

£2.95

JUNE 1989

HI-FI CHOICE

THE WORLD'S No. 1 GUIDE TO BUYING HI-FI

FOCUS ON FREE RADIO

100 CD PLAYERS - SUMMARISED

PERSPECTIVES PLAYS THE NUMBERS GAME

144 AMPLIFIERS - SUMMARISED

9 HI-FI VIDEO RECORDERS ON TEST

SPECIAL OFFERS ON CDs AND HI-FI ACCESSORIES

COMPETITION

OVER
£5000
WORTH OF
MARANTZ
HI-FI
MUST BE WON!

FREE
LOUDSPEAKER
BEST BUY
SUPPLEMENT

30 RECOMMENDED MODELS

60 LOUDSPEAKER REVIEWS
TEST SUMMARIES ON OVER 900 HI-FI PRODUCTS

*play it
again
sam
and
again
and...*



... when it comes to music, nobody plays it better than Yamaha.

Sit back, relax and enjoy the dynamic, natural sound of a Yamaha cassette deck. Engineered to the highest standards, the Yamaha

range of hi-fi cassette decks offers something for everyone –

professional 3-head systems, auto-reverse decks, twin-tape

machines plus advanced features like Play Trim and Dolby HX Pro*

Dynamic Bias Servo – and much more. Plus they're all RS remote

control compatible – in harmony with the rest of your Yamaha

system. So whether you're buying your first cassette deck or

reaching for new heights of excellence, choose a

Yamaha – they're music, naturally

For further information and the name

of your nearest Yamaha dealer, contact us at the address below



*music
naturally*

100 **YAMAHA HIFI**
YAMAHA 1887-1987

Yamaha Electronics (UK) Limited, Yamaha House, 200 Rickmansworth Road,
Watford, Herts WD1 7JS Tel: Watford (0923) 33166

*Dolby HX Pro is a trademark of Dolby Laboratory Licensing Corporation

THE WORLD'S No. 1 GUIDE TO BUYING HI-FI
HI-FI CHOICE
ISSUE NUMBER 71: JUNE 1989

EDITOR

John Bamford

CONSULTANT EDITOR

Paul Messenger

ASSISTANT EDITOR

Jane Hadley

STAFF WRITERS

Daniel Houston, Jason Kennedy

CONTRIBUTORS

Paul Messenger, Alvin Gold, Paul Miller

PHOTOGRAPHY

Chris Richardson

ART EDITOR

Kerry Gormley

ADVERTISEMENT MANAGER

David Reynolds

ADVERTISEMENT EXECUTIVE

Miriam Young

ADVERTISEMENT PRODUCTION MANAGER

Clare Leggett

ADVERTISEMENT DIRECTOR

Alistair Ramsey

PRODUCTION MANAGER

Judith Middleton

MARKETING MANAGER

Bryan Denyer

ASSISTANT MARKETING MANAGER

Katrina Edmondson

CIRCULATION CONTROLLER

June Smith

PUBLISHING DIRECTOR

Marianne McNicholas

FINANCE DIRECTOR

Colin Crawford

MANAGING DIRECTOR

Stephen England

CHAIRMAN

Felix Dennis

PUBLISHED by Dennis Publishing Ltd,
14 Rathbone Place, London W1P 1DE. Tel: 01-631 1433
Telex: 8954139 DENNIS G. Fax: 01-436 0350

Company registered in England.

REPRO: Graphic Ideas

TYPESET by: Time Graphics Ltd.

PRINTED by: Riverside Press.

DISTRIBUTED by: SM Distribution,
6 Leigham Court Road, Streatham, London SW16 2PG
Tel: 01-677 8111.

A



PUBLICATION

Enquiries regarding the content of this journal should be made in writing to *Hi-Fi Choice* Editorial, 14 Rathbone Place, London W1P 1DE. We regret enquiries cannot be dealt with by telephone. While every care has been taken in the preparation of this journal, the publishers cannot be held responsible for the accuracy of the information herein, or any consequence arising from them. Readers should note that all judgements have been made in the context of equipment available to *Hi-Fi Choice* at the time of review, and that 'value for money' comments are based on UK prices at the time of review, which are subject to fluctuation and are only applicable to the UK market. This edition © 1989, Felden productions. ISSN No. 0955 111 5

MENU

This month's *Choice* includes a free loudspeakers supplement, a compendium of reviews of the best loudspeakers we've tested during the past year. Combined with the 30 new reviews completed for this issue it makes for an unbeatable source of reference for those of you who might be considering buying loudspeakers in the near future: documented listening tests and technical measurements on a total of 60 different models – at prices to suit all pockets.

Having begun the month focusing our minds on the loudspeaker tests which make up this issue's main review topic, by the time we'd finished we were left with something of an audio-visual extravaganza. As Alvin Gold explains in his introduction (page 97) to our tests on a small group of Hi-fi video recorders, we really are on the verge of a revolution in home entertainment. With the advent of high quality stereo television sound comes the total integration of audio and video in the home. The digital system being employed for transmitting stereo sound with TV broadcasts is called NICAM; to receive stereo you need a NICAM decoder in your TV set. But an arguably more elegant way of getting kitted out to enjoy good quality TV sound, especially as many hi-fi enthusiasts already aspire to owning a Hi-fi VCR which can be permanently wired in to an audio system (perhaps with an additional surround-sound decoder and extra satellite loudspeakers for enjoying the complete cinematic experience from Dolby Stereo films), is to have one's NICAM decoder built into the VCR instead. We've tested a few such machines this month, and doubtless we'll be testing more before the year is out.

Featured in *Choice Sessions* there's Philips' *CDV 185* CD-Video player, an excellent-sounding compact disc player in its own right yet reasonably priced at just £349, and the first of a new breed of home computer game consoles. What have computer games got to do with *Hi-Fi Choice*? Well, when we heard that this games machine also doubled as a CD player we thought you might be intrigued to see it.

But lest *Choice* be accused of losing its high fidelity ideals, let me remind you that next month's issue is *The Collection*, our annual survey of some of the best high-end hi-fi equipment money can buy. A lot of money in most instances! Our reviewers are currently basking in heavenly sounds emanating from systems representing the state of the art from countries all across the globe. Reading about them is a treat you can look forward to next month.

John Bamford.

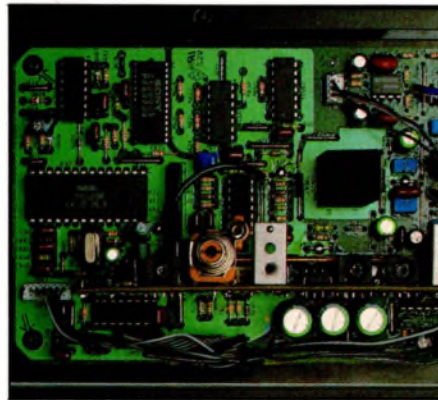


Cover photograph of the
Recommended SD
Acoustics OBS (see page
81) by Chris Richardson.

CONTENTS



Same size drivers in the reviewed KEF C75 (above), we visit Radio Caroline – queen of pirate radio, Perspectives looks at the PDM digital revolution and Aspirations visits a home where hi-fi reflects artistry.



THE FRONT END

6

UPDATE

What's happening in the audio industry? We keep you in touch with product, business and technological developments.

19

CHOICE SESSIONS

Imagine a computer games console that also plays CDs! Paul Miller's been checking out NEC's *PC Engine*; also, Philips' CDV 'clip' player gets a spin.

