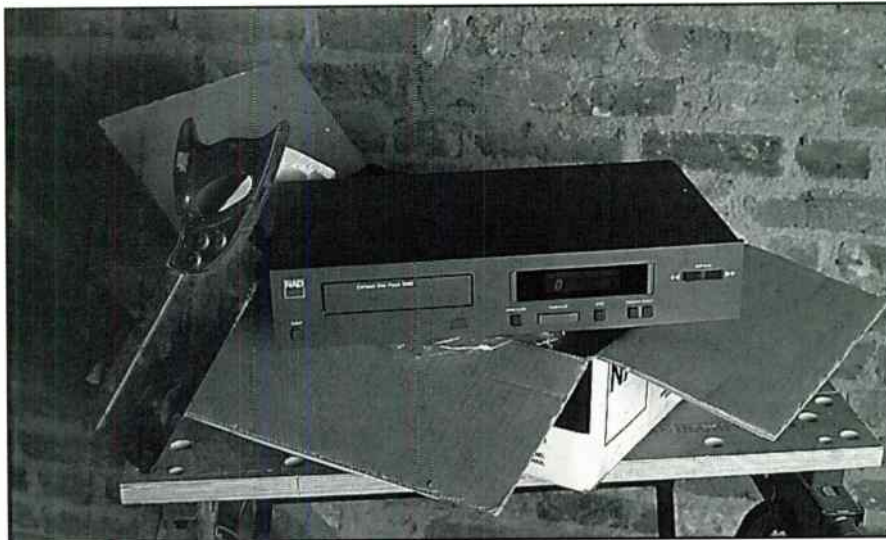
down, but this would not be a problem in a price context related to the cost of the player. Lean, dry and civilised (in the good sense of the word rather than the pejorative) summarises the sound. While we felt its leanness lessened its ability to bring music to life, this is a player that would suit many buyers.

Top two in the ranking were the Marantz CD-52 and Philips CD618. After some discussion, we agreed in marginally preferring the Philips. Civilised, without being too restrained, it was the more listenable - or more 'musical' to use a much abused word. Where the Marantz scored was in better, tighter, bass control: the Philips was a trifle woolly, and could come close to losing its grasp. Its upper treble was softer, too; whereas the Marantz would be described as 'analytical', not masking any of its mistakes, the Philips was warm and consequently, we thought, more expressive.

The choice between these two players is down to personal preference - and price. To our surprise, the Philips CD618 was the cheapest of the whole group, so the boys and girls in Eindhoven deserve congratulation for what they have achieved.

Reference system used:

Arcam Delta 170 CD transport with Deltec PDM-ONE Series II digital-analogue convertor. Deltec DSP-50S pre-amplifier, our own custom active cross-over/equalisation network driving modified Quad ESL-63's via Deltec's DPA-50S power amplifier and Celestion's SL-6000 sub-woofers via Audiolab's 8000M monoblock amplifiers. Audioquest Topaz interconnect, Deltec pre/power interconnect, Deltec loudspeaker cable, Monster Cable for the sub-woofer ●



BACK TO THE NAD

Back in April this year, we conducted a similar test of six players in the same price range. There were two broad conclusions then, but time has moved on and overtaken them. "Six weeks," someone wearing a Gannex raincoat said, "is a long time in politics." Six months is a long time in CD player design!

One-bit processing, we said then, isn't the panacea for the cheaper player it was often claimed to be; for some companies, it still isn't, but both Marantz and Philips have made a success of it this time. It is becoming easier to lay your hands on a good player under three hundred pounds than it was then.

In April, it was the NAD 5425 which came out the best of the bunch. We slotted its brother, the 5420, into this month's batch to see how it fared now. The two players are in fact identical - the difference in numbering is to do with the 5425 being supplied with a remote.

Compared with the best two - the Marantz and the Philips - it lacked life and thrust. Polite, but not invigorating. In today's ranking it would be on a par with the Pioneer, though for somewhat different reasons. The PD-7700 portrayed the depth and scope of the sound stage with more delicacy and precision, for instance. It is £80 cheaper, though, but is overtaken by the Philips CD618 at exactly the same price, and the Marantz at a little under thirty pounds more.

Both these machines had greater strengths, though again different ones, than the NAD. The Marantz, though perhaps less subtle in fine detail, was more involving and 'musicianly'. The NAD was laid-back a little too far by comparison. The Philips CD618, undoubted star this month, was a party-goer compared to a wine taster. Perhaps this is why we liked it so much! ●

Measured Performance

The 5240 uses Japanese MASH technology, which is effective in reducing distortion to a minimum. The distortion analysis shows an absence of distortion spikes and the measured levels in the test results compare well with those of the other machines. So the 5420 is right up with the best in this sensitive area.

Much like Arcam, NAD tailor the top end response of their players to roll down slightly. This can be seen in the frequency response analysis. Such an artifice invariably results in softened out upper treble. Such players sound 'smooth', as it were, avoiding any likelihood of treble sharpness. If ere is a way to err, this is it. Even Marantz and Philips use the little bit of response tweaking to their benefit now.

Separation between the stereo channels was well maintained right across the audio band. Noise was very low and output normal at 2.15 volts. Effective filtering above 21kHz ensures that little in the way of unwanted rubbish gets through to the outer world.

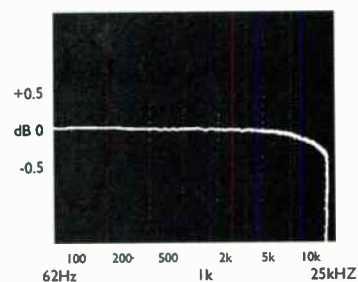
By current standards, the NAD 5420 remains a well engineered player, fully up to the best of the competition in terms of measured performance.

Test Results

Frequency response	4Hz-20.9kHz	
Distortion		
-6dB	.005	.005
-30dB	.004	.004
-60dB	.27	.27
-90	29	29
-90dB dithered	5	4.5

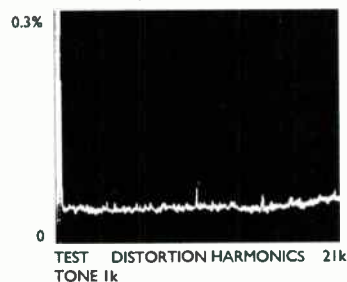
Separation	left	right
1kHz	-115	-112
10kHz	-84	-92
Noise	106dB	
with emphasis	110dB	
Dynamic range	110dB	
Output	2.15V	

Frequency Response



Slight treble roll off.

Distortion



No visible distortion harmonics

akai's revamped GX-95 Mk II is a mammoth deck, representative of old seventies designs, with angular styling and kitsch legends. It uses a complex dual capstan transport, has three heads and all the necessary features for serious recordists for £399.99. I suppose the cynical could say "So what? Denon make cheaper dual capstan types with all these features." They do, but the Akai has a finely honed transport of a sort more commonly found on decks costing far more. It is meant to reach the very highest standards - and that is how I judged it.

The cassette compartment pales into insignificance against the great slab of a front panel. Around it are clustered a host of legends - including a gold plated 'Super GX' badge. This refers to Akai's own glass crystal ferrite head, a unique feature of Akai decks. All other manufacturers, except Nakamichi with their more expensive models, now buy in heads from outside suppliers like Canon and TDK. Making their own gives Akai the potential to pull ahead, assuming their technology is at least as good as everyone else's of course. The glass crystal ferrite head is so resistant to wear, Akai give it a ten year guarantee.

Akai make their own dual capstan transport mechanism, shown here.

At top is the reel motor and to its right, the actuator motor. The direct drive motor is not visible.

Next to the GX badge there is a legend: Discrete 3 Head. This signals that Akai are aiming to enter Nakamichi territory. As yet they have decided not to keep the record and replay heads completely separate, like Nakamichi. Unwilling to copy, they compromise. In order to

be able to use the label 'Discrete 3 Head'

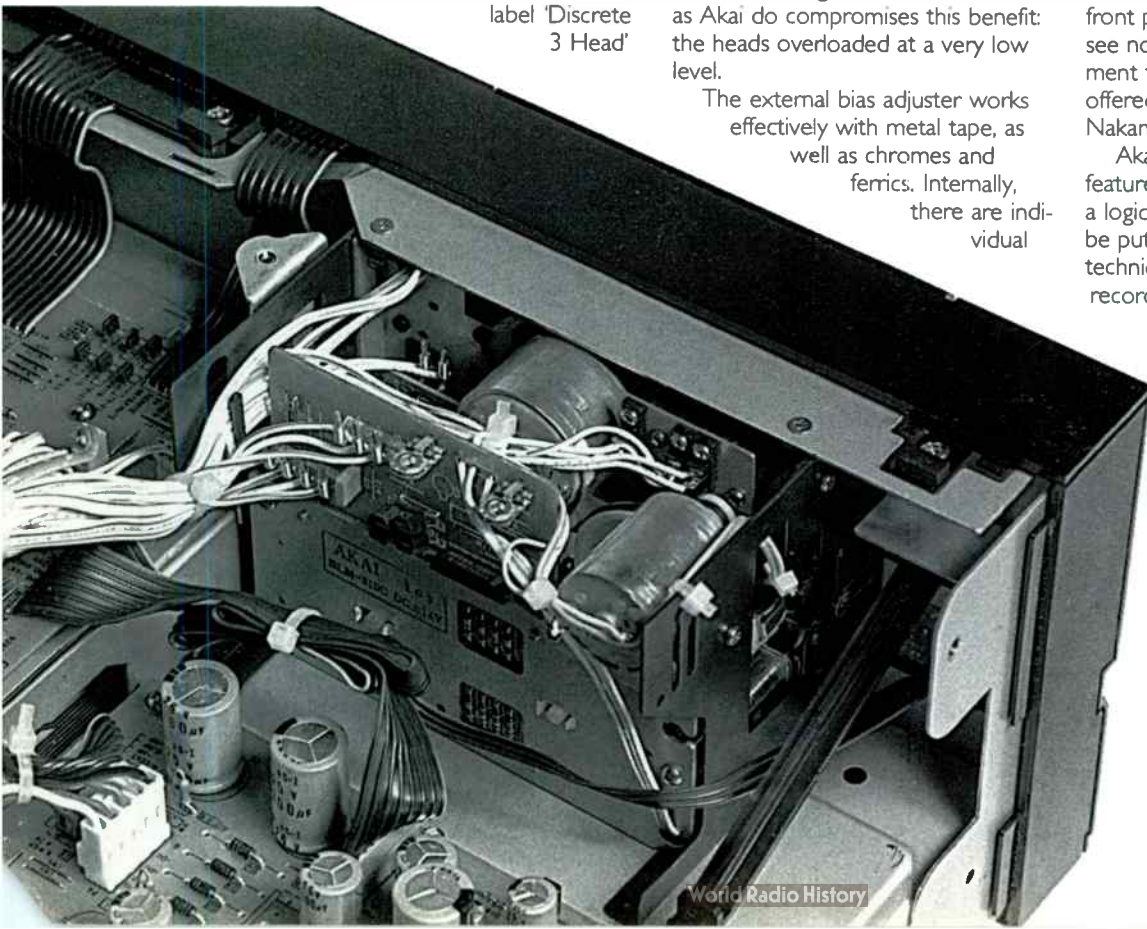
(because for tape buffs that means 'Serious') the record and replay heads are therefore clustered together (siamesed) in a single block, but not only do Akai put in a spacer, they leave an air gap too. The curious and suspicious can therefore see that the heads are discrete - and there will be no argument about it!

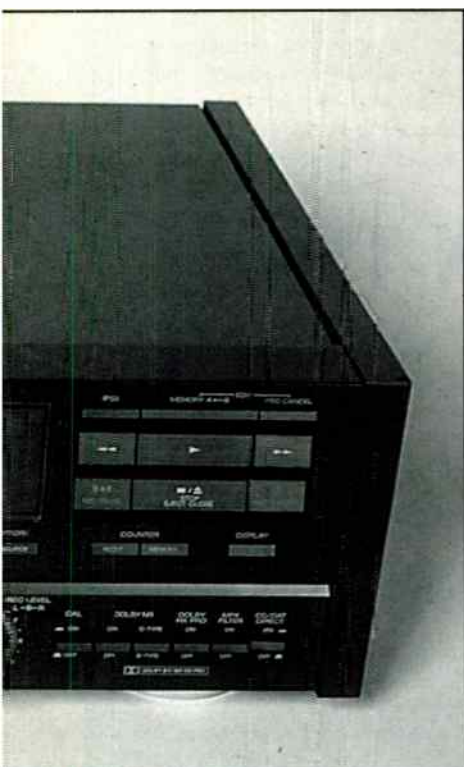
So what's the big deal? Discrete heads potentially offer the highest level of performance. They do not have to be miniaturised, because by being spaced apart they have plenty of room. Having to squeeze both units into a single, size limited location as Akai do compromises this benefit: the heads overloaded at a very low level.

The external bias adjuster works effectively with metal tape, as well as chromes and ferrics. Internally, there are individual

left/right channel ferric adjustment potentiometers that affect chrome and metal as well, so identical results can be achieved on both channels. The review sample was perfect in this respect. Chrome and metal adjusters are fitted too, so the median (zero setting) level of the front user bias control can be altered. Dedicated tape fiends or frustrated recording engineers may be interested to know that all necessary calibration levels for 0VU, record gain, etc are available internally, and record gain (to compensate for differing tape sensitivities) is also brought out to the front panel in a user control. I could see no record equalisation adjustment though, but this is very rarely offered on any recorder - even Nakamichis.

Akai offer users a variety of serious features on the GX-95 II. It does have a logic controlled transport. This can be put into record whilst playing, a technique known as 'punch-in recording'. User adjustable sensitivity is fitted, together with a calibration system that is very easy to use. This applies to the user adjustable bias system as well. Dolby B and C noise reduction systems are fitted, and Dolby HX PRO overload headroom extension. For some curious reason, Akai make this switchable and a warning flag has been added to the fluorescent display to inform onlookers. HX PRO is rarely made switchable like this, because there is little point. It raises treble overload by a small but useful degree, but





record so high onto premium grade metals like TDK MA-XG (+10) for example, that Dolby is not really needed; hiss is barely audible. This was far from the case with the Akai. All I can say in Akai's mitigation is that the GX head on their lesser GX-52, now discontinued, managed +5.5dB - a very high figure. I suspect that the discrete arrangement of the GX-95 II introduces problems.

The transport is also one of Akai's own, a dual capstan type with direct drive to the main capstan. The back-tension capstan is belt driven from the main capstan flywheel, a common arrangement that is usually successful. In addition to the capstan motor there is a separate reel motor and a servo motor to pull and push levers around. The whole works smoothly enough, if not as silkily as a Nakamichi. I was surprised to see that the usual access holes for azimuth and head height on the cassette lid were actually marked as such, possibly tempting users to experiment.

the old Japanese standard, which did roll off in such a manner instead of the IEC Standard, so that they would play our prerecorded tapes without dullness. It may just be that the GX-95 II is made in such small quantities that Akai are not prepared to Europeanise its replay characteristics. Other facilities I have not yet mentioned are a switchable MPX filter, a volume control for headphones and automatic switching from tape to source and back, which is very convenient. While we're totting up a score for the convenience factor, the GX-95 MkII comes with one of the best infra-red remote controls I've seen. This duplicates most of the control functions.

Another great convenience pioneered by Akai is the powered cassette lid, also operable from the remote. It closes automatically when any transport function is selected. The cassette has only to be dropped in and a command made. The door will close by itself and the machine will then start, as commanded. **NK**

Sound Quality

The listening session began with pre-recorded tapes. The immediate impression of a recording of Martin Best and his medieval ensemble was that a good part of the music sounded decidedly muffled. By and large, pre-recorded tapes sounded, in terms of depth, precision of imagery, space around the instruments and tonality, almost up with the best - but with a serious reservation. The flute in a Vivaldi sonata lacked the absolute clarity and purity of sound it ought to have had, as though it had become a relative of the clarinet, albeit several times removed. While the plucked cello and double-bass strings were well positioned, and quite realistic, the ambience of the studio appeared to sound a little hollower than normal.

When it came to other recordings, it was obvious that the treble response on pre-recorded tapes fell markedly. Brass in Mussorgsky's 'Pictures at an Exhibition' lacked edge and bite, with the upper strings sounding resinous. This DG tape is an exciting performance, but on this Akai it fell rather flat; yet the soundstage was definitely three-dimensional. The very subtle Chandos recording of Vaughan Williams' Norfolk Rhapsody showed the oboe to sound too 'round' and the GX-95 failed to bring up the glorious tutti. The violins sounded rather muddled when the strings came in.

Voices fared worse. Tina Turner in 'Break Every Rule' sounded as though the mic had been placed in a damped cocoa tin, though, again, the studio ambience was well caught, and it was possible, which is rare with a cassette deck, to 'see into' the mix. The bass

heading for the heights

Akai's GX-95 Mk II cassette deck, with three heads and every facility for serious recording, should reach the height of performance. Noel Keyword checks it out and Eric Braithwaite listens.

affects nothing else.

Talking about the display panel reminds me that it also shows tape type, an automatic sensing system being used. A long record level indicator reaches from -40 to +10, with good resolution around the zero point. However, the suggested peak record level is an unusually high figure. And this is where a serious weakness in the Akai's performance showed up. The head was surprisingly limited in the maximum level it could get onto tape, no better than a budget deck in the £100 league. We tested a second sample and it gave similar results. Record levels were also limited with ferric and chrome tapes. This is a major flaw in the performance of the GX-95 II.

Low recording levels mean reduced dynamic range and greater audibility of hiss. A top Nakamichi will

As I explain in more detail in the Measured Performance section, the transport works beautifully. It is a gem of a mechanism, almost matching the very best from Nakamichi and Revox. Unfortunately, this deck is let down by its head, as I have already explained - and by inaccurate replay equalisation which I have yet to explain.

The replay amplifiers must be correctly equalised if prerecorded tapes are to be played properly, and if standardised and, therefore, compatible recordings are to be made. Tests showed that there was insufficient high frequency gain in the replay amplifiers, resulting in dull treble from pre-recorded tapes. Head azimuth had been perfectly set, so no improvement was available here. I suspect that the GX-95 II replay equalisation has been optimised to

It's KEF's thirtieth birthday this month. To celebrate the event, they have launched a new addition to their Reference Series, the £995 R103/4. The current Reference range, from the small R101/2 up to the massive R105/3, all show the maturity that the company has reached. A combination of solid research and development, combined with the admirable build quality of these loudspeakers has created products that some consider to be the best in their field.

KEF's research ethic has brought about many changes in the field of loudspeaker design. Their current Uni-Q drive unit is no exception. This is essentially two drive units housed within the same loudspeaker frame. As such, the sound appears to radiate from a single, or 'point' source. This is made possible by use of a Neodymium-Iron-Boron magnet alloy, said to have ten times the energy product of conventional ferrite. It allows a smaller magnet to be used, which can sit inside the voice coil of the bass unit.

To add true low frequency response to the loudspeaker, two 150mm units are used in a direct-coupled cavity, linked together by a force-cancelling rod. The lower frequencies are radiated through a port directly below the Uni-Q unit.

In addition, there is also an optional active low-bass equaliser, known as the KUBE (KEF User-

output which is said to be 112dB suggests that they go very loud. Nothing in my listening tests suggested otherwise (see Measured Performance).

KEF provide an excellent instruction book. It covers every eventuality that the prospective loudspeaker owner should need to know about, including placement, biwiring, bi-amplification and the use of specialist cables. In addition, the manual is

‘Imagery and detail are these loudspeakers’ strongest points, combined with the ability to play very loud.

professionally laid out and presented, as befits one of Britain's largest loudspeaker manufacturers.

The loudspeaker itself is well finished. Our sample was in rose-wood, although other veneers are also available, with nicely appointed terminals and an ingenious grille. This has a magnet fitted to the front, making removal a doddle. In all, the

signal going through the loudspeakers, which were wired out of phase and firing into each other. This cancels out as much volume as possible, while still allowing the loudspeaker to cook properly.

To determine their abilities I used my normal Pink Triangle Anniversary, with SME's Model V pick-up arm and both Roksan's Corus Black and Goldring's Excel cartridges. Compact Disc was Arcam's Delta 70.3 player. Amplification used was an EAR G88 preamp. and EAR549 monoblock power amp. combination (valve and 200watts) and Alchemist Product's Freya pre-amplifier/prototype phono stage together with Genesis monoblock power amps (see test in this issue). Cabling was a combination of Furukawa and Audio Note Silver. A pair of ProAc Studio 1 Mk II and Audio Note AN-J loudspeakers (silver wired and on Huygens stands) were used for comparison. I tried briefly to use my Audio Innovations First Audio power amplifier with the R103/4, but the marriage was not a happy one. Likely reasons are preferred in the Measured Performance section, but suffice it to say that the system did not work as well as I would have hoped.

That aside, the KEF R103/4 proved to be a refined, stable and detailed performer. The most interesting area about it was that the more care you put into system matching, the greater the results.

forward reference

KEF move forward with a new Reference loudspeaker, the R103/4.

Alan Sircom reviews it.

variable Bass Equaliser) 200. Used between pre- and power-amplifiers, the KUBE 200 is said to extend the R103/4's bass response to 20Hz (-6dB), as well as equalising the loudspeaker to suit individual tastes and room settings. Unfortunately, we were unable to test the KUBE 200 until after the bulk of the listening session had been completed, so the results here are without the KUBE in place.

With or without the KUBE 200, the loudspeaker is quoted as having a sensitivity of 91dB. This means that the R103/4 is quite a sensitive beast, which matches amplifiers from 50-200w into its four ohm load. This figure, combined with a maximum

R103/4 looks sleek and refined, especially as it is a floorstanding model.

At the base of the loudspeaker are four spikes, held within black plastic feet for ease of positioning. Once the loudspeakers are in their optimum position, the plastic feet are tightened, which also tightens the spikes. After this, the feet can be removed to expose the spikes. It's a good system, but it does mean that they are not as adjustable as possible. KEF are supposed to be looking into fitting fully adjustable ones in the near future, which would be useful.

I did attempt to run the loudspeakers in fully by leaving a Compact Disc constantly on repeat with a

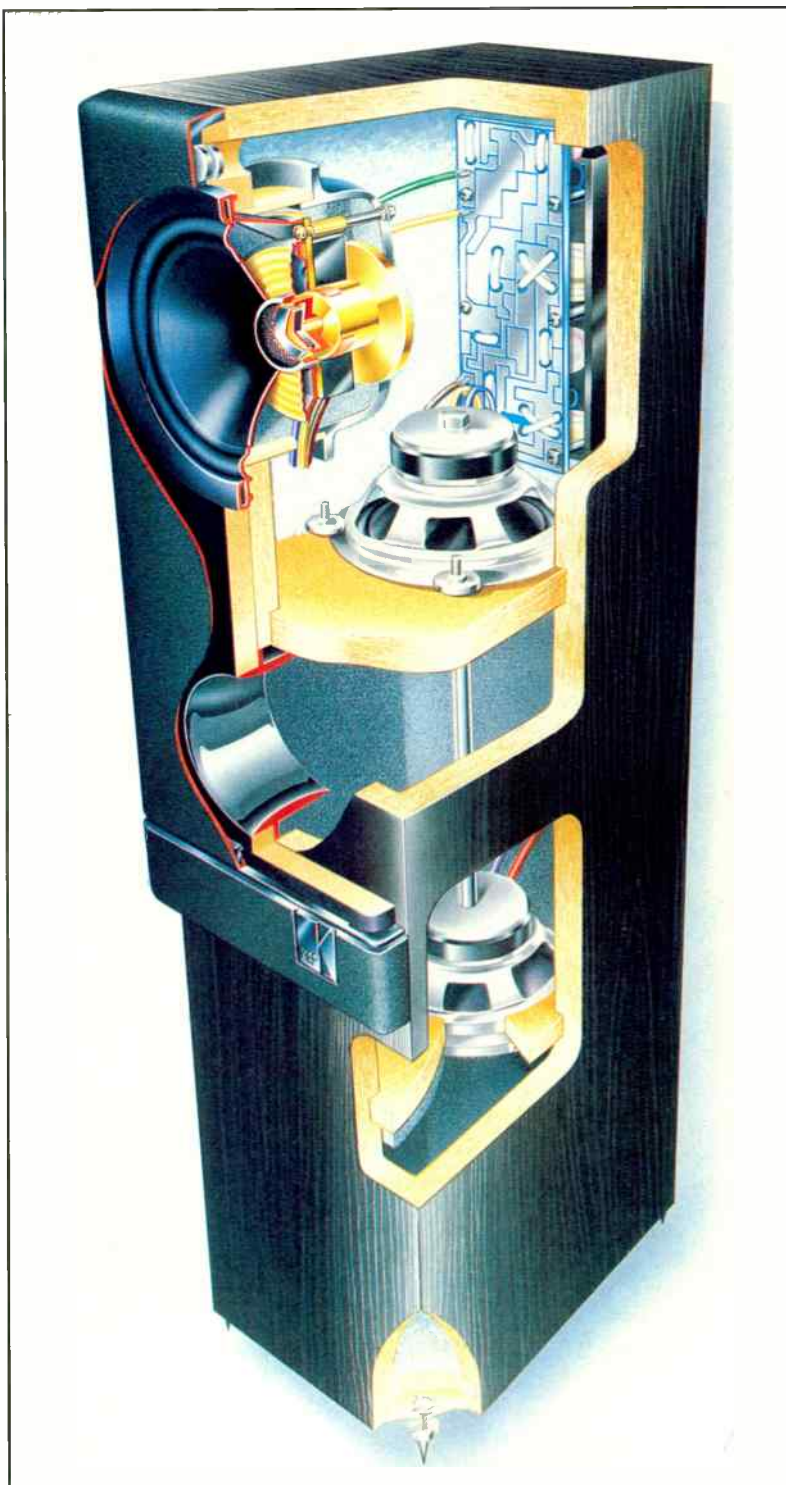
Once run in, the loudspeakers sound good, given components of a similar quality, and a good sound is possible almost as soon as the loudspeakers are roughly positioned. Careful placing, along with judicious cabling and system matching, will bring enormous advances in the quality of the overall sound.

Even when poorly matched and set up, the Reference 103/4's showed signs of greatness. Their imagery was always exemplary, with a wide and deep soundstage producing stable images that demarcate well. Imagery and detail are these loudspeakers' strongest points, combined with the ability to play very loud.



“ In the mid-band, the KEF’s were outstanding, resolving the slightest differences in tonal colours between instruments with finesse and ease.

This cutaway of the R103/4 shows the hidden bass units and the 'coupled cavity' loading used with them. Each of the two drive units has a sealed chamber behind it. They fire into a shared chamber in the middle of the cabinet and this exhausts to the outer world through a large diameter port on the front baffle. When the upper drive unit cone moves down, the lower one moves up, so compressing the air in the central chamber. A steel coupling rod ties the drive unit frames together, to oppose reactive forces. Exposed to the outer world is the Uni-Q drive unit with its inbuilt tweeter that fires through the centre of the main cone. By this technique, high frequencies and middle frequencies are heard to come from one point on the baffle, making the R103/4 partly a point-source loudspeaker. The port contributes output progressively below about 200Hz.



The soundstage the R103/4's produce travels far from the boxes, in all three dimensions. With careful positioning and system matching, they have the ability to disappear completely from a sonic standpoint. In this area, they can match the finest of box loudspeakers, only being bettered by panels. On Mozart's Piano Trio's, this gave the music a sense of an acoustic that is still uncommon.

Because of the deep bass that the R103/4s can produce, the images within the soundstage had a substantial feel that made them near-tangible. This was not as noticeable as the Audio Note J's, which take this solidity almost to its limits at their price. But the KEF's were as articulate as any other loudspeaker in this area,

making voices and bass lines easy to follow.

Most loudspeakers cannot keep time the way a sealed box unit can; the KEF's are no match for loudspeakers such as Linn Kabers with respect to their pace and timing. They can keep up with almost every other loudspeaker in their class, however, almost regardless of cabinet construction.

Where loudspeakers such as Linn Kabers fall down is in their tonal separation, which is not as precise as possible. In the mid-band, the KEF's were outstanding, resolving the slightest differences in tonal colours between instruments with finesse and ease. No matter how difficult it was to define the differences between two instruments, the KEF's

portrayed them every bit as well as the source and amplifier would allow. On 'Everything But You' from Duke Ellington's Unknown Sessions LP, the instruments took on their own distinct tonal entities, where some lesser loudspeakers meld the instruments together.

This ties in with the loudspeakers' resolution of detail and dynamic contrasts, both of which were equally superb. They played everything that was put before them with clarity, not getting in the least bit scared when the music became difficult or had

the KEF 103/4 proved to be a refined, stable and detailed performer

great swings from loud to soft. Rachmaninov's Symphonic Dances, especially when played through the Alchemist amplifiers, had a dynamic range that few loudspeakers can match, but were also adept at reproducing every subtle nuance that the superb analogue Athena recording has. Although these two elements - detail and dynamic range - are intrinsically linked, some loudspeakers often trade the first for the second, producing a sound without any bite or drama. The KEF's are not in this category.

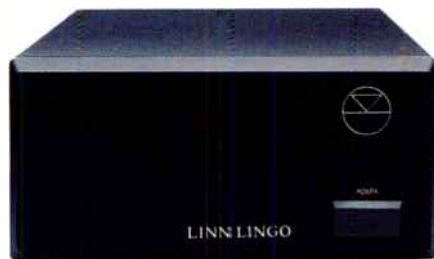
Highlighting

Finally, among those elements of a performance that are easy to define, the R103/4's had a fine sense of coherence to their portrayal of music. With the exception of the frequency extremes, especially the bass, no one area stood out as outstandingly good or poor. This meant that no instrument became over emphasised, making recordings sound fractured, as if the band are rehearsing.

Unfortunately, their main failing was the bass performance. It had a peculiar quality about it; a flatness that, although nice, was not strictly accurate. It never sounded uncontrolled, but could sound a little woolly and ill defined at times. In fairness, more experimentation, running in and a slightly bigger room would go some way to correcting this criticism, but it must be said nevertheless.

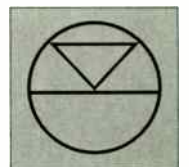
This leads me to one of the potentially most interesting areas about the KEF R103/4, its inherent tweakability. Every change that is

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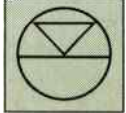
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made to the system is shown up with such clear contrast that one almost expects an announcer to inform you that 'The following record has been brought to you by . . .' I have never heard system changes so distinctly as I did with the KEF R103/4's. This shows that the loudspeaker is consummate at highlighting changes within a system; a good reviewing tool, it could be said.

On the most subjective of levels, very much in the realms of cable changes and the like, I found that the KEF's were ultimately a little uninvolv-

ing, except when played at high volume. It is very difficult to explain why this feeling struck me. Aside from the extremes of frequency, the R103/4's behaved well, were fairly dynamic and should have been highly exciting, but they left me feeling a little cold towards their performance.

I suspect that they are not yet fully run in and that they are slightly too large for my room. I find a lot of what the KEF R103/4's do is deeply impressive. They are so neutral that for once earlier links in the chain take the blame for any coloration. Maybe

they are too neutral, showing up problems in my room and system.

KEF's Reference 103/4's have a remarkable chameleon-like ability to change with the system they are used with. They also let through almost every last piece of information the amplifier gives out, with as little coloration as possible. Their only fault is also their main strength: an absence of character. On the end of a very well matched system, I feel that the KEF 103/4s are likely to sound better than many other £1000 loudspeakers ●

Measured Performance

The KEF R103/4 isn't what it seems by simple inspection. You'll see just one drive unit in the pictures, but as the cutaway shows there are in fact four. You'll be hard pushed to see one of them even in the cutaway; the tweeter nestles in the centre of the single Uni-Q drive unit - that's the one exposed to the outer world. In this manner, high and middle frequencies are radiated from the same point on the front baffle. This has two benefits: it removes response errors due to inevitable phase cancellations between adjacent drive units, and it ensures the sound source is aurally cohesive. In other words, all the sound comes from the same place; you don't get treble from one point on the baffle and middle frequencies from another, which is an unnatural effect that can often be heard.

The tweeter handles frequencies down to around 2.5kHz. The 6in cone of the Uni-Q works from 2.5kHz down to around 200Hz and the twin bass units hidden inside the cabinet work down to 38Hz (-6dB), according to KEF. Because the 103/4 uses a small amount of floor reinforcement of bass output, it has to be measured on a floor. I used an averaging technique to get a reasonably accurate picture of what a listener will hear in use, at a distance from the loudspeaker. This is seen in the third-octave analysis. This gives a block-like picture, due to sound level being shown in fixed frequency bands. In our room, output was flat down to 50Hz, with 40Hz as the -6dB limit. This is close enough to KEF's own figure of 38Hz and, by any standards, the overall flatness of response at low frequencies is impressive. Our analysis has a vertical scale of high resolution (5dB/division), which tends to magnify response deviations.

Whilst the analysis in Fig 1 accurately shows frequency response from 12Hz up to 20kHz, the smooth curve of the impulse analysis, Fig 2, gives the same picture, but in more detail and with more accuracy at high frequencies (and with a lower limit of 50Hz). This shows a certain amount of shallow peaking around 2kHz, with some roll off in treble output above that frequency. The 103/4 just manages to reach 18kHz within KEF's own quoted 2dB limits, which are tight as loudspeakers go. This makes the 2dB bandwidth 50Hz-18kHz, which is very good. KEF's own measured response displayed similar characteristics to our own.

All other things being reasonably equal, this tells us that the 103/4 will sound tonally balanced, but is likely to display some slight projection of vocals with a small amount of subtle emphasis of detailing, due to the mid-range plateau lift. The absence of high frequency peaks usually means that treble

quality will be easy on the ear, the only qualification here being that like other KEF Uni-Qs, the 103/4s are best listened to slightly off-axis. We point them straight down the room; they are best not tooed inward to fire directly at listeners.

As claimed and as we found in use, sensitivity was unusually high at 92dB Sound Pressure Level (SPL or, in common parlance, volume) for one watt of input. Low overall impedance is largely the reason for this, drawing more amplifier power than usual. Since amplifiers are, these days, designed to be able to deliver large transient currents, the KEFs exploit the inherent properties of modern amplifiers well. However, the corollary to this is that they also stress them more and will highlight differences.

I found the ultimate example of this problem in Celestion SL-6000 sub-woofers; their continuous heavy current requirement strains amplifiers to their limit, revealing (or causing) enormous differences in sound quality. Alan found the 103/4s did differ markedly in their sound between various amplifiers. He suspected it was due to their mid-band lucidity, and this probably does have an influence. I suspect that differences are due both to this positive factor and the negative one of them being a demanding load.

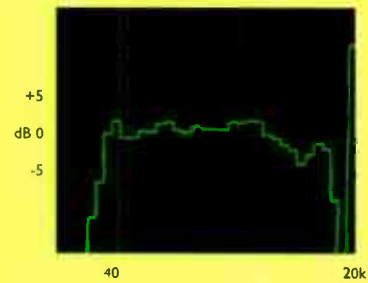
Because of their high sensitivity, the 103/4s will provide high volume from low powered amplifiers, but here I am talking about modern solid state designs like the Musical Fidelity A1. Old, low powered amps will be less happy and valve amps should have a 4 ohm tap or they will not match. Alan did find that the Audio Innovations First Audio Triode amplifier was not compatible, for example.

Although KEF talk about the 103/4s being "conjugated" to "minimise impedance variations", I was surprised to find that they varied in impedance as much as most loudspeakers. Furthermore, the rates of change are high, indicating significant reactive components. Whilst the 103/4 is no worse than other loudspeakers in this respect, it is no better either. Taken in conjunction with low overall impedance, I would rate the 103/4s as a not-too-amenable load, contrary to KEF's own view. Buyers should keep this in mind if they want to get the best out of these KEFs.

Power handling is rolled into the amplifier requirement, quoted as 50-200watts. I would say around 100watts was plenty enough. KEF loudspeakers are traditionally sturdy and reliable.

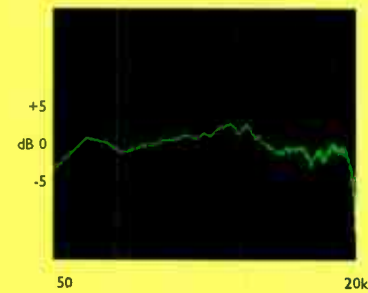
The weight of each cabinet is 18.1kgs and dimensionally they are 900mm high, 215mm wide and 305mm deep. **NK**

Frequency Response (Third Octave)



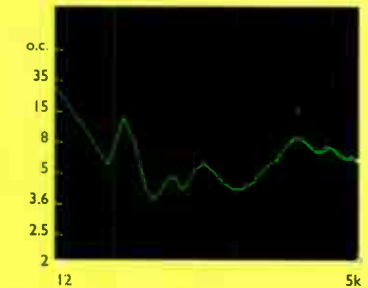
The in-room response at a distance clearly shows smooth and extended bass output reaching down to 40Hz (-6dB).

Frequency Response (Impulse)



The impulse response gives a very accurate picture of high frequency performance and, with high resolution vertical scale, clearly shows a mid-range lift.

Impedance



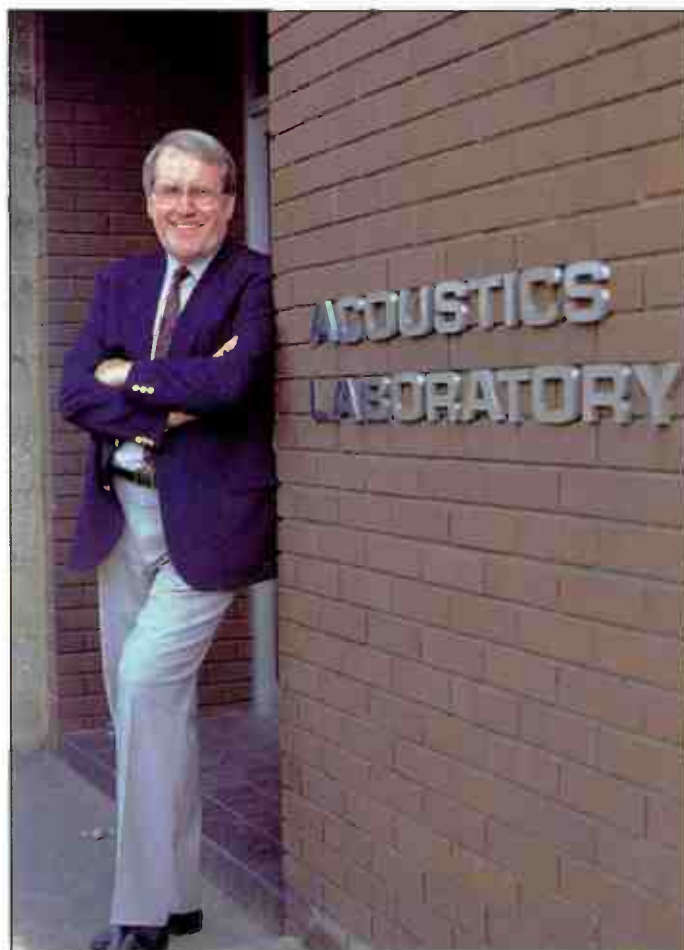
Impedance hovers around five ohms but drops to just less than four ohms at around 90Hz, before rising at low frequencies. High rates of change show significant reactance in the load too. This shows that the 103/4 is not an easy load.



The Kent Engineering and Foundry Nissen hut where KEF Electronics started in 1961.

speaking for thirty years

On the 2nd of October this year, KEF will be exactly thirty years old. We spoke to Laurie Fincham, Technical Director - a long-standing 'back-room boy' now in the front room - about the background of the company.



When did KEF start?

KEF started in 1961, on the 2nd of October to be precise. Raymond Cooke (the founder) came from Wharfedale, where he had been Technical Director. In fact, if you look at Gilbert Briggs' classic book 'Loudspeakers', there is a picture of him magnetising drivers, looking a bit like Alan Blumlein (the inventor of stereo), with his big spectacles and even bigger trousers.

Why did he start the company?

At the time Gilbert Briggs had sold Wharfedale to Rank and he felt that the company was not going in the direction that he felt was correct. Raymond always loved music and likes the scientific approach to designing loudspeakers. His aim is to make things work for their own sake and he is a perfectionist. Anyone who has shown him a manual, only to have it rewritten because of a misplaced comma, will agree.

Going back to the Wharfedale days, Raymond had some ideas that he wanted to try out, such as dome tweeters and styrene woofers and so he decided to start the company, with a couple of people who came from Rank. I don't think he was that keen to do it, as he had a young family.