33

READERS WRITE/CHOICE ANSWERS

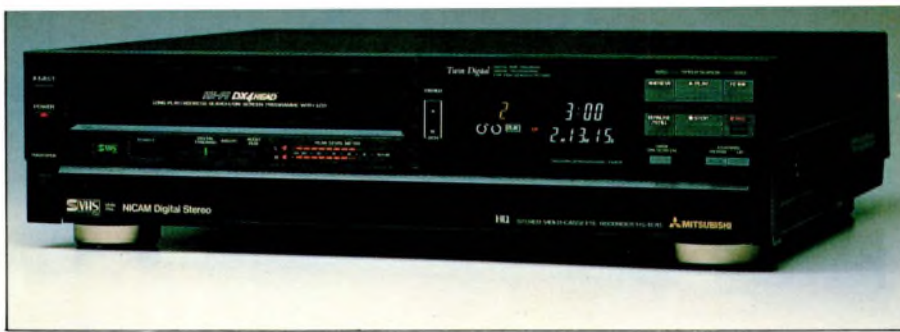
We can't handle telephone queries, but if you've got a hi-fi problem why not write to us at the address on page one? You may see yourself in print.

COMPETITION

14

THE HI-FI CHOICE/MARANTZ COMPETITION

Your chance to win some fabulous Marantz hi-fi. This month's prizes include a *CD75/II* CD player and the third and final chance to get your hands on a complete super-system, plus a runners-up prize of a *CV55* CD-Video.



The low down on nine Hi-Fi VCRs includes Mitsubishi's offering (left), while Sessions, (below) shows how you can use a CD player with a computer games console.

ASPIRATIONS

22

THE FRENCH CONNECTION

Dan Houston drops in on a wine-loving javelin thrower whose aspirations are the Commonwealth Games and another pair of Jadis monobloks.

PERSPECTIVES

28

THE NUMBERS GAME

Paul Miller gets his head around the high-brow mathematics of the new 1-bit digital revolution

FOCUS

36

PIRATES OF THE AIRWAVES

Yo-ho-ho and a ship full of music: *Choice* visits Radio Caroline which this year celebrates 25 years of free broadcasting from the North Sea.

LOUDSPEAKERS

44

MARKET RESPONSE

Dan Houston's specialist dealer survey brings you comment on loudspeaker sales and reliability.

47

CHOOSING AND USING LOUDSPEAKERS

Looking for the right one (pair)? With hundreds of models available it's difficult to choose: Paul Messenger offers a way out of the labyrinth.

49

LOUDSPEAKER REVIEWS

Your money's worth: *Choice* again brings you a mega-test of 30 models, with comment on the best.

93

TECH TALK

Paul Messenger's more detailed explanation of the test procedures.

95

CONCLUSIONS, RECOMMENDATIONS AND BEST BUYS

Summing up on the best of this month's loudspeaker batch.

HI-FI VIDEO MACHINES

97

CHOOSING AND USING VCRs

Hi-fi video recorders are coming of age with on-board NICAM circuitry for receiving stereo TV broadcasts. And for video buffs there's S-VHS too. We explain what's what with VCRs.

99

VCR REVIEWS

Alvin Gold expands his critical faculties commenting on the sight and sound qualities of nine machines

THE DIRECTORY

108

SELECTED DEALER DIRECTORY

Step one: find a good dealer. Here's a regional listing of competent hi-fi stockists.

114

THE CHOICE DIRECTORY

Our unique buying guide packed with information and comment on currently available equipment and accessories we've reviewed.



FREE LOUDSPEAKER SUPPLEMENT

Each year *Choice* tests a vast number of hi-fi separates. With this issue we've compiled a compendium of the best loudspeakers tested by our reviewers during the past twelve months. So combined with the 30 new reviews published this month we're providing a reference guide to 60 different models.

How's that for good value!

CHOICE MATTERS

12

WBT ACCESSORIES OFFER

More discounts on High Street prices – this time with a range of state of the art accessories from WBT.

13

COMING UP

Next month *The Collection*, our high-end annual, looks at a whole range of the best available equipment on the market – a must for all audiophiles. Aspirations visits Ricardo Franassovici, the high-end guru – and there's news and much more besides. Don't miss your copy of this exciting edition of the World's No 1 Guide to Buying Hi-Fi

43

DMP COMPACT DISC OFFER

Hi-Fi Choice and *Absolute Sounds* bring you the range of DMP audiophile Jazz discs at a liver below retail price.

109

BACK ISSUES

Fill in this page for past issues of *Hi-Fi Choice*.



CLASSICS!

A few examples from our exclusive range of highly reviewed top-notch hi-fi.

FREE on these Classics, with this coupon.
BEYER Inflatable HEADPHONES
 or **TOP QUALITY SCANDINAVIAN SPEAKER STANDS**
 or **ORTOFON RECORD CARE KIT SYSTEM**
 ONE FREE GIFT PER ITEM PURCHASED e.g. 3 ITEMS = 3 FREE GIFTS OF YOUR CHOICE



FREE GIFT!
on this item with coupon

£59⁹⁵

DUAL CS410 Turntable Brand-new to the UK, this high performance low priced Dual brings new standards to budget turntables! •(Cart £5 extra.)

Gift voucher may be used on any item of our large range of Dual stocked



Highly Commended

BEST BUY
Hi-Fi CHOICE
MAGAZINE



FREE GIFT!
on this item with coupon

£99⁹⁵

FACTORY REPACK

ARISTON Q Deck Turntable What Hi-Fi? magazine's 'Turntable of the Year' and Hi-Fi Choice mag's 'Best Buy' the sound on this 'Q' will blow your mind with fidelity!! While stocks last... (Quality Ortofon cart only £10 extra)



FREE GIFT!
on this item with coupon

£69⁹⁵

MARANTZ RV253 Dolby Surround Processor Transform your lounge into an auditorium and tremendously increase the audio performance of your system with this 3D surround-sound processor. Now at a lower price than ever before.

*Connectable to most systems.

Gift voucher may be used on any item of our large range of Marantz stocked

BEST BUY
Hi-Fi CHOICE
MAGAZINE

FREE GIFT!
on this item with coupon



£109⁹⁵

ROTEL RA820BX2 Amplifier One of the finest quality audiophile amps currently available. This clean-drive classic boasts impressive performance and no-nonsense styling.

Gift voucher may be used on any item of our large range of Rotel stocked.



FREE GIFT!
on this item with coupon

£69⁹⁵
Pr.

NAD 8020E SPEAKERS Laser-analysed computer-aided research has been utilised to produce an amazing 60 watt per channel compact classic. •W210xH340xD190

Gift voucher may be used on any item of our large range of NAD stocked.



BEST BUY
Hi-Fi CHOICE
MAGAZINE

FREE GIFT!
on this item with coupon



£119⁹⁵

NAD 3020E Amplifier The legendary 3020 in an improved 'E' form. This 20 watt stunner speaks for itself. Need we say more?? •420x91x270

Gift voucher may be used on any item of our large range of NAD stocked.



FREE GIFT!
on this item with coupon

£79⁹⁵

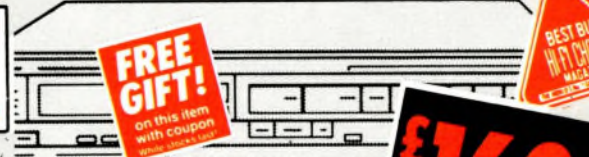
YAMAHA T09 Tuner Crystal clear, to your ear, this sleek, highly desirable digital tuner features 2 wavebands and sixteen touch presets •435x72x237

Gift voucher may be used on any item of our large range of Yamaha stocked



Highly Commended

FREE GIFT!
on this item with coupon



£169⁹⁵

HITACHI FTMD5500 Tuner Containing award-winning circuitry a mind-blowing specification and 16 touch presets this tuner's knockout performance takes care of itself! Only while stocks last. •370x65x268

Gift voucher may be used on any item of our large range of Hitachi stocked.

BUYING
Guide
Recommended



FREE GIFT!
on this item with coupon

£99⁹⁵

AIWA ADF270 Cassette Deck The professional's choice, for price and quality this deck's a winner: featuring Dolby* B&C, fine bias control and auto tape select!

Gift voucher may be used on any item of our large range of Aiwa stocked.

FREE GIFT!
on this item with coupon



£169⁹⁵

MARANTZ CD883 COMPACT DISC This fresh new addition to the Marantz range wins again, offering the same impeccable spec as the CD873, complete with FREE remote control. (also CD65II £249.95, CD65IISE £299.95)

Gift voucher may be used on any item of our large range of Marantz stocked

INTEREST FREE CREDIT
available on most goods.
Ask for details.

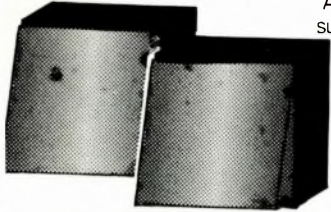
Mr Richer's been slashing prices on even more goodies this month... Here you'll see an example of the incredible deals that've been done, with both Bargains and Classics caught in the cuts. There's dozens of genuine reductions in store too, offering £££s off many of our popular lines... See you soon!

BARGAINS!

Some of this season's specials on scoop purchase and end-of-line product, all at our world renowned prices.

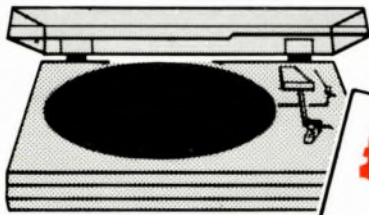
FISHER STEM77R

Amazing value surround/extension speakers handling 15 watts per channel.



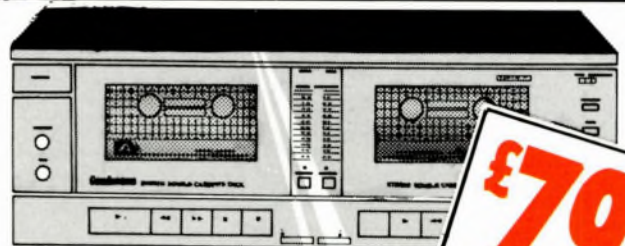
£9.99
Pair

Phone your nearest store for your FREE copy of our 16 page **OUTRAGEOUS BUMPER CATALOGUE/PRICE LIST**



£29.95

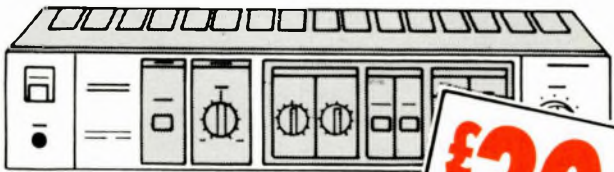
FIDELITY RD200 Turntable Sleek, low profile turntable featuring a DC servo motor and static balance tonearm for increased performance. Cart £5 extra.



£79.95

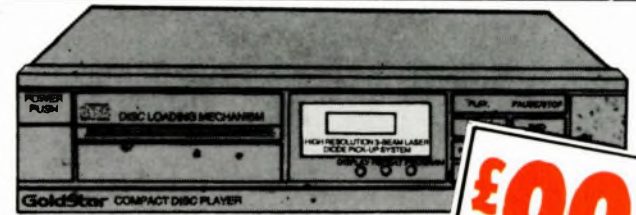
GOODMANS GSW5200 Cassette Deck At this price it must be stolen! No, bulk buying the answer on this fantastic twin with high speed & synchro dubbing.

FACTORY REPAIR



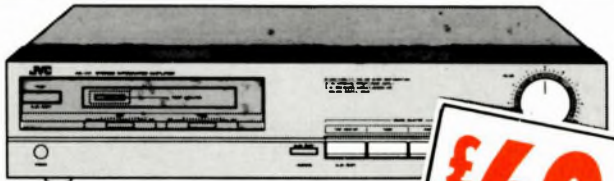
£39.95

SANYO JA220 Amplifier 20 watts of music power! Featuring bass/treble controls, tape monitor and a respectable THD of only 0.9%, what more could one desire?? •420x80x220



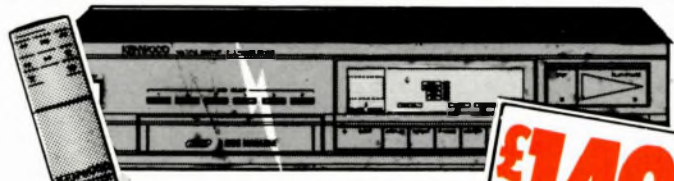
£99.95

GOLDSTAR GCD613 Compact Disc An incredible deal that'll excite even the most dooby-down audiophiles after a hard days night. Throw a disc at it and allow it to seduce your ears.



£69.95

JVC AX111 Amplifier With internal 30wpc twin-amp high fidelity configuration and a low impedance direct power supply what more could you wish for?



£149.95

KENWOOD DPM97 Compact Disc Sophistication is the name of the game here. A classy 6-disc remote control multiplexer boasting a cool crisp sound. In a word... Unbeatable!

WHERE TO FIND US: **BIRMINGHAM:** 10 Smallbrook Queensway, B5 4EN. Tel: 021 643 1516

BRISTOL: 20 Cotham Hill, BS6 6LF Tel: 0272 734397

CARDIFF: 5 Central Square, CF1 1EP Tel: 0222 383311

EDINBURGH: 1b Chambers Street, EH1 1HR Tel: 031 226 3544

LEEDS: 55 The Headrow, LS1 6LR Tel: 0532 455717

LIVERPOOL: 69B Church Street, L1 1DN Tel: 051 708 7484

LONDON (Central): 2 London Bridge Walk, SE1 2SX. Tel: 01 403 1201 (10 Lines) 01 403 4710

London (North): 25 Northways Parade, College Crescent, NW3 (Bottom of Fitzjohns Ave) Tel: 01 722 3359

STOCKPORT: 4 Wellington Street, SK1 3RN Tel: 061 480 1700

YORK: 6 Feasegate, YO1 2SQ Tel: 0904 645535

WE ARE OPEN: 10-6 Mon-Fri and 10-5 Sats except London 10-7 Mon-Fri and 10-5 Sats.

FREE MAIL ORDER available from our Stockport branch. (not on all items)

WE WELCOME: Access, Visa, Cheques and Part Exchange. Also VAT export (handling charge £2.50) All goods brand new in sealed boxes unless otherwise stated. inc. VAT and g'teed 1 year. E&OE. All stores have a clearance corner full of ex-display & secondhand bargains and browsers are definitely welcome! Please phone 061 480 1700 (24hrs) for FREE monthly 16 page price list and hi-fi guide. Don't forget: If you see our hi-fi cheaper anywhere else within 75 miles of your local branch; we'll happily beat that price on the spot by £3. (Must be in stock elsewhere at time of purchase)

WE LOOK FORWARD TO SEEING YOU SOON!



UPDATE



Nights in white satin: the Rock Reference.

PRODUCTS

TRIBAL DEPARTURE

Max Townshend, one of Australia's better exports to these shores, has finished work on his Townshend International *Rock Reference* state-of-the-art turntable.

Rhetorically described by Max as "a Goldmund killer in some respects" the *Reference* costs a cool £1,800. And a revised *Excalibur* tonearm will set you back a further £650. The massive turntable departs from 'established' vinyl replay thinking in several areas, although it also extrapolates the philosophy behind the original *Rock* which came into existence following extensive research and development at the Cranfield Institute of Technology.