The father of one of the Rank people owned the site that we are still on today. He said to Raymond, "I've got a place in Maidstone where we can start." That was the old Nissen hut. The two thus became directors of the company, until about 1971-72. Prior to this, the Kent Engineering Foundry had been in the partner's family for years, making crop sprayers, combine harvesters and motorised road sweepers.

So why did Raymond take up the Kent Engineering and Foundry name?

Very simple. He did have a lot of fancy names for the company, but every time he tried to approach the local bank for finance they would just say "Never heard of it." When he said "KEF" they said "Oh, yes, we've heard of them!". So he just put the word 'Electronics' after the name to make it sound modern. That's how it came about. It's as simple as that. As soon as the backing became available, they started with a couple of tables and a few rolls of tin foil from the local shop and they were off!

Did he start manufacturing drive units straight away?

Yes. The first KEF product was the K-1, a three-way baffle which had the



Left: A new 'Q' Series Range loudspeaker under assembly.

original rectangular B1814 drive unit, which in turn was developed into the B139 bass drive unit. The original unit needed tuning with lead shot to balance it dynamically.

The K-1 was born out of a need to experiment with diaphragm materials, bringing a more scientific approach to loudspeaker design. Raymond was also interested in consistency. Don't forget that in 1958, with the advent of stereo, two loudspeakers were needed instead of one. Ideally they should be as alike as possible. Stereo certainly provided the boost that was needed for small box loudspeakers. After all, most people in those days listened using a large reflex enclosure in the corner of the room. Try fitting a pair of those in!

So originally you produced kits without boxes? Is that how it all started?

You have to remember that at the time, there was almost no complete box loudspeaker business. The Celeste did follow pretty soon after. The only real boxed loudspeaker until then was the Acoustic Research AR-1. This was the first infinite baffle loudspeaker that made any sense and it appeared, I guess, in the mid to late fifties. The rest sold speakers without



Above: Inserting the tweeter into a 'Uni-Q' drive unit.

cabinets. The notion of the boxed loudspeaker really didn't come about until the early 60's.

So the Celeste was the first complete box loudspeaker KEF produced?

It was our first, launched back in 1962. It frightened everybody by its pricing. It was small, heavy, extremely insensitive and it cost twenty guineas. Everybody sold through wholesalers in those days, who were the arbiters over whether a product was good or bad. They sold everything from hi-fi to kettles and they were horrified by the price of these things, but Raymond stuck to his guns. I think that the Celeste made more of an impact overseas, where the market is less reactionary than the U.K., but

eventually it caught on over here. People began to accept low efficiency in favour of small size.

Where did you go from there?

Our next step was to make a floorstanding version, originally called the Duette. This was a bit expensive to manufacture, so it became the Concord, named after the aircraft. I remember at this time KEF were using the local prison to build some cabinets, in much the same way as JPW do today. There was a really good craftsman there, but he got let out for good behaviour, so we had difficulty getting any decent boxes any more.

By this time, about the time that I joined the company in 1968, KEF were becoming well established and



The Anechoic Chamber and the R103/4 Reference against which production models are checked.

their Concerto, Cresta and Chorale set the company well into the 1970's. These began the successful C-Series, notably the Coda's.

How did Raymond start bringing better science, technology and engineering practices into the loudspeaker world?

He started with the drive units, partly because of his own feelings about the loudspeaker generally and also because of the climate of the time. The mythology of speakers, that it is the ingredients not the chef that matter, is totally erroneous. Everybody back then was into new materials, as they are every so often.

new
ULTRA-COMPACT



celeste

Celeste, the first real small hi fi speaker, has been designed for the enthusiast who lacks the space for a 'large' hi fi set up. The Celeste is a compact $\frac{1}{2}$ cu. ft., solidly built in the KEF tradition and superbly finished in solid African hardwood and soft-white grille.

Easily positioned for optimum stereo results, the Celeste is at home on top of your bookcase, window-sill or mantelpiece.

A predominant feature of the Celeste is its very smooth frequency response and wide dispersion which set it apart from all other loudspeakers of comparable size and price. The exceptionally small dimensions naturally entail some loss of low frequency response below the main system resonance but as the response below 85 c/s falls at only 12 dB per octave, correction is readily applied by a modicum of bass boost in the preamplifier. The mid-range and high frequency response remains free from breakup resonances due to the very rigid construction of the diaphragms and cabinet. Crossover frequency 1 kHz.

SPECIFICATION

Size:	18" x 10 $\frac{1}{2}$ " x 6 $\frac{1}{2}$ "	
	46 cm x 27 cm x 17 cm	
Weight:	24 lb	10.9 kg
Impedance:	15 ohms	
Max input:	15 watts r.m.s	30 watts peak
Price:	£22	Tax free

Bass unit
Rectangular 13" x 9" Tri-ply diaphragm of expanded polystyrene with aluminium skins
2" dia voice coil
Flux density 10,500 oersteds
Total Flux 137,000 maxwells
Free air resonance 35 c/s
Resonance in enclosure 85 c/s



H.F. unit
Spherical dome radiator with moulded Melinex diaphragm
 $\frac{1}{2}$ " dia voice coil
Flux density 15,000 oersteds
Total Flux 53,500 maxwells



electronics limited TOVIL, MAIDSTONE, KENT.
Telephone: Maidstone 55761 Telegrams: KEF, Maidstone
October, 1962.

It frightened everybody by its pricing. It was small, heavy, extremely insensitive and it cost twenty guineas.

plastic (Melinex and expanded polystyrene) drive units from the outset, however. Most people used paper cones at the time, but the cost of the tooling for manufacturing paper cones was prohibitive. The vacuum forming machine for plastics was considerably cheaper and it was easier to modify cone shapes. This meant that experimentation was far easier, although plastics have their own unique problems. The original vacuum forming machine is still in use today; you can tell that Raymond is a Yorkshireman at heart!

What problems did plastic drivers create?

The material wasn't as consistent as people were led to believe. The plastic is temperature dependent and it wasn't as dead as we would like either, so we had to coat it. But worst of all, it was very heavy. This meant that originally we had the bandwidth, but not the efficiency.

Moving on, you had a connection with the BBC didn't you?

Yes. We have produced a range of monitor designs over the years, as well as collaborating on many projects. One of the most stimulating was the KM-I. This peaked at about 125dB and had 1.6kW of power, a sort of precursor to the Meridian D-

The reality was, when the company became established and successful in the early 1970's, we started to do some real investigation into cone materials. We realised that we didn't have anywhere to go as it was difficult to assess the effect of a cone in isolation without taking the effects of the box into account. This was when we began to get into impulse testing.

Now, it has all turned full circle. As we have been able to test the effects of loudspeaker boxes on drive units, it may be now that the drive units are the weak link. Even now, we still see that the box is little understood, although this may be due to costs of manufacture.

Cost did play a part in KEF's use of

6000, but with more poke. It had some pretty sophisticated devices in it. We were making it partly for the BBC and partly for the U.S. market. This posed something of a dilemma: was it an audiophile's dream or an engineer's workhorse? The requirements for the two are quite different. Because its sound pressure levels were so great, we used to say that it was measured on the Richter scale, instead of in decibels.

We had problems with it because it went loud, but did it well. People expect to hear a certain amount of distortion at high listening levels. Without it, they just keep turning the sound up! Engineers would end up with the loudspeakers at the threshold of pain saying "If it could only go a little louder!" The loudspeaker was so powerful that the tweeter needed a heatsink. It was never a great commercial success, but it taught us a lot about the psychology of how people listen.



Thirty years on - the KEF factory today.



Rather than looking at the £99 market, we are exploring new ideas and technology for the future. These, such as Uni-Q drive units for instance, appear to the outsider to be a radical departure, but for us they are part of a logical progression taking place within the company. KEF has always pursued comprehensive engineering solutions. Way back in the seventies we bought in the most advanced computers of the day to process test information and we are still expanding this facility. Now, however, it is complemented by other computer based design programmes. Our extensive and advanced research has guaranteed us a stable and respected place in the market, which we will continue to build on ●

Far left: KEF manufacture their own drive units. A vacuum forming machine (blue frame) moulds the cone from a plastic sheet. The cones can be seen stacked at left.

Below: Crossovers are tested for response accuracy with automatic computer based system.

Going back to your domestic market, what do you think was the greatest aid to your development, in the boom times of the early 1970's?

In 1969 Resale Price Maintenance was abolished, re-establishing the word 'discount'. This moved some manufacturers away from the wholesalers and into the hands of the smaller specialists. To avoid price wars, we decided to go direct to dealers.

What about KEF today?

For one thing, we never abandoned the sale of drive units. Any company who wants to manufacture loudspeakers can use our drivers: Rogers, Tangent, IMF and Linn do, for example. We have also continued with the Constructor Series. It is rare indeed for us to buy in any drive units.





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musical and faithful

...is what we might expect

**Musical Fidelity's new TI Mk II
tuner to be. Eric Braithwaite
listens for the tunes.**

I ought to declare an interest right at the beginning. No, it's not that I've ever been associated in business with Musical Fidelity, nor that I've fallen prey to the boss's cakes and been bribed out of both hunger and objectivity. It's just that I've had a certain fondness for the original Musical Fidelity TI tuner since I found myself demonstrating one for a customer a few years ago. Not having heard it before, both he and I were impressed. At first hearing I thought the tuner had an engaging and detailed mellifluous quality. Time told me that it could also have a tendency to coarseness, but the amount of detail it offered allowed its sins to be forgiven quite easily.

The Mark II version goes some way, say Musical Fidelity, to redressing

the criticisms of the original. Internal circuitry has been changed, and the transformer removed to become an external unit which can sit on the floor. Cosmetically, little has changed, it appears to my eye. The new charcoal grey case matches the Musical Fidelity house style, with its chamfered edges top and bottom. The perspex window in front of the display is chamfered to fit too - an elegant touch. The company name is in white; legends over the small but well-spaced control buttons and the display are the familiar Musical Fidelity blue, though four indicator LED's and one in the unlabelled on/off switch are red. Blue ones are available, I hear, but they cost an awful lot of money. Nonetheless, the overall effect is restrained and tasteful. Matching it visually with non-Musical Fidelity gear might not always be too successful - its distinctive appearance will not harmonise with other strong styles.

Facilities, as well as aesthetics, are understated rather than exaggerated. In a typically English fashion, apart from the on/off switch, there are few buttons. In fact, I counted thirteen small, oval push-buttons. Two are for tuning, one will install a frequency into memory, one will switch to mono and one will initiate automatic scanning of the waveband. A further eight are dedicated to programme storage. This is reminiscent of other UK designs. Quad, for instance seem to think six is more than enough for anybody, but then, jokers always say that people with Quad tuners don't know there is radio apart from Radio 3! However, with the explosion in broadcasting over the last two years, eight is looking a bit on the low side for real convenience. That's only one for each of the major BBC and Commercial stations - in London,

anyway - leaving nothing but manual tuning for local radio and the new boys.

Sensitivity

The number might not seem quite so inadequate if it wasn't that this tuner can pull in a fair number of transmissions because of its sensitivity, given a half decent aerial. I picked up a wide variety, ranging North and South of the London office from Bedford to Brighton.

Another surprising omission in this price range is a signal strength meter; one red LED shows whether a signal is just receivable, but there's no clear indication of the better of two reasonable quality transmitters, for example. Ears have to be used to select. One learns the frequencies fairly quickly, but it's a minor nuisance.

Tuning is straightforward. In manual mode it will tune up or down in 0.05MHz steps; in automatic mode it tunes straight up or down until a transmission is detected. Or stations may be recalled by pressing a memory preset of course. Actually programming a station into memory is supremely simple. Tune in, press the memory and then a single preset button and a second or so later, it's in.

Sound Quality

The goddess Serendipity must have been working overtime when I listened to this month's tuners. I managed to hear transmissions of at least some music I both knew and liked. Listening to tuners is quite different to reviewing other sources - you can't always pick your favourite tracks, and waiting for a few to come along willy-nilly doesn't improve the editor's nervousness about meeting deadlines. As a reference I used a reconditioned Leak Troughline and a Hitachi FT-5500 MkII.

Radio 3 had sonatas played by Busch and Serkin on offer from 1930's recordings. So this didn't test stereo. What it did do was provide a startling reminder of how much it is possible to hear when a 78 is well transcribed onto CD. Every modulation of every worn groove was audible. So was the sound of the dampers on the piano strings. The depth was glorious in being so surprising. The piano was clearly behind the violinist. If there was a criticism, it was that although both violin tone and piano were splendidly realistic (allowing for the cuppiness of a piano further away from the microphone) the violin was a little softer and warmer than it perhaps ought to be.

Clean and Vivid

A switch to Jazz FM found another transcription of an early fifties recording. It was in mono again, but sounded gloriously clean and vivid, if obviously curtailed at the top end. Nostalgia is all very well, but readers have a right to be more informed, so I had a cup of coffee and came back to stereo. More jazz showed the T1 Mk II had a good wide soundstage, which - given a good recording - could extend out beyond the speakers. On some, it seemed occasionally that instruments at each side could be more forward than intended, but the stage was unmistakably three dimensional. "Just hear that horn!" I found myself muttering as a sax stepped forward out of the mix, leaving the strands of drums and bass behind it, but loud and clear as the engineer intended.

A later piece included an accordion which was realistically wheezy, so well positioned you could touch it, and at exactly the right sound level against the other instruments. There was good emotional involvement, just like being there. It was difficult to avoid feeling that if something appeared to be missing, it was because it wasn't in the recording. This is radio? Of course it is. It doesn't have to be the poor relation in the family of sources.

I found Cantabile singing live in a studio on Radio 2; everyone was clearly positioned in space, though sounding a little more diffuse laterally than the top rank tuners. During the interview which interspersed the singing, it was obvious who was leaning towards the mic and who was sharing whose. Voices were clear of sibilance or spitching; possibly Jazz FM's presenters - they do have very chesty mics - were a bit too growly, and the notorious slight chestiness of the BBC's announcers' microphones was a little overemphasised, but the slight smack of a news reader's lips as he came to the end of a phrase and a

squeak from his chair were all there.

This must come pretty close to what the studio engineers at Broadcasting House hear, with one exception. Background hiss can be annoyingly evident with the T1 MkII, particularly on Radio 3. This is nothing to do with R3 being a weak transmission; it is because it has more silences and a wider dynamic range, as the BBC engineers keep reminding us. This was the T1's only real drawback - and a digital tuner can do better than this. It is possible - I hear it often - to notice nothing but microphone hiss coming from a black silence, or the whirr of air-conditioning in a broadcast.

Emotional Experience

The mid-range of the T1, while sweet is fractionally forward and the treble

is unfatiguingly delightful, if on the soft side. The lower registers are slightly warm. Both add up to an emotional experience. Feet tap, the head goes back on the settee, the eyes close, the speakers can be ignored, and the music takes over. Perhaps, in the cold light of home, I would have liked more precise imagery, a slightly leaner and more ruthless tonal presentation, a slightly tighter bass. Maybe even a foot or two more of depth which I know can be found.

That extra ounce of perfection costs more than £270 I think. This is the price at which the Musical Fidelity T1 Mk II proves that the broadcasters aren't wasting their time and energy on the quality coming out of their studios. This is a lucid tuner I enjoyed a lot, even if it is a little bit hissy at times ●

Measured Performance

The T1 proved itself to be a competent performer in nearly every area. Frequency response was flat to 12kHz, above which a smooth roll off begins, before the plunge downward due a deep MPX filter that eliminates unwanted pilot tone at 19kHz. These characteristics can be seen in the frequency response analysis below.

Pilot tone and sub-carrier filtering was good enough to all but completely eliminate signals at and above 19kHz; the pilot was -68dB down for example. This ensures the output remains clean, which is of greatest consequence for tape recordists. Spurious high frequency tones can interfere with bias to form audible whistles. One of the benefits of effective filtering is to prevent this sort of thing occurring.

There was some second harmonic distortion on full left and right stereo signals, but otherwise levels were low. The distortion analysis below clearly shows this small problem, but since second harmonic alters only timbre, I wouldn't expect it to be especially noticeable. The other factor is that there was just 0.16% distortion on centre stage information, lessening the subjective contribution of left and right stage components, so this is hardly a problem I feel.

I was disappointed to measure a hiss level of -67dB at full quieting. This is the best the T1 can manage and by current standards it is noisy. Most tuners now better -70dB, since below this tuner hiss is easily audible, at least when listening to Radio 3 with a good aerial. Our listening tests confirmed this problem.

Sensitivity was very high at just 20uV for intelligible stereo (-50dB hiss). Selectivity was unusually high too, at around 88dB both above and below a weak signal, so the T1 has good passband symmetry. It will capture weak transmissions easily and keep keep them free of interference when a strong station is close by.

Only one LED marked 'Signal' is fitted, but it did not give any useful signal strength indication, coming on at 4uV - a signal so weak as to be of little use to man or beast. This was disappointing at the price. Just one LED that came on at 0.5mV to indicate full quieting had been achieved would have been helpful.

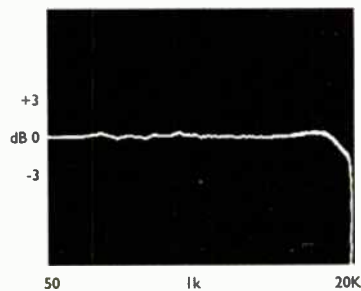
So the T1 measured well, except in

terms of hiss where, on Radio 3 at least, it would be detectable. Music and speech are so continuous on other stations that there are few gaps long enough for the problem to become noticeable. Overall levels are kept up by compression too (Optimod); only on Radio 3 is this not always the case. NK

Test Results

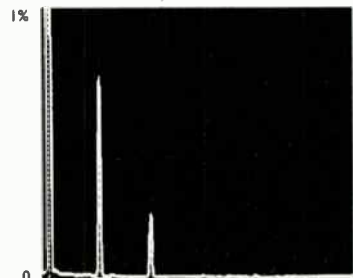
Frequency response (-1dB) 10Hz -12kHz	
Stereo separation	-32dB
Distortion (50% mod.)	0.4% av.
Hiss (stereo, CCIR)	-67dB
Signal for minimum hiss	0.32mV
Sensitivity	
mono	1.2µV
stereo	20µV
Selectivity (alternate channel)	-87dB
Signal strength meter	none

Frequency Response



Flat response up to 12kHz

Distortion



Some distortion (0.8%) on L&R signals

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MUSICAL FIDELITY



golden alchemy

Alan Sircom turns his ears to the shiny golden Alchemist pre and power amplifiers

Significant New Product Time. The Alchemist amplifier range has been quietly doing the rounds among top dealers up and down the country, being thoroughly successful wherever it went. Almost without any press coverage, the Freya line level pre-amplifier and the Odin and Genesis power amplifiers have created a reputation for awesome dynamics, excellent detailing and a strong grip on loudspeakers.

The tale that follows is that of the amplifier and its many attempts to pass into our hands. It first arrived a

few weeks prior to the review, shrouded in mystery and secrecy. That was a pre-production model. It didn't want to work, but at least it looked nice and interesting!

A couple of weeks later, another sample duly arrived, comprising the £1150 Freya line level pre-amplifier, £1400 Genesis monoblocks and a prototype of the phono stage, as pictured. The price of the disc stage is not set yet, but it is expected to be around the £500 mark. Even this time, things were not easy. There were considerable problems, such as a noisy volume control - but only on certain channels and with only some sources - the greatest offender being our Deltac PDM-ONE convertor and a Musical Fidelity Digilog.

After a night of furious research, the fault was traced to an integrated circuit (op. amp.) in the tape loop of the preamplifier, sensitive to small DC inputs. When this was changed, the entire system was delivered to my flat on a hot, sweaty Thursday. Six seconds into the first track was enough to convince me that this was one of the most important new amplifiers in Britain today.

The casework, while a little on the garish side, is very distinctive and uniquely Alchemist. The grey Hammerite rear panels, brass front panels and preamplifier knobs carved from chunks of solid metal give the

Alchemist amplifiers a slick image unusual among new British amplifiers, which often seem to begin life as cigarette tins.

Opening the case up shows that attention to detail has been followed through to the interior of the amplifiers. The blue circuit boards are well laid out, without excess cable runs or jumbled components. In the Genesis power amplifiers, for example, there is different internal wiring for bass and mid range/treble frequencies, to improve the effects of bi-wiring. This shows the integrity of the designers of this amplifier, as well as their inherently tweaky nature.

Solid

Despite a solid construction, the amplifiers are not particularly heavy or large. It is refreshing, in the realm of the big Krells, heavyweight Musical Fidelitys and gigantic Thresholds, that the Alchemist amplifiers are diminutive by comparison. They will happily sit on a Sound Organisation table without destroying it and both monoblocks together are no heavier than a Naim amplifier. After the various back-breaking comings-and-goings of 'our' Musical Fidelity SA-470, the thought of lifting two monoblocks into the house initially filled me with dread; being more than able to carry one under each arm gave my confidence a boost.

Although the Alchemist amplifiers are lightweight, the same could not be said of their power output and sound quality. Putting about 180W into four ohms means that they drive the highly efficient KEF 103/4s (which I had on review at the same time) to ear-bending levels with ease. One of the most surprising areas that the Alchemist amplifiers excel in is their speed. Transients have a tendency to become a little blurred in large amplifiers. This has given rise to supporters of small amplifiers (those who have discovered the virtues of the Pioneer A-400, or valve enthusiasts) calling bigger amplifiers 'sludge-pumps'. As I consider a seven-watt triode amplifier to be one of the finest-sounding currently available, I could be considered one of the 'small amplifier' supporters. It is all the more surprising that I have found a relatively large amplifier (bearing in mind, that anything over 10w seems like a Krell to me) that has the attack and transient speed of a small one.

To give the Alchemist a thorough going over, both the KEFs and the ProAc Studio 1 Mk IIs were used (my Audio Note J's still need a lot of running in, having been silver wired), using Audio Note and Furukawa cables. The sources used were my Pink Triangle Anniversary, with its SME Model V pick-up arm with both a Roksan Corus Black moving magnet and Goldring's Excel moving coil cartridges and an Arcam Delta 70.3 Compact Disc player, connected via Audio Note Silver cable. To make direct comparisons with the amplifier, both Audio Innovations' Triode pre/power amplification and Esoteric Audio Research 549 200w valve monoblocks, with their matching partner, the very OTT G88 valve pre-amplifier were brought in.

Openness

Starting with the Freya preamplifier, this happily trounced everything that got in its way, including the G88, which sounded thick and leaden by comparison. While the G88 had a lucid, warm quality about its presentation that the Freya slightly lacked, the sheer openness of Compact Disc through the transistorised Freya won over the valve G88 overall I felt.

This was shown up dramatically when the prototype phono stage was added. While there was a slight glare to the treble, when compared to the G88, the solidity and richness of the Alchemist preamplifier, combined with its good stereo imagery and sheer depth of bass eliminated any contest between the two. The little Audio Innovations Series 200 preamplifier could not compete either, but at least its sweet sounding qualities meant that it did not disgrace itself badly.

At one point in the course of the review, I had the opportunity to compare the phono stage and Freya preamplifier to the Naim 52. in the context of a Linn/Lingo/Ekos/Troika, 52/250 and Isobarik system. Even here, in the context of quite a synergistic system, the phono stage and the Freya seemed to grip the bass dynamics of the Isobariks better than the 52. Admittedly, this was done very briefly, with only one track ('Go Down Easy' by John Martyn from his Solid Air album), but the improvement was dramatic enough for the owner of a 52 pre-amplifier to express some concern over it.

When comparing the distinctive signatures of the Alchemist and the Naim amplifiers overall, they prove to be entirely different beasts. The sound quality of the Alchemist is closer to the John Sheame Phase One, reviewed recently. In outright terms, I felt the Alchemist amplifiers to be preferable, but the Sheame is slightly more graceful sounding, especially in the treble. It is also about £1000 cheaper.

The light and clear sound of the Alchemist is markedly different from that of the Naim system; the latter places rhythmic information in a stronger light. In some ways, the Alchemist is the more dynamic of the two, although at least one owner of Linn/Naim equipment suggested that its sound was too 'thin' for his liking. It certainly proved to be more impressive and dynamic sounding than Noel's Deltac amplification, although here the Alchemist displays dynamism at the expense of refinement and detail.

In fact, I can only think of a handful of British preamplifiers that could better the Freya. Concordant's Exquisite preamplifier, the Finestra, the SP 1.5 and the long-awaited First Audio may all better it in some respects, but a direct comparison was not possible at the time. I was privy to a factory prototype of the Pink Triangle PIPIT during the course of the review and that bettered the Freya dramatically. It is also similarly priced, but is still a few months away from final production.

Sweetness

Moving over to the Genesis power amplifiers, aside from a slight breakthrough of radio frequency interference at times, there is little to criticise, especially at the price. They have the sweetness and openness of a good valve amplifier, with the clarity and bass of a transistor design. Again, the closest sounding competitor was the EAR 549 power amplifiers, although their overall sound had a lot in common with the Innovations triode amplifiers.

The first striking thing about the power amplifiers is their ability to

cope with dynamic changes. This is an area where valve amplifiers traditionally score better than their solid state cousins. Not so the Genesis amplifiers, which express dynamic contrasts so dramatically that few British built power amplifiers can match them. This meant that music with extreme dynamic changes (Rachmaninov's Symphonic Dances, AC/DC's 'Whole Lotta Rosie' and so on) caused neighbours to complain.

Dynamics aside, the Genesis amplifiers are capable of resolving a great deal of detail, without painting their own picture of what the music is doing. They are quite transparent and open, with a good soundstage and

It is refreshing, in the realm of the big Krells, heavyweight Musical Fidelitys and gigantic Thresholds, that the Alchemist amplifiers are diminutive by comparison

some depth to the bass, giving an air of solidity to instruments. I feel that they can err on the side of brightness at times, especially when used with incorrect cabling. However, the Genesis amplifiers do appear to be coherent without overstressing any one area of the frequency range unduly.

Their portrayal of timing information, more commonly described as 'sense of rhythm', is as good as acknowledged leaders in the field. Little Feat's records have their usual foot tapping qualities to them. In terms of tonal separation, the amplifier combination is not as precise as a good valve amplifier; voices in the choir on Argo's version of Haydn's Nelson Mass were hard to differentiate, although the text was easy to follow.

On the whole, the pre and power amplifier combination had a natural air, smacking of class. Their impression of the instruments on The Blues Brothers version of the Peter Gunn theme was less artificial than that of most amplifiers. This was due more to their individual dynamics than their timbral qualities.

I think it is important to note that the amplifier is highly system dependent. While it will sound pretty good in almost any system, to get the most out of it, some care and attention should be paid to the choice of ►

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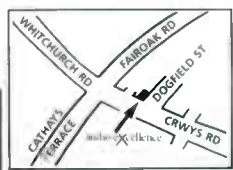
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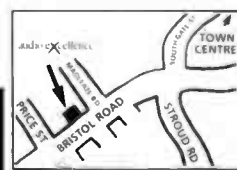
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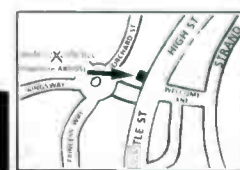
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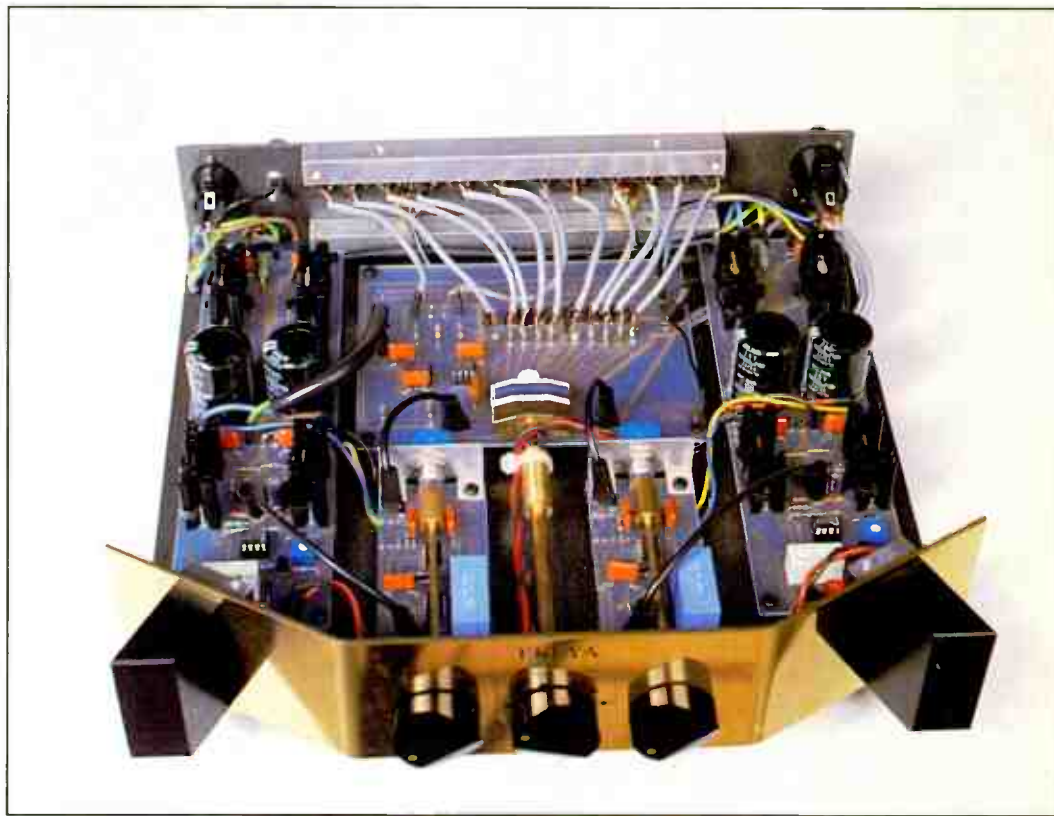
diary...

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interconnect and loudspeaker cables. Once you begin to play with cables, huge differences can be made to the sound. The slight brightness that I mentioned earlier was noted when using the KEF 103/4s with Furukawa to the treble and Audio Note Silver to the bass. On changing the cables over, the sound changed greatly, losing its brightness, but gaining a thickness in the lower bass. Removing the Furukawa eradicated this problem completely.

I believe that this is a sure sign of quality in an amplifier. If its character is so neutral, but so precise, that altering cables can bring about changes, then the amplifier must be something special. I feel that the Alchemist amplifiers are a Significant New Product, as suggested at the start of the article. To better them involves a hefty injection of cash, although they can be equalled by respected names in British hi-fi, some of which have become well established over the years. The Alchemist is a bold new arrival that deserves to become a part of this establishment ●



The Freya pre-amplifier was well laid out internally. Note the use of drive shafts behind the control knobs. This keeps signal paths short, lessening hum, noise and distortion.

Measured Performance

Each of the compact Alchemist monoblock power amplifiers produces a nominal 100 watts output. In fact, they measure 110 watts into eight ohms and nearly twice as much (196 watts) into four ohms. The power supply of each has good regulation in the best of current tradition, the benefit being powerful and well controlled bass. This ensures an air of dynamism is conveyed.

Both power amplifiers had more DC offset (40mV) than is common. The value is usually lower than 5mV. Whilst 40mV is not enough to cause significant amounts of power to be dissipated anywhere in the usual loudspeaker, Alchemist must ensure the figure gets no higher.

Bandwidth of the CD input was reasonably wide at 16Hz-40kHz, but more low frequency extension would have been useful. Compact Disc does go down to below 4Hz and on some discs there is measurable and audible subsonic content. Amplifier designers need to consider this. Separated power amplifiers and independent volume controls on each channel ensure excellent channel separation. It measured 102dB on CD, which is a very high figure. However, it is possible, by use of independent gain trimmers and a master volume control for example, to achieve good channel separation together with a more usable form of volume control. An alternative scheme is found on the ingenious G88 preamplifier from Esoteric Audio Research. This uses two volume controls mechanically coupled by rubber tyred wheels. Turning just one knob turns the other, but slippage allows one to be reset relative to the other, so altering channel balance.

The disc stages were inaccurately equalised at low frequencies, bass rolling off below 170Hz on both the Moving Magnet (MM) and Moving Coil (MC) input. Because the rate of roll off was slow this should make the bass delivery from LP sound lean or possibly light, but not as blatantly deficient as the figures might suggest. Alche-

mist must move the roll off point down to 50Hz or lower however.

Channel separation was good via MM, but mediocre via MC. This is a common enough situation however, crosstalk between the low level stages of MC often being the cause. At -50dB the situation was satisfactory, certainly being good enough for full sound stage width to be achieved. Similarly, overload ceilings were on the low side. Whilst the 60mV figure for MM is satisfactory for all moving magnet cartridges, the 3mV figure for moving coil is low for high output types designed for MC connection (as opposed to those meant for MM inputs). A Goldring Eroica LX will, for example, produce 3.5mV at 25cms/sec rms, running the preamp stage into severe distortion. This would occur on occasional musical peaks. It is common for MC inputs to overload at around 10mV. Sensitivity was high, meaning this stage has been designed for high quality, low output MC cartridges, something Alchemist need to make clear.

Distortion remained low until the power amps were driven hard at high frequencies. Then it shot up to no less than 0.5%, a level that will affect treble quality. Played at normal levels, the power amps stay below the arbitrary accepted safe limit of 0.1% right across the audio band. Pushed a bit, the amp hits 0.1% distortion at ten watts output and rushes up to 0.5% much above this (at 10kHz). In use this may well cause some slight hardness, coarseness or incision to be heard in the treble. The disc stages were distortion free.

The Alchemist has a few measured weaknesses and arguably needs a bit of tidying up. Much the same situation occurred with the John Shearne amplifiers we reviewed in the August 1991 issue, where I felt that there was some direct influence upon sound quality. That is likely to be the case with the Alchemist combination, but it may well only tinge the sound quality rather than damage it. **NK**

Test Results

Power 110watts

CD/tuner/aux.

Frequency response 16Hz-40kHz
Separation -102dB
Noise -77dB
Distortion 0.004%
Sensitivity 400mV
DC offset 44/37mV

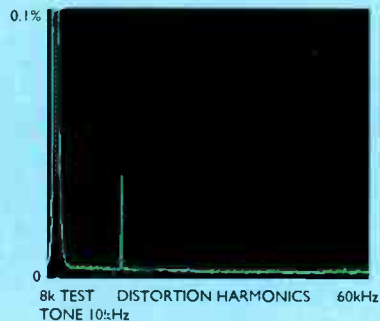
Disc (MM)

Frequency response 170Hz-40kHz
Separation -87dB
Noise -76dB
Distortion 0.004%
Sensitivity 3mV
Overload 60mV

Disc (MC)

Frequency response 170Hz-40kHz
Separation -50dB
Noise -60dB
Distortion 0.005%
Sensitivity 0.15mV
Overload 3mV

Distortion



High frequency distortion of 0.04% at 1W rises to 0.5% at high output.

It's a moot point as to which of Arcam's integrated amplifiers - the Alpha or the Delta - was the true replacement for the much loved old A60. In terms of sound, the Delta had perhaps more of the warm euphony of the A60 than the Alpha; the enterprising youngster gained a good deal of favourable acclaim all the same. Sharper, cleaner, more on the ball, the Alpha in its first version had a lot going for it.

What the Alpha 2 addressed was aesthetics and cost. The original Alpha had a front face to it which divided up the areas between the knobs into raised rectangles. They collected dust, they were expensive to mould, and true to my growing reputation for liking shapes other people hate, it seemed that I was the only one who approved. The Mark II

now we are three

Arcam's integrated 'baby' amplifier is now in its Mark Three guise. Eric Braithwaite compares it to its older brother, the Mk II

replaced the raised extrusion with a flat one, with only a groove running the length of the amplifier to demarcate the top half, carrying the name and the model, from the bottom half containing the controls. I was converted. It looked simple and elegant - and it conformed to what was becoming a distinctive Arcam house style.

Outwardly, at first glance, the Alpha 3 has little to distinguish it from the Mark II. The Greek 'alpha' now has 'Arcam' above it while the name of the character has gone off to the right in front of the phrase 'Integrated Stereo Amplifier'. Perhaps we're now expected to have learnt a little Greek? The colour of the small indents on the now metallised knobs is white instead of blue, and the new ones lack the groove that was a very useful guide to their position when looking down from above. Both these changes, albeit minor, seem unfortunate to my mind.

The number of knobs remains the same - input selector, volume, bass,

treble and balance - but 'disc' on the input selector is now 'phono'. The disc input is moving-magnet only. There is one addition, which is easy to miss at first glance. Now we are offered a 'direct' switch as well, next to the tape button. This is Arcam's concession to audiophilia - it bypasses the tone control circuitry.

Round the back, things are slightly different, too. There are the same number of input sockets, but instead of three pairs of 4mm loudspeaker sockets (Arcam used to supply a set of banana plugs for the speaker leads) there are now four pairs of sensible binding posts.

For those who have become slightly confused, this is a hangover from the A60, which allowed the user the option of wiring the speakers to the amplifier so that a pair would mute if headphones were used. The option is still there, but two pairs of speakers can be left permanently connected, with one pair switched off by inserting a plug in the headphone socket to switch them out. Alternatively, the two pairs of sockets can be used to bi-wire speakers, a useful step forward in tune with present thinking.

Now to the insides. Power has been increased to 40W - against the original 30W - and the output stage now has bigger capacitors, plus air cored inductors. "In 1990 we sold over seven thousand Alpha 2's," said Steve Reicher of Arcam," but we were only asked for fourteen MC stages, so we spent the money we saved by removing it on improving the circuitry." On a very minor note, "You may have noticed we've changed to simple bog-standard feet," he added. "We had 'designer' feet for the Mark II, but they kept falling off. These don't."

Losing Out

"Our slogan for this amplifier is 'The British are coming!'" he added. "We - the British home industry - have been losing out to the Pioneers of this world lately, and we're out to get our rightful share back again with this amplifier. It's more dynamic, more open, there's more space than the Mark II. We're really rather delighted with it."

So why did the Alpha need to be improved? The Mk II, which I listened to first for this review, was sweet, engaging and very listenable. I had to be dragged back to my word processor and reminded I was supposed to be writing about it. If it had a shortcoming, it was lacking in power. It needed efficient speakers on the end, otherwise the treble and upper mid range would coarsen and the amplifier loosen its grip on the frequency extremes when the volume was whacked up. Bass was warm but not deep - a size seven

Welly on a size five foot, instead of a tight fitting size eleven boot. While the outer edges of a somewhat shallow soundstage were distinct, there was some smearing of images between the speakers. Overall a warm-edged but clean sound, with all the best latent virtues of the old A60 made tighter.

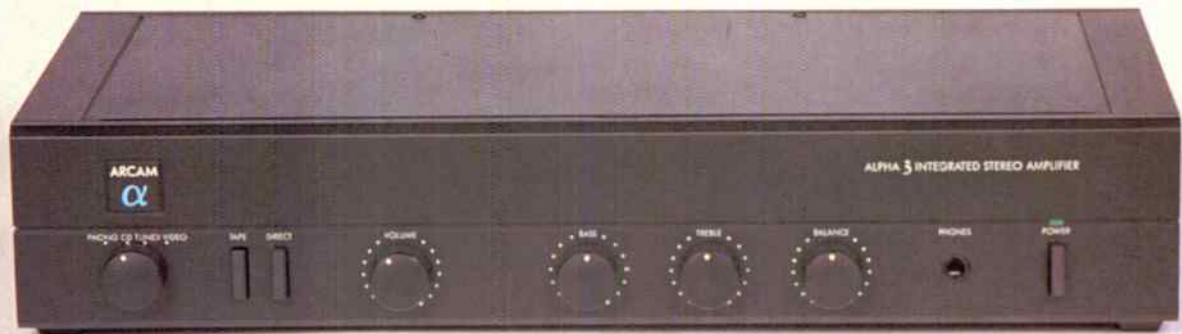
The differences were immediately obvious. The Alpha 3 is drier, leaner, cleaner, more fleet of foot. It's more of a sprinter, and how much more! Omette Coleman's 'Song X' was a revelation compared to the Mk II. It was very quick on its toes. A cymbal splashed a little, the individual pieces of the drum kit were a bit muddled together, and some of the subtle dynamics were glossed over, but it was awarded four Wowls for performance and the same number out of five for excitement. It stopped absolutely dead with no hang over at all, and achieving that is difficult for almost any amplifier.