Weighing in at a hefty 53 pounds, 20 of which is the platter, the *Reference* has been engineered with stability and rigidity in mind. The platter is made from a variety of materials which Townshend believes creates one of the most inert combinations available. The clamped record sits on a 16mm-thick vinyl slab which has been drilled through with 36 three-quarter-inch holes (to within 2mm of the surface) and filled

with plaster for inertness. The vinyl slab is screwed to a further slab of aluminium to "run true" and there are sandwiched layers of lead and bituminous damping pads underneath this to increase mass and inertia.

The steel plinth (with incorporated power supply) is a suspended subchassis similar to the Cranfield *Rock* but has also been filled with plaster and lead to make it very heavy and rigid. Back lit touch controls on the plinth govern 33/45rpm and Off settings. The 8mm bearing pin is mirror-polished tungsten carbide which couples to a steel ball in the spindle which is rifled to carry oil up to the bearing.

Townshend explained that the *Reference* was "all that we've learned from the *Rock* plus, plus, plus". Needless to say the *Reference* has a front-mounted damping trough, which now locks tightly into place. "You wouldn't buy a car without shock absorbers, would you?" asks Max incredulously.

"It's certainly different and other audio engineers have confirmed that. It's a bit like the age-old social instincts thing - a lot of people go with the tribe not because the tribe is good but because of the tribe itself. With this we've tried to do some lateral thinking and break the tribal

mould. If you ask me how, it's a bit like that joke about why a dog licks its private parts... the answer is because it can!

"I can't say I've achieved perfection yet because that would leave nothing else to do, and I'm always working on improvements. But we've been quite surprised ourselves: you should come and listen to it."

FOR HEDONISTS?

Epicure loudspeakers are being served up in this country as having a new concept in loudspeaker design. Elegant rather than dishy, the five models cite high-efficiency, linear frequency response, high power handling and good transient response as their strong points. The cabinets taper from back to front minimising baffle width while maximising internal volume, and computer aided design techniques have been employed to get the best possible performance characteristics, according to makers.

Epicures are vented at the bottom rather than ported, a move which "extends the bass response giving a smooth air flow

and eliminating wind noise". Cheapest in the range is the £299 *Model 5* - a 40cm-high two-way unit. Models 4, 3 and 2 are correspondingly larger and more expensive at £399, £699 and £899 respectively. The flagship of the range, *Model 1*, costs £1,499 and consists of two separate boxes housing sub-bass and mid-woofer eight-inch drivers below, with two four-inch midrange units and one-inch tweeter above.

All models are guaranteed for five years and finished in stained wood veneer.

The speakers are imported from the American Eastern Seaboard and distributed here by Harman Audio of Slough, Berks.

BUSINESS

INCA'S DECLINE

Incatech has ceased trading although the technology of the brand has been taken up by a new company, Ox Tec, which is an independent subsidiary of high-end manufacturer Oxford Acoustics Ltd. Dr Fraser Shaw of Oxford Acoustics and Colin Wofnor, the man behind Incatech have teamed up to design a new



Epicure loudspeakers: the aural equivalent to a clam chowder from the Eastern Seaboard?

range of Ox-Tec amplifiers described as "the next generation of Incatech amplifiers". Ox-Tec products are being made at the Oxford Acoustics factory in Witney, Oxfordshire and the first models should be appearing this month (June).

"The Incatech amplifiers are superb," commented Dr Shaw, "and Ox-Tec amps will bear a resemblance to them, although they will look a lot prettier and have improved sound qualities. This partnership should produce products that will terrify the national and international competition." Ox-Tec will now honour all service and guarantee arrangements with Incatech amps. Ox-Tec Ltd, Unit 4, West End Industrial Estate, Witney, Oxon OX8 6UB.

HAYDEN'S BEDMATE

As we went to press, Ortofon was planning to move its UK distribution headquarters to rented offices at the Hayden Laboratories base in Chalfont St Peter, Buckinghamshire. And although a takeover of the Danish cartridge manufacturer by Hayden has not been mentioned, an informed source said that this looked likely in about four months time. Morale at the present Ortofon offices in Twyford seemed very low in anticipation of the move.

Ortofon had just launched its Premier Programme of 19 new models and our source said the decision to move had been made in Denmark just eight days into the launch. "We had our feet kicked away from under us; there was no consultation - we were told it was not up for discussion," said our contact who didn't want to be named for fear of losing his job. Ortofon also distributes Canton domestic and in-car loudspeakers from West Germany in this country but whether the move will include Canton is unsure. Rob Follis, of Hayden, presumed it would and said there were no takeover plans as yet.

Initially Ortofon will remain independent of Hayden and merely co-operate on "distribution and administration programmes." The company's sales force will be headed by Chris Broadbent as at present,

and Hayden's Dermot Grace will be appointed as General Manager and Director.

HORN MAKER BOUGHT

Vitavox, maker of bespoke audiophile loudspeakers has been bought by Halma plc in a move described as giving the company's esoteric loudspeakers "a new lease of life". Vitavox largely concentrates on specialised drive units for defence communications equipment but also exports its huge walnut-veneer folded horn loudspeakers to Japanese audiophiles at about £5,000 a throw and makes transducers "to order". The firm is now based in Stanmore, Middlesex. Telephone: (01) 952 6983.

NEW NAME

Confusion between the Boothroyd Stuart name and Meridian equipment which it makes has been solved by creating Meridian Audio - a company solely responsible for marketing Meridian systems worldwide. Meridian Audio will now be based at KEF Loudspeakers' headquarters in Tovil, Maidstone. Both companies are owned by AGI (Electronics) Ltd, and the move allows for "streamlined sales, marketing and accounting" though Meridian will remain autonomous in other areas.

BEARD'S LOSS

Indications as we went to press were that Generation Securities Ltd, a company owned by members of the Sir Robert McAlpine construction family, would relinquish its interest in Beard Audio. Andy Giles, Beard's PR man, said the "likely" pullout was entirely amicable and that Bill Beard would continue to manage his valve amplifier operation as before. GS bought Beard Audio early in 1988, and the reasons for its pullout remain obscure. "It's fair to say," explained Giles, "that a company such as Beard Audio can be highly profitable on a cottage industry basis but the involvement of a large concern such as Generation Securities isn't always a good idea."



Planetary departure with Tannoy's new loudspeaker range here showing the M15.

PRODUCTS

OFF THE PLANET?

Five loudspeakers in the new Series 90 range have been launched by Tannoy. The five replace the existing Planets range and are finished in blue rather than gold trim. Priced from £129 to £600 the range features the likes of aluminium dome tweeters, bi-wiring facilities and hard-wired crossovers throughout. Cheapest is the 15-inch high E11 finished in black ash vinyl. At £169 the M15 takes over from the popular Mercury loudspeaker and is available in black ash or rosewood finishes. M20 is available in black ash or rosewood real wood veneer at £229 and £269 respectively; features such as gold-plated

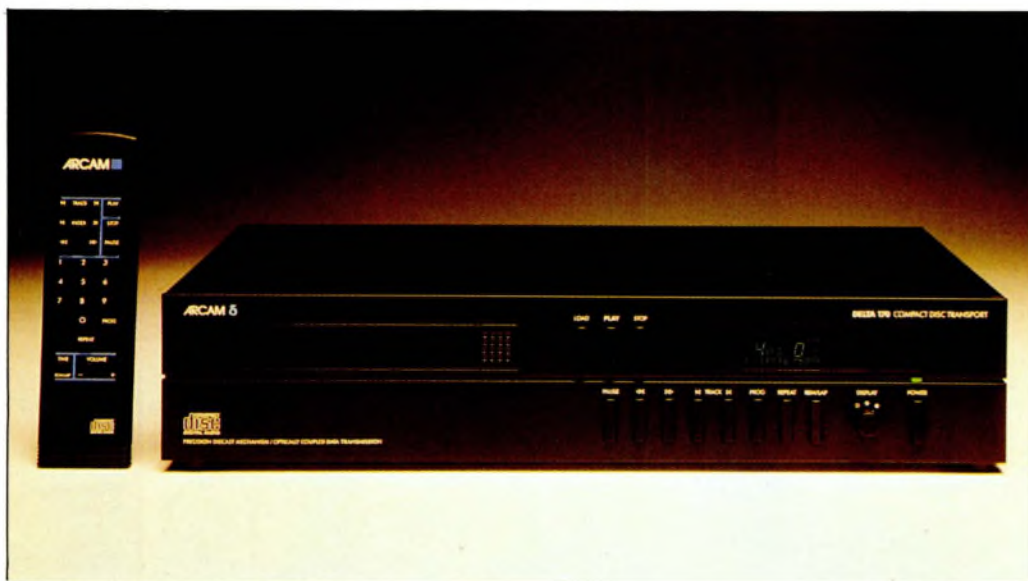
terminals and van den Hul internal wiring come in at this stage. Two floor-standing models, the £279 J30 and £499 J95 (also available in rosewood at £600) complete the family.

SWISS MADE

The new Revox compact disc player is being imported under the 'budget' banner. Priced at £649 the B126 is a typically Swiss idea of budgeting but Studer Revox promises standards of sound quality found in its more expensive equipment which B126 matches in terms of size and style. New components and audiophile circuitry are incorporated in the usual uncompromising build quality found in Revox products, and controls are logically (even ergonomically) laid out on the fascia.



Swiss-style budgeting with the Revox CD player.



Arcam's CD transport dispenses with the DAC.

PURPOSE BUILT

Arcam has launched a CD player transport to complement its own *Black Box* and other digital-to-analogue converter units.

First shown at the Bristol hi-fi show in February, the £600 *Delta 170* is Britain's first separate CD transport system. Its digital bitstream output must be linked to a separate DAC unit or a DAC-equipped amplifier or preamplifier. Both coaxial and optical outputs are provided.

Delta 170 has been designed as an affordable route to the now-established advantage of splitting the functions of CD reading and conversion to an analogue signal. The first job of a CD player creates an "electrically noisy environment" from the servos and microprocessors – and D/A conversion is hampered by interference caused when the functions are carried out in the same box, says Arcam. Linked with a proprietary amplifier or Arcam's £250 *Black Box* the *170* is a "major and cost effective upgrade". In making a "one-job" piece of equipment Arcam engineers have been able to address just the problems facing them for that function. The transport, which employs the *CDM1 Mk 2* single laser beam mechanism, was developed with tracking and error correction, vibration, power supply isolation, and the "cleanliness" of digital outputs in mind.



One for the kids? MA's Baby Monitor.

BABY MONITOR

No, Monitor Audio hasn't branched into the ante-natal market, but it has officially launched its first *Baby Monitor 7* loudspeaker which retails for £150. First seen at the Bristol Show the *Baby Monitor* is a 34cm-high bookshelf or stand-mounted two-way model finished in black ash on Medite. It uses the aluminium dome tweeter designed for MA's *R352* and *R300MD* models and a long throw impregnated paper cone mid-and-bass unit.

TECHNICS FOR CD LOVERS

Touted as a "high-end audiophile CD player", the *SLP999* has been launched by Technics at a

premium of \$450.

Following the current numbers-game trend, *SLP999* goes up the sound quality ladder with linear 20-bit decoding and eight times oversampling circuitry. Four DACs (Digital to Analogue Convertors) are used to "eliminate zero cross distortion" and the oversampling

technology apparently copes with disc scratches and finger prints which have dogged this "perfect sound forever" medium.

A shuttle search dial for precise cueing and an auto-space facility to give a three-second space between songs make tape editing a simple job. Other features include a 'single-ready' disc tray, switchable digital output, headphone jack (with volume control), programmable memory, auto-cue plus the normal functions all operable with the inclusive 43-key remote control unit.

NEW LINES

Zenonlec, the upwardly mobile distribution network, has added three separate brands to its existing range. The company is re-importing Japanese Nikko electronics including CD players and tuners, and CEC turntables and CD players (also from Japan). It has also signed up Heco loudspeakers from West Germany, taking it out of its erstwhile 'accessory' mould once and for all. The Heco range consists of the *Interior* and *Superior* ranges as well as several in-car speaker systems.

New models for the domestic speakers are expected in May and Julian Angell of Zenonlec was expecting details as we went to press. Two examples of the existing models are being continued: the £149 *Interior 120*, and £399 *430* – a floor-standing two-way type which we've reviewed in this issue.

ONE FOR THE ROAD

Aiwa is exhibiting its new line-up of equipment, including a range of new separate amplifiers and tuners, in a roadshow during May.



Technics' new CD player: everything but the...

Enough personal stereos to put a different one on each head of a hydra, cassette decks and several new midi-systems will also be shown at venues throughout England.

The show kicks off at the Kensington Hilton Hotel in London on May 10th, goes to the Imperial Hotel in Harrogate on the 15th and 16th; Britannia in Manchester on the 18th; Hinckley Island Hotel (Leicestershire) on the 23rd and winds up in Bristol at the Holiday Inn on the 25th.

BASS-IC NEEDS?

Moving air with a 'small' box is the proclaimed ability of TDL's new diminutive (for TDL!) *Studio One* transmission-line loudspeaker. The *Studio One*, which measures 76cm high, is the smallest and latest in TDL's Transmission Line range and costs £549 a pair with 10 cm high stands extra at £75 a pair. The speaker has been developed to produce deep extended bass in small rooms and TDL says "no room is necessarily too small to cope with these speakers".

The guts of a TDL Studio One: built to move air rather than break wind



Philips' answer to TV sound giving you the blues.

Internally the front-ported *Studio One* uses a braced and damped loading enclosure to move air. Treble is provided by a metal-dome tweeter set below the main polyolefin cone driver.

SILENT MOVIES

Natty gadgets are all the rage these days... now you can watch the late-night horror movie without disturbing the husband/wife/kids/gerbils. One of the latest ideas taking advantage of

infra-red sensors is the Philips remote headphone set currently being offered free with its 1518 television. The £40 *SBC3180* headphones can also be bought separately and are compatible with any TV with a headphone socket. "Cable-free movement (even in bed)" is the heralded advantage of this package – obviously the possibilities are endless...

SOUND IN THE LIBRARY

Allison Acoustics, recently re-established here, has announced three bookshelf loudspeakers to its existing range. Made in Massachusetts the models are from Allison's *AL* Series and are priced £149 for the 14-inch high *AL105*, £199 for the *AL110* and £249 for the *AL115*. Finished in black, oak or walnut vinyl woodgrain the speakers carry a five year guarantee and feature driver protection circuitry to avoid mishaps at parties. Further details/dealers from Allison Acoustics, Huddersfield Telephone (0484) 603965.

TECHNOLOGY

SEEDY STORIES

April's edition of *Which?* magazine carried some alarming findings from its readers about the reliability of CD players and, more importantly, discs themselves. Ten per cent of CD players owned by the readers had broken down at least once although there was apparently no significant difference between

brands. Problems were cited as jumping or sticking during play and loading/ejecting faults.