No less lively, but less of a strain, solo Classical guitar was clean and the plucked notes tidy and tight. Air was almost visible around the notes, if it was a little too widely spread across the centre. Orchestral music was more laid back than the Alpha 2, with a good wide soundstage not bounded by the speakers. Instruments are perhaps not as finely positioned as they could be, but were nicely lit, if not sharply spotlighted. Horns swelled into tuttis, but a spot of hollowness in the brass tended to take away a little of the bite. Inner detail could seem a little blurred at the edges.

Lean

Tonal qualities were believable throughout the range, though liable to be a little too lean, which reduced the piano's force and grandeur in the Rachmaninov Piano Concerto, and took away some of the power of Barenboim's thundering climax in Chopin. The Arcam kept a grip on all Barenboim's very fancy footwork, and the shades of tonality, though with a bit of a struggle. It's a torture track, and the Alpha wasn't vanquished.

Though I would have preferred a more precise layout of images and a little more depth, hall or studio ambience was well portrayed without exaggeration. Dying notes died instead of tailing off, and a side drum in 'Facade' had the most satisfactory clean and tight 'bonk' so sharp you could almost measure the skin. Not fruity or overblown, but not bass-happy, the Arcam Alpha 3 portrays music as a display of beautiful dried flowers; the bass is controlled but not deep - more a carefully shaded watercolour than a brooding powerful Munch. The benefits of the revisions and increased power output (we measured 50W, Arcam claim



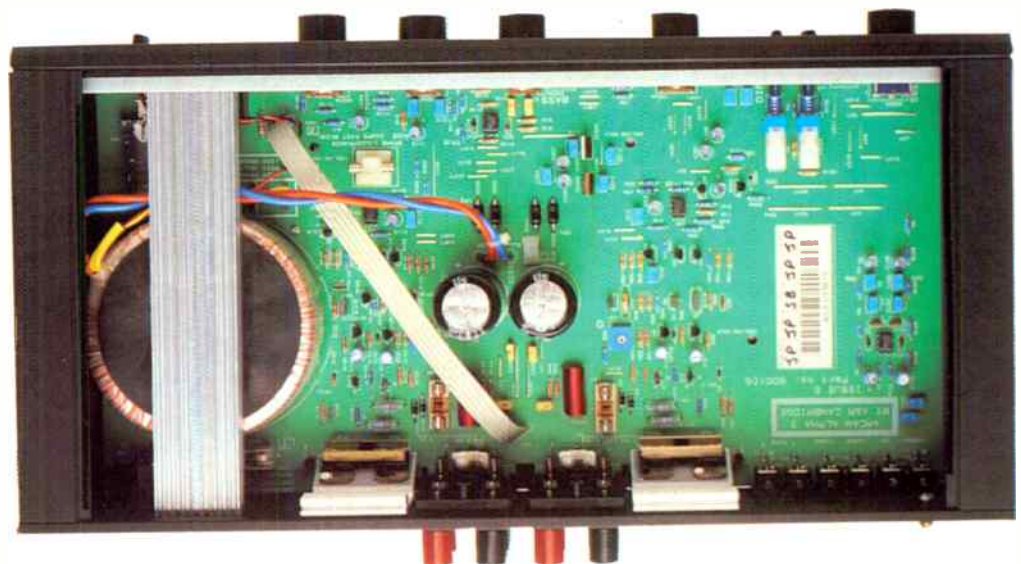
40W) are improved speed, clarity and tight control.

The listening was all done bypassing the tone controls; switching them in narrowed the soundstage within the speaker boundaries, and dulled the dynamics a little.

However 'oderous' comparisons are, they've been invited, so I wired in *that* amplifier, the Pioneer A-400. At first hearing, it seemed Arcam had lost the duel. Fast - very fast - clean, pinpoint imagery, but a soundstage less wide and no deeper. were the A-400's immediate attributes. On music like Tina Turner or Fela Kuti the dynamics - and dynamism - were astounding, as was the sharp rasp and bite of the brass. It made the Alpha seem restrained, lacking the thrill of being on the edge. But, while the Alpha 3 won't give up on anything, the Pioneer turned 'Song X' into confusion rather than complexity. It didn't have the same 'Wow!' factor. In reverberant recording venues notes wobbled away rather than died cleanly into the distance.

Vinyl

Where the Arcam scored over the Pioneer was undoubtedly in the disc stage. They still believe in vinyl in Cambridge, but they don't in Tokyo. The A-400's is barely better than the A-119's, reviewed in this issue. The Arcam was glorious, with all the best attributes of the CD input. Bass rolls off, and that turned the deep heart-beat in 'The Wall' woolly, but it saves the sight of randomly flapping cones, and every detail of the mix was spread out in front of the listener. The diving plane screamed across from right outside the speakers. First impressions were good enough to go completely overboard and put £2,000's worth of turntable, arm and cartridge in at one end and feed it with the same money's worth of



‘The diving plane screamed across from right outside the speakers. First impressions were good enough to go completely overboard

Quad ESL 63's at the other. That's twenty times what the Alpha costs.

It's good, but not that good! The stage is detailed - very detailed indeed, every grunt, groan of the conductor and shuffle of underemployed orchestral feet was exactly placed and at exactly the right volume. If there was any query, a slight ringing could be heard on some piano notes, and bass was less controlled than ideal. Indeed, a slight

lack of control was evident in the lower and upper mid, which could muddle the textures and affected the tone of strings. Dynamics were slightly compressed - rather than the gutsiness of the Pioneer's CD stage, the Alpha on LP tended to recess the heavy bits and give way without giving up. But despite a shallower soundstage than is possible, it brought out all the good tonal qualities and detail of my finest - and expensive - collectable LPs. Very creditably, the softness in the bass, the lesser degree of grip in terms of dynamics, and a touch of wiriness in strings, all by a small degree, were all that distinguished the disc input from the CD.

Does it beat *that* amplifier? In terms of absolute guts and sheer drive, no, not quite. In terms of inner definition, the better the source, the clearer it becomes. If you have kept your records, the phono stage won't disgrace a good mid-price turntable and cartridge, and the quality of the sound should give you pause about trading them in for CDs. There, the Arcam Alpha 3 is way ahead. ●

The big toroidal mains transformer of the Alpha 3 can be seen at right

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Measured Performance

Glancing inside the Alpha 3, my attention was caught immediately by the presence of a large toroidal mains transformer. It suggests the Alpha should have very good power and transient current delivery. The suggestion was turned into fact when I measured the Alpha. It almost managed the unusual feat of doubling its power delivery into a low load. A 'normal' loudspeaker of eight ohms nominal impedance receives fifty watts; a low impedance four ohm load will receive up to eighty watts. That's a fair amount of wallop for £199.90. It makes the Arcam as powerful as a Pioneer A-300, but less powerful than the cheaper Denon PMA-350 or the more expensive Pioneer A-400 which costs £230. Arcam are understandably keen to wrest at least some of the sales going to these Japanese amplifiers back into their own hands, since it has traditionally been an area in which they were strong.

The CD, tuner and tape inputs all have a wide bandwidth. I note that Arcam have now ensured good subsonic extension through these inputs to match the abilities of Compact Disc in particular. The lower -1dB limit was 4Hz. In line with their usual policy, one employed by most UK amp manufacturers, high frequency output is rolled off above 20kHz, the -1dB limit being one octave further up at 44kHz in fact. The idea of this is to suppress any possible supersonic signals that could intermodulate down into the audio band.

Arcam have a policy of using the latest IEC disc equalisation curve that has a low

frequency roll-off built in, to stop disc warps flapping loudspeaker cones. This prevents amplifier power being wasted and it lessens distortion in the loudspeaker too. It can be heard to dry out bass a bit I find and the early-ish roll off point of 44Hz (-1dB) is likely to be detectable with loudspeakers that go low, especially in comparison with an amplifier like the Denon DR-M350 and Pioneer A-300, both of which lack such a filter in their disc stages.

Arcam go for a good measured performance; they are not fully paid up members of the 'measured performance doesn't matter' school. Distortion was below 0.01% - a very low value - right across the audio band. Only towards full output did levels rise a little, but the arbitrary 0.1% limit was not breached at any frequency. The distortion analysis clearly shows how little high frequency distortion was produced. This invariably results in smooth sounding treble, lacking coarseness or any tendency toward sounding fierce.

There was very little hiss and negligible hum, through all stages including the phono input. Sensitivity was high, especially of the latter stage, allowing low output moving magnet cartridges to match-in well.

In all areas, as perhaps should be expected from such a well established manufacturer of quality amplifiers, Arcam engineer the Alpha 3 very well.

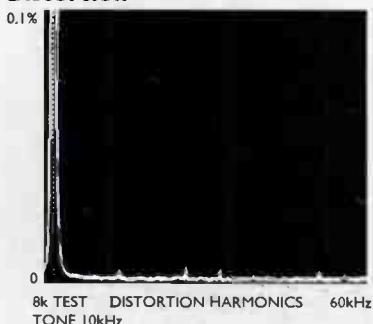
Test Results

Power	50watts
CD/tuner/aux	
Frequency response	4Hz-44kHz
Separation	-76dB
Noise	-94dB
Distortion	0.005
Sensitivity	200mV
DC offset	1.3/2mV

Disc MM

Frequency response	44Hz - 46kHz
Separation	-57dB
Noise	-75dB
Distortion	0.006%
Sensitivity	2mV
Overload	100mV

Distortion



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Claims to have matched the properties of a good electrostatic loudspeaker with a box design are made regularly. Heybrook in fact don't claim much for the Sextet - and perhaps wisely there's no suggestion in their literature that it possesses any 'electrostatic' properties. This would be a red rag to quite a few reviewers who rely on the Quad ESL-63 electrostatic as a long stop reference. But they were very keen for us to review it all the same, perhaps sensing that because I use modified '63s the Sextet would appeal. Well, they were right!

The Sextet costs £899, which is a tidy sum of course. But a really good loudspeaker, of which there are very few, can bear almost any price. It uses three drive units, one of which is a distinctive looking mylar ribbon tweeter, taking up the usual position at the top of the cabinet. Below it sits a dedicated mid-range unit with a 140mm polypropylene cone that should, in itself, possess little colouration. It is back loaded by a sealed enclosure that contains a mixture of long haired wool (from hippy sheep, as Alan would have it!) and acoustic fibre. The idea of using two materials is to get a broader range of absorptive properties. Below this unit lies a 180mm bass unit with a central phase plug and doped paper cone. It is loaded by a reflex chamber, having twin ports that exhaust through the base of the cabinet. Because of this

through quite a lot of positioning tests and found that just 10cms or so in front of a back wall and angled in toward listeners (even this is not essential) was about right. Wall mounting often compromises both bass quality and stereo imagery; with the Sextet it does neither.

A black grill cloth covers the drive units, but not the vertical fillets of burr walnut on either side of the front baffle. The cabinet is finished in black ash veneer. A gloss black fillet across the front at the top face carries the Heybrook name. I found the Sextet visually attractive; it is interestingly different, whilst at the same time remaining traditional and tasteful. As 'big' loudspeakers go, it blends into surrounding furnishings with ease.

The rear carries two pairs of screw/4mm terminals, linked together externally. Removing the wire links allows bi-wiring, where the treble unit is fed independently from the amplifier; the bass and mid share a cable. I used the speakers bi-wired with Linn cable.

Heybrook claim the Sextet is easy to drive and needs amplifiers of 30-200watts. Measurement showed their claims are justified. The loudspeaker is a very easy load for any amplifier to drive; it is almost ideal in fact. I would recommend any 50-100watt amplifier of your fancy. Having said that, make it a good amplifier, since the Sextet is very lucid and revealing. It should be

unit that may be appropriate. Alan Sircom recommends Heybrook's own amplifier which, he says is very good.

The feature of these loudspeakers that caught my attention immediately during our initial listening session was their apparent clarity, coupled with excellent sound staging and a certain dryness that suggested great control. Often, further listening tests only show that initial impressions were inadequate; something or other lurking in the background, like a box honk or screechy treble, slowly makes its way forward in one's mental impression, eventually overwhelming and destroying enjoyment.

Qualities

Whilst the Sextets sounded interesting initially, they also sounded a bit bright, somewhat forward and 'scratchy' in their treble quality. It was the latter effect that would compromise them, I thought. Surprisingly, it didn't. Further usage only allowed me to readjust to their presentation and appreciate their qualities even more. Perhaps they softened up in the face of firm treatment from the 300 watt per channel Class A Musical Fidelity SA-470; it lets no speaker step out of line.

The Heybrooks are in any case an unusually tight and dry sounding loudspeaker, from one end of the audio spectrum to the other. They have the firmest, fastest bass I have heard for a long time. There is some upper bass box 'whoomph'; I could hear the cabinet going off at times, but the effect wasn't unduly irritating, mainly because the loudspeaker is so absorbing to listen to in other areas. Drums were reproduced with a firm and controlled resonant 'boom' of superb definition due to minimal cone waffle or overhang. Similarly, bass lines were supremely well laid out in terms of fundamental strength and timing, even if some of the richness within overtones was a little 'dried out' as it were, due to the 160Hz dip. The effect was not overtly noticeable all the same; I listened for obvious loss of information but noticed only this lean-ness. Alan Sircom and Eric Braithwaite both commented on a "loss of cohesion between bass and mid" which I suspect was attributable to this dip also. There was plenty of deep bass and in-room measurement confirms bass extension right down to 40Hz within about -2dB - an excellent result. Like all box loudspeakers though, the Heybrooks don't reproduce subsonics and at times they, like others, sadly ignored two octaves of information I am used to hearing from the box-less Celestion sub-woofers. This inability applies to all reasonably sized boxes though; even giant TDL Transmission Line Studio Monitors like our currently

successful sextet

For Noel Keywood the new Heybrook Sextet loudspeaker is a great success.

last feature, the cabinet must be raised off the floor or any carpet. If spikes are screwed straight into the cabinet base, using inserts provided, then the recommended gap is 23-30mm above a carpet and 30-40mm above a bare floor. Alternatively, Heybrook offer a small metal base for £49, the precise value of which defeats me. We used it all the same, meaning 30mm to the floor was the required gap.

The tall, slim cabinet of the Sextet is unobtrusive, visually and physically. It stands 900mm high, is 270mm wide and just 200mm deep. It will slot into quite small spaces and, better still, has been designed to stand close to a rear wall, a feature that makes it even less intrusive than usual. I went

partnered with something decent. Quite what is determined by its sound quality; bright sounding amplifiers I would not recommend, because the speakers veer toward brightness in themselves. I 'cheated' by driving them from a Musical Fidelity SA-470. Apart from exercising brutal cone control, which complemented the Sextets, it has smooth treble, which is necessary. It is also extremely revealing and atmospheric, which again did a lot for the loudspeakers.

At a more realistic price level I would suggest that a high quality amplifier of excellent lucidity and 'smooth' or even 'warm' tonal balance is used. An AudioLab 8000C/P combination springs to mind as a

resident and much liked Studio 4s, only hint at what exists below 40Hz on Compact Disc. No matter, the Sextets deliver incredibly fast bass of superb balance and definition. They've got a lot of impact and there isn't the merest hint of one-note effects. The prominent bass line of Robbie Shakespeare on 'Make 'em Move' from Language Barrier sounded powerful, but precise. Time wise, each note was perfectly placed,

They fully conveyed the intent and involvement of that bass line - and I loved them for it.

making for superb intelligibility. I only noticed here that, unusually, deep bass fundamentals and, therefore, bass power seemed a bit exaggerated due to the weakening of upper bass harmonics, attributable to that 160Hz suck-out.

Another cogent test of bass 'playing' in a loudspeaker comes from the Tina Turner album, Break Every Rule. The track of the same name is founded upon a distinctive bass line; I have heard (and walked away from) speakers that have completely flunked this track, producing random huffings and puffings at all the wrong moments. The Sextets strode along with superb pace and control. They fully conveyed the intent and involvement of that bass line - and I loved them for it.

Projection

But it wasn't the bottom end performance of these speakers that first caught my attention, nor is it their greatest distinction in my view. That honour actually goes to a synthesis of properties that I would lump together under the title of sheer 'projection'. The Sextets are one of the few box loudspeakers I have ever come across that can really produce a plausible sound stage thrown well forward and as firmly etched and strongly defined in the centre as at the edges. In this sense they move into Quad territory - and they do it with great authority. There are no 'ifs', 'ands' or 'buts' about this: the Heybrooks image spectacularly well and the information they project forward is of superbly high quality. Again, like the Quads, their mid-band lucidity and analysis is so great that production techniques and the finest of details are brutally exposed. Trouble is, here I have to admit that their richness and forward



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projection is so startling that they do actually surpass my own modified ESL-63s. Whereas the electrostatics were smoother and more revealing with simple programme material, the Heybrooks showed they could resolve more in the way of dynamic contrasts and stay relatively unmuddled whilst doing so. In fact this is a pure level problem with the Quads; they do start to flatten out mid-band contrasts and they can also get a bit muddled if pushed up in volume. The Sextets proved equally or more revealing, and they also sounded less congested at high-ish levels. What this meant in practice was that the sound stage was strongly projected forward out of the loudspeakers and individual images upon it were very clearly delineated, one from the other. An unresolved contest started between the Quads in one room and the Heybrooks in another with a track by Sonny Terry and Brownie McGhee, "Bring it on home to me", from the album Sonny and Terry. The Heybrooks pushed both artists and the instruments firmly forward out into the room and improved the intelligibility of the musicians speaking to each other. Here, as in other examples, I suspect the Heybrooks inject some artificial enhancement. Raised output around 5kHz is responsible for this, as it is for making the Sextets sound a bit bright, if not unpleasantly so. Whatever, I have to acknowledge the fact that the resolution, clarity and projection of vocalists by these loudspeakers is utterly superb, even if it is arguably a trifle artificial. I could more easily and readily discern what these two were saying with the Heybrooks, whilst noting that the Quads were providing more detail of a fine and delicate nature.

Questionable

The Heybrooks became more questionable when reproducing the strings of the Concertgebouw Orchestra; Ashkenazy remained on stage whilst I found the strings virtually in my lap. In this respect (i.e. forward projection) the Sextets are strange and do, I believe, distort perspectives. They are best with close miked Rock and some simpler Classical pieces, since they enhance presence and closeness. Classical purists are warned!

Keeping with the upper bass and mid-band, I noticed also that the Heybrooks are a loudspeaker that starts and stops cleanly and with great precision. Again, this is Quad territory. It results in superb time domain delineation of events, a wonderful clarity of timing and great sense of silence when it is meant to be there. Box loudspeakers commonly suffer from being unable to fall silent,

especially between transients, when all the wood, metal, paper and damping gunk quivers uncontrollably and unstoppably. Heybrook have done a great job in seeming to have quelled all this extraneous motion. I heard some whoomphs, buzzes and squeaks at times, but being belted by an SA-470 does make loudspeakers complain a bit - in the few moments that opportunity allows.

By keeping upper treble down a bit, Heybrook have made certain that the Sextets don't sound really sharp. Their treble quality is pure, if a bit brittle. They don't have any long term nasties though, but I must say that they can develop an incisiveness that made me wince with some over-bright recordings. In contrast, the Quads, I should note, always sound sweet and delicate - and also more cohesive.

The Heybrooks hang together temporarily, but they change character in other ways across the audio band, like most multi-driver loudspeakers -

and this does sometimes intrude. Box whoomph, scratchiness in the treble and divorced lower bass all play their part here, to the detriment of the whole. But as I said earlier, the Sextets have such enormous strengths, they are so revealing and entertaining, that in their worst moments they manage to remain below the threshold of offence.

I was captivated by the Sextets, which preserved all the excitement in music and presented it with great forthrightness. They were hard to walk away from - with almost any record, no matter how badly it was recorded. I only hold slight reservations about partnering equipment, since whilst these loudspeakers are an easy load, character mismatch in other items could push their highly particular nature past the point of acceptability, without revealing their great strengths. Matched with care, they're a great loudspeaker - dramatic, entertaining, fast and very revealing ●

Measured Performance

Because the Sextets rely to some degree upon wall and floor reinforcement of their sound, they have to be measured in situ for a meaningful frequency response to be obtained. The third-octave analysis shown below was made in-room with some position averaging, although this was not essential. Frequency response stays much the same on or around the forward listening axis; only at significant angles above and below does the tweeter lose output. The optimum listening position is reasonably uncritical.

Bearing in mind the fact that the vertical scale is expanded to highlight deviations, the response of the Sextet is a fairly balanced one. Features to note are a small 'presence' peak around 5kHz, responsible for some forward projection of detail I suspect, as well as the apparent 'brightness' of the loudspeaker. Above this, treble output rolls off to become -2dB at 10kHz and -4dB at 20kHz.

Ignoring the suck-out at 160Hz, caused by floor interference, bass output is very even, reaching down to 40Hz within a few dB or so. This shows why the Sextets sound so even and balanced in their bass performance. Experiment confirmed that the suck-out cannot be removed by repositioning and that moving them forward from a rear wall only widens the dip, making it more audible. These speakers need to be kept close to a rear wall, as recommended by Heybrook.

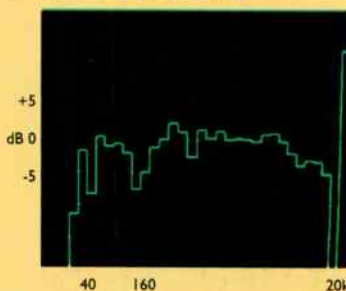
Sensitivity measured 87dB Sound Pressure Level (i.e. volume) for one watt input - a normal enough value. The Heybrooks will go loud with a fifty watt amplifier, or very loud with a hundred watt amplifier. Heybrook suggest anything up to 200watts can be used. I found they produce 110dB SPL peak in a 16ft x 12ft room without strain. My ears couldn't take any more!

The impedance curve, seen below, dips down to 6 ohms minimum at 800Hz and 150Hz. However, over most of the audio band it hovers around 8 ohms, making this an 8 ohm loudspeaker. Lack

of sudden rates of change shows the impedance is largely resistive in nature, except below 100Hz where, as usual, the ports produce peaks, around which the electrical reactance reflects the mechanical reactance. By normal standards, the Sextet is an easy load.

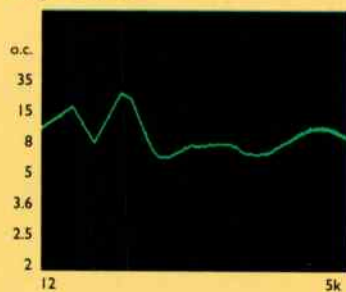
The Sextet measures well, although some of its idiosyncrasies are explained by its measured performance, I believe.

Frequency Response

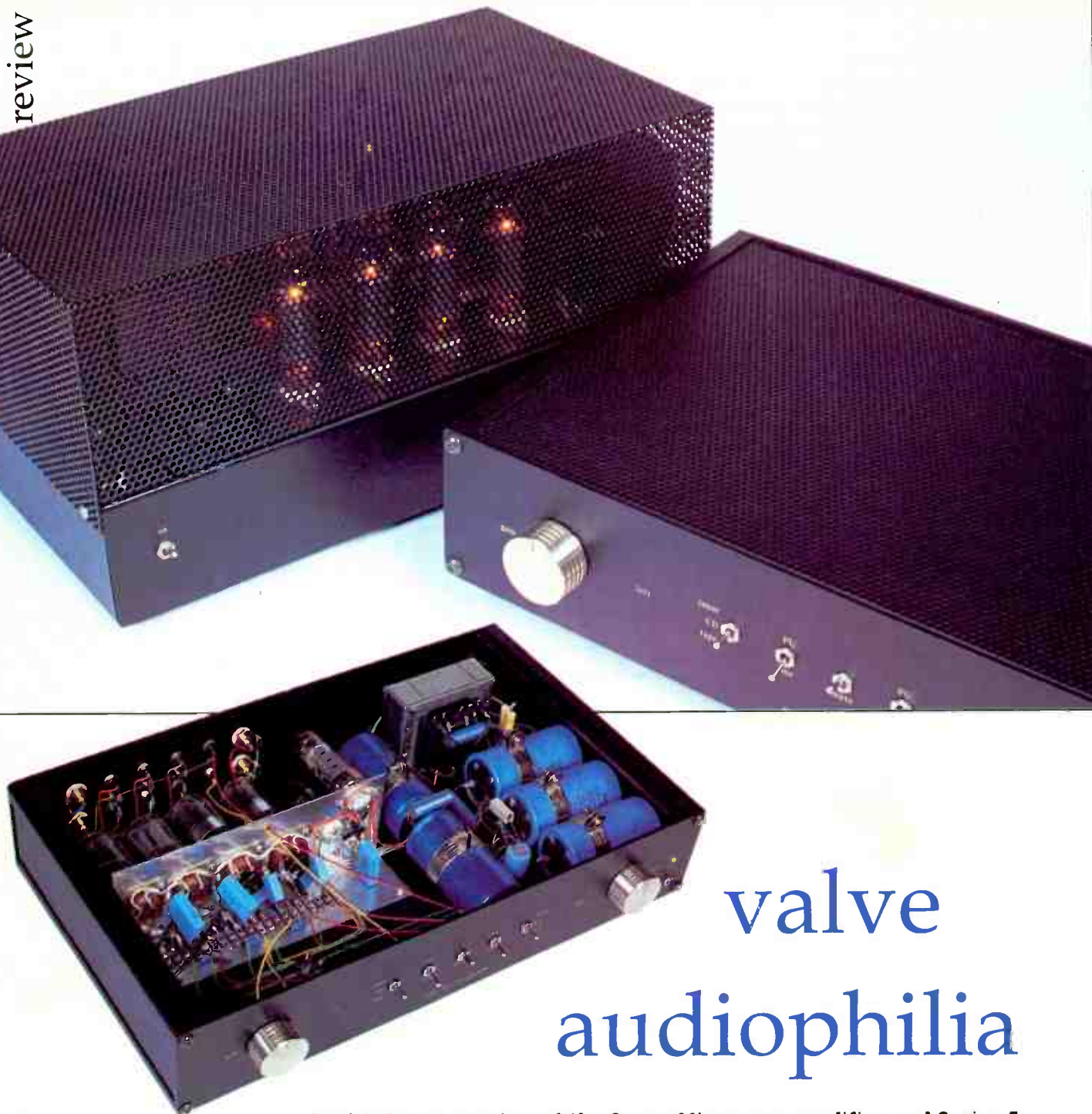


The in-room response of the Sextet is basically even from 40Hz up to 10kHz within a few dB. Only a floor suckout dip at 160Hz is a minor problem.

Impedance



Impedance dips to 6 ohms minimum at two points, but otherwise hovers around 8ohms from 100Hz up to 20kHz. Low frequency peaks, seen at left, are produced by the ports.



valve audiophilia

Croft's latest version of the Super Micro pre-amplifier and Series 5 power-amplifier could mean high-end valve sound without a second mortgage.

Alan Sircom counts his pennies and plugs them in.

The Croft Super Micro A pre-amplifier stripped bare. Note the inverted valve seats and the complete absence of a printed circuit board.

Croft amplification has always had a reputation for being 'valve audiophilia on the cheap'. The boxes and the logos may look no more than functional, but the equipment always sounds good. Two recent devices add credence to this reputation: Croft's latest version of the popular Super Micro A pre-amplifier and their new and diminutive Series 5 power amplifier. The two combined will leave change from £1,200: the Super Micro A costs £649, the Series 5 £548.

It is strange that all the hot-running valve amplifiers arrive for test during the summer months. Croft's latest pre- and power-amplifiers are superb weather indicators. Once the amplifier is

switched on, so the temperature outside rises. The rain storms, freezing fog and blustery gales that are normally associated with British Summer disappeared as soon as they had been switched on long enough to provide cosy heating for the listening room. This means that my lasting memory of the Crofts is one of perspiration.

To be fair, the pre-amplifier does not run that hot. With only seven valves inside its case, there is a lot of room for air to circulate and for the heat to dissipate without raising the room temperature too dramatically. The Series 5 power amplifier is a different matter: Encased in a box slightly larger than a toaster are no fewer than

fourteen valves. Even if these ran relatively cool, they would still give off a lot of heat. As it is, the Series 5 runs as hot as its analogous toaster.

Both products are intended to meet particular demands. The Series 5 was designed to be inexpensive and good sounding, without being either low powered or cumbersome, while the Super Micro A is designed to produce a more open sound typical of American tube, or valve, pre-amplifiers.

Amar Biswas, one of the directors of Eminent Audio, who are Croft's distributors, went on a fact-finding tour of the U.S. tube amplifier manufacturers earlier this year. The Americans were said to be impressed by the value for

money factor Croft are so good at. Amar, on the other hand, was more than keen to see what goes into some of the latest high-end valve gear, to find out if this technology was practical enough to filter down into Croft's range.

He was particularly impressed by the sound that some of the manufacturers were producing. Preamplifiers like the C.A.T. especially, were offering a wide, open sound that was difficult to find in British equipment, but would still sound very acceptable to ears this side of the Atlantic. When examining these products and questioning their designers Amar found that there was a way of approximating this spaciousness without sacrificing any of the traditional Croft virtues. It involved the use of U.S. octal based triode valves; two 6SL7GT's in the preamplifier output stage and two 6SN7GT's in the main amplification stage. The installation of these valves in the existing Super Micro A preamplifier took all of one weekend.

By comparison, the Series 5 is a more straightforward design, using standard EL84's as output valves and ECC 83's as drivers, using many of the features found in Croft's successful Series 4 amplifier, but in a simplified form. The simplification does not mean that there has been a drop in component quality, as the power amplifier uses good quality metal film resistors and polypropylene capacitors.

As with all Croft's products, the amplifier has been hardwired throughout. Not a circuit board in sight, although the aluminium base plate for the valves on the Super Micro A has an interesting feature. The valve seats have been inverted, so that the valve is inserted to the bottom of its seat, instead of the top. This has allowed components to be attached to the seat with greater ease than normal, so the components are less likely to be dislodged.

Functional

Croft live up to their 'cottage industry' reputation when it comes to their cases, which can best be described as functional. To keep prices down, corners have to be cut and this is an area that is easy to chip away at without harming the sound. Externally, all the Croft pre-amplifiers share the same box. A better class of knob for the twin volume controls distinguishes the Super Micro A and Mega Micro from the lesser pre-amplifiers. While the boxes are infinitely better than they were in the early ciggy tin days, they are still not designed with aesthetics in mind.

As we are dealing with two very distinct entities, I shall look at the two products separately and then describe how they integrate together. The sources used were a Pink Triangle Anniversary turntable, with SME Model V pick-up arm and Roksan Conus Black moving magnet cartridge - the Super Micro A, along with many British valve preamplifiers, has no moving coil stage. Compact Disc was Arcam's Delta 70.3 Bitstream integrated player, while the

amplification used for comparison was Esoteric Audio Research's G88 preamplifier and 549 monoblock power amplifiers, along with my Audio Innovations Series 200/First Audio combo. Both of these are considerably more expensive than the little Crofts (except the Audio Innovations preamplifier), but do give an idea as to what a good quality valve amplifier can do. Finally the loudspeakers used were Audio Note's AN-J's (silver wired) on Huygens stands and ProAc's Studio 1 Mk II's on Slate Audio stands. Both Furukawa and Audio Note Silver cables were used.

First, the Super Micro A preamplifier. Once thoroughly warmed up, this item does seem to have found at least some

‘for those who are fast becoming tube addicts, this is a difficult system to beat.

of the aspects of the more expensive and esoteric American preamplifiers. Whilst being somewhat forward in its presentation, it is lucid, open and very coherent, with a wide soundstage. Its sense of rhythm is a little slow, when compared to the better transistorised preamplifiers. In mitigation it has one of the richest sounding midbands of any preamplifier under £1000. It rarely strays into sounding thick or muddy, but instead retains the warmth and clarity of a typical Croft valve preamplifier, with the clean detail of a solid state model.

It does err on the euphonic side of neutral, but only just. At frequency extremes, the Super Micro A holds its own well with its peers, only sounding a little ragged when compared to more expensive models. Though the Ion Systems and the Audiolab preamplifier, both of which are similarly priced, may be slightly better at the extremes, neither can offer as warm and inviting a sound as the Croft. The joy of this preamplifier is its sheer musicality; it can be criticised on a number of counts, especially its microphonic casework, but its appealing overall sound leaves 'em smiling, unless driving rock music is the mainstay of the musical programme.

The preamplifier seems to fit into most systems well and as many of the older power amplifiers such as Quad II's or Leak TL/12's or Stereo 20's are now in need of something more modern, the Croft Super Micro A, with its high-end pretensions and its mid-price cost seems to be an obvious choice.

The Series 5 power amplifier is every

bit as much bargain material as its preamplifier cousin, but in a distinctly different manner. While the Super Micro A is attempting to take on the high end almost single-handed, the Series 5 has less lofty ambitions. This power amplifier is designed for those who want the warmth and life of a valve amplifier, without the cost that has become associated with them. At 25w/channel, the Series 5 can hardly be classed as a powerhouse. It is possible, as it is with all Croft's stereo power amplifiers, to add another Series 5 to make a pair of tasty monoblocks, if some minor surgery is performed. Alone, it does have enough grunt to drive relatively efficient loudspeakers well.

In many senses, this is more a standard British valve product than the Super Micro A. It has that distinctive Croft valve sound to it: rich, warm and enjoyable. Again, the amplifier is a little forward in its presentation, but its soundstage is deep, rather than wide. The bass, normally an area of some disappointment with valve power amplifiers, is tidy and tight. It may not have the snap that is associated with good solid state amplifiers, but it has fine weight and extension for such a device. Its treble can be a little jangly on occasion, but this also has a lot to do with the equipment it partners.

Wide and Deep

As the two sections were quite warm and had contrasting strengths in soundstaging, I did worry that they would mis-match badly, but the wide soundstage of the Super Micro A and the deep stage of the Series 5 combine well to produce three-dimensional images with an impression of solidity, without sounding artificial. The warmth of the two when combined did not seem to be too overt, but sounded almost charming in its listenable character.

As with most all-valve amplifiers, the dynamic range of preamp. and power amp. in unison puts solid state to shame, ringing the musical changes in dynamic contrasts with a realistic ease. As two stand-alone pieces of amplification, both work well. The Super Micro A seems to have the edge in terms of high-end bashing; it would not sound out of place in a system costing several thousand pounds, while the Series 5, by virtue of its 25w output alone, would not hold up as well.

Taken as a complete amplifier system, for those who are fast becoming tube addicts, this is a difficult system to beat. Only Concordant's Exultant system comes close price-wise; I have not had a chance to evaluate this system yet, but it should be interesting.

If only Croft could work on the niggles that I have about their build quality, I would have no reservation in recommending this pre and power combination to anyone in the market for top quality valve amplification on a shoestring. They may not look beguiling, but their sound certainly is ●

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HEAR HERE.

The cheap amplifier business is obviously looking up, in numbers - or down, in price! Pioneer's A-119 amplifier is priced at a mere £99. Give up a packet of cigarettes a week, or order a couple of pints of Guinness less on Friday night, and the money for it is saved in a year.

This is a cheap and simple model. The lettering on the black, uncluttered fascia says - for once - exactly what it is: an Integrated Stereo Amplifier. There are tone controls for bass and treble, a balance control and volume control, and a four position input selector. The low price end of the budget market is obviously not quite ready for audiophile minimalism yet, for there's also a headphone socket, a loudness button (oh dear!) and a switch to choose either a second tape input or a graphic equaliser wired into the spare pair of record/play

Measured Performance

Power output measured 40 watts into a normal eight ohm load, increasing to 56 watts into a low four ohm load. This is enough power to make most loudspeakers go loud, but not deafeningly so. The increase in power is limited too, suggesting mediocre regulation and, probably, muted 'slam' in the bass.

The CD, Tuner and Tape inputs have a wide frequency response of 6Hz-51kHz. This is appropriately wide for CD, which goes down to 4Hz. Channel separation was satisfactory at -70dB and hiss minimal at -91dB. There was no hum. The analysis shows the presence of odd order harmonic distortion measuring 0.08% at high frequencies. This can sometimes be detected as slight coarseness in the treble. In the mid-band, distortion feel to 0.04%. Both values are satisfactorily low not to be a problem.

The disc stage had a wide bandwidth, with more low frequency extension than might be sensible. By reaching down to 7Hz it will amplify warps, which consumes power and increases distortion. Otherwise, measured performance was fine in all areas.

The A-119 measures well in all respects and has no obvious weaknesses. **NK**

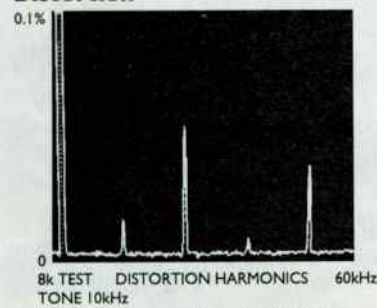
Test Results

Power	40watts
CD/tuner/aux.	
Frequency response	6Hz-51kHz
Separation	-70dB
Noise	-91dB
Distortion	0.04%
Sensitivity	150mV
dc offset	-25/-18mV

Disc MM

Frequency response	7Hz-43kHz
Separation	-55dB
Noise	-72dB
Distortion	0.04%
Sensitivity	2.5mV
Overload	150mV

Distortion



sockets. (graphic equaliser? It gets worse!)

The knobs and push-buttons are fairly insubstantial plastic affairs, though the smaller ones are slightly domed and improve the spartan looks. The case is nothing if not well-ventilated - there are plenty of slots above and beneath. Underneath, by the way, are alternative positioning slots for the rearward rubber feet, if you find you want to place the amplifier on top of something less deep without the drum feet poking over the edges.

Round the back, there are nickel plated phono sockets for disc, two tape recorders, tuner and CD, and some very cheap spring-clip terminals for the speaker cable. While these accepted 79-strand, one failed to stay sprung, losing its grip if the amplifier budged even an inch. I know this is a cheap amplifier but, along with some of the phono sockets feeling distinctly infirm when plugs were inserted, such weaknesses do give rise to worry over longevity.

Pioneer's assumptions about an A-119 owner's listening priorities are clear from the selector knob. Firstly comes 'DAT/Tape' - a bit optimistic this, since even the cheapest DAT recorders cost five times the price of this amplifier. Then comes CD at the top of the selector knobs arc. Finally, Phono and

Tracy Chapman's 'Fast Car' showed the bottom end to be a bit wobbly rather than tightly controlled. Both on this CD and on Cat Stevens' 'Tea for the Tillerman', voices were grainy and again without their real timbre, though this was bearable. The rather coarse grained, thin upper-mid and treble tended to make cymbals splash across the sound stage instead of sticking in there with the rest of the drum kit. There's nothing worse than an amplifier which shouts and screams; at least the Pioneer A-119 doesn't do that.

This mild problem showed up more on Vlado Perlemuter's Chopin disc, where the reverberant hall failed to surround the piano, and stayed more just left and right of it, and the upper notes took on a 'honky-tonk' tone.

This is a 'forward' sounding amplifier. The whole soundstage, as it were, is convex towards the listener instead of concave. Nothing too wrong with that; it may not be entirely true, but it does make an amplifier sound enthusiastic. Combined with a rather weedy treble, however, this meant the Pioneer A-119 lost some dynamic punch. While apparently quite lively, playing Grace Jones' 'Slave to the Rhythm' showed that, in terms of dynamics, the Pioneer went 'bam and slap' rather than 'wham! bang! slam!'



pioneering spirit

A basic amplifier from Pioneer for under a hundred pounds. Eric Braithwaite listens to the sound change - in his pocket

Tuner are relegated to the right.

Listening rather bore out these apparent priorities. For one thing, gain was lower when the phono/disc input is selected; reasonable listening levels required a volume position around the two-o'clock mark - and not with a low output cartridge either. In comparison, CD would give the eardrums a fair bashing at the noon position.

The disc stage (moving-magnet only) was a disappointment, as it tends to be in cheaper amplifiers. While there was quite a reasonable lateral spread, and what might be called 'basic' imagery (not inaccurate or foggy, but without much more than a semblance of depth and separation), instrumental tones and colours became 'samey', upper mid- and treble were somewhat pinched, with the result that voices sounded weedier, and dynamics were, overall, understated. It was as though the disc stage was pushing hard against a closed door, but not getting through.

CD was a different story. Bass was of decent quality and went down low, though

I'm sure readers have been waiting for me to say this, but of course the loudness circuit made it worse! While the track touched the stomach lining it didn't turn it over - as bigger and pricier amplifiers can do.

It's perhaps unkind to grumble too much. For this money - and providing you don't have an extensive record collection you want to get the best out of on the cheap - the Pioneer A-119 does a decent job. Tuner and Tape circuits, by the way, were as good as the CD, though the second tape/graphic equaliser input was a trifle more compressed. But you wouldn't use a graphic equaliser or the loudness circuit, would you?