Nearly 30 per cent of the survey respondents had experienced problems with discs (again with no great difference between labels). More than three-quarters of these faults were apparent from new, and *Which?* did not comment adversely on incidence of CD-rot though a small number of its readers reported disc problems "after a period of time" even with proper handling.

The survey's findings were based on just under 3,600 replies to a randomly sent members' questionnaire last autumn. One in five *Which?* members had a CD player.

IN BRIEF

Stereo Hi-Fi Installations, the domestic installation specialist has been bought by Michael Stevens and Partners which deals with similar professional audio applications. The new address is Invicta Works, Elliott Road, Bromley, Kent. Tel: (01) 460 7299.

In-car as well as domestic hi-fi will be featured in this year's National Sound and Vision Show, held at The Last Drop Inn, Bolton, Lancashire from Friday October 6th to Sunday October 8th.

Aberdeen Audio has a new branch called Hi-Fi Excellence, opening in early June to deal solely with hi-fi. The new shop, in Skene Square, Aberdeen, will have two single-speaker demonstration rooms and will stock Musical Fidelity and Cambridge products as well as those currently available through Aberdeen Audio.

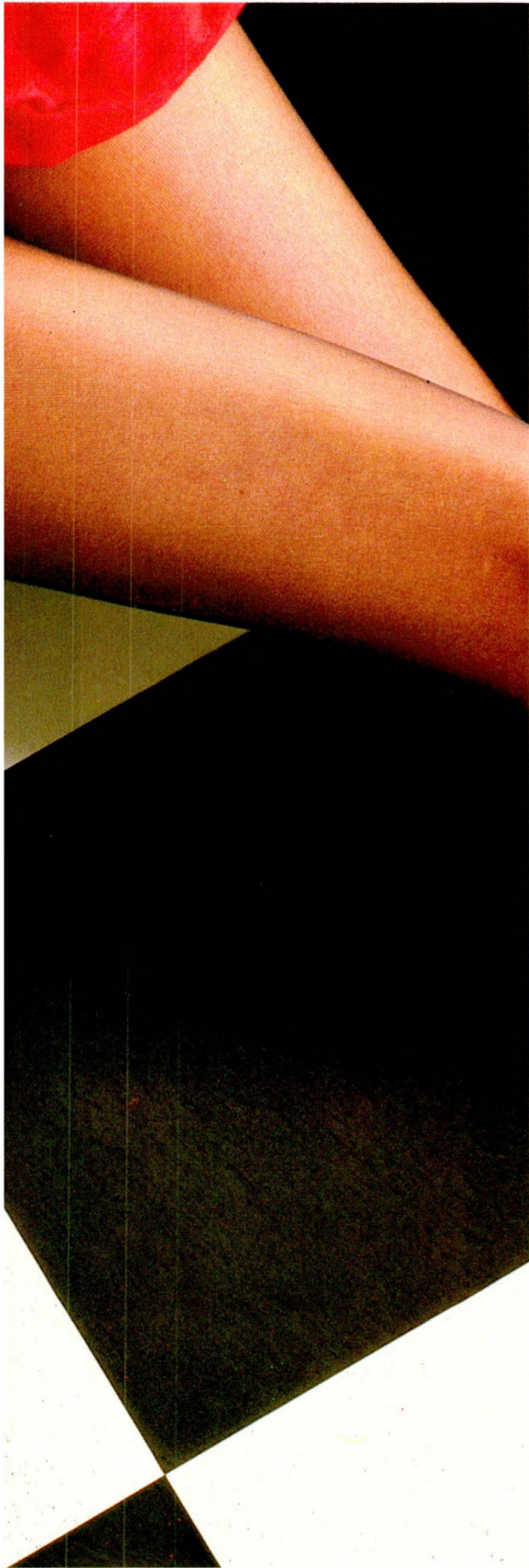
A demonstration of Revox multi-room link-up systems will be held at Spalding Electrical in Croydon on Tuesday May 23rd from 9.00am to 2.00pm.

Stereo Stereo, of Glasgow is holding a Linn clinic and musical evenings on Wednesday May 31st and Thursday June 1st at its St. Vincent Street premises. Wander in or 'phone for details: (041) 248 4079.

Beware of imitations



VS-75EK



Most of us have different pieces of equipment at home needing separate remote controls - TVs, video recorders, midi systems etc.

Being an audio/visual company, Akai looked at the problem of how to integrate them and came up with the perfect solution.

The Universal Remote Control.

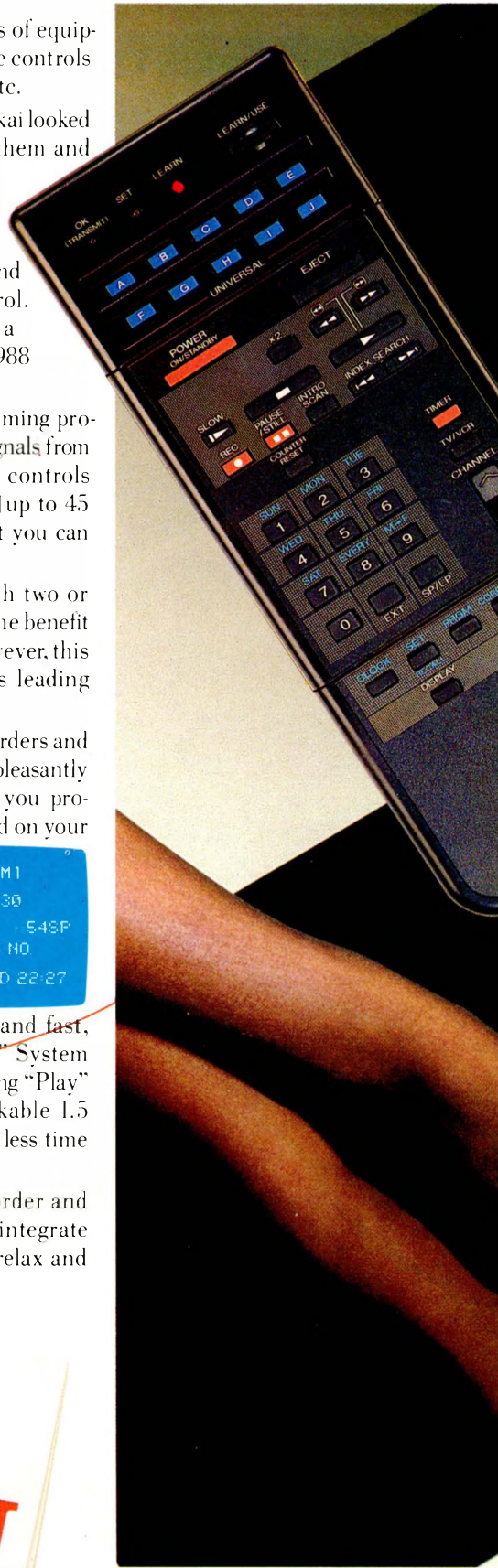
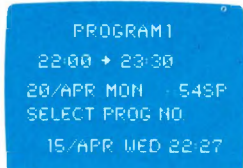
It's a new concept that allows you to control your complete audio and visual system with one remote control. It comes not as a costly option, but as a standard feature on four of our new 1988 video cassette recorders.

By following the simple programming procedures you can transfer the control signals from all your existing (infra-red) remote controls onto our Universal Remote Control (up to 45 functions can be operated). After that you can throw your old ones away.

Any person who has juggled with two or three remote controls can appreciate the benefit of our Universal Remote Control. However, this is only the latest example in Akai's leading position in audio/visual technology.