Overall, the Pioneer is bright and cheery, without the worst boot-boy brashness that can afflict the buyer on a budget, and it does go loud enough for a small party. There are better, in terms of delicacy, for another fifty or sixty pounds, but yes, times are hard and money is tight. For Pioneer to put this little amplifier on the market at less than the ton shows they take the youth and bedsitter market fairly seriously ●



Through the design facilities at their three-year-old European Research Centre at Woking, Canon have produced their first ever piece of hi-fi, the S-50 Wide Imaging Stereo loudspeakers priced at £349. Our review pair were the smaller of two designs destined for the marketplace. The larger S-70's will be floor standing and have a dedicated bass driver. In contrast, our S-50s have just one unit and are small enough to be mounted on stands of normal height. Alternatively, Canon suggest, they can be put on shelves.

The S-50 looks like no other design. A matt black dome sits above a shallow gloss black cone that also forms a base. The cone acts as an 'acoustic mirror' Canon tell us. The dome above holds a downwards facing, pulp-coned five inch drive unit with a parasitic tweeter cone in the centre.

These loudspeakers are a bass reflex design; the one-inch port exits from the rear under-side of the dome, between two flat sided support pillars. A pair of binding posts are fitted in a recess on the under-side. The Canons stand just a little over a foot high on their three small plastic feet and they are very well finished.

if anyone can...

Canon's first venture into audio is a novel loudspeaker that gives stereo all around the room.

Can they succeed where others have failed, asks Eric Braithwaite.

A British team designed them: Phil Ward, who spent several years with Mordaunt-Short, and senior designer Mike Jewitt - also well known in the loudspeaker design world. He worked closely with Hiro Negishi, head of Canon Research Europe. The aesthetics are down to Alan Boothroyd, known for the stylish Meridian designs. It was he who came up with the idea for the 'sexy' dome shape, as a Canon spokeswoman put it, although a dome had to be a part of the design.

The whole construction is rigid and inert. The conical 'acoustic mirror' is, so Canon say, the largest casting of its kind in the U.K. It's made of Mazak, the zinc alloy that older

readers may recall being used for Dinky Toys and the like. The dome and base are made of moulded ABS plastic. The dome itself feels inert, partly because of its shape, but it's also filled with natural wool wadding. "It was difficult to stop this sliding about inside," said Phil Ward, "so we searched around for some system of keeping it firm and in the right place. One day in Boots the Chemists we saw they sold hairnets, and thought that was exactly what we needed." The production speakers still use hairnets, though not bought in the lunch hour from the local chemist, but I couldn't persuade Phil to comment as to whether chestnut sounded better than blonde or grey. .

Measured Performance

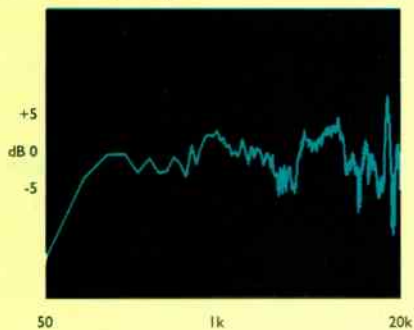
Loudspeakers that deflect sound invariably have a bumpy frequency response. They often exhibit peculiarities in their tonal balance and overall character as a result. The common problem is a depression in the frequency response (suck-out) that erases a band of frequencies. Subjectively, the effect may become apparent only on occasion, but when it does show itself it can be irritating for a listener. For example a depression around 3kHz dulls violins.

By general 'funny' loudspeaker standards (i.e. loudspeakers that dispense with convention, forfeiting accuracy for some other design goal), the Canon manages relatively well in terms of frequency response. Our analysis has a high-resolution vertical scale, making the ups and downs look worse than usual. Bearing this in mind - and using the conventional Tannoy 603 tested in this issue as a basis for comparison - you can see that the Canon has a bumpier frequency response than is common. There is a suck-out around 3kHz, which removes some sense of detailing, and average high frequency level above 8kHz is depressed. However, the peak around 5kHz gives a good impression of treble, although the impression is none too subtle. Although the loudspeaker sounds essentially balanced in tonal terms, it does not sound smooth and this plot shows why.

As a load, the loudspeaker is easy to drive in that it has a high overall impedance with a nominal value well above 8 ohms, as the analysis shows. The minimum value is 6ohms over a narrow band of frequencies around 1kHz. So little current will be drawn. The drawback of this is that sensitivity is compromised and, indeed, the Canon was insensitive. It produces 86dB Sound Pressure Level (read: volume) for one watt of input power from an amplifier, whereas the Tannoy 603 will give 89dB. That +3dB advantage means the Tannoy will be significantly louder for any given amplifier power.

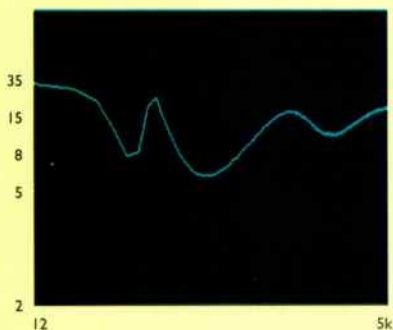
For what it is, the Canon S-50 measures well. Against more conventional loudspeakers, it is poor however.

Frequency Response



A bumpy frequency response, typical of a reflected-sound loudspeaker, but one that has a flat underlying trend.

Impedance



Nominal impedance was high, exceeding eight ohms. It dipped to around six ohms minimum at 1kHz only. The speaker was insensitive as a result.

Let's get the jokes over with first. Yes, they do look like a pair of high-tech post-Modernist lamps, and people did ask me why I didn't switch on the lights. There were even cracks made about them being available in red with white spots and was I going to join the Brownies. Let alone one smart Alec who suggested I pinched next door's garden gnome to sit on the top of one of them "to make it feel more at home."

Back to serious matters. The acoustic mirror is nicknamed 'Mount Fuji' apparently, and it does bear a resemblance to that even-sided squat volcano. That is, as far as I can judge from the postcards. The principle is that this will reflect the sound coming from the downward-pointing single drive unit under the dome, and the listener should be able to hear decent stereo from almost any position in the room. If it can be made to work, this a very attractive notion.

Canons to the Right...

Listening began with the Canon S-50s positioned on stands as though they were an ordinary pair of boxes. The manual is an ideal of its kind; well-printed and informative about placement, spikes, room reflections and cables.

William Walton's 'Facade' began the march of Compact Discs through the loudspeakers. This is not the early one with Dame Edith Sitwell declaiming her own poems, still at the top of her voice and sounding like the enormous megaphone she used at the first performance, but the Decca recording with Peggy Ashcroft and Jeremy Irons reading and the London Sinfonietta doing the playing. It's tricky, because the different voices Irons uses, and Dame Peggy's variety of inflections, have to come across, while many of the instruments are played with mutes, which can muffle the differences.

Results were better than previous experiences of omnis would have suggested. Both Jeremy Irons and Peggy Ashcroft were in the right place; the band, however, was bunched up more left and right than is actually the case, and there appeared to be little sense of depth. The London Sinfonietta are - or should appear - well behind the orators, who are obviously out in front and close to their microphones.

A little further listening to Rachmaninov's Second Piano Concerto (Ashkenazy/Concertgebouw/Haitink) showed that while the piano had good weight and presence in the first few bars, it tended to disappear into the rest of the orchestral texture afterwards, and the instrumental strands became somewhat confused. Generally, orchestral recordings appeared wider than normal, and

somewhat more diffuse; the difference, in terms of imagery, between gaslight and halogen bulbs.

Tuning to Tracey Chapman's 'Fast Car' and Grace Jones' 'Slave to the Rhythm' showed a good grip of bass in the former, although the artificially enhanced bottom end buzzed a bit, and exhibited a rather curious effect in the latter disc. The mix in 'Slave to the Rhythm' was more what you might hear from the back of the National Exhibition Centre at Birmingham, instead of from just in front of the stage, which is where the recording is placed. The listener is cosily enveloped by the sound rather than being obviously in front of it. The effect is quite fetching, if not precisely accurate. It's as though the listener is on the outside edge of a goldfish bowl, with the sound being generated from inside near the opposite side. It does take a bit of getting used to, especially if you're an electrostatic image freak like myself.

‘The effect is quite fetching, if not precisely accurate. It’s as though the listener is on the outside edge of a goldfish bowl, with the sound being generated from inside

On the plus side, while these speakers are certainly programme-dependent, and the 'goldfish-bowl' effect is less prominent with some than others, the S-50s certainly sounded clean, clear and dynamic. Upper mid and treble could be bright, though mercifully not fierce, with a sheen which overemphasised sounds like Eduardo Fernandez slapping his palm on the body of the guitar during Turina's 'Homereje a Tarrega', or Grace Jones' finger-snapping. In our room there was some mid-range suck out, but to be fair, the manual does advise some attention to furnishings like carpets and curtains, and the Canons may well have benefitted from a less live acoustic. Bass, helped presumably by the inert materials the dome and acoustic mirror are made of, was surprisingly plentiful for such a small drive unit. It is aided by a reflex port, which is tuned to 55Hz.

...and Canons to the Left

Now the crunch. Do they do what they were designed for - allow a stereo seat anywhere in the room? I took up a little-used place in the corner, where I hadn't sat since I was made to wear a dunce's cap some time ago. Two very different pieces of music this time: Fela Kuti's 'Original Sufferhead' and Handel's 'Zadok the Priest'.

Whereas part of Fela's drumkit had surged forwards from between the speakers, and his voice hung in front of them in the normal seat, from off side, while stereo was certainly present and there was no serious off-axis collapse of parts of the frequency range, the effect was disconcerting. It was as though the whole stage had been skewed and distorted in shape. While the organ, brass and voice still had positions in the soundstage, they weren't quite the ones they had from dead centre. Brass was noticeably harsher.

The chorus and instruments in 'Zadok the Priest', curiously fared rather better, and seemed more clearly defined, though still with this disturbingly twisted polygon of a stage.

Conclusion

The design of the S-50s is certainly innovative, and it's a very far cry from the vague and dishwatery omnidirectional speakers of a couple of decades ago. Other more conventional box speakers will portray the traditional soundstage far more effectively, though. If pin-point precision is what you're after, the classic LS3/5a design, unrivalled in this respect, costs very little more, and the Epos El 1s match the Canons' £349 price tag pretty closely, whilst easily bettering their overall fidelity.

If you want speakers which offer a sane off-axis sound for the whole family, and, like me, have unpleasant memories of the omnis of the past, give the Canon S-50s a try and surprise yourself. But make sure you can live with them for longer than the time of a demo. While supremely entertaining and fast, they're not neutral by any means. From the point of view of literally filling the room with sound, there's nothing to match them. It's the way they do it... I'd love to hear them in my local pub.

A final word. Canon Audio don't intend to sit back, wait for the plaudits - or the sneers - and remain an omnidirectional speaker company. Other audio products will apparently be following, and, said the little bird, will be just as innovative and startling. They won't look 'black box ordinary' they say, and that is certainly something to look forward to ●

HOT SEATS IN THE HISTORY OF OMNIDIRECTIONAL SOUND



THE BURNE-JONES TREBLE TWENTY.
Reproduced by courtesy of 'Gramophone'.

Normal loudspeakers are designed to beam the treble and mid-range frequencies directly at the listener's ears for the best resolution of imagery. The trouble with this is that the ideal listening position become limited to a small area. This is variously referred to as the 'sweet spot' or the 'hot seat'. Out of the magic area one or other of the stereo loudspeakers will dominate, ruining the impression of a sound stage.

Out of a family of three on the sofa, two are likely to miss out on the full performance.

In the early days of stereo recording, this was one of the things people who had been listening in mono moaned about. Everyone had become used to being able to put a single loudspeaker almost anywhere, as long as it was in front of their favourite seat. With a stereo pair, as we all know to our cost, the best place needs to be found for the loudspeakers first, and then the seating arranged to match afterwards.

It's no wonder that the idea of reproducing some sort of stereo stage, which will exist regardless of where the listener is, has attracted - and tormented - more than a few designers over the years. Previous attempts at the feat have usually squirted sound out in all directions, much as instruments do in real life. This has produced a breed of loudspeakers termed 'omni-directional', or 'omnis' for short. Most had a main drive unit at the top of the box firing upward to reflect sound around the room. The designers' hope was that some form of stereo would thus be heard from anywhere the listener chose to stand or sit.

A refinement, used in some of Stig Carlsson's Swedish Sonab designs in the seventies, was to place four tweeters in the corners at the top, two firing upwards and backwards, two upwards and forwards. This gave some conventional soundstaging, supplemented by reflected images. A Grundig design from the same decade was somewhat similar, as I recall, but a more unusual shape; the units were placed inside a metal perforated sphere a little bigger than a football which was parked on the top of a tubular, and rather wobbly, chrome pole.

Few of these attempts actually worked

well, sad to say. Since they relied on sound-waves bouncing off the walls and ceilings, room reflections tended to counter some frequencies; reflective surfaces bounced some back; absorbent surfaces literally sucked in others, and the overall frequency response when it reached the listener's ears could be quite bizarre. Imagery, in the sense that we're used to hearing it when projected from normal boxes, was at best vague and indeterminate.

One way round this sort of amorphous sound is to reflect the sound from in the speaker, as it were, instead of throwing it out into the room haphazardly and hoping it will homogenise. This is broadly speaking the function of Canon's 'acoustic mirror', the offset cone they've placed below a single, full range drive unit.

Briggs and Burne-Jones

Canon's literature calls this 'a Japanese idea and a British product'. They haven't researched their loudspeaker history thoroughly enough. Back in the fifties, Gilbert Briggs, speaker designer and founder of Wharfedale, offered a loudspeaker for sale which comprised a narrow wooden column with an upward facing drive unit. Placed a couple of inches above it, and mimicking its shape, was a turned wooden cone. All frequencies would therefore be reflected outwards, rather like the ripples on a pond after a stone has been thrown in. This was for mono, of course, and the specimen I came across a year or so ago seemed to work. The Canon relies on exactly the same principle, so the Japanese are rather behind, even if they don't know it.

When I spoke to Canon, Phil Ward told me there was a similar design patented even earlier, in 1926. However, we do know that Gilbert Briggs' speaker was actually built.

At a similar time, 1959, another omni using the same principle and looking much like the Canon was built by by a now-forgotten company, Burne-Jones. As can be seen from our illustration, a downward pointing drive unit, but with two reflectors instead of one, formed a device called the Treble 20. This was not a full-range speaker. It was designed as an add-on tweeter to improve the dispersion and clarity of the high frequencies. Apparently it worked in mono, but was far from effective if used as a stereo pair.

It is very tricky to make the principle work properly with stereo. Displacing the reflecting cone so it doesn't sit immediately under the driver, and firing the driver downwards, should control both the horizontal and vertical dispersion of the sound. This should result in a stereo image staying stable instead of wandering about all over the place. It has always been a major problem with omni loudspeakers. Canon join a long line of companies and inventors trying to reach the elusive goal of widening the stereo sound stage. There's nothing new under the sun - especially not in omni-directional loudspeakers ●



Rotel Revised

Improvements to the RCD-865 Compact Disc player

and an upgraded Bitstream chip have resulted in the new Rotel RCD-965BX.

Paul Miller tests it.

After what seems an interminable wait within a fast moving market, Rotel have finally announced the replacement for their successful RCD-865 Compact Disc player. The new RCD-965BX is a modern Bitstream design, yet its aesthetics depart little from those of its predecessor. Yet inside substantial revisions have been made, developments that have added not a penny to the original list price of £300. I wondered whether this might be another winner from Rotel.

Without pre-empting the conclusion, my short answer to this is a firm 'Yes!' However, the evolution of this new player has not been entirely straightforward. An intermediate model, the RCD-865BX surfaced about a year ago in France, Germany and the U.S., but it was never distributed in the U.K. This BX version was designed to overcome many of the technical limitations of the original, trading the old SAA7320 Digital-to-Analogue convertor (DAC) chip from Philips for a more up-to-date SAA7321. The specs were vastly improved but problems in its circuit layout meant the RCD-865BX

The effectiveness of a simple but well-matched jazz quartet is rarely revealed in such a calm but open and sophisticated manner as it is with this player.

actually lagged behind its predecessor as far as sound quality was concerned.

But with the introduction of the new RCD-965BX, complete with new SAA7323 DAC and revised, fully symmetrical layout, all this is history. What we end up with is a player that sounds much like the RCD-865, only more so. Hardly surprising when you consider that the newer SAA7323 DAC brings to light many of the

subjective qualities of the older SAA7320, offering a sweeter and richer sound than the intermediate SAA7321. This is particularly relevant when the DACs are compared in single-ended rather than differential mode, of course.

So the RCD-965BX is an extension of Rotel's original theme, expanded in its repertoire and sophistication, pulling out ever more subtle detail without compromising its sought-after 'musical' quality. Two years on, the Bitstream era has witnessed many new players which are able to resolve oodles of detail. Nevertheless, it is the manner in which this detail is presented that really sorts the men from the boys.

All too often we're faced with an elaborate wall of music, where, though everything seems in order, the end result still lacks interest or conviction. That unpredictable spark necessary to ensure music is genuinely engaging can be absent.

The RCD-965BX, more than any player at this price, is blessed with just this intangible spark. Programme rich in high frequency content, like the crash of percussion or the bite of a

metal stringed guitar, for instance, is resolved with exquisite precision. Yet beyond this there is an airiness, a sense of atmosphere and natural ambience that transforms facsimile into reality.

The natural, unfussy quality of Laila Dalseth's 'Emily' (Gemini) sounds positively glorious with the 965BX, the rich grumbling timbre of the bass, the brassy splashes of percussion and gentle ripple of piano all combining beneath the uncomplicated power of her voice. The effectiveness of a simple but well-matched jazz quartet is rarely revealed in such a calm but open and sophisticated manner as it is with this player. It has a remarkable command of the most intricate details, but rather than throw them forward out of the mix these subtleties retain a perfect sense of proportion - clear as crystal but never exaggerated.

New Generation

Little of this is betrayed by the sober appearance of the player, however. Sure, Rotel have attempted to jazz things up with a satin rather than a matt finish on the fascia, plus a new display and index skip facility. Nevertheless at a glance you'd be hard pressed to distinguish it from either the RCD-865 or RCD-855. The latter will be kept on by Rotel for a good few months yet, by the way.

The same Philips transport mechanism and digital output are used between these players, though Rotel have now opted for a newer third-generation decoder (SAA7310), which processes digital information off disc, before sending it on to the SAA7323 Bitstream DAC. Like others in the SAA7320 family, this one-bit DAC uses a combination of 4x, 32x and 2x oversampling (256x in all) plus a 2nd-order, single-stage, noise-shaper to generate the high-speed Bitstream. By contrast, the parallel SAA7350 family (as used by Marantz, Arcam, Deltec and Meridian) use 3rd-order shaping and lower rates of oversampling.

According to Philips, the SAA7323 is supposed to offer the low noise floor of the SAA7320 without the sporadic idle patterns that compromised this early chip, even though my test results imply that there are problems yet to solve. Nevertheless, the fine sound of this player is attributable to the application of the DAC and bears testament to the quality of Rotel's RF engineering. This, plus the high quality analogue filter and gain stage, are crucial to the success of the RCD-965BX.

Fortunately, this isn't another of those sophisticated but damningly over-civilised and boring players. Yes, the 965BX can boogie with the best of them! The strength of bass from

Madonna's 'Justify my Love' is quite remarkable and this player lets you have it right between the eyes - it is raw, deep and tremendously solid. Rather than submerge the track under a wash of ill-controlled low frequency information, the RCD-965BX carves out great welts of bass drum, producing slabs that underpin the precise focus of her vocals and the steady, crisp bite of percussion.

It's so controlled, but equally so engrossing, that you find yourself winding-up the volume further and further. But this is the best of Bitstream and the sound simply expands to accommodate the extra volume. There's no bunching of instruments, no hardness or compression to grate on your nerves. The music just keeps on swelling and when you run out of room, well, just open a door or two!

This entirely natural, effortless quality should appeal to Classical buffs in particular, enabling them to experience the ebb and flow of a grand orchestral work without ever

‘The music just keeps on swelling and when you run out of room, well, just open a door or two!’

losing sight of the music's scale and drama. Even the relatively simple Pachelbel 'Canon and Gigue' is transformed into something altogether more moving and elegant by the RCD-965BX. Compared to much of its competition (and by that I mean all, save Pioneer's superb PD-8700) this player throws open its doors to a beautifully balanced piece of music, the fleet enthusiasm of the three violins counterpointed by the very measured rhythm of harpsichord and bass.

Conclusion

No other player I've heard has been able to reproduce this deceptively simple a piece of music with such poise, such attention to proportion and intricacy of detail. Above all it sounds so remarkably engaging, never flat but bubbling with a richness and life from within. It's the sort of sound that can stop you dead in your tracks but still prove utterly satisfying hours, days and months later. So the RCD-965BX will not dazzle you with false displays of bravado. But if you have just an ounce of sensitivity then it cannot fail but have you enthralled ●

Measured Performance

Despite Rotel having abandoned the original SAA7320 Bitstream DAC in favour of its newest relative, the SAA7323, its technical performance has not advanced to the degree I would have expected. There is a hint of compression at peak levels which is reflected in the mild reduction in distortion from 0dB to -10dB, just as the 0dB frequency response also shows some instability below 500Hz. The player is near enough DC-coupled, by the way!

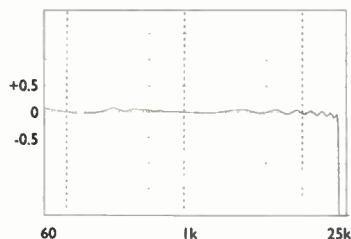
Odd-order distortion advances with frequency, as is customary with the 7320 family, though at low levels the figures are clearly worse than those typically obtained with the SAA7321 DAC. Moreover the RCD-965BX suffers from a low-level speed correction tone which compromises both the overall S/N ratio (just 93-94dB, A-weighted) while popping up on the distortion plot around 7.3kHz. This anomaly is consistent from channel to channel, as are the spray of mains harmonics clustered to the left of the 1kHz peak.

Nevertheless these technical shortcomings would appear to have no adverse subjective impact. But then the original RCD-865 also suffered the most appalling basic measurements while going on to set new standards in sound quality. It is a trend that continues with the RCD-965BX.

Test Results

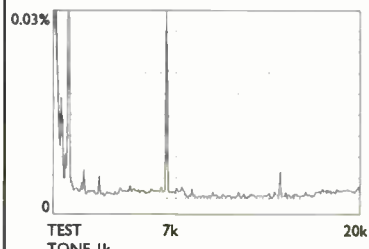
Frequency Response (-1dB)		
<1Hz.-20.8kHz.		
Distortion @ 1kHz		
	Left	Right
0dB	0.0019%	0.0017%
-10dB	0.0016%	0.0012%
-30dB	0.025%	0.013%
-60dB	0.417%	0.420%
-90dB dithered,		
	27.5%	17.0%
Distortion @ 10kHz		
0dB	0.016%	0.016%
Stereo separation		
1kHz	101.4dB	104.1dB
20kHz	96.5dB	94.4dB
Peak Output 2.075v		
Noise (A-wtd.)		
w/o emphasis		-93.1dB
w emphasis		-94.3dB

Frequency Response



Flat response with slight filter ripple.

Distortion



Motor reference tone at 7.3k.

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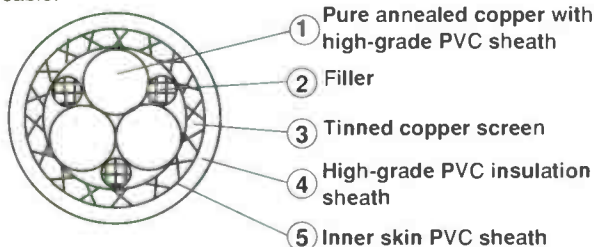
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Epos/Heybrook/Mission Cyrus/Marantz/N
Heybrook/Mis
Mission Cyrus/
Marantz/Nakamichi/Sonus Faber/Onkyo/
Nakamichi/Sonus Faber/Onkyo/Ortofon/I
sonus Faber/Ortofon/Mordaunt St
Onkyo
Mordaunt Short/Mantra/Radford/Tascam
Mantra/Radford/Tascam/Creek/Celestio
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Naim Audio/R
Rega/Roksan/Audio Research/Ion System
Roksan/Audio Research/Ion Systems/Arc
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Radford/Tascam/Creek/Celestion/Sound
Tascam/Creek/Celestion/Sound Organis
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SME/Akai (vid
Akai (video)/AKG/

Two Leak TL25 Plus monoblock valve power amplifiers have been languishing in an upstairs cupboard in my home since they were retired from the hi-fi system several years ago. Recently, I thought I would try them as monitoring amplifiers in the small recording facility which we have built up and expanded since I started getting work as a record producer. The studio is MIDI based, which means a lot of the music goes straight onto the digital master tape and we get really clean recordings with very low levels of distortion and noise. Obviously any monitoring system must match the level of performance from the recording equipment.

I dusted off the TL25's, plugged them in, fed Compact Disc and Digital Audio Tape sources to them via a passive preamp. and waited for that valve sound to wash over me. I was horrified! One channel hummed loudly; that was easily cured, one of

the output tubes had gone soft. But the noise level wasn't hiss, it was the sound of tearing calico! I checked all the voltages to see if any of the D.C. blocking capacitors needed replacing. They didn't.

Rather than put them back in the cupboard, I decided to see if anything could be done to this thirty-year-old design to improve matters. The modifications I came up with may be of interest to anyone owning an old Leak amplifier. The electrical work is very simple and the main design change can easily be undone to allow comparisons.

Modification

Part of the problem with the TL25 Plus is its high input sensitivity. It is not ideally partnered by most modern pre-amplifiers. It is both noisy itself and will exaggerate any noise on the input signal. Attenuating the input is a cludge since you then amplify the noise in the attenuator as well!

The inherent noise of any tube power amplifier is primarily generated by the first valve stage, in this case, the EF86 pentode and its anode load and screen feed resistors. The TL25's were designed using cheap and nasty carbon composition types for these critical components, so the first job was to replace RA and RB (Fig.1) with 1/4W metal film types. The low-noise resistors improved matters but the sensitivity was still too high. Pentode valves, like the EF86, have high gain but are much noisier than triodes. Fortunately any pentode may be operated as a triode by connecting the screen grid to the anode and by happy coincidence what was needed was less noise and more gain. That is what is shown in Fig 2b where the input valve is shown changed to operate as a triode.

Buying new output valves as matched pairs, a service offered by good retailers, improved matters further by reducing hum.

Sound Quality

The audible benefit of the modification is obvious. Listening to our DAT master tapes and Classical CDs, I can hear the hiss from the microphone pre-amps before the music starts. The signal comes, as it were, 'out of silence'. This is essential for a monitoring amp. in order to judge where to edit track beginnings and ends. Hum could still be lessened. A good performance can only be secured by careful matching of output valves and I worry what effect valve ageing might have. I feel Leak cut corners on the power supply design for this amplifier; the High Tension line is smoothed with an RC network rather than the 'Rolls Royce' solution of a large and expensive smoothing choke - and it shows! However, the amplifier is linear and being a Class A design the power supply unit noise shouldn't be modulated by the music signal, as happens on a poorly designed Class AB transistor amplifier.

The audible implications of the raised output impedance that results from the conversion of the first valve from pentode to triode will depend on the design of the loudspeakers being driven. It's difficult to generalize, but as a rule any loudspeaker with a tendency to bass overhang will not be improved by driving it from a valve amplifier. Fortunately our nearfield monitors are reasonably bright so the TL25's may just warm them up a bit. In every other respect the sound quality is unchanged or improved by the modification.

Conclusion

Modified, the Leaks are 'digital compatible', turning in a measured 15 bit noise performance, level frequency response, good reactive load

fifteen-bit valve performance

Richard Brice
modifies a pair of
Leak TL25 Plus
valve amplifiers

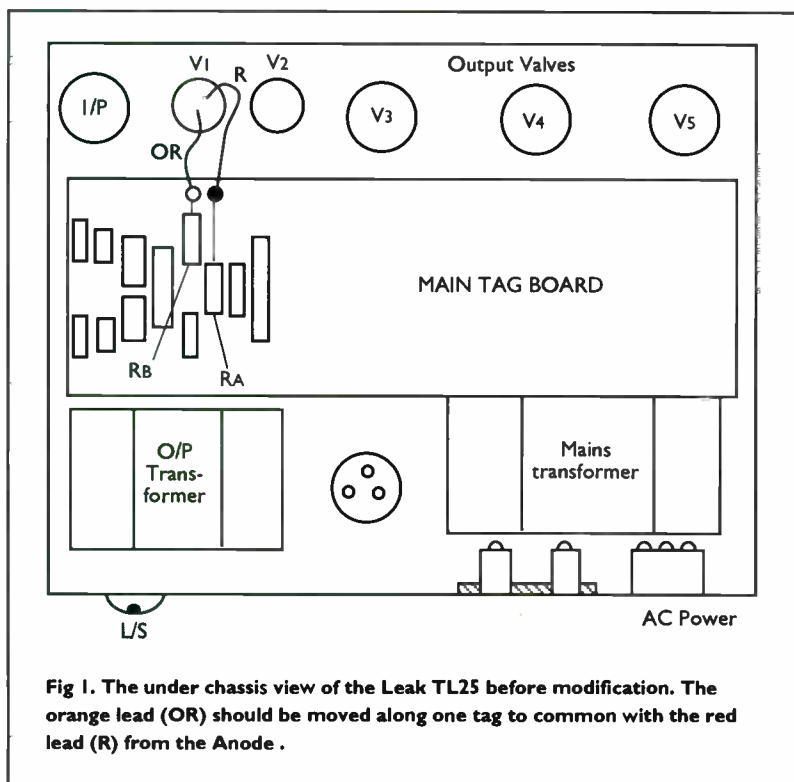


Fig 1. The under chassis view of the Leak TL25 before modification. The orange lead (OR) should be moved along one tag to common with the red lead (R) from the Anode .

handling and low harmonic distortion. The loudspeaker damping factor is poor but in listening tests this didn't seem to be a problem.

There's something about valves, something musical and aesthetic. A friend of mine used the studio the other day to check some backing tracks. She pointed to the TL25's glowing on their shelf and said, 'Is that a sculpture?' I like to think of an audio system as a meeting of art and technology and if your power amps get mistaken for objets-d'art then you're half way there already! ●



Measured Performance

Changing the forward gain of any amplifier should not be undertaken lightly or wantonly. To check the performance of the modified TL25 Plus, I ran a series of checks on the modified amplifiers on the test bench:

Modified Performance Specification

Output Power, 1kHz sine-wave input, clipping starts just greater than 17v r.m.s. (24.6dBv): 28.9 Watts into 10ohms.

Noise (unweighted)
-58dBV, predominantly 100Hz power supply noise.

Noise (100Hz notched out) -65dBv.

Dynamic Range (unweighted)
83dB, approx. 14 bit (100Hz notch)
90dB, approx. 15 bit

Frequency Response at 1 Watt
+/-0.5dB, 20Hz - 20,000Hz
-3dB, 40kHz
at 5 Watts
-3dB, 20kHz

Distortion (1kHz, 5 Watts)
approx 0.1% , predominantly third harmonic

Sensitivity
1.1v r.m.s. for full output.

Output Impedance (80Hz, 5 Watts)
1.5 ohm

Damping Factor 5.33

Squarewave Response (3kHz, 5 Watts)
No overshoot or ringing.

Reactive Load Handling

1kHz into 10 ohms and 10 ohms in parallel with 32uF:



5kHz into 10 ohms and 10 ohms in parallel with 3.3uF



No sign of instability observed.

Very Low Frequency Response

20Hz, 5 Watts



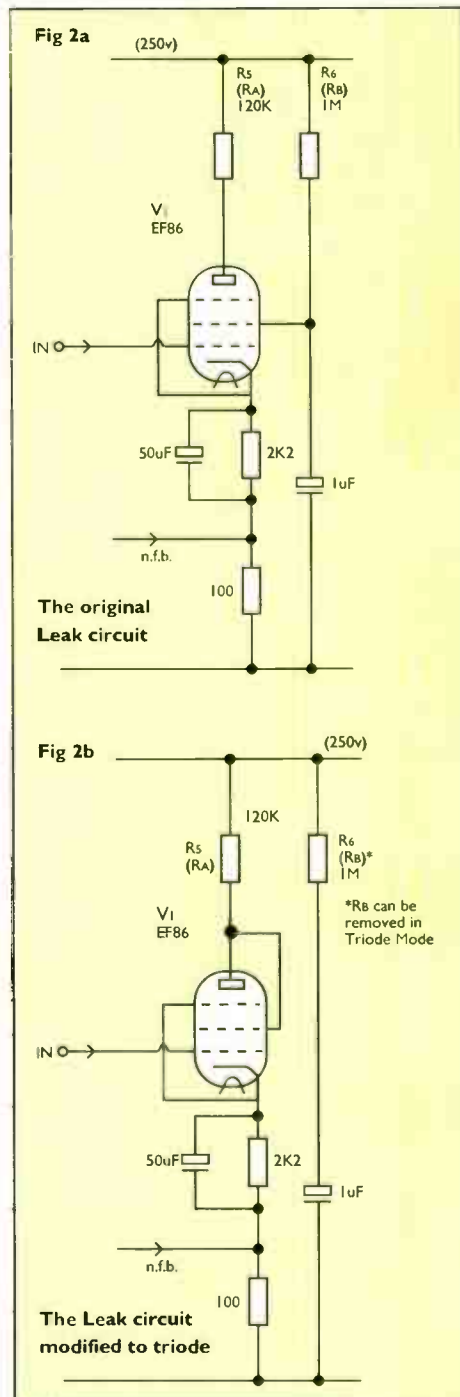
Test Results

The modified amplifiers deliver a very healthy 33.9 Watts into 8 ohms, revealing that the 'Plus' is a well deserved epithet. Frequency response is good too: within half a dB from 20Hz to 20kHz at 1 Watt output. Noise (unweighted) measures about 83dB below maximum output which is equivalent to a correctly dithered 14 bit dynamic range. The major noise component is at 100Hz and is due to a less than perfect power-supply design. If the hum is filtered out, the noise is -90dB below full output; equivalent to a theoretical 15 bit performance.

The lowering of the loop gain has had a number of effects. One is to increase distortion. This is pretty insignificant since the inherent (open-loop) distortion of the amplifier is well below one percent at normal operating levels. The second effect is to increase the stability margin of the amplifier when feeding into reactive loads (like a real loudspeaker) and will result in a smooth, coherent performance when feeding difficult loudspeakers. I have found insufficient stability margin to be a common cause of the nasal, congested midrange sound that some amplifiers possess.

The third consequence of lowering the forward gain is to raise the output impedance. The measured value is 1.5 ohms at 80 Hz at a medium power output. For a 1960's valve amplifier this is a good figure but poor by modern standards. The loudspeaker's bass resonance is better damped with the first valve operated as a pentode.

Sensitivity is reduced to 1.1v r.m.s. for full output. This is correct for most modern pre-amplifiers and is ideally suited to a CD source with a passive pre-amp. My studio 0VU line-up level is -10dBV or 316mV r.m.s. Full output is achieved when input signal level is +11dB above 0VU, an ideal figure.





English excellence

**The talents of Goldring's
Excel moving coil cartridge
were appreciated by
Alan Sircom**

The last of the great British cartridge manufacturers must still have some greatness about them to survive in the age of digital. Goldring have some excellent products: their 1000 Series moving magnet cartridges have a fine reputation as outstanding value for money. The Eroica is one of the better lower-priced moving coil cartridges around today.

Further up the price scale in a more rarefied atmosphere, where value for money is less of an important issue than sound quality, how do Goldring fare? Priced at £499, Goldring's Excel is close to the top of the British cartridge world, if you exclude Linn's or Audio Note's cartridges. Neither of the latter are home grown though. Linn's cartridges are made in Japan to their own specification, whilst Audio Note's are designed in Japan, but built on the South Coast of England. At its price (and beyond), the Excel has some fierce competition from rivals like these.

Stylus profile and geometry are recognised as important factors in determining performance. The Excel features a Van den Hul I stylus. Though very similar in profile to the Gyger used on the £550 Excel GS, the Van den Hul is a 'straight' stylus, lacking the special twenty degree grind of the GS. It means the Excel cantilever has the usual slight end-bend, if you'll pardon the expression, that puts the stylus at the correct rake angle. Our diagram shows this.

In common with most moving-coil cartridges, the stylus is not user-replaceable. Goldring therefore offer a healthy trade-in on cartridges with a worn or damaged stylus. Goldring suggest that the Excel should track at anywhere between 1.5g - 2.0g, with a nominal recommended value of 1.7g.

The manufacturer's recommended loading for this cartridge is 100 ohms, with load capacitance not exceeding 500pF, including the arm lead. This sort of load presents little problem to most amplifiers with MC stages. Those who have to use a head amplifier, with valve preamplifiers, for example, should experience no difficulties either. Finally, the output of the Excel is 0.5mV at 5cm/sec, which is enough for most MC stages or head amplifiers. I did have cause to use the Excel once with a poorly matched head amplifier (an Audio Innovations, designed for the very low output Audio Note I0), which changed the character of the cartridge dramatically, so be warned.

Convenient

A convenient feature of the Excel is its use of threaded mounting holes. The cartridge bites on to the mounting bolts, eliminating the usual miniature nuts. This is a good idea, as it gets rid of unwanted hardware that can resonate and affect sound quality.

Physically, the cartridge is of about average weight for a moving coil at 8.5g. The body is quite deep, but not very wide, being T-shaped in appear-

ance when viewed from the front. The side panels are finished in a brushed-gold colour, with four gold screws and four grooves contrasting with the wooden centre panel. While some may say that this is a little garish, it can look quite attractive when partnered with a turntable which has a suitable finish. Black and wood seem to blend in well, but the Goldring looks quite out of place in a silver arm.

‘the Excel picked out the lyric with ease; even Husker Du at their most intense and The Tallis Scholars at their most archaic were easy to follow

To ascertain just how good the Best of British is, I put the Goldring Excel on my Pink Triangle Anniversary, with its SME Model V pick-up arm, sitting on a Mana table. I needed a good moving coil phono stage for this test, but my only head amplifier did not work successfully with this cartridge. Instead, I turned to using the G88 valve preamplifier from Esoteric Audio Research (EAR), which has a specialised moving coil input transformer. A pair of EAR 549 200W valve monoblocks were used also, along with the Alchemist amplifiers tested in this issue. Loudspeakers were predominantly ProAc Studio I Mk II's, on Slate Audio stands. Finally, Furukawa cable was used throughout.

I suspect there is a slight mismatch between the cartridge and arm (the cartridge sways gently in the groove and the loudspeaker cones flap a little) but does not appear to be a significant problem. The cartridge is very compliant, so it possibly needs an even lighter arm than the SME.

Bristol Car

Having sorted the problems out and let the cartridge run in properly the true character of the Excel began to appear. It has a refined, sweet sound, that is polite without being dull. If this is the best that we British can do, then at the very least it is true to our character. The Excel in some ways is the cartridge equivalent of a Bristol

car; not as fast or as well appointed as the luxury imported models, but still every inch a gentleman.

The Excel's smooth character was detailed - not in the same way as the big Ortofonos, but with a clarity and refinement that doesn't exaggerate any areas where the Excel misses out. One can point to the bass as an area where this cartridge's detail is slightly lacking. There is quite a bit of information being resolved, but it can get muddled when the music gets complex. On 'In The Neighbourhood' from Tom Wait's *Swordfish* trombones LP, the simple bass line was played with clarity, depth and intensity that had the appearance of being realistic, but on 'Georgie And Her Rival' from Elvis Costello's latest LP, Mighty Like A Rose, bass, guitar and drum kit got confused, blurring into one another. However, the bass still had a good, weighty presence.

This track also showed up an emphasis to the slightly splashy nature of cymbals. The track is sibilant anyway, but unfortunately it shows up the only major blot in the Excel's otherwise exemplary treble performance.

In terms of imagery, the cartridge leans toward producing a wide soundstage rather than going for depth. It is not two-dimensional; image depth is good, but it is overshadowed by the width of the soundstage, which better caught my attention. Within this soundstage instruments were positioned with some stability, and they had good solidity due in part to the good bass weight.

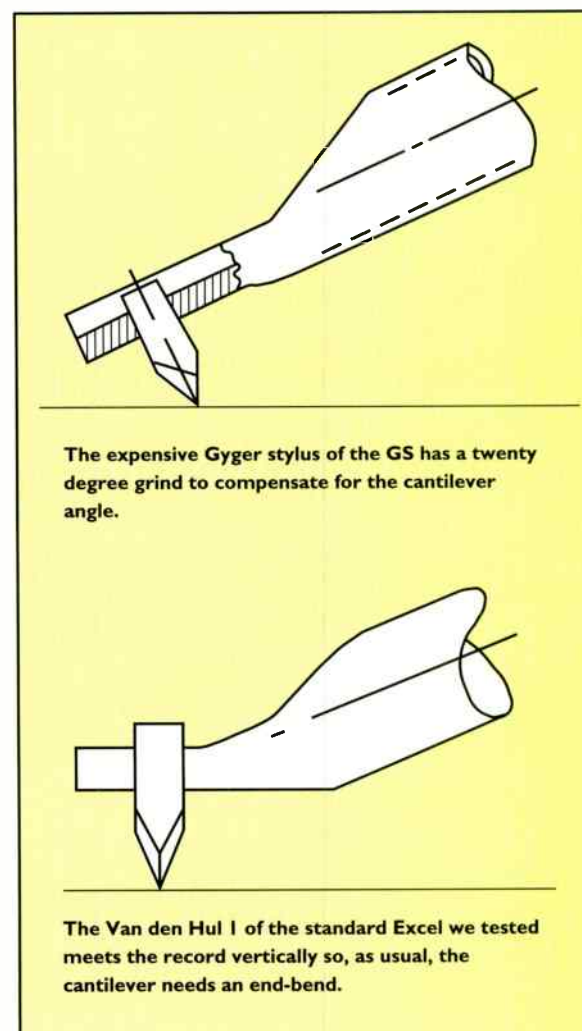
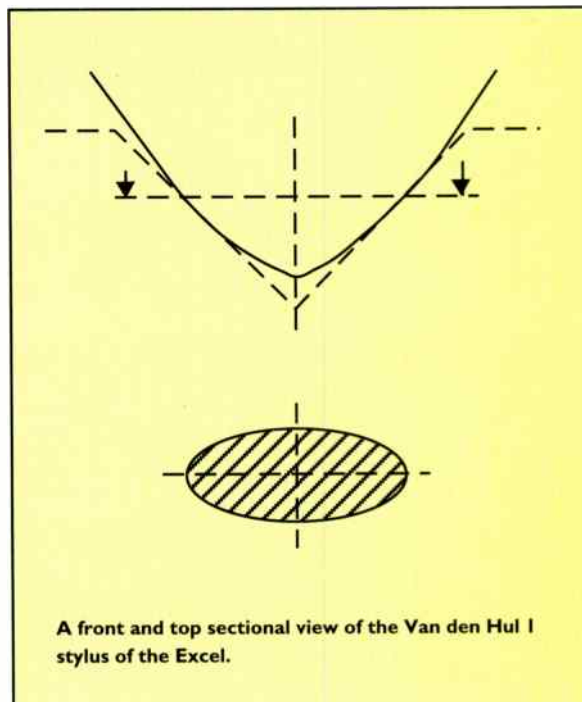
Articulation

One area where the Excel excelled (pun strictly intentional) was in the articulation of vocals. No matter how difficult the voice or recording, the Excel picked out the lyric with ease; even Husker Du at their most intense and The Tallis Scholars at their most archaic were easy to follow. Tonally, the variety of male voices within the Sarum Chant separated well. As these voices are singing in unison it is usually only possible to differentiate between them with the finest equipment. The Goldring Excel fits within this category. Rhythmically the cartridge bopped along nicely; not as precise in its timing as a Troika or a Clavis, but not lagging far behind either.

My biggest reservation has nothing to do with the sound quality of the cartridge itself. As with all Goldring cartridges I have encountered to date, the cantilever sits very close to the underside of the cartridge body. On some slightly warped records, the cartridge body bottoms out, hitting the disc surface.

Apart from this niggles, the Gol-

ding Excel is a very able performer. It's a little too polite for some tastes: Mozart and Mendelssohn enthusiasts will love it, Mahler and Motorhead fans will be less impressed. Around the £500 mark, cartridges follow distinct paths. This one is a leafy English country glade, gentle and refined, which leads toward music ●





tuner under a ton

**Teac's £99 T-X3000 tuner
could be music to people's
ears as well as pockets,
decides Eric Braithwaite**

The Teac T-X3000 proves that Japanese tuners aren't all facsimiles of a flight deck, needing a forty page manual to guide the buyer round the buttons and flashing lights. This simple, clean-lined design has the bare minimum of facilities - and therefore knobs and buttons - without short-changing the user in any way. Thinking of change - it will leave a pound coin over out of a hundred pounds.

Finished in 'brushed aluminium' matt black, this FM/AM tuner has small, neat and readable legends silk-screened in gold, with no fussy advertising slogans. It's a welcome example of restraint and functionalism. What is offered in the way of controls (from left to right) is Power On, a switch for the MPX filter, Auto/Mono, which reduces hissy stereo from weak stations to a clearer mono, the display panel, the station memory programming button, tuning

mode and finally the two Up/Down tuning buttons. Below, ranged along the lower third of the fascia are the programme and AM/FM selectors all clearly labelled. It proved a very intuitive layout - with one exception. This was reassuring and fortunate because we weren't sent a manual.

Money has obviously not been spent unnecessarily. While fairly lightweight, and tucked into a somewhat flexible aluminium box, the T-X3000 doesn't feel as feather light as some. The current Japanese fad for drum feet is evident; though gold coloured, they're shallow and not too obtrusive. A few pennies have been saved round the back by using a pair of spring terminals for the AM aerial connection. The VHF/FM socket is the now-usual Japanese one which will require an adaptor for the normal UK co-axial plug.

The display is informative without being cluttered, and it is in this year's colour flavour - orange. It's here that one observes a single omission: it has no signal strength display, doubtless due to its low price. The frequency readout is in kHz and MHz, according to whether it's tuned to AM or FM. There is a twenty station memory for push button tuning, for this is a synthesiser tuner. Tiny orange lights show whether the MPX filter is switched in, reception is in stereo, automatic tuning is on, and if the station is tuned in. There were only two or three niggles over using the T-X3000. One was that the 'Tuned' indicator persisted in lighting up no matter how bad the reception really was, and when it was set to scan the FM waveband it behaved like a slow train. It stopped at every station, whether it was an acceptable transmission or not. This was due to the strength of signal from our aerial in fact, but it is a potential problem to bear in mind.

Selectivity and rejection were very

good, however; closely spaced stations did not interfere with each other. Programming and retrieving from the memory looked simple enough, though it does seem a little obscure to press 1/11 and 10/20 to come up with memorised station number 11 instead of pressing 1/11 twice. I couldn't lay my hands on number twenty, although it could be tracked down by using the Memory Scan facility. Perhaps I was being stupid.

The Memory Scan, by the way, offers a useful five-second taster of each programme; very handy if, like me, you have an innumerate memory yourself and can't remember which stations you programmed in beyond the first five. Any combination of stations from the two wavebands can be memorised up to a maximum number of twenty. Well, up to nineteen for me.

Sound Quality

As usual, no allowances were made in the partnering equipment for the remarkably low price of this Teac tuner, so comparisons are with an 'absolute' reference. In this case, the reference tuner was the Hitachi FT-5500 Mk II, some way above the T-X3000's price bracket.

As luck would have it, BBC Radio 3 was playing a record I knew - the Aldo Ciccolini/Enrique Batiz recording of Falla's 'Nights in the Garden of Spain', which put me into a good mood, especially as the weather had turned dull and grey outside. Neither dull nor grey would describe the tuner though. This is a bright recording, but it didn't sound fiercer than the norm. Checking against the reference - which has a slightly 'grey' treble - suggested that the Teac had a good, sensible unexaggerated upper-mid and treble response. Where it proved a little lacking was in the lower mid and bass. Timpani didn't

sound tight, but rolled around a bit, brass was all of a piece, without clear differentiation, and the lower mid-band and bass were loose by comparison. Horns and lower strings tended - sorry about the onomatopoeia - to waffle and woof, a shortcoming which showed up in music from other stations.

Further listening tied this down to a degree of muddle in the mid-range and below, which affected one's perception of the soundstage. While the width of the representation was commendable, the instruments - or the players - were slightly diffused across it without the precision the reference had. I must have been feeling lucky, for I turned to Jazz FM just as they were playing Ella Fitzgerald. Here, the studio tinkering - a box of violins on the left, her voice forward in the mix, and a solitary saxophone on the right, was quite obvious, though without the inner detail - in the drum kit for instance - that the reference brought out.

An electronic organ a little later, while keeping up a good rhythm and coming across full of life, showed up the Teac's tendency to burble a little helplessly at the lower end of the spectrum. There was something at the back of the mix, but it wasn't clear quite what was droning away. It turned out, switching to the Hitachi, that it was a vibraphone which the engineer seemed to have forgotten about in the mixing.

A reassuring aspect of this tuner was that when the quality of the transmission improved, so did the representation. While its faults were still evident, high quality transmission from Radio 2 lessened them somewhat. I have to admit, reluctantly, listening to the 'J.Y. Prog'. This must have been when my luck ran out. However, multitrack recordings were clearly multitracked, although a central image was slightly over-large, and the same spreading of music across the distance between the speakers was evident. The Teac couldn't manage the relative transparency of the reference, or its depth of stage, and prolonged listening suggested it had a lighter tonal quality. While this kept music bright and cheerful, without overflowing into brashness, it affected voices.

Jimmy Young himself sounded lighter in tone and more nasal, as did an announcer on a commercial station. He - on the reference - sounded more like John Inman than he did on the T-X3000, which added a distinct nasality to his voice. He also seemed to be having more trouble with his teeth - there was more 'spitching' and sibilance in evidence on voices generally, though it was by no means wildly out of order. Microphone hum during an interview on

BBC local radio was more of a buzz than in real life, announcers had a noticeably - though again not outrageous - emphasised chestiness which was over-bronchial, and interviewer and interviewee were rather vaguely located. This is due to the rather woolly and loose lower mid-band that was evident when the tuner was playing music. Baritone voices, therefore, had added growl, while tenors came over quite realistically. Sopranos, while we're at it, didn't shriek, though female announcers did hiss just a little more than would be ideal.

The AM section, as it is so often the case, was disappointingly banal. It wasn't ridiculously muffled or, listening to Capital Gold, utterly dull, but it made little effort to produce anything much better than a mid-price tranny. If the scanning process on FM was a slow train, on AM it was a 'cross the world in one day' express. It only managed to convince itself that four

stations were worth stopping for. Oddly, one of the omissions was BBC 648, the European World Service transmission, which it should have been more enthusiastic about.

Conclusion

I was tempted to summarise the listening session by saying this is a tuner for background listening. Bearing in mind the astonishingly low price, it's more. Among its peers, it does have a freedom from obtrusive faults - the treble is well balanced, overall the sound is quite sweet. In the context of a budget system it will serve most people well, whilst not offering the detail and depth that spending double the amount will provide. The Teac T-X3000's great strength is that it gives a taste of how good radio can be, and none of its faults will turn people off. Not unless you must listen to Capital Gold or its out-of-London equivalents on Medium Wave ●

Measured Performance

Tuners these days are reaching a very high standard of overall measured performance, due to modern dedicated integrated circuits which combine high performance with consistency - always difficult to achieve with tuners. Teac have brought these qualities together in their new budget T-X3000 tuner. It has a surprisingly good performance - at an amazingly low price.

Where once tuner frequency response would be peaky or absent in treble extension, the T-X3000 measures flat out to 14.6kHz, as the frequency response analysis below shows. Teac have provided a good high frequency filter to cut out all unwanted information at and above 19kHz. The steep dive down at far right shows its effect; measurement confirmed a high degree of attenuation, both of pilot tone at 19kHz (-68dB) and sub-carrier (-58dB).

Channel separation was excellent on stereo, even at high frequencies. Distortion was low at 0.2% (average) and it was primarily second harmonic in nature, which is benign in its subjective impact. At the price the Teac have managed very well in a difficult area, especially so since the T-X3000 is very selective. High selectivity can compromise both distortion and channel separation; on the Teac both properties measured well.

Being sensitive, a relatively low strength aerial signal of 0.5mV (minimum) proved enough to get this tuner into a state known as 'full quieting'. This is where hiss sinks to a minimum and best subjective results are obtained, especially in terms of clarity. At -72dB, the hiss level was low; it is difficult to hear this. Only at times, usually during silences on Radio 3, can a very slight background hiss be heard at this level. Around -70dB is the threshold of goodness: above it hiss can be detected, below it the task becomes difficult. The Teac comes in comfortably below.

The station pulling power of the T-X3000 was no weaker than its audio performance. In other words, it was very good. Rejection of strong, interfering stations just 0.4MHz from a weak wanted station was extremely good at 87dB. I

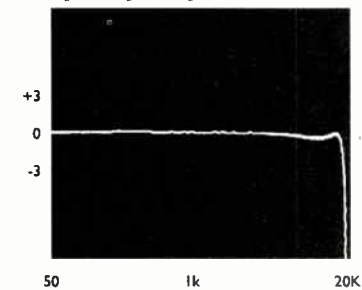
found it virtually impossible to get a strong signal to break through. Sensitivity was very high also. Hissy stereo (-50dB hiss level) was possible from a signal measuring just 20uV. There is no signal strength indicator.

At just £99, this tuner has an extremely good measured performance. It represents extremely good value. **NK**

Test Results

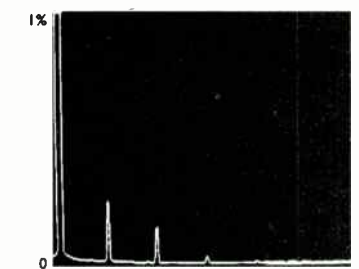
Frequency response (-1dB)	20Hz -14.6kHz
Stereo separation	-38dB
Distortion (50% mod.)	0.2%
Hiss (CCIR)	-72dB
Signal for minimum hiss	500uV
Sensitivity	
mono	1.25uV
stereo	20uV
Selectivity (alternate channel)	-87dB

Frequency Response



Flat frequency response up to 14.6kHz

Distortion



TEST DISTORTION HARMONICS 7kHz
TONE 1kHz
Very low distortion of 0.2%

Over the next few years, we are told that we are about to see the coming of the Euro-amplifier. Changes in legislature and standards in the European Community regarding consumer electronics are said to bring about major changes to the sound of an amplifier. Perhaps the new Philips FA890 (£229.95) integrated amplifier is the first of this new breed.

euro-amp

Philips' FA890 amplifier is designed to conform to new Euro regulations. Alan Sircom doesn't think much of them.

Over the next few years, the latest crop of standards have suggested that hi-fi equipment remains immune to large amounts of Radio Frequency interference (hereafter referred to as RF), particularly in the phono stage. To make an amplifier meet stringent requirements in this area necessitates use of RF input filters that degrade sound quality.

If anyone is going to be at the forefront of the new restrictions in Radio Frequency breakthrough, it is going to be Philips, the quintessence of all things European. Their latest amplifier seems to typify products built for Europe, designed by committee for the marketplace, but not for the listening room.

Philips have an outstanding reputation for design, research and development. Throughout the history of consumer electronics, the Philips name has been synonymous with new technologies; Compact Cassette, Compact Disc and the new Digital Compact Cassette are all obvious examples. In many cases, this original research has been followed up with later refinements, such as the developments that have been occurring with digital to analogue converters recently.

In many cases however, the fruits of Philips' R&D labours have not been exploited to the full by Philips themselves. While they have made significant headroads in to the domestic Compact Disc market and have every intention to broaden this area, their own brand products have traditionally lost out to other manufacturers. Philips themselves are not too unhappy about this, as they sell a large amount of components to them. Many of the most successful

CD players feature a Philips transport and Philips chipsets.

Unfortunately, the research and development seems to be done on the more theoretical levels, possibly overlooking the real world product. This seems to be a shame, because I am sure that a similar amount of R&D put toward correct implementation of their developments would make their own products as superior as their research work. This has been borne out with their Compact Disc models of late, that seem to combine innovation with good execution of the design at a competitive cost.

The product in question here, the FA890 amplifier, is designed for remote control use. This fits in with the Philips standard RC5 infra red remote, meaning that the volume control on a Compact Disc remote will also adjust the volume control on the amplifier. This is important to bear in mind when connecting the CD player to the amplifier. People who place convenience high on their list of priorities are apt to use the remote volume control on the player. Using the remote output with this amplifier would cause dramatic changes in volume levels, as it affects two volume controls simultaneously.

Remote aside, the amplifier is, in appearance, a pretty typical European or Japanese product. It has one of the

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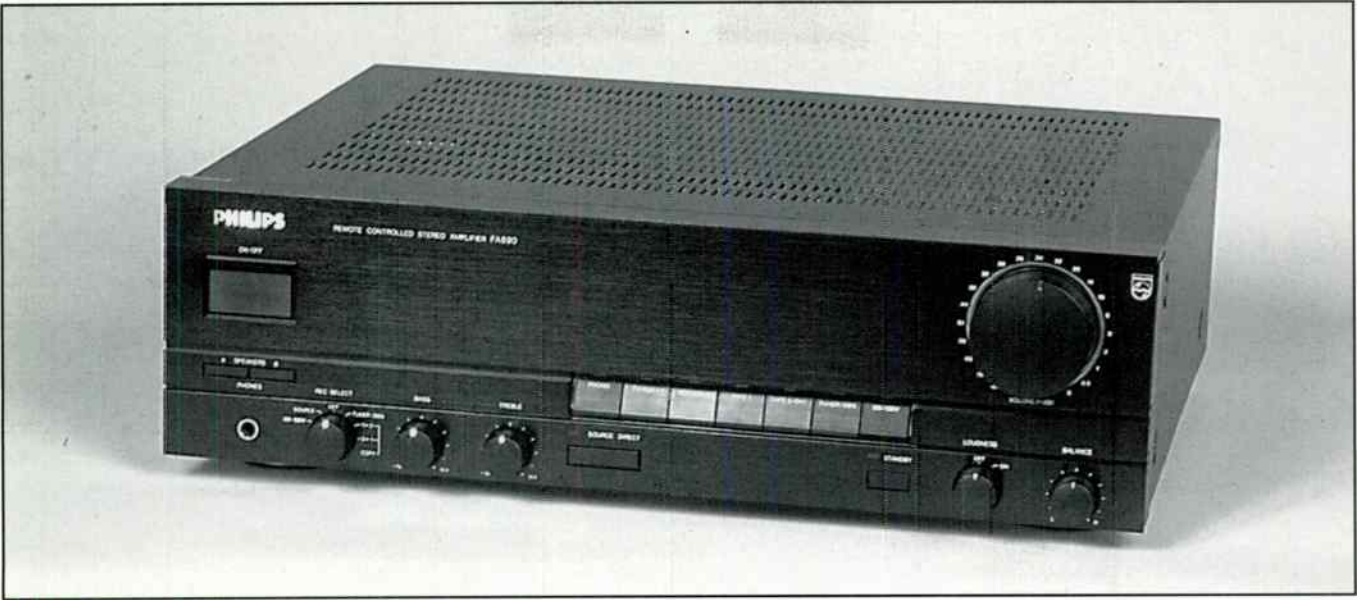


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- KENWOOD
- LINX
- MARANTZ
- MERIDIAN
- MICROMEGA
- MORDAUNT-SHORT
- MUSICAL FIDELITY
- NAKAMICHI
- PHILIPS (CD)
- PINK TRIANGLE
- PROAC
- QUAD
- RAOFORO (CD)
- REVOLVER
- RUARK
- SD ACOUSTICS
- SME
- SNELL
- SONIC LINK
- TOL
- TOWNSHEND





largest on/off switches that I have seen on any amplifier. This, combined with the pale blue lights that halo both the on/off switch and the servo assisted volume control make for a somewhat ostentatious front panel.

The remainder of the controls consist of a pair of loudspeaker switches, to enable two pairs of loudspeakers to be run, a headphone socket, recording selector, plus bass and treble controls with a 'direct' switch to disable them. This has a display light that comes on when the tone switches are out.

A row of signal selectors offer Phono, TV/Aux1, VCR/Aux2, Tape1, Tape2/DAT (curious this one, as I would have expected this to read 'DCC', but I digress), Tuner/IDBS, CD/CDV. Below these lies the infra red sensor and balance control, with the large volume control above it.

At the rear of the amplifier lie all the respective phono sockets for the inputs, with gold sockets for the phono and CD inputs. Above the disc stage sockets lives a moving coil/moving magnet selector switch. Next to the sockets there are two sets of loudspeaker connectors, but they do not accept either thick cables (thicker than 79 strand) or 4mm sockets. This indicates Philips' insensitivity to such matters. Finally, there are a series of AC output sockets and a captive mains lead exits the rear panel at the top right hand corner. The AC sockets allow connection of up to three components to the amplifier. This means that the on/off switch on the amplifier controls the other components.

In terms of outright sound quality, the FA890 sadly falls too short of the mark to allow it to even approach amplifiers such as the NAD 3020i, especially on the phono stage. The amplifier has a sound quality that is both harsh at the higher frequencies and indistinct and muddy in the bass. When listening to records such as

'Sympathy for the Devil' by the Rolling Stones, the sound-staging properties of the amplifier were flaccid and ill-defined. There was a sense of stereo, but inner detail within that sound stage was quite poor.

In fairness to the amplifier, it was quite detailed and it did not sound as vexatious as some of the similar amplifiers from the Far East. It has, however, little else to commend it in sound quality terms. Vocals sound recessed and muted, guitars and violins sharp and drums, while not

bloated, have little definition and can never sound tight.

I feel that the FA890 amplifier is not designed for the specialist hi-fi market. Its market is for those whose priorities place ease of use and system matching above outright sound quality. While it is not the stuff of hi-fi in our terms, those who are looking at upgrading from their midi system, but are willing to trade sound for convenience, will find the Philips amplifier an attractive prospect. The rest of us will have to look elsewhere, I'm afraid ●

Measured Performance

Alan said the FA890 sounded immediately and obviously awful on disc; he used a Roksan Corus Black moving magnet cartridge. I suspected the problem was excessive input capacitance, likely due to EMC requirements. Philips confirmed that the FA890 met stringent German EMC requirements, which will soon be adopted Europe wide. Tests showed that it has 570pF input capacitance. The figure should be 200pF or thereabouts. Excessive capacitance significantly alters the frequency response of moving magnet cartridges, rolling off high frequencies and producing a dull sound, although sometimes with a forward upper mid-band.

The verdict is that the FA890 is not compatible with moving magnet pickup cartridges, except a few low impedance designs. It is OK with moving coil cartridges - and CD of course.

Otherwise, the amplifier measured well. It is enormously powerful (112W into 8ohms/182W into 4 ohms) and has an excellent power supply, allowing it to deliver heavy currents and cope with difficult loudspeaker loads. Together with remote control, it's a bargain for those who aren't fussy about sound quality. **NK**

Test Results

Power	112watts
CD/tuner/aux.	
Frequency response	4Hz-74kHz
Separation	83dB
Noise	-86dB

Distortion	0.004%
Sensitivity	170mV
dc offset	-36/-39mV

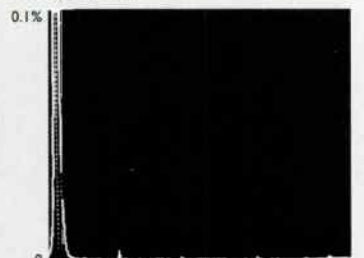
Disc (Moving Magnet)

Frequency response	40Hz-64kHz
Separation	-73dB
Noise	-83dB
Distortion	0.006%
Sensitivity	2.8mV
Overload	145mV
Input Z	47k/570pF

Disc (Moving Coil)

Frequency response	40Hz-52kHz
Separation	-70dB
Noise	-68dB
Distortion	0.008%
Sensitivity	0.35mV
Overload	15mV

Distortion



8k TEST DISTORTION HARMONICS 60kHz
TONE 10kHz

High frequency distortion was negligible

As fewer and fewer people buy turntables these days, amplifier manufacturers are beginning to question the value of putting an expensive disc stage into a new amplifier. Even once-resolute vinyl supporters are beginning to produce Compact Disc-only versions of their most successful amplifiers, while the latest crop of specialist budget super-amplifiers from Japan all seem to have a disc stage fitted only as a token gesture.

At the same time that we see slippage in the quality of the on-board disc stage, we see the rise of the external phono stage, known as a head amplifier. These seem to fall into two distinct categories. On the one hand there's the amplifier manufacturer who still wishes to make fine amplifiers which suit turntables, but does not want to produce one version with, and another without, disc stages. This is typified by Deltec and Nene Valley Audio, whose £300 Phono2, with a separate £230 Power Supply Unit is tested here.

The other manufacturer getting into head amplifiers is, logically enough, the turntable builder. They want their product to be displayed at its best and if amplifiers are falling short of producing good phono stages, they need to correct the trend. Most well known in this

lead, an on/off switch and a DIN socket for the power feed to the phono amplifier. The rear of the Phono2 amplifier has two phono sockets, with an earthing post, for the disc input, two phono sockets for the line level output and a captive PSU lead with a DIN plug on the end. The Phono2 also has the facility for running an extra power supply at a later date, but this necessitates sending it back to NVA briefly for modification.

Simple Beast

The ISO is a far simpler beast. It comes in a black Perspex box about the size of a presentation case for a gold watch or a fountain pen. Its power supply unit is a line transformer, akin to those used to power a Personal Stereo from the mains. On the underside of the box, aside from the feet and the power cable, there lies a gold earthing post. At the rear of the unit there are four phono sockets, marked IN and OUT in gold lettering. Michell's name and 'ISO' in capitals are engraved in gold on the top of the device. A red LED glows diffusely through the black Perspex front.

Both boxes of electronics need to be far removed from any mains transformers, including their own power supplies. NVA's Phono2 is

comes as standard with moving coil matching only. Either head amplifier is likely to be far better than almost any in-built phono stage on the market, with only a select (and expensive) few preamplifiers bettering their disc performance. As such, it would not be worthwhile considering either of these phono stages unless one has a very fine turntable, arm and cartridge combination first.

For this test, my Pink Triangle Anniversary, SME Model V and Goldring Excel were used as the reference turntable. Amplification was NVA's own P80 passive preamplifier and A80 monoblock amplifiers, together with NVA's own cable. To take the NVA bias out of the equation, a Pioneer A-400 was also used.

The ISO, along with a select few products such as the Finestra (also designed by the ISO's creator, Tom Evans) and the S.P. 1.5 preamplifiers, are designed with phase integrity, including absolute phase, as an important criterion in forming the overall sound. The Pioneer A-400 is also strong in the area of phase accuracy, so was considered to be a logical alternative to the NVA. Loudspeakers used were ProAc's Studio 1 Mk II; Furukawa cable was used throughout with the A-400. Both head amplifiers were given

upstaged disc

The latest trend in amplification is to put the Phono stage preamplifier in a separate box, which is then known as a 'head amplifier'.

Alan Sircom gets to grips with two up-market models.

country are Roksan, with their ArtaXerxes and Michell's ISO, priced at £393, which is also tested here with the NVA.

Both head amplifiers are two-box units, divorcing the electronics from the power supply. The NVA is far more substantial, with two identically sized black cases, which have the same minimalist styling as the rest of NVA's range. As is usual with NVA, the cases are impossible to open without first taking lessons from Richard Dunn, the man behind the company.

From the front, there is little to tell the two boxes apart; the power LED and the NVA logo are on different corners, but that's it. The rear of the power supply has a captive mains

quite capable of sitting directly by the side of any NVA preamplifier in production, as they are all passive models without mains power.

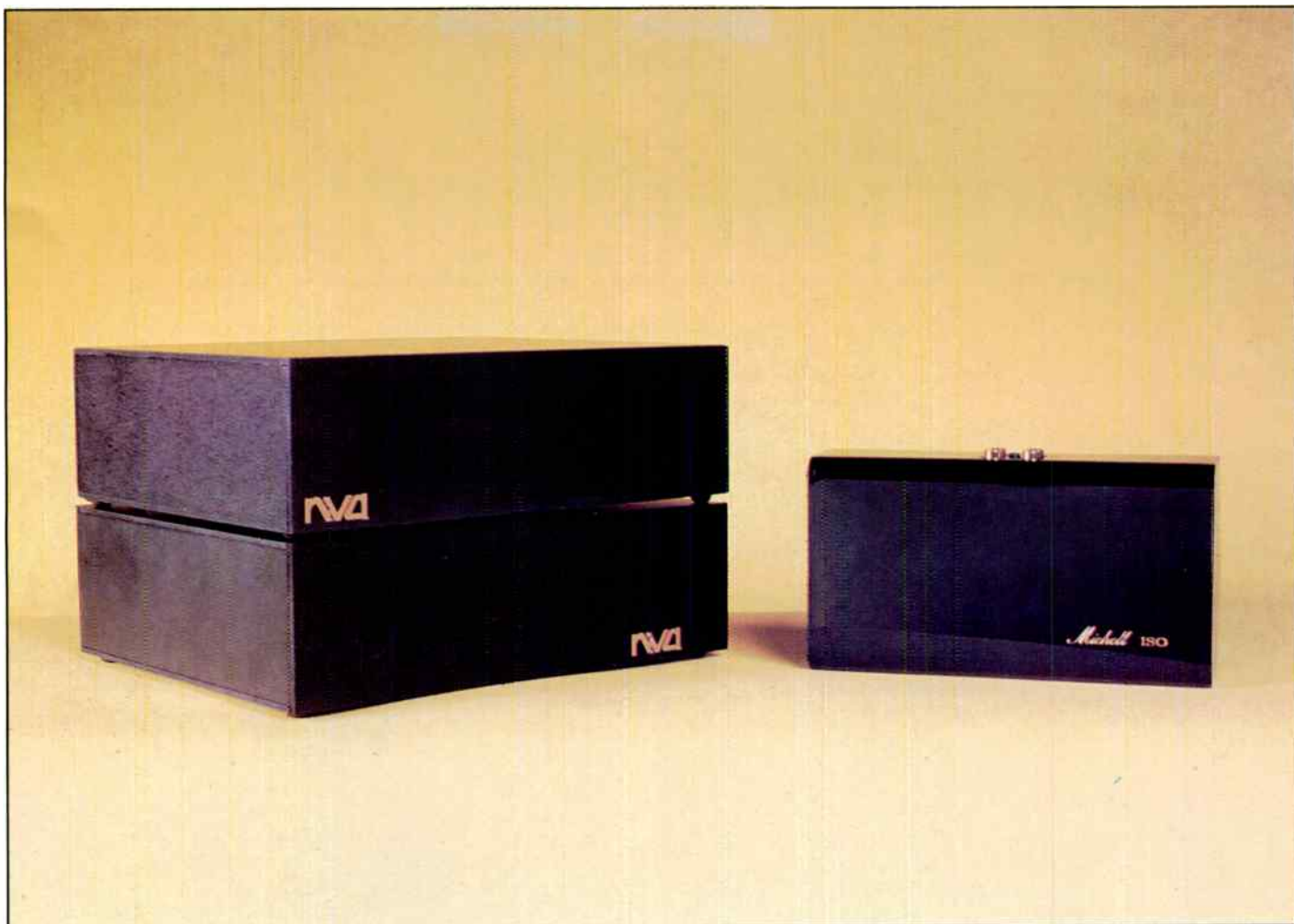
Michell's ISO seemed to be even more sensitive of positioning than the NVA, but this may also be due to its apparently lower noise floor. The ISO benefitted from being nearly a foot away from any transformer. With a Pioneer A-400 amplifier on the top shelf of a Sound Organisation table and the ISO on the lower shelf, transformer hum was readily noticeable in most positions. It should be placed as far from the amplifier as cables will allow.

While the Phono2 can be factory set to suit either moving coil or moving magnet cartridges, the ISO

approximately thirty six hours run in, before any serious listening took place.

Separation

Both the NVA and the ISO are superbly detailed, showing most integral phono stages a clean pair of heels. The most obvious improvement that I could hear was a sense of separation between instruments and a finer degree of articulation than normally expected from vinyl. Whether this is due to the amount of time spent in researching what goes into a fine phono stage, or if it just proves the efficacy of physically separating the phono stage from the rest of the amplifier I cannot comment, but I do feel that the former is



probably closer to the truth.

In fact, in terms of articulation and clarity, there is little between them. The NVA delves further into the lower regions of the music, giving a sense of weight that is more immediately noticeable than it is with the ISO. This is not to say that the ISO plays music with a lightweight air, but that the NVA is more solid sounding than the ISO. This was especially noticeable with strident rock tracks, such as Danzig's 'Twist of Cain', where this solidity appeared as pace and driving rhythm. The ISO was not too far behind, but it did not seem to accent this area in the way that the NVA did.

Unfortunately, this depth to the sound was let down by the NVA's treble. I felt this to be far too 'hi-fi' sounding and verging on the edge of brightness on some material. I know the sound quality of my turntable and 'bright' is not a word that comes to mind regularly.

With the addition of the Goldring cartridge, the turntable veers toward the warm and polite; something I rarely felt with the NVA. It was lucid, detailed and, for the most part, very listenable, but I felt that the NVA's accent was far too pronounced in the upper regions.

It was here that the ISO really came into its own. It showed up the character of the cartridge without

Either head amplifier is likely to be far better than almost any in-built phono stage on the market, with only a select (and expensive) few preamplifiers bettering their disc performance

displaying any of its own interpretations. This was especially true when the ISO was played through the A-400, a partnership that is successful from both a theoretical and a sonic standpoint.

In both amplifier systems, however, I felt that the ISO was the stronger of the two in absolute terms. It did not have the deep bass performance of the NVA, but it was far easier to sit in front of for long periods. In addition, I also noticed a

distinct increase in noise on the NVA. It was noticeably louder in volume, but even when the volume levels were suitably adjusted to match the two, the ISO had a far quieter background. In fact, I cannot think of a phono stage that is as hushed as the ISO. Given that it is placed a suitable distance from any electrical interference, it displays little of the hum normally associated with a moving coil amplifier.

At the end of the test, my opinions had changed radically from the beginning. Initially, the NVA's powerful driving sound impressed me, with its forceful interpretation of loud rock music. Gradually however, as I plundered my collection of records, the lighter rock, jazz and classical music began to convince me otherwise.

The NVA Phono2 is a fine head amplifier, well suited, obviously, to NVA's own equipment. Its pacy and powerful rhythmic sense will be appreciated by those who place those characteristics highly. The Michell ISO appears to be in a different league. It is more civilised and studious. It can rock with the lads, but it is equally suited to a string quartet, a jazz trio and the two Pet Shop Boys. As such I feel that the Michell ISO is possibly the finest moving coil stage that I have encountered to date ●

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...continued from page 11

fully to establish this point. If you would like to, let us know! In the meantime, I agree that although using 100k resistors got us out of a predicament simply and quickly, it is not a recommended mod. since much more than 100pF of subsequent capacitance will roll off treble.

ADDICTION

I think congratulations are in order for producing an excellent magazine that hopefully has no intention of forgetting about the many thousands of vinyl LP users. The pressure to 'dump' an entire music collection for the sake of keeping up with the Jones' can at times become enormous, especially as it can seem at times that there is a real shortage of LPs in the high street shops.

If your staple diet is classical music there is indeed a lack of new titles, but there is a secondhand market that is expanding at an enormous rate and many of the older recordings often beat the socks off newer digital releases (as most of us already know).

Despite the impression of this vinyl shortage, the reality is that there is a wealth of material available if you know where to look. As far as I am concerned the high street chains are all but useless for anything other than chart material. What the discerning music lover should be doing is supporting the local specialist retailers who can give a service that the mega stores can only dream of.

In an effort to support those who prefer vinyl a group called Analogue Addicts was set up more than a year ago, to campaign for the maintenance of choice for the music lover. It also aims to guide members to the specialist retailers of both new and secondhand records, and to encourage an increase in quality of the end product.

Those readers who do not want to be pushed around by the big hardware and software manufacturers and can see through the marketing hype should join the AA. Details are available from:

Box 33, 22 High Street, Keighley, West Yorkshire BD21 2AA.
Richard Hudson
Treasurer - Analogue Addicts.

ADDRESSING ISSUES

I have purchased your magazine for the first time and must take this opportunity to say how

much I have enjoyed reading it. I will clarify this by saying I have not purchased or looked at a hi-fi magazine for 8 to 10 years.

I wonder if you could help me? Many years ago I purchased JR loudspeakers but, now the JR EX1 bass units have developed a hum. For the record this hum only appears at a certain volume setting and can be removed by either turning the volume up or down. My problem is that I cannot find out the new address or telephone number of the company.

Thanks for your articles in your Tweaky Corner. This item just fell into my lap at the right time. Having recently moved and now setting up the hi-fi the system is suffering from various interference or noises or spikes (?) coming through the speakers. Having never experienced this at my old address I spent many hours going through the system. It was only the other day that I decided that it was not the hi-fi but the electrical supply. What a relief reading your article today.

Problem. Very interesting BUT. What happened to the names, address and phone numbers of various companies supplying the products you have mentioned. Can you help in this matter as well?

M.I. Skudder
Orpington, Kent

As you have probably gathered, JR loudspeakers no longer exist. We spoke to Jim Rogers himself on the matter. He suggested that it may be a crossover fault, which should prove no problem to a competent service engineer. The bass units themselves were originally made by Audax, but later loudspeakers were fitted with SEAS drivers. Should the drive unit prove to be too troublesome, Jim recommended looking at similar models from the current SEAS range.

With regard to mains suppression, do not expect a 100% reduction in spikes from any device. For your problem, I would prefer to put QED (tel 0784-246236) suppression boxes on any offending electrical devices outside the hi-fi system, than to use any mains conditioner or purifier.

If you find that the source of the interference is external to your building, try using the conditioners by Copenhagen Transformers (imported by Zeus Audio - tel 0232 332522) or Radar Developments (tel 0793 765256). These do help to eliminate impulse spikes and are said to be effective, without actually degrading the overall sound. **AS**

RANTING AND TUNING

In a short period of time you have produced the first decent new hi-fi magazine. In particular the articles concerning second-hand and venerable items such as the Thorens TD150 and the explanation of recording levels has been most enlightening.

An indication of another useful future topic seems to be hinted at by the inclusion of what appears to be a diagram of a DIY phase-reversal switch on p17 of the August issue. I trust that this will be repeated, together with some accompanying text.

Might you not put your considerable knowledge to work explaining tuner and aerial specifications? I live at the outer extremes of two BBC transmitters (Oxford and Wrotham) and am plagued by intermittent whistling interference on Radio 1. Having tried a NAD 4020 of some vintage and a Sony 730ES leaves me none the wiser regarding a permanent solution, despite a four element aerial pointing towards Wrotham.

As you have a knack of reviewing items I am vaguely interested in (e.g. Aiwa HS-150 and NAD 8100) at about the time I want to find out more, I live in hope of something on tuners and aerials appearing soon.

Matthew Parris,
Wokingham, Berkshire

Space Gremlins infiltrated the office and stole the words which should have accompanied Richard Brice's diagram. However, we paid the ransom demand, and they were returned to us in time to be printed in this issue. **AS**

As regards the tuning problem, the causes can be very diverse. The BBC engineers told us that older aerials weren't really designed to receive beyond 94-95MHz, and of course Radio 1 is now broadcast on 98MHz. A newer design may be the solution, but the BBC also warned us that there are still a number of the older variety floating around in the shops, so beware.

However, this isn't the end of it. Apparently, Radio 1 is transmitted at lower power from Wrotham than Radios 2, 3 and 4, which may mean substituting a larger aerial. The computer couldn't quite make up its mind as to whether the Wrotham or Oxford transmitters would be more suitable overall.

Just to add to the confusion, one of the engineers told us

that he was in Wokingham recently and the source of the interference turned out to be the local Police Station.

The BBC suggested two things - phone them (as anyone can from anywhere in the country) on 081 752 5040, or better still, they said, make a tape of the interference and send it to them to think about at
BBC Engineering Information,
BBC White City,
201 Wood Lane,
London W12 7TS
EB

SPLEEN VENTING

As a long time user of vintage valves (Leak TL12, rebuilt by Glen Croft) I am pleased to see interest and awareness increasing. It is a good thing to give people genuine alternatives, individuality is important. The main point of this letter is a sad case of spleen venting.

I must vent said organ at the myopic philistine who described early incarnations of the NAD 3020 as ugly ducklings. I am a tolerant man, but that cannot pass unnoticed.