Choose one of our new video recorders and you'll find other Akai features that will pleasantly surprise you. Like IMS which gives you programming instructions clearly displayed on your TV screen, with the controls at your fingertips...or finding the beginning of recordings now made simple (thanks to our "Index Search" and "Intro Scan") and fast, because of our **QSS** "Quick Start" System which cuts the delay between selecting "Play" or "Record" and action to a remarkable 1.5 seconds, all of which means you spend less time searching more time enjoying.

So now, with an Akai video recorder and Universal Remote Control, you can integrate your audio/visual system, sit back, relax and enjoy it.



For more information on the Akai range of products.

please phone our Sales Desk on 01-897 0951



WBT HI-FI ACCESSORIES OFFER

Get the best from your hi-fi and save £s with high quality connectors.



Ever felt like making up your own interconnects or improving the quality of the plugs and sockets around your system? Now's your chance to do it and do it properly. *Hi-Fi Choice* in conjunction with Absolute Sounds are offering you the chance to buy the very best audio connectors at a discount.

The German WBT company produces a comprehensive range of high quality gold plated plugs and sockets, which includes two varieties of phono plug, loudspeaker plugs and an array of sexy accessories.

The WBT-0101/0150 lockable RCA phono plugs are for soldered connections and come in two sizes, for up to 9mm and 11mm diameter cables respectively. The alternative is the WBT-0108 which has screw terminals and should be used with WBT-0425 endsleeves for best results. These gold plated tubes are crimped onto the cable ends and ensure an airtight connection without the fiddle of soldering. And for a really professional look to your home-made cables, you can finish the leads off with spiral sleeves. (Note: you don't use spiral sleeves with cables exceeding 7.3mm diameter.)

If you want to improve your loudspeaker terminals and feel confident with a Black & Decker in your hands, look no further than the beefy WBT-0700 4mm pole terminals. These are designed to accept any form of speaker connection from bare wire to banana plugs and can be fitted to virtually any loudspeaker.

Perfect for all loudspeaker connections, the WBT-0600 4mm lockable 'banana' plug fits cables ranging from 2.5 to 16mm², so no more effort with large cable cross sections. For thinner cables use the WBT-0570 spiral sleeve. The 0600 can either be crimped or soldered – just as you wish.

The WBT-0200 is a top quality phono socket, just the job for cabinet mounting, for casing-wall thicknesses ranging from 0.5-6.0mm.

WBT supplies audiophile solder too (WBT-0800), and once you've perfected your connections put your cable-jungle in order and label your cables with the WBT-0500 labelling card. These sticky-backed labels are marked 'CD', 'Tape', 'Video' etc and can be wrapped around cables and connectors to make identification easy when wrestling at the back of your audio gear.

WBT products are designed to make DIY connection upgrades a painless – even, dare we say it, fulfilling pastime. We suggest you check 'em out!

TO ORDER WBT ACCESSORIES

(Tick selections)

	Recommended Retail Price	Our Price
<input type="checkbox"/> WBT-0101 RCA Male for 9mm cable	£12.95	£10.95
<input type="checkbox"/> WBT-0108 RCA Male for 9mm cable crimp-type	£15.50	£13.50
<input type="checkbox"/> WBT-0150 RCA Male for 11mm cable	£17.50	£14.95
<input type="checkbox"/> WBT-0200 Chassis mount RCA Female	£12.95	£10.95
<input type="checkbox"/> WBT-0425 Strand end sleeves for WBT-0108	£ 1.95	£ 1.60
<input type="checkbox"/> WBT-0500 Labelling card (only available with minimum order of £5.75)	£ 1.95	£ 1.60
<input type="checkbox"/> WBT-0550 Spiral sleeve (5mm cable entry)	£ 1.95	£ 1.60
<input type="checkbox"/> WBT-0560 Spiral sleeve (6.2mm cable entry)	£ 1.95	£ 1.60
<input type="checkbox"/> WBT-0570 Spiral sleeve (7.3mm cable entry)	£ 1.95	£ 1.60
<input type="checkbox"/> WBT-0600 4mm Banana plug (lockable)	£16.75	£14.25
<input type="checkbox"/> WBT-0700 4mm Pole Terminal	£16.25	£13.75
<input type="checkbox"/> WBT-0800 Silver solder (0.9mm x 10 metre)	£ 6.75	£ 5.75

PAYMENT

- I enclose cheque/PO made payable to Dennis Publishing for _____
 (£5.75 minimum order)
- Please charge my Access/Visa
 (delete as appropriate)

Credit card number _____ Expiry date _____

Signature _____

Name _____

Address _____

Postcode _____

HFC/WBT/1

Please send order form with payment to:
 Hi-Fi Choice Mail Order, PO Box 320, London N21 2NB.

All our prices are inclusive of postage, packing and VAT. Please allow 28 days for delivery. Available to UK readers only.

A & R • AR • Ariston • Audiolab • Audioquest • Audio Technica •

• Nagaoaka • Nakamichi • Ortofon • Quad • QED • Revolver • Revox • Rotel • SME • Sennheiser • Spondor • Stax • Systemdek • Tannoy • Target • Thorens • Wharfedale • Yamaha • Zeta •

B.L.Q. • B & W • Beard • Beyer • Celestion • Cyrus • Decca • Denon • Dual • Gale • Goldbug • Goldring • Goodmans • Grado • Heybrook • I.T.L. • Incatech • Jekyll • KEF • Kenwood • Linn • Linn •

BUY THE BEST OR THE BEST YOUR MONEY WILL BUY

We cater for all budgets

Our trade mark is value for money. Whether you wish to purchase a modest priced system or a esoteric set-up you've come to the right place!

Our staff are both friendly and helpful, from a budget CD to a Linn/Ekos their sole aim is your complete satisfaction. Call Chris, Richard, Graham or James for an appointment, please bring along your favourite record or CD and we will be delighted to demonstrate from our extensive range of equipment.

NEW CYRUS *MISSION* SPEAKERS

Mission have always enjoyed an enviable reputation for their loudspeakers but the latest models are extra special. Come along and give them a listen and you'll be just as impressed as we were. The 781 and 782 represent the finest value around at under £250 and £400 respectively. Also available in rosewood at no extra cost.



SPECIAL OFFERS

	WAS	NOW
AMPLIFIERS		
LINX Nebula Integrated Amp. S/H	£349.00	£229.00
MUSICAL FIDELITY Pre-Amp/		
QUAD 405 I Combination S/H	£500.00	£249.00
SPEAKERS		
MISSION 780 Argonaut Ex-Dem	£699.00	£549.00
TDL Studio III S/H Mint	£650.00	£399.00
CASSETTE DECKS		
KENWOOD KX66 Top Value		
Double Deck	£169.00	£149.00
YAMAHA KX1200 Top of Range		
3 Heads etc etc NEW	£500.00	£449.00

For the collector — an original
LOWTHER ACOUSTA stereo speaker system... OFFERS?

Where to find us

KOSS

Infra Red Headphones
Cordless!

Including Infra Red Receiver — Complete

ONLY £149.00

HARROW AUDIO

27 Springfield Rd., Harrow, Middlesex
Telephone: 01-863 0938

NOW OPEN MON - SAT



Manticore • Marantz • Mission • Monitor Audio • Musical Fidelity

DON'T MISS THE STATE OF THE ART ISSUE OF HI-FI CHOICE

The Collection

PACKED WITH REVIEWS
ON THE VERY BEST IN
HIGH-END AUDIO



Including the latest from
CONRAD-JOHNSON, KRELL, APOGEE, SONY,
VOYD, STAX, MICROMEGA, ZARATHUSTRA
and many others.

PLUS...

ASPIRATIONS — looks at hi-fi in luxurious surroundings and we get to hear the unbelievable Martin-Logan *Statement* loudspeakers which cost a cool £49,000.

PLUS...