The seductive curves of the controls on the old 3020 is unmatched and will live in plastic moulding legend. Who could not fail to be mesmerised by the fine LEDs pulsing like the music through the innards of an all time classic? The NAD 3020B and KEF Coda III's gave me my first glimpses of music. I have moved on, but your reviewer should be aware of the deep emotional turmoil he can cause by such flippant remarks. The mouldings may have gone, but their memory lives on in many hearts.
G. Lee,
Muswell Hill, London

As someone who seems to find aesthetic delight where others don't, I sympathise. As someone said, you can't please all the people all of the time... **EB**

FELLOW SPIRIT

I have cancelled my regular Hi-Fi mag. (no names no pack drill) in favour of your publication. Anyone who uses a Leak Troughline as a reference is a fellow spirit!

I am aged sixty, so my youth was what I consider the Golden Age of hi-fi. Then, newly married with an understanding wife, I graced the living-room of my semi with a home-built Wharfedale sand-filled enclosure, using Gilbert Briggs' book. It was driven by a Pamphonic valve amp. (EL84 push-pull), Connois-

seur three speed deck and arm from Sugden, another Yorkshireman

Like an idiot I ditched this system in the mid 60s for a Leak Stereo 30 (transistor), two bookshelf speakers and a Garrard deck. It took me some months to acknowledge my mistake; the amp was as hard as nails and where had all the bass gone?

I drifted, hi-fi wise, into the 70s and 80s until I had a system of indifferent oriental gear which I kicked into touch when I made an Antique/Junkshop find. I was offered an old 'radiogram' which I 'reluctantly' accepted, saving my chuckles of glee until I got home. I found I had a Rogers Domestic Corner Horn fitted with a Lowther PM6, a Whiteley Stentorian cabinet fitted with a mint Garrard 301 and a fifty watt Beam-Echo Avantic mono amplifier with EL34 push-pull output!

I put in a new 32uf+32uf cap in the amp. as a matter of course - the old one was dated 1969 - and everything was in order. I didn't even need a new idler wheel, the original had seen so little use.

I have got my 'sound' back after twenty odd years! I am looking out for another amp for

stereo, and I have the original dilemma of a satellite speaker for the corner horn. I am using an Audio Technica arm and Linn Asak cartridge with a new tip on the Garrard.

I have come to the conclusion that in the price bracket I could afford, Transistorisation and Stereo mid-sixties style was a disaster we all felt we had to live with in the name of progress. I look at today's all-singing, all-dancing gear and am reminded of a radiogram that impressed me as a child. It had a clock and cocktail cabinet built in. It had to be good!

**Tom Wolstencroft,
Stockport, Cheshire.**

TRANSMISSION RESUMED

I was most interested to read Noel Keywood's Reflections in the September issue.

I completely agree that accuracy is what it is about, but that narrow thinking has rebounded into sloppiness. There is often not enough rigour in the design approach, apart of course from certain companies. The same applies to magazine reviews, dare I say...

I also noticed the correspon-

dence about transmission lines. My good friend Raymond's memory has lapsed here, because the Kodak speakers (which KEF were kind enough to design and build at my request) were indeed transmission lines, at least under our industry's current woolly interpretation of this term, albeit rather short ones.

They had two B139s and two T15s (Duettes) but also a rectangular opening at the foot of the front baffle from a heavily damped, double-folded line. They were small - the front baffle was just big enough to accommodate the drivers and the vent.

I took them around the country, and recall that one pair did a fair job of filling the Fairfield Hall, Croydon with two Leak 50w valve amps., circa 1965.

They had an aperiodic bass which worked well in almost any environment, reinforcing Raymond's comments on the validity of this design approach, Thiel/Small notwithstanding.

**Denis Wratten,
Acoustic Gold,
Hampton, Middlesex.**

DIRECT FROM CROFT

My first encounter with an OTL was a Futterman. Operating correctly, it produced a sound in advance of any transformer coupled amplifier we heard.

My first OTL design, the Series II, came onto the market around nine years ago and had most of the features now used on the DCO 150 you reviewed, alongside my Series III.

The output stage of our OTLs is based on the first Futterman circuit of 1954, which was direct coupled (only subsequently did Futterman go to the capacitor coupled circuit to obtain increased output).

The question of DC balance and offset is not a problem in our amplifier. The power supplies are floating, hence, there is no offset present on the output even in the event of an output tube developing a short circuit! The bias adjustment on our OTLs is merely to match the current flowing in the two pairs of output valves and has no affect upon DC offset (any valve amplifier with a fixed bias requires bias adjustment to compensate for the ageing of the valves).

Whilst we may have built only around 100 OTLs, this is around 100 more than anyone



OVER THE EDGE

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else in this country - and not one speaker system has sustained any damage!

The Series III was developed around three years ago to be the cheapest OTL possible, whilst still retaining usable output power and using top quality components. The original circuitry is necessarily simplified, hence, the increased measured distortion. The feedback can easily be raised to reduce this, but sadly the amplifier sounds flat and lifeless.

We don't consider the pursuit of astonishingly low levels of distortion has much relevance to sound quality - have you measured some of the direct heated triode, zero feedback amplifiers?

If you require a low distortion OTL then try any Futterman. We do not hear the high frequency problems that you do. If it sounded as you describe we would not consider manufacturing it or have a continual waiting list with advance payments for Series IIIs or 3s's. We can only presume it was being clipped.

As regards matching, one point not brought out was speaker impedance. OTLs like higher impedances as a general rule. Indeed, they can drive the impedance peaks that solid state amplifiers cannot, because of their limited voltage capability.

OTLs are rare because they normally cost megabucks: Counterpoint, Klimo, Prodigy, Atma-sphere, New York Audio Labs. etc. It is not because they have spurious problems.

The Series III is £2400 cheaper than any other OTL available. Whilst it is not available for all and sundry, neither is any other variety of valve amplifier, or esoterica.

Glen Croft, Eminent Audio, Wolverhampton.

Well, I'm glad you're alive and well! We tried to contact you many times and received so many contradictory messages about your state of being, as it were, that we were forced to give up. You were asked to contact us via Eminent Audio - but you did not.

The reason for our persistence was - apart from saying hello! - to get a circuit diagram for analysis and to double check and discuss our results. We still do not have a circuit and consequently cannot offer unequivocal replies over any of your contentions about valve OTL amplifiers. However, I can see no way that a floating supply eliminates the possibility of DC offset, except by the mechanism suggested by Tim de

Paravicini below. We were under the impression that your OTL is direct coupled, but it now seems likely it is capacitor coupled. Amar of Eminent told me, after the review was put into print, that a crowbar protection circuit is fitted to protect against DC offset. Is it or isn't it? We would all like to know.

Harmonic distortion with higher order components is audible, even in small quantities. Nobody is suggesting that it must be reduced to nothing, but I would suggest it is reduced to an inaudibly low level. Whilst there is and always will be argument over what constitutes such a level, around 0.1% maximum is desirable with extended harmonics. Normal valve amps. often have second

know a bit more about the nitty gritty of valve OTLs. I asked Tim de Paravicini of EAR to provide us with greater illumination. Tim designed valve amplifiers for Lux of Japan and now produces the EAR range of valve amplifiers. He isn't an impartial observer, but he is one of the few people in Britain (the world?) who KNOWS about such matters. **NK**

REPLY TO CROFT FROM TIM DE PARAVICINI

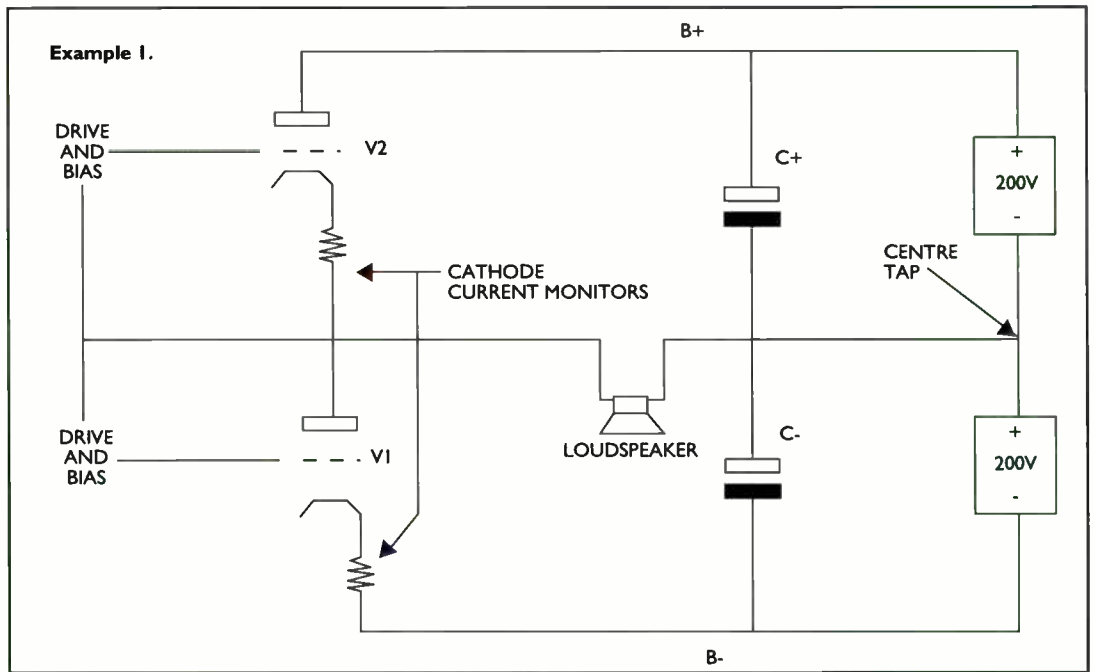
I am going to use two simplified circuit diagrams to illustrate my arguments about direct valve coupling.

Example 1 is one of two methods of direct coupling. It has the ability to reproduce

could possibly damage the load (loudspeaker), because either B+ or B- can be regarded as having near zero impedance.

In example 2, the Power Supply Unit (PSU) centre tap is not connected. This is the only method by which the PSU can be made floating. This circuit cannot be a true DC amplifier, since the load current returns via either C+ or C- to the valves. A short on V1 or V2 will charge either C+ or C- and so, this circuit behaves as a capacitor coupled amplifier, not a true direct coupled amplifier, which is why the loudspeaker cannot see a DC offset of course.

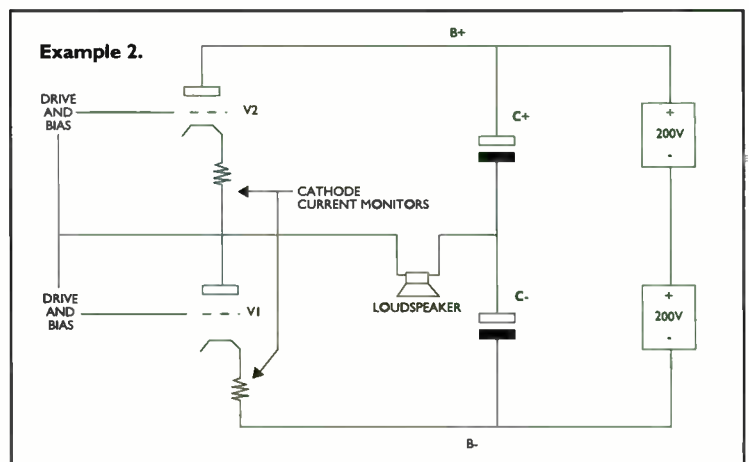
Without a circuit, it is impossible to know exactly which of



harmonic distortion only which, being subjectively innocuous, can exist in amounts up to 1% and still be difficult to detect. So the guidelines differ according to the nature of the distortion.

We did mention high output impedance, but did not make it clear that this means high impedance loudspeakers are preferable. However, very little information is available to buyers or dealers on this subject, so speaker matching on the basis of impedance will be difficult. Although aware that valve OTLs need a high impedance, well damped (acoustically) loudspeaker, we were surprised to find that your amplifier controlled TDL Studio 4s well. Even many lesser solid state amps fail here, so we were careful not to make an issue out of this.

Finally, readers might like to



signals down to DC, but requires very good control to set the output offset with no signal.

Should either V1 or V2 develop a fault, say a cathode/grid short circuit, so drawing an excessive current, a permanent DC offset will then exist which

the two arrangements Croft use, but a floating centre tap suggests that, effectively, capacitor coupling is used. The position of the capacitor has been moved from the positive side of the loudspeaker to the negative return line, but it is there all the same. ●

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**AUDIO TECHNICA CD LENS CLEANER AT 6078
£15.30**

When Compact Disc players were top loading, the tiny plastic lens which focusses the laser onto the disc was accessible, and could be cleaned (gently!) with a cotton bud. Now, however, it's tucked away and can't be got at when the drawer closes. Audio Technica's answer to the problem of hidden lens cleaning is a special Compact Disc with tracking information on it to steer the laser. Eight tiny brushes on the disc surface remove dirt from the lens as it passes over them. One wet brush does the cleaning, and the other seven dry it.

While the instructions suggest applying only one drop of fluid to the cleaning brush (clearly marked by an arrow), this proved almost impossible from the small bottle provided. An eyedrop-per-type would be far better.

One snag is that it won't necessarily work on all CD players; it took three attempts with our Arcam transport before it could be persuaded to start cleaning. A second snag is that it plays music for ten seconds while it finishes the job. The instructions point out that some players won't play the sound, in which case keep your eye on the time display and count up to ten and your blessings. The music (hah!) would clear a supermarket at closing time in less than the few seconds it lasts.

Lens cleaning is a recommended service procedure. I don't know whether the effect was psychological or not, but after the lens had been cleaned, the CD did seem - well, cleaner sounding than before. The inner detail definitely seemed more defined.

This certainly seems a sensible accessory, and it appears to be the only way of cleaning the laser lens in most front-loading CD players.

CD CLEANING



**AUDIO TECHNICA CD ROTARY CLEANICA AT6059
£49.95**

This is a neat white, palm-sized battery operated machine, looking like a small food processor - especially with its smoky coloured plastic lid.

The disc is given an advance brush-over, then placed on a spindle and sprayed with cleaning fluid (which, judging just by the smell, has an alcohol base) from the atomiser provided. A-T suggest stains should be removed with a preliminary spray and what seems like a rather hard miniature rubber squeegee. The lid is then replaced, and the disc spun dry. The process takes about ten seconds, and the two size C batteries are expected to last for about 50 CDs.

A single spin demonstrated that this machine is more of a spin-drier - Audio Technica grandly use the word 'centrifuge' - than a washing machine. Both stains and fingermarks had to be removed using the rubber squeegee, for only dust and fluff was removed in the spin. The lid doesn't lock on, and can be lifted off while the disc is spinning; fortunately the motor isn't strong enough to turn a CD into either a bacon slicer for children's fingers or into a frisbee, since it is held down by a small rubber clamp.

It's hard to see this gadget as much more than a Yuppie

Once upon a time, CD was guaranteed free from Magic. Not any more. Nowadays all sorts of weird and wonderful gadgets and fluids are available to enhance performance. Most are accompanied by a 'scientific' claim and some, to our surprise, do seem to work. Where it was applicable, we used a Cambridge Audio CD-1 Disc Quality Assurance Unit to help establish the veracity of the claims.

CD Tweaks

toy for the man who has already been given more than he ever needed for his last few birthdays. If it brushed as well as spun, it would be rather more effective.

won't - since cleaners can't - do anything to make scratched discs readable.

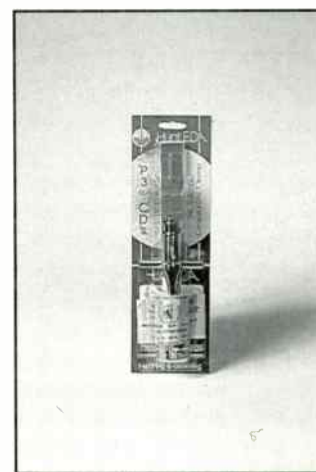
This certainly cleaned off fingermarks, stains and smears of cigarette ash. Its only disadvantages were that it is a little flimsy, and has to be held down with one hand while the handle was turned with the other. The cleaning ring under the lid is also going to become dirty with use, and didn't seem to be removeable for washing or replacement.



**ALLSOP 3 COMPACT DISC CLEANER
£12.99**

This has a turntable with cogs round the outside, and a revolving cleaning pad above. Hold the knob and turn, and the revolving pad cleans the CD radially. The cleaning fluid comes in a plastic bottle, and three drops onto the playing side of the disc are sufficient.

Intended to remove dust, light stains or fingermarks, Allsop say it will prevent 'skipping and mistracking' - but only if a result of a dirty disc. It

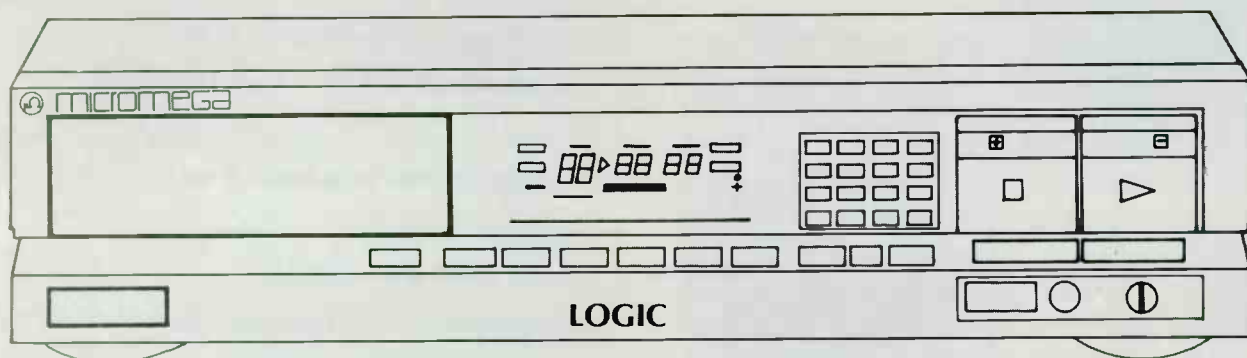


**HUNT E.D.A. P3
£10.99**

The hard work here has to be done by hand. The kit consists of a 'CD Holder' (a kind of plastic prong which you grasp at one end, while the other end is inserted through the hole in the disc to keep your



MICROMEGA



MICROMEGA AND MUSICALITY

You only have to look at a Micromega CD Player to see that it is very different from the mass of more 'normal' machines on the market. You only have to use one to see that the differences are more than skin deep. In fact, everything about the Micromega range is the result of a fundamental reappraisal of the ideal conditions for CD replay.

It's all very well us talking of power supplies and data integrity, but as a customer you want to know how these things affect what you hear.

CD has had specific musical failings. In general these can be summed up as a lack of the following: deep bass weight, upper range tonal accuracy, dynamic coherence and many aspects of stereo performance. It has also been accused of having an antiseptic or clinical sound. The upshot of all this is that many CD players sound gutless with screeching highs. The sound can sound harsh and 'glarey' when the music gets complex or loud, and the soundstage is wide yet mostly flat.

Many 'audiophile' players try to compensate for this by adding pleasant second order harmonic distortion to 'sweeten' the sound, and a midrange suckout to give an impression of depth. Thus they try to hide the problems rather than solve them.

Micromega players retrieve much more information than other CD machines. This is because of the way they are built. The result is a more complete sound. High frequencies and harmonics are sweet and airy, the music swells with a true sense of body, and it does not get hard as it gets loud. The soundstage is open, with width, depth and height, and properly proportioned images which do not wander. Even more importantly, music is preserved with a natural sense of ebb and flow, which allows you to hear how an instrument is being played, and gives melodic lines a clear and well defined shape. And that all adds up to increased musicality.

These effects benefit any type of music, yet they are more easily recognised on well recorded acoustic performances. In our experience, recordings on the Chesky, Reference Recordings and Harmonia Munddi labels are particularly revealing. Once you have heard the difference, you will hear it with every type of music.

How often have you heard natural sound and natural perspectives from a CD? How often have you tapped your feet or been swept along by the emotive swell of an orchestral crescendo? With a Micromega player this is normal.

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'The purpose of any piece of audio equipment is musical performance. The purpose of the new bitstream Micromega Logic is to bring unparalleled levels of musical performance to the most competitive of fields; affordable compact disc players. Tucked inside this attractive package, brim with useful facilities, is a player of superb constructional and component quality standards. At £499 the Logic resolves more detail, more space, more control and more musical understanding than its competitors. Ambience and scale is reproduced with an eye to the truth not the understated, not the overblown. Music has colour, texture and emotion. This is what transforms mere listening to a true experience. Experience the Logic.'

DUO BS II



'Micromega's separate bitstream digital-to-analogue converter, the Duo BS, has been extremely well received by press and consumers alike. Now in its Series II guise, the Duo BS II hits new heights of performance at a remarkably affordable price (£499). Working from either a co-axial or optical output the Duo BS II will simply transform your existing player's performance.

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sticky fingers well away from the playing side), a spray bottle of cleaning fluid, an applicator tool (shaped a bit like a doll's house dustpan handle) a miniature toothbrush (the sort you're often given to clean a stylus with) and, for some reason, a paper hanky.

The fluid is sprayed on the underside of the applicator tool, which is covered in a thin layer of cloth reminiscent of the 'jiffy' cloth to be found in the kitchen. This is acrylic and something of a surprise, for it's quite coarse. The damp cloth side of the applicator is then stroked radially over the CD, which is planted on the holding tool, from the centre hole to the outer edge, overlapping each stroke until the whole CD has been cleaned. The process takes a couple of minutes, though the CD on its holder is rather wobbly. I didn't drop one on the floor, though.

Unlike Audio-Technica's, which is very restrained in terms of making assertions about their cleaner's effectiveness, the accompanying blurb to the P3, amid a good deal of techno-speak about 'Fine nozzled (calibrated) metering bottles', 'Unique "radial" cleaner' and so on, claims that digital 'harshness' is minimized, there's 'greater spaciousness and ambience', 'broadcasted (sic) improvements in clarity' and 'up to a 26% increase in clarity.'

To a certain extent, the latter claim was met on measurement. Using the Cambridge Quality Assurance Module the counters displayed fewer signal dropouts after the test disc had been cleaned with P3 - almost exactly 26%! Nonetheless, despite claims to the contrary in the accompanying literature, some slight surface scratches did appear on the disc after the applicator had been used on it.

MILTY COMPACT AND LASER VISION DISC CLEANER £2.17 (Drum of 80)

Known as 'Milty Wipes' to save time and typesetters' tempers, these are soft, lint-free impregnated cloths, eighty of which come in a round plastic tub.

The tissues are not too dissimilar, at first sight, to those useful wet wipes you



use to refresh yourself after a sticky journey; these, however, won't be a good substitute - they're impregnated with a strong medical-alcohol smelling liquid.

Reference to the Quality Assurance Module showed a slight (but statistically insignificant) drop in the number of corrected errors on the newly wiped disc; the CD, however, did come up sparklingly clean, with dust, a few odd bits of fluff, and a fingerprint removed. It was also kind to the disc; no surface scratches appeared after using the wipes.

This seems fair enough - there are no claims on the container other than about the removal of dust, stains, and fingerprints, and this the Milty Wipe performs.

GREEN RINGS



AUDIO TECHNICA GREEN RING STABILIZER AT6079 £6.50 (Pack of 5)

These are thin (and removable) green-coloured plastic rings, grooved to slide snugly onto the outer edge of the CD.

Each ring weighs 0.5g, and Audio Technica say the added mass around the circumference of the disc 'suppresses shaking during rotation' which

'decreases vibration so as to improve the CD sound.' Interestingly, no claims are made about the colour.

A-T also suggest that the ring has a protective aspect - the slightly raised edge will lift a CD a fraction off a surface if it's put down without its jewel box.

The rings were easy to slip on and off without any deformation. Being a thoroughgoing sceptic about pens from outer space and snake oil preparations generally, I was amazed to find slightly more precision and tightness in imagery, and what I felt to be a little, but worthwhile greater overall clarity. The red-light absorbing properties of the green rings doubtless lessens stray reflections of laser light too.



ALLSOP CD PLUS PROTECTIVE STABILISERS £12.99 (Pack of 10)

Green rings - except that these are black! Very similar to the A-T Green Rings; Allsop say theirs are made from NAVCOM 'Noise and Vibration Control Material'; which 'enhances stabilisation by dampening disc vibration. Less vibration allows the CD player's laser to read data with better accuracy, resulting in a truer reproduction of sound for clearer, more natural sounding music.'

The black rings are a smaller diameter than A-T's green ones, and consequently less easy to fit on without fingerprints appearing on the disc. They also stretch slightly, so are not as re-usable as the green ones. Nor did they fit as evenly around the edge.

Results were similar to the A-T green rings, except diminished somewhat. Perhaps green does have something to be said for it after all.



FEET

ALLSOP 3 AUDIO ISOLATORS £24.99 (Pack of 4)

A set of four NAVCOM (see above) round moulded feet. The lower surface has six bumps on it to sit on the table or whatever; the upper surface (which the amplifier, turntable, CD player or other item stands on) is finely grooved. The feet will support anything weighing up to 9kg. 'Reducing vibration,' says the blurb, 'results in less distortion for tighter bass, clear sound and greater overall sound quality.'

The slight rubber-eraser smell - I can never resist a quick sniff - took me right back to my schooldays. Installed under our Arcam transport, the main result appeared to be a slightly wider soundstage. Timing was slightly loosened, but paradoxically some transients seemed to be tighter. Feet could well be a useful aid, but results will depend on the quality of the transport, mechanism, and the physical weight of the player, as well as its proximity to loudspeakers ●



down to the nitty gritty

Eric Braithwaite gives the £249

Nitty Gritty Record Master

LP cleaning device a whirl.

I spent a while in the rare record business. It's like owning a bookshop. Everybody assumes that you can spend all your time reading - or listening to all the records you were never able to buy. Some do. They either have private means and don't need to be in the trade, or they do need the income and find they're sliding fast down the slope to bankruptcy. There are plenty of tales in both worlds of book and record sellers who couldn't bear to part with their stock to those funny intruders called customers.

My stock, alas, was strictly for sale. Such is the lust of foreign collectors these days, that the discs were too often on display for sums I would blench at if I was asked to pay them. That explains why I'm to be found scouring one of London's most famous second hand markets while the birds are still yawning and waiting for the alarm to go off on Saturday morning. I have found bargains - and some rarities - but they mostly have one little problem.

By the time even a mint record finds its way onto a market stall it's liable to have collected at least a few sticky fingerprints. There's nothing like London air, exhaust fumes and the dust thrown up by a thousand pairs of feet to add a further delicate patina of grime on top, even after only an hour or two in a cardboard carton on the pavement. That is why I spend a fair amount of time, scrubbing brush - metaphorically - in hand. In fact,

having been in the business, I have my own tried and trusted cleaning method, but it seemed worthwhile trying out a machine anyone could buy.

In a particularly mean mood recently, I handed over fifty pence for twenty records whose sleeves were gummy with damp, cobwebs, brickdust and worse. The 'worse' looked as though it had something to do with rodents. If there was going to be a real test, this would be it. Sense prevailed, however, and I stuck to a selection of ordinarily marred discs. I did try one or two of the ones that looked as though they'd come off a rubbish tip, but if anyone is gormless enough to spend £249 to clean up records the dustman wouldn't touch, they have a problem. I was just curious to see how much the Nitty Gritty could cope with.

The Nitty Gritty Record Master which we were provided with is a manual machine. The moulded plastic black top has a vinyl finish; the base, which contains the reservoir for waste cleaning fluid and the vacuum pump, is made of thin wood, finished in walnut. A small round turntable on the left holds the record, with a hand-held clamp over it. To the right is a narrow trough with two velvet 'lips', which dries the record. This behaves in similar fashion to the suction hose of a vacuum cleaner to remove the dust and liquid. A plastic outrigger blanks off part of the nozzle for drying EP's and 10-inch LPs or 78's.

Nitty Gritty's own cleaning fluid is squirted onto a velvet pad which is wiped over the surface of the LP. The record is then placed wet side down on the platter and the clamp-cum-tuning hub is positioned over the label on the spindle that projects through the hole in the middle.

Next stage of the operation is to switch on the mains powered vacuum pump, which sounds exactly like a miniature vacuum cleaner, the vacuum pump exerting quite a fierce suction. Turning the record, by means of its clamp, through two or three revolutions dries the disc totally. Finally, lift the record off and repeat for the other side.

The machine proved quite effective - the LPs came off the platter looking clean and shiny, with the normal detritus and surface dust removed and vacuumed away. Tiny stubborn particles won't necessarily be shifted as easily, though. I was worried that the velvet pads which rub the record during the drying/vacuuming process seemed a bit thin with their hard plastic holder just a fraction of an inch beneath. It took a little while to pluck up courage to clean a prized rare record for fear of scratching it. Fortunately, it survived, but I would have thought a thicker cleaning pad would not only alleviate

paranoia, but also reach into the grooves rather better and brush them more thoroughly.

Nitty Gritty's machine removed fingermarks carefully - carelessly! - applied to selected records beforehand, though some marks needed two goes to shift entirely. Two LPs which had somehow collected a lot of surface dust and goo (I'm a smoker, which is bad for records anyway, and I have a lot of building work going on outside which spreads an astonishing amount of dust and grime everywhere - including inside the record sleeves) came off the machine markedly improved, much quieter and I heard the shuffling of orchestral feet and the tap of elbow on music stand which had been disguised by the surface noise.

Records tainted with fingermarks regained their original pristine state and no longer produced that slight but irritating 'ssshhh' as the stylus tracks through the grease. A particularly intractable LP, once cleaned, was revealed to have suffered serious groove wear in the past. Some of the crackle and pop had vanished, however, which did make it less painful to listen to. The thoroughly polluted records needed more cleaning sessions than were really worthwhile, but they were rendered

playable - and the brickdust had to be brushed off by hand first.

Record cleaning is not a cure-all. No machine or method can restore a scratch or a damaged or worn groove, but what the Nitty Gritty did successfully was restore ordinarily afflicted LPs to playable health. It is something of a time consuming process, however. While you're supposed to wait for the used fluid to evaporate, which restricts cleaning sessions to between six and a baker's dozen LPs at a time, a rubber bung underneath can be removed and fluid drained away so more can be dealt with.

The more expensive models do take a good deal of the bother out of it: the 1.5 and 2.5 models turn the record over a wetted pad through a revolving capstan which drives the edge of the LP, and then turns it again while the vacuum operates. The most expensive will wash and dry both sides of the record at once - a boon if you want to clean a large collection regularly.

Our Record Master certainly functioned well and the ability to restore a good proportion of the original sound to a record is definitely a benefit. If you have a large vinyl collection, the range is well worth inspection - and so are your records! ●

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Jason Kennedy, HiFi Choice, Feb '90

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Alan Sircom, Hi-Fi World, July '91

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Martin Colloms, HiFi News, July '90

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Paul Messenger, HiFi Choice, June '90

Well you don't need a degree in the bleedin' obvious to hear the huge improvement the Sound Frame wrought.

Paul Hartley, Hi-Fi World, May '91

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

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

Malcolm Steward, High Fidelity, Dec '90

Several hours and many albums later I was even more convinced as to the worth of the Sound Frame

Paul Hartley, Hi-Fi World, May 1991

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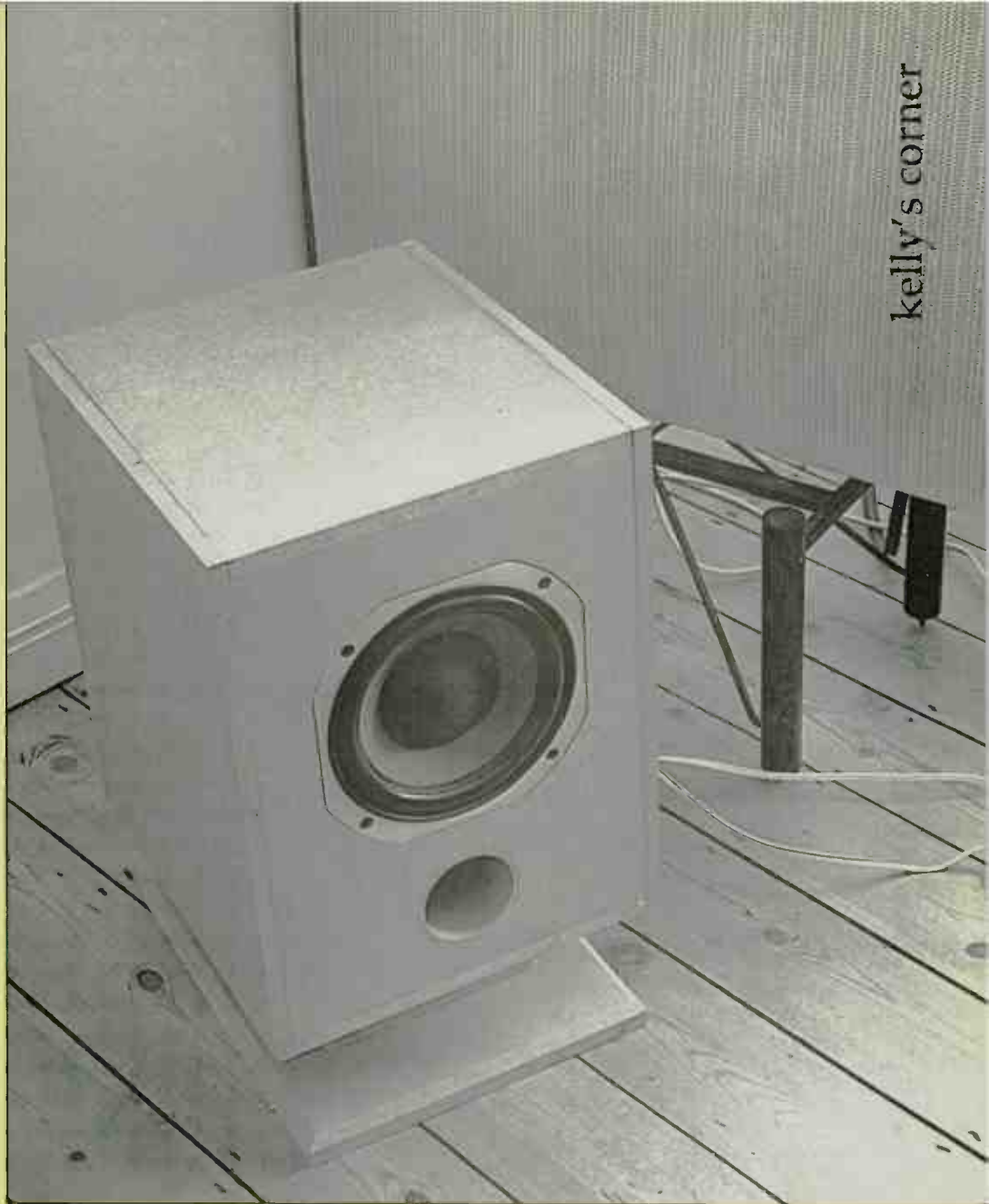
**Richard Kelly builds a
Wilmslow sub-woofer kit
for his Quad ESL
loudspeakers.**

You may recall that recently I acquired a pair of Quad Electrostatic loudspeakers and came to the conclusion that they were excellent in all respects but slightly lacking in the ability to go loud. It's been proven to me that if you take the signal below 100Hz out of the Quads and put it into a subwoofer system, then not only do you get prodigious bass all the way down, but because there's less work for the Quads they can go that little bit louder.

When I heard that Wilmslow Audio made subwoofers for both the original ESL and the 63's I thought it might be in everyone's interest to check them out, so I asked Wilmslow to allow me to build one and give it a whirl.

The CDVC kit, as it is called, duly arrived the next day and was hurriedly opened and checked off against the packing list. All the panels are 18mm MDF and are well finished, just needing a final dusting off before assembly. Even though the panels are not marked as to exactly what's what, it's a relatively easy task to identify all the relevant bits.

If you bought the first issue of Hi-Fi World you would have seen my article on another Wilmslow Sub-woofer, the CCP. I no longer have the CCP so I can't check this out, but if my memory serves me correctly this one shares many of the same cabinet pieces. Externally they look identical. It's only when you get inside that the first difference hits you: it's only got one drive unit. This is an 8"



kelly's corner

Volt driver of 16 ohm impedance and has two voice coils, one for each channel. Rather chunky it is too!

Excited

There are two separate crossovers mounted on the back panel, these being constructed with pretty basic RS components - nothing to get excited about unfortunately. Wilmslow have improved the binding posts that they use. Instead of the standard sort of chrome and plastic ones that are commonly found in component shops, they now supply beefy copper posts that certainly look the part.

How does it go together? Very easily. No matter how I tried to misinterpret the instructions I couldn't get myself into an irremediable situation, so I can safely say the whole kit seems to be idiot proof. From beginning to end, allowing more than ample glue drying time, the whole caboodle took 36 hours to build.

At the moment I'm using a NAD 1000 pre and 2100 power amp to

**Richard Kelly's monthly look
at budget hi-fi - old, new,
borrowed or blue.**





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drive my Quads. This combination has been working most satisfactorily and it seemed fitting that they remain in place. Wiring up the subwoofer is simplicity itself: two leads in and two out. It is placed centrally between the speakers.

It was switch on time. After the first hour had passed I was disappointed with the result. My previously spacious sound stage had become less well focused and I couldn't for the life of me figure why. Nor could I detect any great increase in bass output.

I think that at this point I had better refer readers back to the July issue of Hi-Fi World. My Quads are placed hard against the side walls approximately one third of the way down a long room. With this arrangement I was quite delighted with their bass performance. The whole sound was well balanced from top to bottom. All I was after was an increase in volume... and I wasn't getting it.

So to be fair to the CDVC I was expecting from it something other than extra bass - its principal purpose in life. I was perfectly happy with the bass from my Quads and had hoped the sub-woofer wouldn't degrade it. I had better accept however that not everyone will be able to use the ESL in an optimum siting arrangement, in

‘No matter how I tried to misinterpret the instructions I couldn't get myself into an irremediable situation, so I can safely say the whole kit seems to be idiot proof

which case they will be making concessions and may well be lacking the balance that I have (you believe this man could be balanced?).

With this in mind I carefully disarranged my system and pulled the speakers back towards the rear wall and away from the side walls. The ESL's then sounded well sub-optimum on their own, but perhaps more like they may sound in many set ups. Splicing in the subwoofer definitely made a big difference, bringing the lower registers into court again and at the right sort of level. Performance was marred only by a lack of tunefulness to the bass. It went

low enough, certainly, but where previously there was real extension with all the open nuances and shades that bass guitar can display, there was a lack of insight into this side of reproduction.

I hope this doesn't sound too damning. In a sub-optimally sited ESL system I can see that the Wilmslow CDVC sub-woofer will make a valuable contribution to the overall sound. If the Quads are imaging OK, then this will not be adversely affected; the crossover appears to produce little or no degradation of signal. If you can't get round the problem of speaker positioning, then this could well be the product for you, but do try to optimise beforehand.

Confused? You betcha...I wonder if I'd have come to the same conclusions if I had a different room and my own Quads worked less well! Side wall reinforcement gives me enough bass for Reggae.

I apologise for seeming so indecisive about the CDVC but with so many variables coming into play I can't persuade the Editor to extend my deadline by six months. You shall hear more when and if I do find that "sweet spot". Until that time my overall view of the CDVC is a qualified one - it offers slow-ish bass to those who have none at all. ●

a reader, Tony Seaton of Bromley, suggested we should continue and expand our selection of vinyl suppliers which featured in our May issue. While we saved up the train fares to reach parts that only lager commonly reaches, we decided to let him kick off with his own additions and comments.

BARGAIN RECORDS

9 The Arcade, Eltham High Street, London SE9. 081 859 5836

A wide selection of sensibly-priced second-hand Classical, with a little light music and Jazz.

BEANOS

27 Surrey Street, Croydon 081 680 1202

Claim to be the U.K.'s biggest. Moores' (see below) makes me wonder about this...They may also be a touch pricey for some lines, but this hasn't stopped me from spending a small fortune in there before now. Leave your Access card at home! Can be a touch 'cocky' at times - if they haven't heard of an obscure album, some of the staff will claim it doesn't exist, with the attitude 'if it existed, we'd have seen it in a shop this size!'

GARON RECORDS

65 Covered Market, Oxford 0865 246887

Ron keeps a good assortment of

secondhand Classical and Rock vinyl, with some interesting Jazz, and specialises in film music. Also has a good selection of second-hand CDs and Cassettes. In addition, some good rare/imported new Vinyl. I understand Gavin (hence GaRon...) keeps a similar emporium in Cambridge.

HAROLD MOORES' RECORDS

2 Great Marlborough Street, London W1. 071 439 9206

Expensive, but exceptionally expansive exhibition of excellent Classical material. Probably the largest selection around.

OVEN READY RECORDS

46 Kingsbury Square, Aylesbury, Bucks. 0296 82296

My wife has found some excellent rare-ish 70s Folk-Rock here at not too O.T.T. prices. Worth a visit. Good Mail-order and 'Wanted' list services.

PIED PIPER

293 Wellingborough Street, Northampton. 0604 24777

We've done well here on one or two rarities at tolerable prices. 60s Psychedelia would seem a speciality.

RAW POWER RECORDS

34 Lewisham Model Market, Lewisham High Street SE13. 081 852 4422

A small shop and a respectable range of Rock: some Blues/Jazz/60s and an occasional rarity. Prices reasonable.

more second hand record shops

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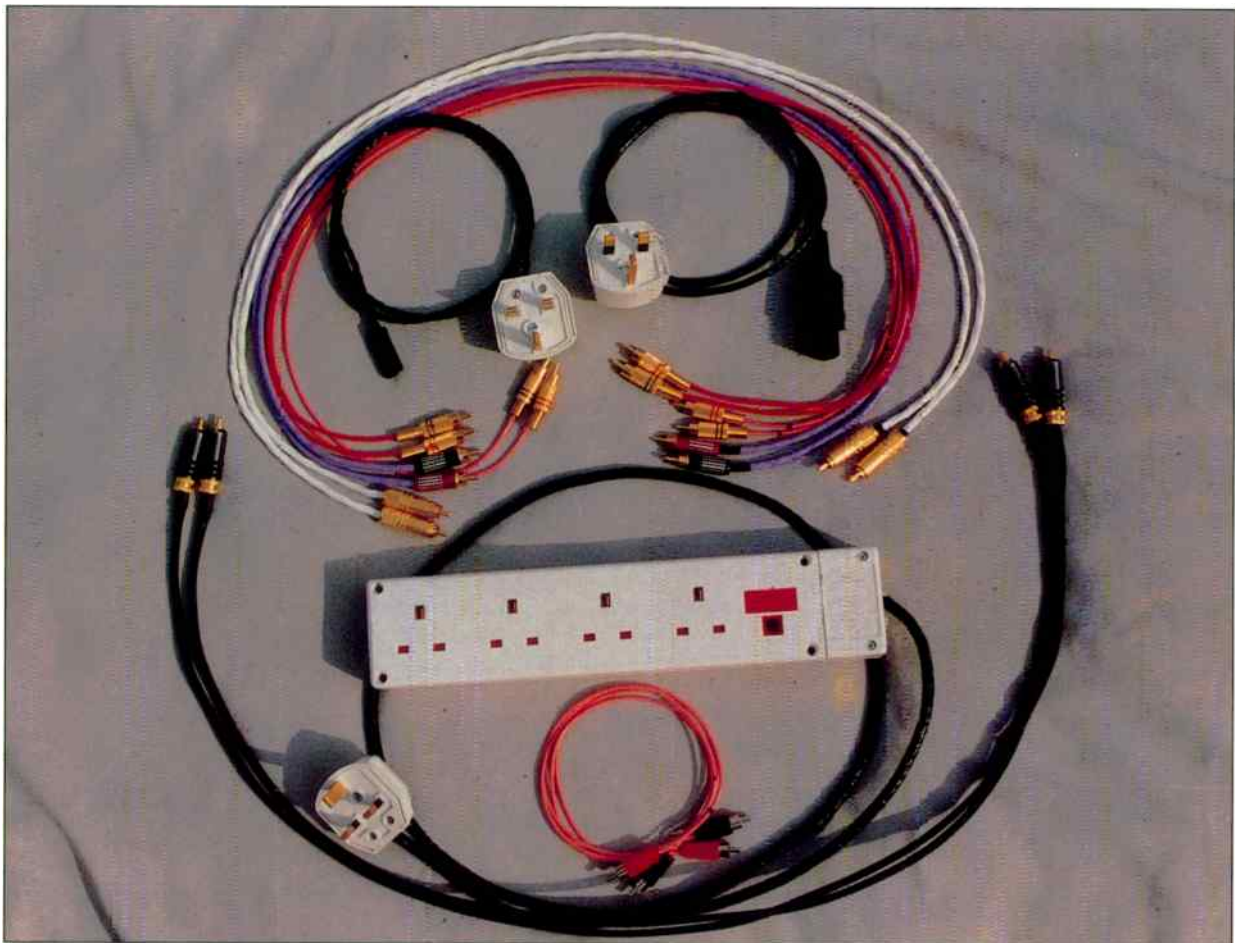
New and used Vinyl, CD and Cassette - often a good selection of 'audiophile' pressings.

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41 Upper Wickham Lane, Welling, Kent. 081 304 4622

Simon and Simon have a good selection of rock, Folk, Blues, Rap, Jazz and some Classical. Huge range of singles. Fair prices - but the boys know when they've got a Goodie! Nice Hi-Fi to listen to, too !!

If we're really going to take the 'World' title seriously, Tony writes, he knows 'some wonderful places in Paris, one in Munster, one in Munich, and an excellent one, also selling some vintage U.K. Hi-Fi in Boulder, Colorado...' ●



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World Radio History



● I reckon I must have one of the most front-end based systems around. When I upgraded my turntable I was determined to aim high and avoid the need for further upgrades. I've ended up with a Linn Sondek/Ekos/K9 playing through a Marantz PM35 and a pair of B&W DMI 10's on Target stands. It's amazing how good a budget amplifier and speakers can sound!

I'd like some advice, please, on where to go from here. Having heard the difference even a half-decent amplifier can make, I have more or less decided to begin in that department, rather than purchase a Lingo for the Sondek. Can I set about choosing a pre/power amplifier combination without knowing what speakers they will ultimately be partnered with? One possible final system I have considered is to have a Naim NAC72/NAP140 driving a pair of Naim SBL's, with a Lingo and a Hi-Cap added at some stage in the process.

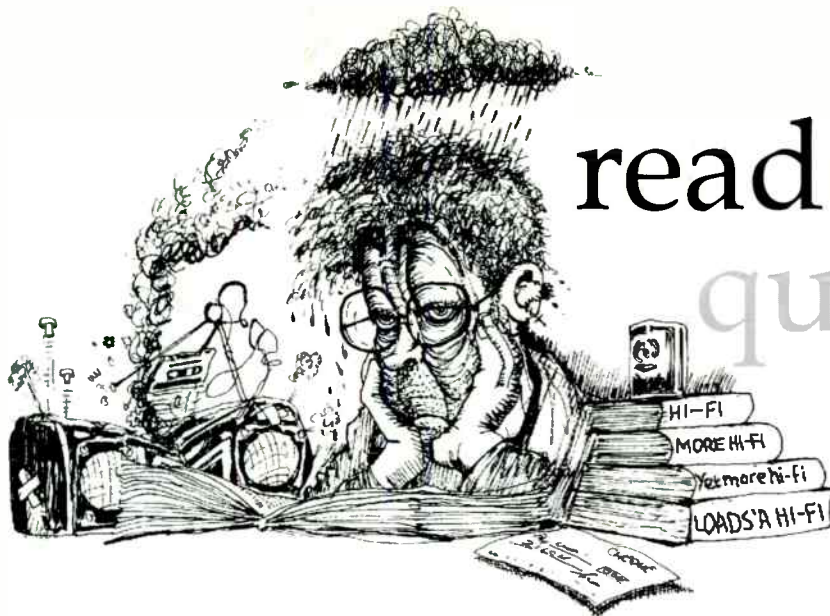
The question is, what are the alternatives I should think about? I've heard lots of good things said of the Audiolab 8000P/8000C amplifiers, but what speakers are suited to them? I should say that I am not keen on small loudspeakers such as the Linn Kans or Naim IBL's, and I need to have speakers that work well close to a wall.

My tastes in music are very varied, covering jazz, classical and rock, with female vocals a firm favourite.

**Bob Bishop,
New Malden, Surrey**

While I agree that it would probably be a better bet to upgrade the amplification, I would not discount the virtues of adding one of the power supplies that abound for the Linn. Both Linn's Lingo and the Pink Triangle Pink Link offer dramatic improvements in sound quality at the source. It is a little 'flat earth' to suggest so hierarchical an upgrade, but it makes sense on both a sonic and financial standpoint, as the power supplies cost around £500 - far cheaper than most pre/power amplifiers.

Moving back to the amplification, in addition to the Audiolab and Naim amplification that you have mentioned, also check out Linn's own range. Its sound is a little laid back compared to the Naim kit, but is highly musical, all the same. At the same time, it may be worth looking at Ion Systems SAM 40 pre/power amplifier. Its clean, clear sound



readers' queries

would match your musical tastes well.

Also, while tube amplification may not be to everybody's taste, it might be worthwhile delving into some of the valve products currently available. A maximum budget of £1300 would enable you to explore amplification by Art Audio, Audio Innovations, Concordant and Croft.

Finally, loudspeakers. These are obviously somewhat dependant on your choice of amplifier. The Naim SBL is an excellent choice, although it really begins to come into its own when used with a NAP 250 or 135's. Aside from the SBL's, the Heybrook Sextet, raved about by Noel in this month's issue, could also fit the bill well. **AS**

● As a student residing in this country for a year, I bought a second-hand system consisting of NAD 3020B and Celestion 3 speakers to listen to my Sony D20 Sony Discman. The Celestions are placed on a bookshelf three inches from the back wall and are connected with Audioquest solid core cable.

To my surprise this combination sounds brighter, clearer and more dynamic than the main system I have at home in Brussels, which consists of a Philips CD743, a NAD 3140 and B&W 220 speakers., which are placed on the B&W-recommended stands and connected with QED multistrand cable. This system sounds far less dynamic, less detailed, more muffled and very bass-heavy.

According to the principle 'a chain of reproduction can only be as strong as its weakest link' it should be the opposite. Can you comment please?

Write in with your

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will endeavour to

solve them or at

least offer some

practical advice.

Probably the first thing I will do in Brussels is to upgrade my main system. What upgrades do you recommend, considering a limited budget will not allow everything to be upgraded at once?

**Axel Boey,
Milton Keynes, Bucks**

A tough question, this. When you suggest that the second system that you have sounds 'brighter' and with more detail, are you sure that you are not confusing the two? Systems often err on the side of brightness to make it sound artificially detailed. While it may be that Lady Luck has shone upon your British system and made it synergise, I suspect that it may be doing so by default.

That aside, the faults you mention in Brussels system could lie anywhere within it, I'm afraid. Starting with the cheapest area first, move from QED cable as quickly as possible, maybe to the Audioquest that you are using in

the other system. This will alleviate some of the lack of dynamics and detail. Other than the Audioquest, try DNM Rainbow Ribbon solid core, Linn K20 or any of the others under £10 per stereo metre.

Next, the amplifier. The NAD 3140 was discontinued over eight years ago, so it may be a little past its prime. Try experimenting with bypassing the 'SLC' circuit, at the rear of the amplifier; this was designed to compensate for cable variation and may help. Failing this, however, look at models like Mission's Cyrus One and Musical Fidelity's B1 MkII, or the 'made-for-UK' Japanese amplifiers, such as the Denon PMA-350, Marantz's PM40-SE or the successful Pioneer A-400.

Now we move to the loudspeakers. The B&W 220's can sound a little bass heavy at times. Try the new Mission Cyrus 780's or the B&W DM610's in their place.

Finally, to replace the CD is an expensive, but worthwhile venture. Look at models around the £300+ mark to make a significant step forward. Players here include the Marantz CD-60SE, which is a particular favourite, but is due to be replaced shortly, so be quick! This, partnered with a good interconnect, such as Audioquest or Sonic Link would eliminate the last of the nasties. **AS**

● My system is as follows: Linn LP12/Lingo/Ekos, Naim 32.5/Hi-Cap/250 and Linn Kan II's biwired with Naim A5 cable.

The turntable is on a Mana wall shelf, the amplification and Lingo on a Tripod stand and the speakers on Kan II stands.

I need a new cartridge for this ▶

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system. I know I should buy a Troika, but I have run short of money, houses being what they are!

I was thinking of buying an AT OC5 until I read the review in August's Hi-Fi World about it being too bright. I want a smooth-sounding system with good bass. Would I be better off with a moving-magnet cartridge rather than a cheap moving coil?

**S. Chisholm,
Middlesborough, Cleveland**

While some systems will tame an AT-OC5, yours is not one of them. In the same price bracket the Linn K9 is probably the best bet, though it may sound less refined than you really want.

We believe the Roksan Corus Black should be a good match, and it may be worth trying an Ortofon 530. **EB**

● I have a balanced system comprising Voyd turntable, Heliux Cyalene arm, VST V cartridge, Audio Innovations 500 amplifier and Rogers LS4a speakers on Foundation Stands with Linn K20 cable.

The room is ten feet by twelve feet with a bay, quite heavily furnished, with the speakers firing down the twelve foot length. I am looking for a speaker upgrade to get the best out of the system and the room. The LS4a's, while good, are a little reticent and woolly at times. These will be pensioned off to a second room. I enjoy the tonality of the Rogers, but am not so keen on the muffling quality. Speakers must sit no more than one foot or sixteen inches from rear and side walls. I've short-listed Snell K's, Audionote K's, Tannoy 3000's and the new Rogers floorstander.

However, I have reservations on compatibility with CD, which as yet I do not own, and also am concerned about the limitations of the room in respect of floorstanding models. Music varies from Indie Pop, Rock, Choral, Classical, Folk and Big Band.

I have also been advised to ditch the LK20 in favour of a better cable, i.e. Audionote AN-B. Can you offer any advice on my speaker choices, room compatibility in terms of bass extension/clarity and the likelihood of noticeable benefits of changing cables.

**G. A. Gilding,
Lancaster**

As you suspect, the room is one of the problems, but not the only one. The Audio Innovations Series 500 is sensitive about its ancillaries;

the Rogers would never sound at their best, either so close to the walls, with the 500, or, alas, with LK20 cable. AudioNote AN-B cable would be an worthwhile replacement. The speakers are more of a problem; if they really cannot be kept further out from the walls, then AudioNote K's on Pirate or Huygens stands might be the only option. There will be some reflection from the walls, inevitably muddying the bass a little, and probably some restriction of the soundstage. Possible alternatives - but they would have to be tried at home - could be JPW AP2's or AP3's, and perhaps KEF 101's. **EB**

● I am currently running a very mixed system, but am fast moving towards the sound of valves. My front end consists of a Philips 850CD (now seemingly Mk!), and Quad II pre/power stereo, all pretty much original. This is going to a pair of Mordaunt Short MS25ti's. The question is, with £500 should I upgrade the Quads to modern specs, or should I pip for another pre-amp, preferably valve. They're nice, and suited to my growing Classical tastes. And the CD isn't very fast. Can you suggest a speaker upgrade for later reference for £250 above the pre-amp limit, along with any people doing Quad upgrades - including Quad!

**Steve Force,
Cheltenham, Gloucester**

Quad themselves will bring the II's up to spec with new valves and replace aged components. The basic charge is fourteen pounds per hour plus V.A.T and the cost of components, charged pro rata for each quarter of an hour's work. Ring them on 0480 52561, and they'll discuss what can be done. Doug Dunlop of Concor-dant Audio (0455 843752) rebuilds the Quads, using the old chassis, to an entirely new design for £360 with a two-year guarantee on the valves. No longer Quads, they're rebadged as the Exultant, and 192 pairs have been made since 1989. We are hoping to have a pair for review before the end of the year.

The pre-amp is probably best replaced, as the Quad is quite antiquated, when compared to the latest models; Croft's Super Micro A (re-viewed in this issue) might be suitable, as would the £400 Art Audio VP-1 or even Concor-dant's £675 CD-only Exhilarant pre-amp. **EB**

● My problem is not upgrading my set up - alternative source overload syndrome has put paid to that - but sort of extending it.

I have a Rega planar 3, with the new cartridge imminent, Rotel 840 BX, Denon DR171, Linn Index. I have not as yet used the 'tape-to-tape dubbing' facility or the deck's microphone inputs.

My query is how to record both vocals from the mic and music from a backing tape on the same cassette. Can this be done with standard hi-fi equipment? What sort of beast will allow me to do this? What would you recommend?

Obviously, adding another deck will allow me to separately record the vocals and play a backing tape, but how do I record both together?

**Mark Lawla,
London**

It can be confusing. The 'microphone' inputs, which are usually at the front, and the 'line' inputs at the back which you normally use for recording via an amplifier, are nearly always alternatives. You can use either one or the other, but not both together. While this could be done in the reel-to-reel days, cassette decks which have offered a 'mixing' facility - the ability to put signals from two separate sources together before they reach the recording heads - have always been few and far between, and I don't believe there is a domestic version on the market.

There are three ways of going about it. One is to get an electronically knowledgeable friend to disable the Erase head, which would then allow you to record the music first and the voice on top of it the second time around. Apart from invalidating the guarantee, and annoying the company if the deck needs servicing, synchronising the two recordings can be a fiddly business.

The second is to buy a mixer with both line and microphone inputs, which will allow you to input anything from two different sources, including a pair of microphones. The combined output is fed from the mixer as one signal to the cassette deck as though it was the 'tape out' of an amplifier. These vary from around twenty pounds at Tandy's to hundreds or even thousands for professional mixers.

Otherwise, Teac's professional arm, which they call Tascam, make several combined mixer/cassette decks, though

they are much more expensive than a domestic cassette deck plus cheap line/mic mixer. The price you pay depends on the quality and how serious you are about recording. **EB**

● I have recently purchased my first hi-fi system, comprising a Rotel RCD 855 with Deltec Little Bit DAC, Creek 4040S3 amplifier and Celestion 3 loudspeakers. I am now looking to add a tuner - my old radio sounds terrible now! I should therefore be delighted if you could suggest some tuners that I should audition. If possible I would like it to sound as close as possible to my CD/DAC combination which I think sounds superb. A friend has suggested the Sugden DTFM as an 'audiophile' tuner. Is this worth considering? I listen mainly to Radio 3 and I'm not a station hopper so limited presets pose no problems for me. I can afford to spend up to about £350 on a tuner, excluding aerial. Perhaps you could also answer this question: why in all the hi-fi magazines are tuners treated almost as a poor relation of hi-fi?

**D. M. Halfpenny,
Prescot Merseyside**

To deal with the last question first, largely because FM broadcasts have a limited bandwidth - the upper frequency limit is 15kHz, as opposed to 20kHz for CD, and because many pop/rock stations compress the dynamic range - there has been a feeling that tuners offer the poorest quality sound in the hi-fi chain. We believe they are a valuable source of music which might otherwise never be heard, so we both use and review them. While, because of the relatively limited bandwidth, the sound will never scale the heights of CD, it's possible to get pretty close to what the studio engineers hear.

Tuners to look out for in your price bracket include the Pioneer F91 and Harmon Kardon TU9400, both with clear and clean FM. Home-grown tuners are the Musical Fidelity T1, now in Mk II guise and reviewed in this issue, which has a very lucid and detailed presentation, the minimalist Ion FMT1 which offers exceptional sound quality uncluttered by buttons and knobs, and the Arcam Delta 80, which may seem on the warm side. The Sugden I haven't been able to hear, but previous Sugden tuners have also had a somewhat warm presentation. **EB**

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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-1 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



SORBOTHANE CD FEET

Four big, round rubber feet, 50mms in diameter and 18mms 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 £24.95



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 CLEANER PRICE £10.20



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
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NAGAOKA STYLUS CLEANER

Here's another simple but effective cleaning kit from Nagaoka. 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

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

above (i.e. gold plated, heavy duty) but with side entry for heavy loudspeaker cables of up to 5mm conductor diameter. The screw clamp grips the cable over its full diameter by applying pressure with a non-rotating cylindrical slug.

SIDE ENTRY BANANA PLUGS (4)£10.00

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.

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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.

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GOLD PLATED 4MM BANANA PLUGS

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BANANA PLUGS (4)£8.00



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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 ... £7.00



AUDIO TECHNICA CD LENS CLEANER

Here's a product for smokers in particular. However, seeing the peculiar haze that can coat 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£15.30



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

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ELECTRONIC STYLUS CLEANER£19.95

LASERGUIDE

The clear polycarbonate of Compact Discs scratches easily. Measurements we have carried out show that scratches, being closer to the silvered reflecting surface where the laser beam is focussed, are much more of a problem than fluff, finger marks, etc. They demand heavy error correction and often overwhelm a player's capacity to substitute in spare programme information held redundantly for this purpose. Interpolation is then used to cover up the problem - which means guessing what the missing signal was like in order to fill in the gaps.

The only answer is to fill in scratches, lessening their ability to act as optical prisms capable of scattering the laser light. Laser-Guide is an optically engineered silicone treatment that claims to do this, reducing randomly reflected light by up to 50%. It is claimed that Laserguide improves stereo depth and openness. Just apply to the disc surface.

LASERGUIDE£14.95



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 1metre and 2metre lengths with conventional TOS-link connectors.

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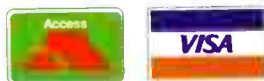
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the panels are milled to have strong side joints. We have specified a durable black paint finish to give it a smart, yet unintrusive appearance. The screws are self-starting, but clearance holes are pre-drilled. You'll only need a Philips X-head screwdriver to assemble the cube; it comes in a flat pack.

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This kit is the most specialised we have found to date for cleaning vital components in the transport mechanism of a cassette deck. Audio Technica's kit is stocked in preference to those natty looking cleaning cassettes with all the cogs and wheels inside, and also in preference to abrasive cleaning tapes. Nakamichi do not recommend either, they tell us. Whilst acceptable for inexpensive, two head decks, they are a threat to critically aligned three head types.

There's nothing to beat careful manual cleaning, using high quality materials applied with new, clean cotton buds. This is the proper way to clean your cassette deck.
CASSETTE CLEANING KIT £7.25



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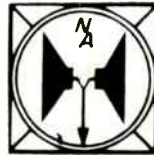
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One of the best implementations of Japan's MASH low-bit system, offering a big, solid sound with plenty of weight.

PHILIPS CD-850 £400

All the finesse of top quality Bitstream, with an open, balanced and involving performance.

ARCAM ALPHA ACD1 £420

Offers a warm, full bodied sound with big bass.

ARCAM DELTA 70.3 £699

Arcam's first Bitstream player. Its refined, but powerful sound sets the standard at the price.

MERIDIAN 206B £950

'Entry level' Meridian player. Detailed, with a wide soundstage, but somewhat lacking in 'joi de vivre'.

NAIM CDS £2937.50

The current talking point in the world of hi-fi. A worthy contender for the 'best CD player in the world' throne. Perfect partner for a Naim system.

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ARCAM BLACK BOX I, II AND III £210, £260 & £360

Three solid performers that can transform a mid-price Compact Disc player with a digital output. They get progressively better as the price gets higher.

DELTEC LITTLE BIT £300

Sets up a wide, open stage and places a captivating performance within it. Spectacular Bitstream technology at a very low price.

AUDIO ALCHEMY DIGITAL DECODING ENGINE £376

Paperback sized Bitstream convertor that offers a serious upgrade for the price. Sweet, open and detailed.

MERIDIAN 203 £495

Impressively detailed and complex sound, if a little lacking in involvement.

MICROMEGA DUO BS £499

Superb, warm, rich analogue-like Bitstream sound, from the idiosyncratic French. Latest guise suits a wide variety of convertors, as opposed to earlier versions.

DELTEC PDM SERIES II £595

Spacious representation with strong embodiment of performers. Natural and relaxing, but superbly refined and subtly impressive.

MERIDIAN 606 £1200

Now revamped to allow for the DAC-7 Bitstream, the earlier 606 was a fine performer, improving on the traits of the 203, but still a trifle uninvolved at times. We shall see how the DAC-7 version fares.

DELTEC PDM-II £2000

Uses Philips new Bitstream DAC-7 super-chip to give a performance of unparalleled drama. Frighteningly deep and controlled bass, master tape standards of fidelity. Very forthright; a trifle violent in its truthfulness. Literally - stunning!

TRANSPORTS

ARCAM DELTA 170 £620

An easy yet tidy sound that underpins digital convertors well.

MERIDIAN 200 £750

Well built transport mechanism which lends a fine sense of solidity and detail to music. Well suited to non-Meridian DAC's too.

TEAC P10 £1400

Orders events in a precise manner, lessening time domain confusion and blurring. Succinct and impressively controlled.

MERIDIAN 602 £1500

As with the 606, this improves over the 200 transport. Good build quality and a strong sound, if a touch bland when used with the wrong DAC.

PINK TRIANGLE LITTLE PINK THING £392

Good-looking, neutral sounding turntable. Excellent soundstaging capacity and decent bass. Best partnered with a Rega, Roksan or Linn arm.

NOTTINGHAM ANALOGUE SPACEDECK £590

Idiosyncratic turntable, with its high mass platter and distinctive looks, that is both fast and goes deep. Well partnered by the Space Arm (£380) and the Analogue Tracer II cartridge (£175) from the same company. Usually used in the context of a valve-based system.

MICHELL GYRODECK £595 (£695 with RB300)

Highly underrated turntable. Impressive build quality, virtually unmatched by the other British high-end manufacturers. Very solid, dry sound. Plenty of bass and good soundstaging. In some systems it can sound a little bland; in others, excellent. Better than ever with its new power supply.

PINK TRIANGLE PT EXPORT £676

Terrific soundstaging abilities, good bass and a neutral performance that improves upon the LPT considerably. Works with all the arms listed with the LPT, plus the SME range.

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TURNTABLES

REGA PLANAR 2 £155

The first of the real 'hi-fi' turntables. Excellent value for money, having been spent where it matters - the arm and the bearing. Quite transparent and lucid, it fares well against some more expensive turntables.

SYSTEMDEK IIX-900 £190 (no arm)

Great package. A suspended turntable that is easy to set up and takes a variety of arms (the Moth arm being the obvious choice). Sound quality is surprisingly natural, if not as precise as some.

REGA PLANAR 3 £249

Improves upon the Rega 2 in almost every way. Sets an impressive standard that others strive to beat.

MICHELL SYNCHRO £265

Very well built turntable. Distinctive looks. Solid, stable sound, with good bass at the price. Bit lacking in involvement and detail.

LINN BASIK £285

Fitted with Linn's excellent Akito tonearm, the Basik is very much in the Linn mould. Its timing and pace are superb. Very musical.

LINN SONDEK LP12 £679

Still one of the finest, after all these years. Brought into the 90's by the Linn Lingo (or Pink Triangle's Pink Link) power supply at £496 extra, the LP12 has always been the turntable by which all else is measured in this country. Tuneful and musical, placing dynamics above imagery in its list of priorities.

ROKSAN XERXES £695

Fast, tight and clean, some have described the Roksan (especially with its Artaxerxes phono pre-amplifier) as almost CD-like in its presentation. A good alternative to the LP12.

VOYD VALDI £699

Similar to the Pink Triangle, the Valdi is an expressive performer, with a deep bass that sneaks up on you. Matches Audio Innovations equipment well.

PINK TRIANGLE ANNIVERSARY £1175

One of the finest sounding turntables in production, the Anniversary takes the listener nearer the recording studio than almost any turntable. Suits the same arms as the PT Export.

TOWNSHEND ROCK REFERENCE £1995

Great soundstaging, pitch stability and timing, the Rock Reference has a bass performance that is deeply impressive.

TONEARMS

REGA (MOTH) RB250 £178

Excellent value for money. The one piece Rega arm. Lucid and graceful.

REGA RB300 £115

Little to beat this arm at the money. Has appeared in some outrageously expensive turntable packages without sounding out of place. Very slight softening of notes, when compared to the finest.

LINN AKITO £137

Different presentation to the Rega arm. Not quite as happy with expensive MC cartridges as the RB300, it nevertheless shines with cheaper MM's (especially on all Linn turntables).

ROKSAN TABRIZ £165

Good bass and not too tizzy for the price. Works very well in Roksans (naturally) and Pinks.

LINN ITTOK LVIII £560

Great dynamics, excellent timing and delves deep into the lower registers. Latest models use refinements developed on the Linn Ekos.

NAIM ARO £752

Unipivot tonearm with a seductive soundstage and a lot of character. Can resolve an vast amount of information from a groove. Works well in a Linn, its sheer freedom of movement makes it difficult to use with a more 'springy' deck.

LINN EKOS £1097

A sort of 'Turbo' Ittok, the Ekos improves upon the strengths of the Tik-Tok, making it more transparent and dynamic, without becoming overtly so.

SME SERIES V £1247

Probably the finest built of all pick-up arms, the V seems to have little to criticise about it, on the right turntable. Some suggest that it can sound polite; it performs (without getting in the way of the music) with grace and artistry. Strong soundstaging properties; it does not appear to have the problems associated with other arms at frequency extremes.

CARTRIDGES

AUDIO TECHNICA AT95E £18

Probably the finest starter cartridge. A little bright, scratchy and a trifle thin, it still represents excellent value for money.

ARCAM C77 £22

Good all rounder. Quite neutral and tidy, but a bit lacking in life. Works very well in old arms. Can be upgraded by stylii changes.

ORTOFON 510 £30

Even-toned, with excellent bass and good stereo imaging (all due to its solid body) for the price. Also upgradable via stylii.

GOLDRING 1020 £49

Sweet sounding cartridge, similar to the Ortofon in many ways, but has less clattery treble. The mid point of their 1000 series cartridges.

LINN K9 £89

Can sound a bit forward and lacking in bass in some turntables and arms; the Linn nevertheless has a tight, crisp sound, with plenty of speed of attack. It is also quite detailed.

ROKSAN CORUS BLACK £110

Very expressive and musical cartridge. Coherent and detailed, it can be a little bright in some systems.

AUDIO TECHNICA AT-OC5 £122.95

Needs an exceptionally good front end to sound good, its resolution of detail is very good for the price. A cautious recommendation, as it can easily sound raucous and fierce in the treble.

SHURE VST-V £173

Excellent tracking moving magnet cartridge. The Shure offers some of the fine detail of MC's with the brusque-ness of an MM.

ORTOFON MC30 SUPER £270

Despite being detailed and analytical, the MC30 still sings a seductive song. Very solid body.

GOLDRING EXCEL £499

Smooth, detailed and refined sounding cartridge. Bit relaxed and easy on the ear, but still high in enjoyment quotient.

LINN TROIKA £798

One of the most musical cartridges ever, the Troika uses a three point mounting. As such, it is somewhat limited to Linn and Naim arms (and would usually appear on the LPI2).

LYRA CLAVIS £980

The cartridge that currently resides at the top of the U.K. music lovers' list. One of the finest cartridges ever made. More music than hi-fi!

ORTOFON MC5000 £1500

The big information retriever. Can resolve more detail from the plastic than almost any other cartridge around. Slightly too analytical for some tastes.

CASSETTE DECKS

DENON DRM-400 £140

The least expensive usable cassette deck available. Plays prerecorded tapes well and produces acceptable recordings. Variable bias, wobbly speed.

TECHNICS RS-B665 £180

Unusually speed stable, giving clean clear recordings; poor with metals. Plays prerecorded tapes well. Good for piano.

NAD 6325 £160

One of the best at the price: superb with prerecorded tapes and makes excellent recordings. Awkward to use.

AKAI GX-52 £200

Fine recordings from the GX head on all tape types; good replay too. Excellent all round.

NAD 6340 £220

Unmatched ability with prerecorded tapes and makes very stable recordings on all tape types.

NAKAMICHI CASSETTE DECK 2 £300

Especially good with metal tape, with which it makes fine recordings. Excellent with prerecorded tapes too, but slightly inferior to NAD.

NAKAMICHI CASSETTE DECK 1 £600

Our sample had poor speed stability, but otherwise the Cassette Deck 1 offers a good, if somewhat overpriced, all round performance.

NAKAMICHI CR-7E £1500

As cassette goes this is the ultimate - and better than the Dragon. Near perfect recordings on all tape types; replays prerecorded tapes extremely well too.

TUNERS

DENON TU-260L £100

Sensitive and has a clean, balanced sound. Astonishing value.

NAD 4225 £159

Fine, spacious presentation; smooth and easy sounding. The best under £200.

ION SYSTEMS FMT-1 £259

Fine minimalist tuner with good stereo, deep bass and excellent detail. Probably the cheapest 'real' tuner on the market.

ONIX BWD1 £395 (exc power supply + lead)

Great partner for the OA21s, as it can be powered from the amplifier, the tuner has a wonderful open clarity, that belies its price.

NAIM NAT-02 £853

Little box, big money, dead good. Try and find better unless it's a . . .

NAIM NAT-01 £1377

All else is mere artifice. If you want better radio reception, go and live in the BBC's studio.

AMPLIFIERS

NAD 30201 £149.95

Well known budget classic. Its crown has slipped a bit of late, but it still represents the standard to beat. Distinctive 'NAD' sound.

DENON PMA-350 £169.99

The usurper to NAD's throne. Packs a lot of punch for the money. Phono stage not as strong as the rest of the amplifier.

MISSION CYRUS ONE £200

Well-known British amplifier. Minimalist appearance, suitable partner for most equipment.

CREEK 4040S3 £220

Easy on the ear, the Creek seems better suited to LP than CD.

PIONEER A-400 £230

One of the most controversial and popular amplifiers today. Excellent sound, especially when partnered with extremely esoteric source components. As with the PMA-350, weakest link is the phono stage.

ONIX OA21S £350

Yet another minimalist amplifier, the OA21 has the rare combination of detail, finesse and balls.

AUDIOLAB 8000A £350

Well-built amplifier with a strong following. Very neutral sound for the price.

NAIM NAIT 2 £389

The classic small integrated amplifier is still hard to beat. New CD only version is not so hot, though.

LINN INTEK £398

Since the price reduction and sonic improvements, the Intek has become a worthy competitor for the Nait, but has more power.

ION OBELISK 3 £399

Great stereo, with a punch. Ion Systems' top integrated puts build and sound quality far above big boxes or loads of buttons. Upgradable with their X-PAK-1 power supply and can also make a fine stand alone pre-amplifier.

LOUDSPEAKERS

NAD 1000+2100 £179.95/£289.95

Good, all-round budget powerhouse pre/power combination. Can be made even more powerful by adding another 2100 power amplifier.

IAUDIOLAB 8000C/8000P £325/£545

Built like a tank. Clean, neutral sound with a slick styling to match.

NAIM SEPARATES RANGE

A legend in its own lifetime, the Naim range has always been hard to beat, even harder to criticise. Goes from the reasonably priced NAC 62 at £405 up to the remarkable NAC 52 at £4535

CROFT MICRO RANGE from £265

Hand built range of pre and power amplifiers. Exceptional value for money. Very warm and inviting (and so is the sound).

ION SYSTEMS SAM 40 from £949

Highly expandable pre-power amplifier system. Great sound from the outset, it gets better as the system expands. Easy and inexpensive way to go active, as the circuitry fits within the amplifier.

AUDIO INNOVATIONS SERIES 500

£990

Sweet sounding valve integrated amplifier. Good looking, but a little system dependant.

MUSICAL FIDELITY P-180 + CRPS

£799/£499

Stonky power amplifiers, which are both powerful and refined (especially with the addition of the Choke Regulated Power Supply). Go well with Croft and P.S. Audio pre-amplifiers as well as Musical Fidelity's own.

CONCORDANT AMPLIFIER RANGE

from £675

Possibly the finest valve preamplifiers made in this country (particularly the £1800 Exquisite), the company's modifications to the Quad II also add considerable worth (and watts) to this classic mono power amplifier.

DELTEC DSP-50S/DPA-50S £725/£925

Noel's favourite. Very clean, very clear, very neutral.

AUDIO INNOVATIONS SERIES 200 PRE AMPLIFIER/FIRST AUDIO POWER AMPLIFIER

£305.50/£1531.50

Pretty amplifier combination which can sound very sweet with the right components. Very lucid and transparent.

ART AUDIO MAESTRO £1927(PR)

Beautiful looking valve power amplifiers. Not powerful, but very sweet and involving, especially when used in triode operation.

JOHN SHEARNE PHASE ONE £2398

Pretty, valve-like amplifiers with a sweet, lucid sound. Highly suited to neutral sounding equipment.

LINN KAIRN/LK-280/SPARK

£1295/£653/£639

Top flight Linn amplification. A little forward for some tastes, but very detailed and designed with the future in mind.

MUSICAL FIDELITY SA-470 £6000

Expensive, powerful and feels as heavy as a car engine, the SA-470 appears to have no limits whatsoever (more than can be said for those who have to lift it).

GOODMANS MAXIM II £90

Fine 'giant killer' loudspeaker. Not as small a sound as would be expected from a small box. Will not compromise expensive equipment.

GOODMANS M500 £130

Fine budget loudspeaker. Not very subtle, but highly efficient, even-handed and dynamic. Good for loud rock.

NAD 8225 £149.95

Very light, open and clear sound for the money.

WHARFEDALE 505.2 £190

Gets a bit befuddled with complex music, but can still sound excellent in some areas. Still one of the loudspeakers to beat at the price

B&W DM610 £199

Our latest test winner. Very competent and musical, without any nasties.

HEYBROOK HB1S3 £249

Powerful, efficient loudspeakers. Lots of welly, lots of bass. Enjoyable to sit in front of, if not the most refined of treble performances.

NAD 6225 £299.95

Fun floorstanding loudspeaker that goes deep and loud without shouting too much. Our Ad. Manager's current favourite!!!

EPOS ES11 £300

Few can match the virtues of the ES11. One of the finest at the price. Great imagery, weighty bass without becoming overpowering. A goody!

ROGERS LS3/5A £350

Smooth, refined and open sound. Little real bass, but excellent soundstaging and phrasing. One of the finest classical music loudspeakers around, only matched by the Harbeths at the price.

HARBETH HL/P3 £359

Souped-up, bi-wirable version of the BBC design, as typified by the Rogers LS3/5A. Even better imagery and clarity, especially on vocals. Best suited for Radio 3 and Radio 4 enthusiasts, the HL/P3's lack a little in volume and a little depth to the bass.

LINN KAN II £439

So called to prove that you Kan get a big sound from a little box. Incredibly fast, pacy loudspeakers, that give the appearance of a huge bass response, given the box size. Perfectly suited for the Linn/Naim system, may not prove so wonderful with other equipment.

KEF 101/2 £495

The baby of the KEF Reference series. Tells you exactly what is being played, does not mask flaws in the system prior to the loudspeakers. Very system dependent, but can sound good with the right system.

PENTACHORD £499

(or £990 for sub-woofer system)

Real wood finished pentagonal loudspeakers with Bandor units and no crossover. With the addition of the sub-woofer, they are capable of a superbly transparent, but deep and dramatic sound.

NEAT PETITE £525

Baby loudspeakers with a sound quality that positively trounces the opposition. Tight, fast, great stereo and good dynamics. Few little boxes come close.

TDL STUDIO I £599

Smallish transmission line loudspeaker. Good imagery, well focused (when positioned properly) and some of the deepest bass you can imagine. Slightly room dependent.

PROAC STUDIO I MK 2 £612.25

Since removing the metal dome tweeter, ProAc's Studio I has taken the lead among neutral loudspeakers at this price break. Very musical.

NAIM IBL5 £815

Small, floorstanding loudspeakers, best suited to Naim amplification. Can sound excellent in the right room (being fast, expressive and tight), but thin and reedy in others. Can be driven passively or actively.

AUDIO NOTE AN-J£799 (Copper Wired) £999 (Silver Wired)

Excellent soundstaging, a natural performance and high efficiency from these derivatives of the Snell design. A good match with Huygens stands. Work well with valves, especially Audio Innovations/Audio Note equipment. Silver wiring is a worthwhile option.

LINN KABER £1198

The obvious upgrade for owners of Linn Kans. Need a lot of power to drive properly. Active version also available.

TDL STUDIO 4 £1499

Bigger version of the Studio I. Needs a large room. Capable of moving a lot of air. The best loudspeaker for organ music, short of the really big TDL's. Impressive, awesome and a bit frightening.

NAIM SBL £1527

Highly suited to the Naim system, the SBLs are impressive, dynamic, powerful and expressive sounding, especially in active guise. May prove too intense an experience for some people!

QUAD ESL-63 £2072

Large electrostatic loudspeakers. Imagery and detailing second to none, but lacking in bass. An academic among loudspeakers.

LINN ISOBARIKS from £2190

Few who listen to Isobariks working properly cannot fail to be stunned into submission by their gut-wrenching dynamics. A bit larger than life at times. If the Quad is an academic, the 'bariks are the Mike Tyson of the loudspeaker world.

NAIM DBL £6000

Huge, active-only loudspeakers, which make even the powerful Isobarik quake in its boots (stands?). Can produce immense sound pressure levels. Not for the squeamish!

MERIDIAN D6000 £7500

The pinnacle of Meridian's research into active loudspeaker systems. Makes other systems seem primitive by comparison. Once set up, it becomes one of the easiest systems to use. Very controllable, the overall sound is slightly bright in some rooms, but is otherwise intensely dynamic and powerful.

TANNOY WESTMINSTER ROYAL

£10000

Vast full-range horn loudspeakers, which are very popular in Japan. Incredibly dynamic and detailed, with a rich sound and efficiency that lends itself toward valve amplification.

“At home I use valve amplification and prefer listening to vinyl. CD misses the air and ambiance of a recording.” *Niro Nakamichi, Hi-Fi Choice, June 1991*

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Rounder Records CD

For two decades America's Rounder Records has been putting out what it describes as quality alternative music. There's never been a more appropriate moment to discover their output with our front cover CD. In the days of the synthetic pop star, the video pretty boy who can't play a note, Rounder's artists remind us what real music's all about.

Some of the most powerful and exciting music I've come across in the past few years has been from artists associated with the Rounder Records Corporation of Cambridge, Massachusetts. Despite the variety in style and approach of the musicians on the label there's a common bond which unites them: they all play what could loosely be described as roots music. That term is pretty vague and in case it means nothing to you I'll tell how I interpret it. I think of roots music as real music: music which emerges from heritage and experience, music which represents a tradition, music that's buried deep in the performer's soul. It's not prefabricated, synthesized or artificial, nor is it devoid of emotion or feeling, like so much contemporary music. It's not a recent invention, and it definitely isn't the kind of stuff that's hastily compiled to avoid missing the latest bandwagon that happens to be passing. In a nutshell it is music which has integrity.

Unfortunately, integrity and today's music business aren't frequent bedfellows. In a recent interview on Canadian television Frank Zappa summed up the situation succinctly when he said that to be a success nowadays all a musician needs to do is to look good: the ability to com-

pose, perform live or even play or sing at all doesn't matter - as long as you look appealing on the video you can always hire people to do everything else for you.

You'll be relieved to discover that there's nothing so cynical or plastic about any of the music or performers to be found on this month's free CD: all of these guys are playing music simply because there's nothing else they'd rather be doing.

Rounder Records' catalogue is handled in the UK by Topic and Special Delivery Records who form the English arm of The Network, an alliance of independent record labels who distribute specialist music throughout Europe. Our thanks go to them for supplying us with the nine tracks which make up this issue's free CD. If your local record dealer hasn't anything in stock from Rounder tell him to give Special Delivery a ring - his customers are missing out on a lot of exciting music.

CONTENTS

There are tracks from nine different artists included on this CD. You'll hear songs that show the influence of straight blues, gospel, soul and the pot pourri of disciplines that characterise the sound of New Orleans. Like I said before, what links them together becomes apparent once you listen: each of the artists is singing and playing straight from the heart.

TRACK 1

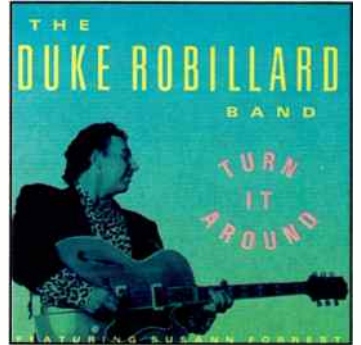
THE HOLMES BROTHERS
"The Final Round"
from the album *In The Spirit*
(ZENSOR ZS 103/NETCD 10)



How the Holmes Brothers avoided the attentions of a record label for the best part of twenty years remains one of life's great mysteries. At last they've put their invigorating brand of blues and soul onto disc and, to Rounder's eternal credit, it's a live-in-the-studio recording. "The Final Round" has all the drive of classics like Sam and Dave's "Hold On I'm Coming" and benefits from an abrasive edge borne out of sheer enthusiasm. Popsy Dixon's magnificent falsetto vocal interjections are the icing on the cake. This album should have been made years ago and then followed by many more!

TRACK 2

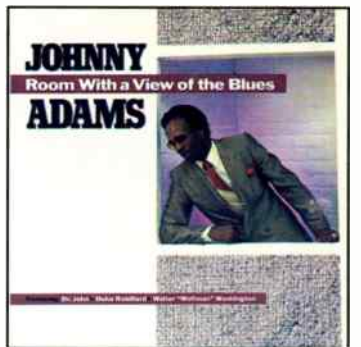
THE DUKE ROBILLARD BAND featuring Susann Forrest
"Passionate Kiss"
from the album *Turn It Around*
(AMALTHEA AM 1016/NETCD23)



Duke Robillard's an all-time hero of mine. He's one of the finest guitarists around and, like Richard Thompson, his playing tends to win the admiration of other guitarists (including failures like me!). He's not a graduate of the stunt-guitar school or given to displays of blistering speed and difficult playing for its own sake: he simply plays with so much feeling and finesse that the instrument virtually comes alive in his hands and talks to you. With his latest trio he has support musicians who do full justice to his eloquence and craft. If you only buy one album this year make sure it's *Turn It Around*.

TRACK 3

JOHNNY ADAMS
"Body and Fender Man"
from the album *Room With A View Of The Blues*
(ROUNDER CD 2059)

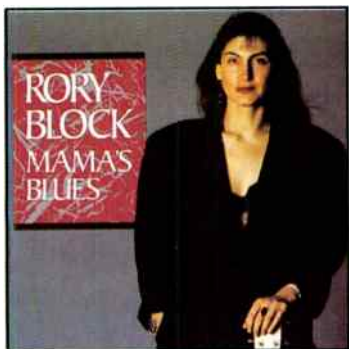


Singer Johnny Adams hails from New Orleans and was described by *Newsweek* as "the best not-yet-famous singer in the world". No understatement but hardly due reward for a career which spans thirty years! Nonetheless, the album from which this track was drawn - featuring songs from the pens of R'n'B's most distinguished songwriters, including Percy Mayfield - was chosen as Album Of The Year in the New Orleans Music Awards. Helping it on its way were contributions from some particularly fine musicians: on "Body

and Fender Man" listen out for guitarists Duke Robillard (fills and first solo) and Walter "Wolfman" Washington (second solo), and the unmistakable sound of keyboard voodoo man Mac Rebennack on piano and DX-7.

TRACK 4

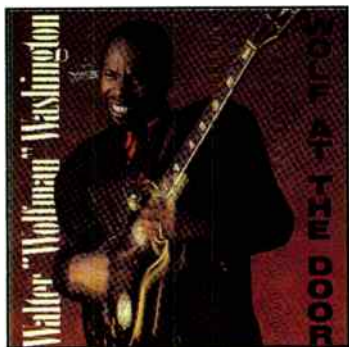
RORY BLOCK
"The Spirit Returns"
 from the album *Mama's Blues*
 (MUNICH NETCD22)



Singer and guitarist, Rory Block featured on Hi-Fi World's first CD and we're pleased to hear from her again on this one. This time the track is taken from an album I reviewed in these pages recently, the stunning *Mama's Blues*. "The Spirit Returns" demonstrates the lady's talent for writing and playing fiery acoustic country blues. Like the rest of the album the song was recorded on the fly at the Payne AME Church in Chatham, NY and captures her dynamic and animated playing wonderfully. Check out Peter Ruth's blues harp as well: this track shows what can be done with just two instruments and one voice.

TRACK 5

WALTER 'WOLFMAN' WASHINGTON
"Tailspin"
 from the album *Wolf At The Door*
 (ROUNDER CD 2098)

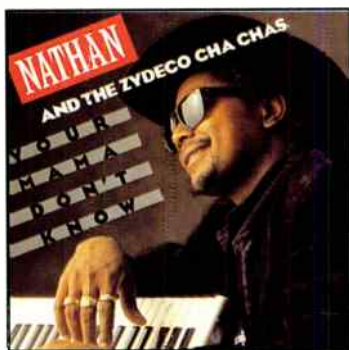


The Wolfman is another rhythm and blues player from New Orleans and "Tailspin" typifies his and his band, The Roadmasters' distinctive style. Although seemingly laid back and relaxed, the combo is deceptively tight, playing with razor-sharp precision. Rounder describes Washington as having a jazz player's ears, a blues player's attack and a gospel

player's soul: after hearing this track I think that there's little chance you'll disagree. I would add that I particularly enjoy his economical guitar work on this album where he demonstrates effectively that it's the quality and not the quantity of notes you play that counts.

TRACK 6

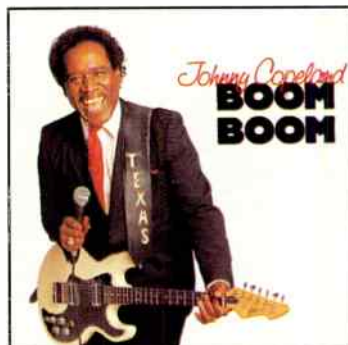
NATHAN AND THE ZYDECO CHA CHAS
"Ain't Gonna Cry No More"
 from the album *Your Mama Don't Know*
 (ROUNDER CD 2107)



If you are drawn to music that's busy and rhythmically intense you'll revel in the infectious Arcadian strains of Nathan William's music. This young Zydeco practitioner and his cohorts whip up a dancing storm on "Ain't Gonna Cry No More", taken from an album where cajun meets R'n'B, reggae, the blues and any other influence that happens to be passing. The Cha Chas play with an fervour that's perpetually tugging at the leash and this is one track where your limbs will defy any attempt you make to try and keep them still.

TRACK 7

JOHNNY COPELAND
"Cut Off My Right Arm"
 from the album *Boom Boom*
 (ROUNDER CD 2060)

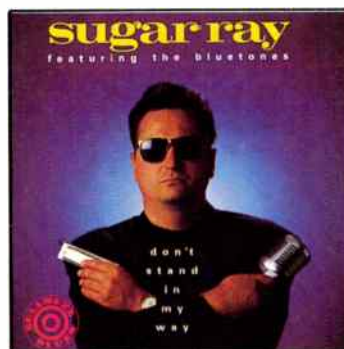


The agile muscularity of Johnny Clyde Copeland's distinctly melodic Texas blues style is showcased to perfection on this album. It's good-natured, good-rockin', good-time music: sparse but powerful arrangements augmented with the astringent edge of Copeland's guitar and voice. Listen to the track we've selected, a slow burning, soulful shuffle, and savour how forcefully Copeland's stinging

guitar fills punctuate the vocal line, reinforcing its impassioned pleading.

TRACK 8

SUGAR RAY featuring **The Blue Tones**
"The Helmet (Bluetone March)"
 from the album *Don't Stand In My Way*
 (BULLSEYE BLUES NET CD 9507)



The album's title track is clearly meant as a warning: Sugar Ray Norcia doesn't appear to be someone whose path you'd particularly like to block if this wholly instrumental track is anything to judge by. The blues harp has an inherently mournful quality but in Sugar Ray's grasp it sounds suicidally desperate. If you prefer your blues to sound like it's really hurting then Sugar Ray's definitely your man.

TRACK 9

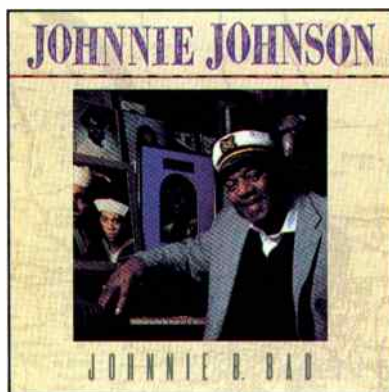
IRMA THOMAS
"Thinking Of You"
 from the album *The New Rules*
 (ROUNDER CD 2046)



This month's CD closes with a trip back to New Orleans to hear the lady who has been dubbed the city's Queen of Soul. Irma Thomas' voice has astounding power and range and it's hard to believe that this boppy little number, which brims with the sort of enthusiasm that would be expected from a teenager cutting her first disc, was recorded when she'd reached forty-five years of age, after a career in music which up to that point had spanned twenty-five years. Fact fans might also be interested to note that the original version of the Rolling Stones' "Time Is On My Side" was recorded by Ms Thomas: if anyone has a copy they don't want I'd be pleased to hear from them ●

Only the arrival of a Duke Robillard disc prevents a sixty-six year old piano player from grabbing the Rock Record of The Month slot.

malcolm steward



**JOHNNIE JOHNSON
Johnnie B. Bad
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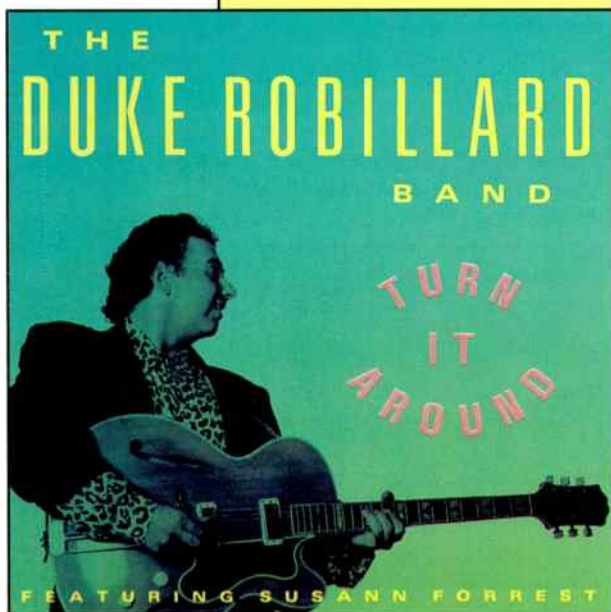
● 'When I was around four years old, my parents bought a piano. I imagine it was just for decoration in the house, because no one in the family was musical, not a one. But I sat down and started playing right off the bat, something simple like "Chopsticks". My mother cried and said it was a gift from God.' So says Johnnie Johnson in his introductory notes to this album and on the evidence presented here I dare say that what

Mrs Johnson imagined wasn't far from the truth.

Johnson progressed from the parlour to backing Chuck Berry, and played on all of his big hits. This gave one of rock's top statesmen cause to agree with Mrs Johnson about her son's abilities: Rolling Stone Keith Richards who played on and produced two of this album's tracks is also an admirer. He remarked 'When I first heard Chuck Berry's records, way back when, the first thing I wanted to know was Who's this guy singing Johnny B. Goode, and the second thing was, Who is playing that goddam piano?'

Berry himself has the greatest respect for Johnson and recalls friendly call-and-response duels fought on-stage. He would play licks on the guitar which he knew were impossible to replicate on the piano but Johnson would answer him with a run so close that he 'would get a tremendous ovation.'

I feel presumptuous adding my thoughts about his skills to those of Richards and Berry but this man plays with such a natural ease and an astounding fluidity that it would be



RECORD OF THE MONTH

**THE DUKE ROBILLARD
BAND FEATURING
SUSANN FORREST
Turn It Around
AMALTHEA AM1016/NETCD 23**

★ If you've listened to this month's front cover Compact Disc you'll have had a one-track introduction to Duke Robillard courtesy of the

song 'Passionate Kiss'. It's a delightfully simple number and is indicative in general of Robillard's adroit fusion of rock and blues dialects. (Listen to his 1986 album *Swing* if you're also interested in hearing his sincere and fluid approach to jazz). I adore his playing and it's his chaste technique and attitude to song-writing that I find particularly appealing. His music has a pared-down, elemental quality that's reminiscent of rock's early pioneers. It also convincingly demonstrates the veracity of Lou Reed's belief that a rock band needs no more than a bass, drums and two guitars.

Whilst Robillard's playing is direct, straightforward and honest there's no doubt that he stands high above many others who are regarded as axe-heroes. His technique, which is devoid of artifice and extravagance, is accomplished, sophisticated and brilliantly communicative: he seems able literally to allow the guitar to speak. Go through the tracks on *Turn It Around* and savour the voice of each guitar he uses and the different responses he's able to elicit with each instrument. The Doc Pomus number, 'Sweets For My Sweet' is a prime example of how he conjures different images and effects a change of mood by altering his playing subtly or by switching guitars. Here he uses a brace of Epiphones, a Gold Top Les

Paul and a Stratocaster to capture the time in which the song first became popular and to imbue it with a respectfully fresh feel.

The tracks which follow contrast sharply. 'Tell Me How' sees him paying tribute to his early hero Buddy Holly and using two Stratocasters in stereo to emphasise the toppy, bleached tone which characterised his sound. 'I Think You Know' is the first blues tune Robillard penned and is performed here as a homage to Stevie Ray Vaughan. Playing the songs consecutively hammers home the chameleon-like adaptability of Robillard's technique.

I have all of Robillard's albums and consider this to be one of the finest he has made. I enjoy, for example, the discs he cut with his former band, The Pleasure Kings, which feature some marvellous playing and strong material but which always leaves me slightly disappointed because the players supporting him seem rather pedestrian by comparison. That's not the case with this album, where the band are, as the vernacular has it, cooking with gas, especially singer Susann Forrest.

If you're a connoisseur of guitar-based rock and appreciate music played with elan, passion and genuine devotion you need to buy this album immediately.

disrespectful not to pass comment or to compliment him. He's also a fine singer, an ability he dismisses with modesty, describing his voice as merely 'passable'.

The track 'Tanqueray' first made me sit up and take notice of his distinctive style and by the time I reached Johnson's version of Muddy Waters' 'Key To The Highway' (both, incidentally, tracks which feature Keith Richards) I was completely hooked. This is the sort of music that burrows under your skin very quickly. And by the way, if you think for one moment that a sixty-six year old rock'n'roller's music is going to be short on energy and enthusiasm, think again. It oozes vitality.



TAJ MAHAL
Like Never Before
PRIVATE MUSIC 211 679

● Henry Saint Clair Fredericks, a.k.a. Taj Mahal, developed his profound interest in black American and Caribbean music while he was studying for his degree during the early Sixties. Having gained his B.A. he started out playing the blues in Boston folk clubs before switching coasts and relocating to Santa Monica. There he met up with another ardent musical archivist, virtuoso guitarist Ry Cooder. Together they formed a band called The Rising Sons whose repertoire drew on blues and rock influences.

Subsequent to that collaboration Taj Mahal has commanded the respect of his peer group and bearing witness to this a host of 'name' musicians appears on this his latest album. Included in the credits you'll find Darryl Hall and John Oates, The Pointer Sisters, Mac Rebennack (Dr. John), guitarists David Lindley - another Cooder-collaborator - and Little Feat's Paul Barrere. And adding the most contemporary element to the album, on 'Squat That Rabbit', there's D.J. Jazzy Jeff on turntables(!)

The album's spread of songs encompasses traditional and more recent styles of black music. Whilst the latter will no doubt encourage younger listeners to investigate Taj's output I found myself more at home with the orthodox material. Duets

like 'Blues With a Feeling', with Taj on piano and Sonny Rhodes on lap steel, and 'Take a Giant Step' where Taj plays guitar and Bill Summers accompanies him with simple percussion have, for me, greater impact and, dare I say it without sounding aged and pompous, more dignity than the rest. Nonetheless, the album has a high octane rating throughout and comes highly recommended.



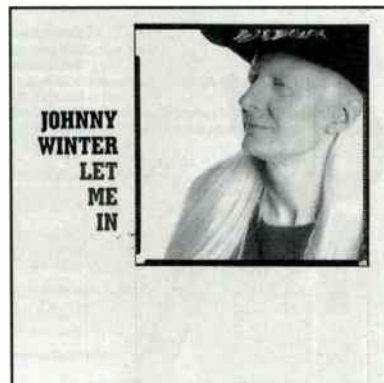
JOHN AND MARY
Victory Gardens
RYKODISC RCD 10203

● In case the names aren't too familiar John and Mary are John Lombardo, a founder member of the thinking and sensitive person's rock band 10,000 Maniacs, and Mary Ramsey, a classically-trained violinist who played with both the Erie Philharmonic for four years and the Lexington String Trio whilst studying at Buffalo University. Lombardo met Ramsey when he attended a poetry recital at which Ramsey's trio were playing. I've always thought it more appropriate for musicians to indulge in such intellectually stimulating behaviour rather than getting cranked up on vodka and throwing television sets out of hotel bedroom windows. Decorum and erudition are so lacking in the music business, don'tcha think?

The partnership produces thoughtful and intensely melodic music, with its conjunction of Lombardo's rock sensibilities and six and twelve-string guitar, and Ramsey's folk and classical influences, viola, violin and ethereal voice. Bringing further colour to the proceedings are Maniacs' drummer Jerome Augustniak and guitarist Robert Buck, and guests who include ex-Small Face Ronnie Lane, who takes the vocal lead on 'We Have Nothing'. The music has a refreshingly gentle air: it isn't lacking in dynamics or excitement but I've found that after an hour or two of anything heavier this album affords the listener an opportunity to unwind and catch his breath.

As you might expect, there's quite a similarity between the music of John and Mary and that of 10,000 Maniacs. As an admirer of much of the latter group's work you can interpret that

as a favourable comparison. I think that you'll discover that there's a lot of satisfaction to be gained from music which is this intelligent and comfortably removed from the mainstream.



JOHNNY WINTER
Let Me In
POINTBLANK VPBCD 5

● The arrival upon my desk of an album by Johnny Winter put me in a nostalgic mood. He had featured on my playlist regularly during the seventies when I was busy checking out blues guitarists. Outwardly he was an unusual candidate for my interest: most of the guys I was listening to were black but Winter was white - very white indeed, being an albino with the longest, whitest hair I'd ever clapped eyes on. Despite being so distinctly memorable I somehow failed to keep in touch with his career in later years.

Winter, unlike many of his contemporaries on both sides of the Atlantic, had an authentic blues style that really appealed to me. His playing wasn't a sanitised, soul-less pastiche that simply stole a few licks and chops from the music's originators but paid no more than scant respect to it in spirit: he sounded genuine, he played with gutsy emotion and conviction. Working with the likes of Muddy Waters and others who had lived the blues must have helped; it had to be a better education than sitting in a bedsit in Bexleyheath with Bert Weedon's Play In A Day and a couple of LPs trying to capture the muse!

Let Me In shows that time hasn't changed him. His guitar playing and vocal manner appear as heart-felt and committed as ever before. 'Illustrated Man' gets the album off to a roaring start and leads into a magnificent roller-coaster re-working of Robert Parker's classic 'Barefootin' where Winter's guitar slides, screams and wails a tortuous path through the backbeat. The ubiquitous piano of Mac Rebennack features here too, as well as on three other songs including the lament 'Life Is Hard'. This track alone justifies purchasing the album.

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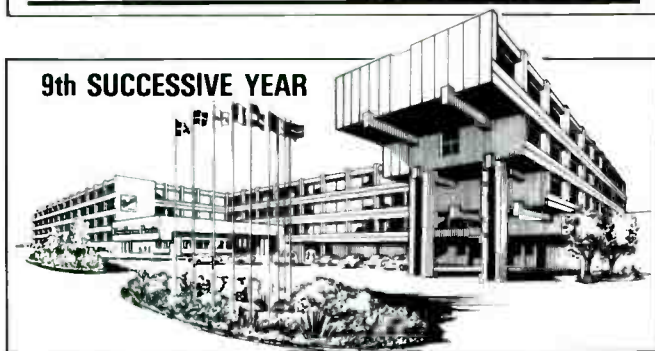
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JOHANN SEBASTIAN BACH
Prelude and fugue in B flat major

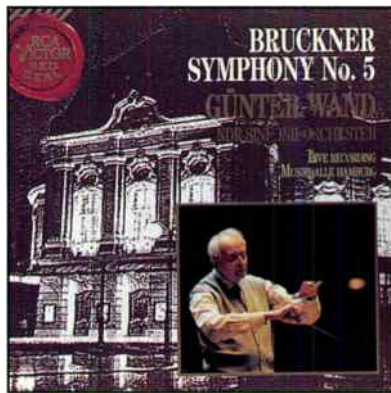
BWV866/Aria and ten variations in the Italian style BWV989/Chromatic Fantasia and Fugue BWV903/Capriccio on the departure of a beloved brother BWV992/Fantasia in C minor BWV919/Adagio in G Major BWV968/Tocatta, Adagio and Fugue in D Major BWV912

Rosalyn Tureck, piano
 TROY 010 (ADD/65.32)

● Most of us have to settle for the off-key chorusing of friends, but for a certain William F. Buckley Jr, of Connecticut, birthdays meant the music of J.S. Bach. It helped, of course, to have a drawing room capable of holding a Bosendorfer grand piano, and an audience of twenty-four. Most of all, it helped to have as a close friend one of the finest Bach interpreters of modern times, Dr Rosalyn Tureck. Interpreter is perhaps the wrong word, for Rosalyn Tureck was one of the pioneers of the revival of interest in Bach's keyboard music and what is on offer here is playing of great affection, freedom and evident delight.

This CD is one of a series of four issued by the Troy label using material recorded at recitals in Mr Buckley's home between 1979 and 1984 (not always on his birthday, it should be added, and on one occasion on Dr Tureck's birthday). The recording was something of an afterthought and, although close and dry, the end result (as remixed by Andrew Kazdin, one of the regular engineers for Sony Classical) is wholly acceptable. As far as possible, the sequence of performances is exactly as played and, thanks to a combination of close microphones and an attentive audience, Mr Buckley's birthday guests only make their presence felt when it comes to expressing their appreciation.

While eschewing the familiar keyboard warhorses, the programme achieves a good balance between the popular (the Chromatic Fantasia and Fugue, the Capriccio BWV992) and the less-well-known. You and I may not have been on William F. Buckley's original guest list, but it feels a privilege now to eavesdrop on this perfect recreation of an 18th century drawing room recital. Bach on the piano may not be authentic, but it is difficult to imagine it played more persuasively.



ANTON BRUCKNER
Symphony No.5 in B flat Major

Symphony Orchestra of the Norddeutscher Rundfunk, Hamburg; conductor, Gunter Wand
 BMG Classics RCA Victor Red Seal RDD60361 (DDD/74.01)

● Among those 'cathedrals of sound' that are the symphonies of Anton Bruckner, it is perhaps the Fifth which most rewards an intensive exploration of its 'architectural detail', for here is music which in terms of symmetry, thematic development and structural logic is as fine as any ever written. Bruckner is often pigeon-holed as a 'naive composer' and socially he was, even ingenuous. But not in his music. The complex finale of the Fifth displays a contrapuntal mastery akin to that of Bach and the kind of intellectual muscle more readily associated with Beethoven. Uniquely in symphonic music it combines the challenge of sonata form with the rigorous discipline of a mighty double fugue, a musical argument resolved in a breathtaking coda that satisfies every expectation built up in the preceding movements. The kinship with Beethoven is more than superficial: the spiky, angular theme of the fugue is clearly based on that of the Grosse Fuge Op131 and the assimilation of the themes of the first three movements into the opening bars of the finale is an undisguised imitation of the 'Nicht diese tone...' of Beethoven's Ninth.

You expect spiritual rewards from a Bruckner symphony; the Fifth, more than any other, also throws down an intellectual challenge no less satisfying. The attentive ear will almost hear the composer's mind at work and gain an understanding not only of how this particular symphony is constructed from its basic 'building blocks', but any piece of abstract music, given an interpreter capable of revealing the inner structure as part of an understanding of the whole, that is. Such an understanding is the great strength of Gunter Wand's conducting. In lesser hands, this symphony could become episodic and disjointed. Not here; everything builds inexorably to the final apotheosis, and with perfect pacing. Who suggested Bruckner's symphonies were overlong? Seventy-four minutes here and I am left wanting more.

The recording, as has been Gunter

It's the personal touch that counts in each of this month's recordings: individual views on Bach, Chopin and Liszt, two flautists on top form, cogent Bruckner conducting, and a champion of Renaissance choral music who appreciates the virtues of 'line and length' on the score and the score-card!

peter herring

Wand's practice for several years now, is taken from concert performances, in this case in Hamburg's Musikhalle in October 1989. The impulse of the performance suggests a single concert tape was employed with 'patches' from others to cover the odd blemish. If it has been assembled with movements from different concerts, then it has been seamlessly achieved. Only one or two distant coughs betray the presence of an audience during the performance itself and I applaud the decision of the tape editor to retain the 'inter-movement' shuffling and rustling rather than fade into an unreal digital silence.

As in every Bruckner symphony, the brass playing is critical and the NDR Symphony Orchestra is not found wanting in this respect; nor is its woodwind section which is entrusted with many telling and exposed solos. In every way, this recording earns its place in the front rank of Bruckner performances and is especially welcome because the Fifth is one of the least well represented of the symphonies in the catalogue. Hear great music-making; and hear how great music is made.



FREDERIC CHOPIN

Ballades No1 in G minor Op23; No2 in F Major Op38; No3 in A flat Major Op47; No4 in F minor Op52; Barcarolle in F sharp Major Op60/ Berceuse in D flat Major Op57/ Fantaisie in F minor Op49
Eugen Indjic, piano
CLAVES CD50-9105 (DDD/61.48)

● Born of Russian-Serbian parentage and now an American citizen resident in Paris. Eugen Indjic made his first concert appearance in 1957, aged ten. In 1970, he won the Warsaw piano competition, followed by Leeds two years later and the Rubinstein prize two years after that. When he was sixteen, one critic simply said: 'He plays Chopin like a Pole.' Judging by this recording, made in Heidelberg last autumn, that quality hasn't been lost in the intervening years.

But it was the programme of this Claves release that first attracted me. Along with the Etudes, I number the four Ballades among the most rewarding of Chopin's compositions, music full of invention and imagination. And the beautiful and hypnotic Op49 Fantaisie surely contains the quintessence of Chopin in its twelve-and-a-half minute span, the noble chorale-like theme woven into magical harmonizations and urged into the kind of bold rhythmic adventures of which Chopin was the master. Eugen Indjic plays it with great fluency and confidence, while ensuring his virtuosity remains the servant, not the master of his playing.

I appreciated his controlled approach to the Ballades as well, and the popular Barcarolle (Chopin's evocation of the magic of Venice) and Berceuse are enlivened by the freshness and precision of the playing. Sensitive and scrupulous, without becoming too fastidious, this is Chopin playing of a high order, enhanced by a clear, natural recording that registers all the nuances of these meticulous interpretations.



FRANZ LISZT

Piano Concerto No3 Op. posth./De Profundis/Totentanz
Steven Mayer, piano; London Symphony Orchestra; conductor, Tamas Vasary
ASV DIGITAL CD DCA778 (DDD/66.32)

● 'World premiere recordings' proclaims the sleeve, which may surprise those who already have a performance of 'Totentanz' in their collections. But this is the Busoni edition of 1919, itself produced from what was probably Liszt's second version of a work which occupied him on-and-off for almost two decades. The differences are mainly in the orchestration, with the finale showing the most marked contrast with the usual scoring. While losing nothing of the flashing brilliance of the piano writing, if anything this formative stage of Liszt's 'Dance of Death' reveals a slightly more sombre intention than that encountered in the final version.

The origins of the 'Third Piano Concerto' are odd and outlined only sketchily in the accompanying booklet. It seems that somehow the manuscripts, which date from around 1839, were unaccountably filed by archivists in both Germany and the Soviet Union with scores for the Piano Concerto No1. The error was uncovered by American musicologist, Jay Rosenblatt, who then prepared a performing edition of the work. It emerges as just under fifteen minutes long, in one continuous movement and certainly worthy of Mr Rosenblatt's efforts.

For me, however, the most rewarding 'find' here has to be the thirty-three minute 'Instrumental Psalm', De Profundis. If, indeed, this work has never been recorded previously, it is an astonishing oversight. Admittedly, it was left unfinished. However, out of the plainchant version of Psalm 129 ('Out of the depths I cry to you, O Lord...'), Liszt does craft music of both substance and virtuosity. The dazzling reworkings of the plainchant theme are no mere show.

Judged on these performances, Steven Mayer must be included among the great present-day Liszt interpreters and he is well-supported by the composer's fellow Hungarian, Tamas Vasary. The recording, a Trygg Tryggvason production from Walthamstow Town Hall, is full-bodied, with ample space and the kind of crystal clarity which we now take for granted.



WOLFGANG AMADEUS MOZART

Flute Quartets No1 in D Major K285; No2 in G Major K285a; No3 in C Major K285b; No4 in A Major K298
Peter-Lukas Graf, flute; Carmina Trio
CLAVES CD50-9014 (DDD/54.13)

● No one would number the Flute Quartets among the finest of Mozart's chamber works (he did, after all, make no pretence of his dislike of the flute as a solo instrument), but any lack of substance has its compensations. They were written as much for the enjoyment of the performers as the entertainment of an audience and, after two centuries and more, this delicious music still fulfills these two roles.

The first three quartets were composed around 1777-8, to a commission from the Dutch music lover, De Jean; K298 would appear to date from some eight years later, a lively, witty work written for the musical family of Mozart's friend, Baron Gottfried von Jacquin (it is noticeable how every one of the instruments gets a chance to shine, Mozart evidently aware of what was required to keep everyone happy). After the variations of the first movement, there is a short minuet and then a bubbling rondo based on an old French folk tune.

One would imagine that the excellent Peter-Lukas Graf and his colleagues in the Carmina Trio are rather more skilful performers than the von Jacquin family, yet they seem to find just as much fun in playing this delightful piece.

The freshness of the playing is a consistent pleasure throughout these quartets and, while the Collins Classics version with flautist Judith Hall, may be on a par artistically, I do prefer the more



**FOLK AND FANTASY:
BRITISH WORKS FOR FLUTE
- VOLUME TWO**

Kenneth Smith, flute; Paul Rhodes, piano
ASV DIGITAL CD DCA768 (DDD/73.13)

● A second compendium of British flute music? Surely Kenneth Smith is 'barrel-scraping' this time? Not so: with an agreeable, contrasted mix of original compositions and transcriptions, the Philharmonia's principal flautist has come up with another winning showcase for both his instrument and his own talents.

As the title suggests, this time he has turned to composers who tapped the rich spring of British folk music, Ralph Vaughan Williams and Percy Grainger among them. The 'fantasy' of the title comes from works such as Arnold Bax's Four Pieces for Flute and Piano, with its fairy-tale like evocations, and the wistful, haunting 'By the river in spring' of Michael Head.

Michael Head, one-time professor at the Royal Academy of Music, is one of three unfamiliar names among the composers here. Peter Lamb's 'English Air' is an exquisite miniature, but no lightweight, while John McLeod's 'Le Tombeau de Poulenc' packs ideas into a genial eight-and-a-half minutes of music.

As well as an effective transcription of his 'Greensleeves' orchestral fantasia, Vaughan Williams is also represented by the colourful 'Suite de Ballet', where Kenneth Smith's playing - especially in the Humoresque and Passepied - positively sparkles. And if you want to hear him out-Galway the man with the silver flute himself, sample the exuberance of Hamilton Harty's fantasy 'In Ireland'. In more reflective vein, Paul Rhodes' transcription of Percy Grainger's ideas on the famous Lincolnshire folk song 'Brigg Fair' is beguiling, as is Kenneth Smith's reworking of one of Elgar's most delightful tunes, 'La Capricieuse'. There is expressive playing, too, in Lennox Berkeley's finely-honed Sonata.

Indeed, the contribution of pianist Paul Rhodes, to the success of both 'Summer Music' (the first volume, reviewed a couple of issues ago) and this new collection cannot be over-estimated. Clearly sharing his partner's enthusiasm for this neglected area of British music, he colours and contours the piano role with comparable imagination.

**RECORD OF
THE MONTH**

They had to plug the church doorways with foam in an effort to stop the wind, blowing relentlessly across the flat Norfolk countryside, from sweeping down the nave. The 'control room' for the recording had to be set up in the village hall, which meant running 180 metres of low-loss video link cable between the microphones and the digital recorders. At one point, the cable had to be elevated above the road at a height sufficient to allow combine harvesters to pass under. And, on top of that, engineer and producer had to hope that the local United States Air Force base would stick to its promise not to fly over the area during the two days of recording.

I was in the village of Salle in Norfolk (more a farming hamlet), a community which, like so many others in East Anglia, possesses a magnificent parish church funded out of the profits of the wool trade in the Middle Ages but now, of course, utterly disproportionate to its needs. As well as its architectural merit, the Church of Saint Peter and Saint Paul is also possessed of a wonderful acoustic, ideal for medium-scale unaccompanied choral music. Which is why, despite all the practical problems, it has been the principal recording venue for The Tallis Scholars' hugely successful series for Gimell Records. Somehow, everything from creaking church doors to low-flying jets has been overcome to produce some of the finest recordings of Renaissance polyphony ever made.

HEINRICH ISAAC

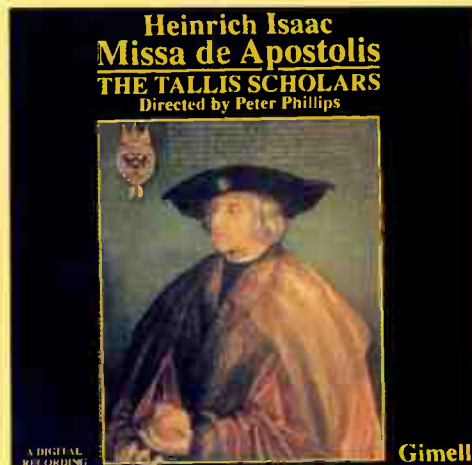
Missa de Apostolis (6vv)/Motets: Optime pastor; Tota pulchra es; Regina caeli laetare; Resurrexi et adhuc tecum sum; Virgo prudentissima (6vv)
The Tallis Scholars; director, Peter Phillips
GIMELL CDGIM023 (DDD/74.30)

★ 'Like watching a really good slow bowler,' was how the cricket-loving Peter Phillips summed up the wonderful unfolding of the Missa de Apostolis of the Flanders-born composer, Heinrich Isaac. As we talked after the recording session at Salle, he went on: 'The Mass slowly unfolds; Isaac doesn't think things have to be imitated precisely and he paces the music cleverly.'

'In his time, Isaac was reckoned second only to Josquin. His style is certainly more diverse than Josquin's and, for music for grand occasions, he preferred the greater breadth of five or six voices.'

'He was,' concluded Peter Phillips, 'one of the greatest masters of choral sound.'

Like Josquin, Heinrich Isaac was born in Flanders (now Belgium and The Netherlands) around 1450. He was regularly in the employ of Italian nobility, including the Medicis, and became court composer to Emperor Maximilian I in Vienna. After his death in 1517, his style found many disciples. But where Josquin's status as one of the key figures bestriding the worlds of medieval and Renaissance music has been maintained over the centuries, Isaac was gradually relegated to an entry in the music dictionaries, with his works rarely sung or recorded.



In addition to recording the undisputed choral masterpieces of Palestrina, Victoria, Byrd and, of course, Tallis, among others, Peter Phillips and his colleagues have also seen a role in focusing attention on these composers' neglected contemporaries, if not forcing a revision of their standing in the musical hierarchy. In this way, many will have been introduced to the distinctive character of the music of Clemens non Papa, William Comysh, Carlo Gesualdo and others. And the reputation of Isaac, you can but feel, can only be enhanced by this new issue.

The Missa de Apostolis, which I heard recorded at Salle, is a magnificent setting for six voices which, as Peter Phillips commented, has great breadth and grandeur. The same qualities can be enjoyed in the motets Optime Pastor and Virgo Prudentissima, the former a celebratory piece written in 1513 for the historic meeting between Cardinal Lang, chancellor to Maximilian I and the newly enthroned Pope Leo X (son of Lorenzo the Magnificent, like Maximilian, one of Isaac's employers). The text is full of allusions and hidden meanings, all of which are explained in Peter Phillips' sleeve note. He writes with all the style and fluency with which he directs the choir.

Another motet, Virgo Prudentissima of 1507, was written for Maximilian's coronation as Holy Roman Emperor and, showing the political tradition of having 'God on your side' is nothing new, it asks the Blessed Virgin to look favourably on the new ruler. There are two other Marian motets, and one for Easter Sunday to complete this representative 'musical portrait' of Heinrich Isaac.

As with any Tallis Scholars' performance, the 'core' of superb blend and tuning is evident throughout, along with the ability to sustain a line apparently effortlessly: 'staggering the breathing', as Peter Phillips describes it. Just a couple of Schoeps microphones positioned at the 'focal point' is all that is needed to produce the precise, transparent sound that characterizes all the Tallis Scholars' recordings, plus of course that carefully-chosen acoustic. Having found his optimum microphone position, producer Steve Smith told me, if changes had to be made, it was the singers that moved, not his mics!

Because of the paucity of recordings of Isaac's music, it is tempting to describe this new issue as a 'valuable document' or some such. But that would suggest the works here need that kind of scholarly crutch. They do not; this is simply a very fine composer at long last getting his due.

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