NEWS, VIEWS, AND MUCH, MUCH MORE.

HI-FI CHOICE

JULY ISSUE ON SALE JUNE 9th

COMPETITION

Hi-Fi Choice and Marantz have got together to offer you the chance to win a selection of fabulous hi-fi and video components.

With our April, May and June issues we are giving away three CD75/II compact disc players, plus a £4,000 complete system comprising CD94/CDA94 two-box CD player, PM94 amplifier, SD55 cassette deck, ST54 AM/FM tuner, LD50 DMS bi-wireable loudspeakers . . . and a CV55 CD-Video combi player. This month there will also be a runner-up prize of another CV55 CD-V machine.

Over £5,000 worth of Marantz separates to be won!

1st PRIZE: Complete separates system including CD94/CDA94 two-box CD player and a separate CV55 CD-Video.

2nd PRIZE: CV55 CD-Video combi player.

PLUS: A CD75/II CD player to be won.



THE COMPETITION

Here's how it all works. Each month we have had a simple competition consisting of five questions requiring one word answers. Fill in your answers on the entry form provided, remembering to include your full name and address, and send it to us at the address shown at the bottom of the page. The first correct entry drawn from our mailbag after the closing date wins a *CD75/III* compact disc player.

We had a *CD75/III* up for grabs in the April and May issues and there's a final chance to win one this month.

To win the Marantz system:

If you are a regular reader and have saved the *System Entry Forms* from the April and May issues you now have the chance to win a complete separates system.

Obviously this is a little more challenging; there are two additional questions to be answered which, although one word answers, are a trifle cryptic. But get your brains into gear and you'll soon have them licked!

If you missed the last two issues copies can be purchased from our Mail Order department. See page 109 for details. When you have completed the answers on all three *System Entry Forms* – the ones published in our April and May issues and this one – clip them together and send to the address at the bottom of the page,

clearly marking your envelope 'SYSTEM' in the top left corner. Similar rules apply in that the first correct set of entries pulled from the mailbag on the competition closing date wins the fabulous system complete with two-box CD player and separate *CD-V* player. We also have a runner-up prize of a *CV55 CD-V* machine for the second set of correct entries.

Of course, there's nothing stopping you trying to win a *CD75/III* as well – but the entry form must be **posted separately**.

THE QUESTIONS

1. When CD was launched it was touted as offering 'Perfect Sound $\square \square \square \square \square \square \square$ '.
2. The soundtrack on a Hi-fi video recorder uses an FM multiplexing system. FM stands for $\square \square \square \square \square \square$ Modulation.
3. A CD player's optical digital output allows it to be connected to an external DAC using a $\square \square \square \square \square \square$ optic cable.
4. VTA stands for Vertical Tracking Angle; SRA stands for Stylus $\square \square \square \square$ Angle.
5. A loudspeaker's sensitivity rating of, say, 87dB for 2.83V measured at 1metre distance might otherwise be described as 87dB/1 $\square \square \square \square$ / 1metre.

And for the system . . .

6. Males on the move . . . Stereo sound for your ears only. $\square \square \square \square \square \square \square \square$
7. Canton's loudspeakers improve night vision? $\square \square \square \square \square \square$

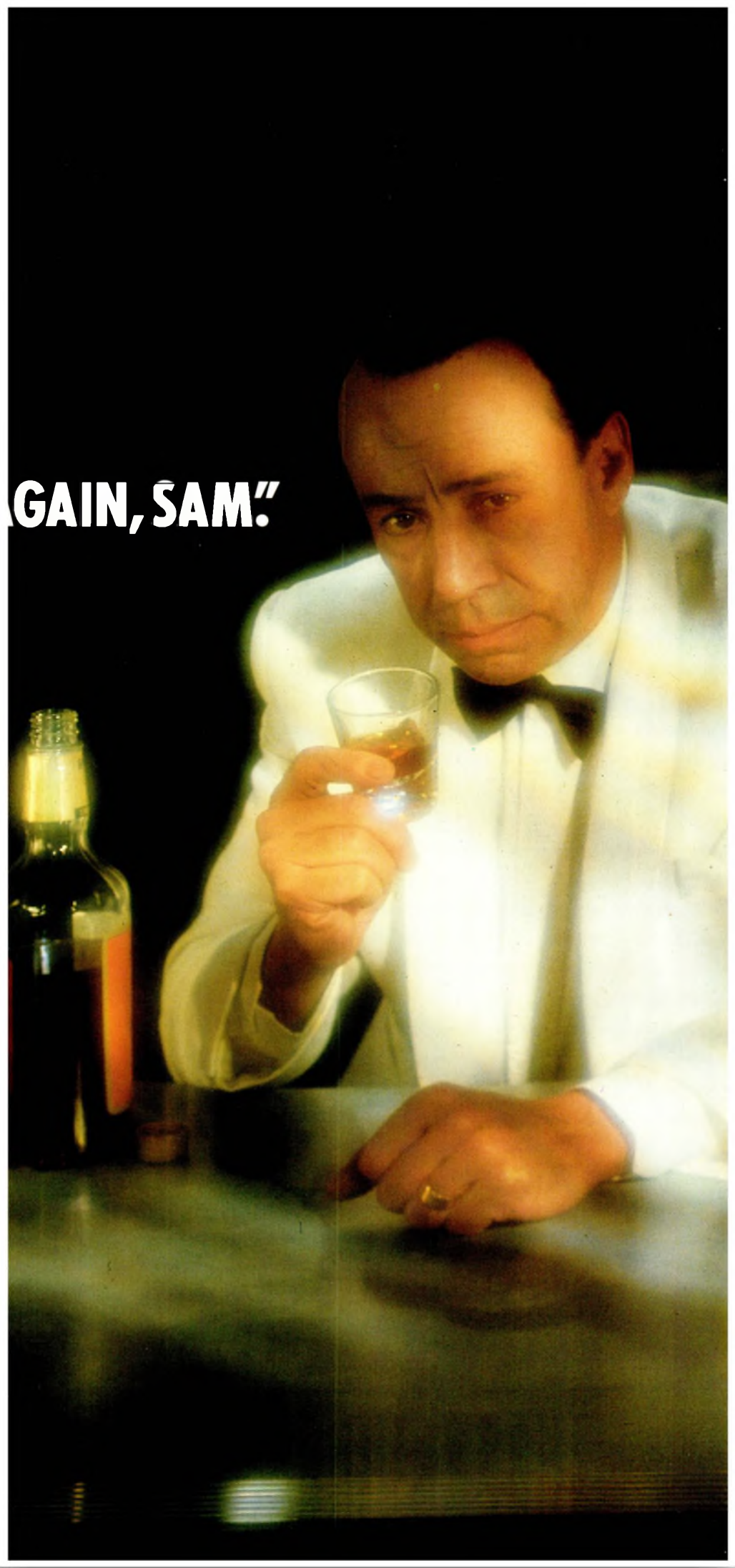


COMPETITION RULES

- 1) All entries must be on the entry forms provided. Photocopies will not be accepted. Entrants for the system prize must submit completed entry forms for all three parts, in a single envelope. Incomplete entries will not be considered.
- 2) There is no cash or other alternative to the prize.
- 3) Employees of Dennis Publishing Ltd and associated companies, or their agents, or of the manufacturers and suppliers of the prize system components or their relatives are not

- eligible to enter the competition.
- 4) The competition is not open to readers living outside the United Kingdom.
- 5) The prizes in each competition section will be awarded to the first set of correct answers opened. The Editor's decision shall be final and binding. No correspondence whatsoever will be entered into regarding the competition.
- 6) The winners will be notified by post and the results will be announced in *Hi-Fi Choice*.

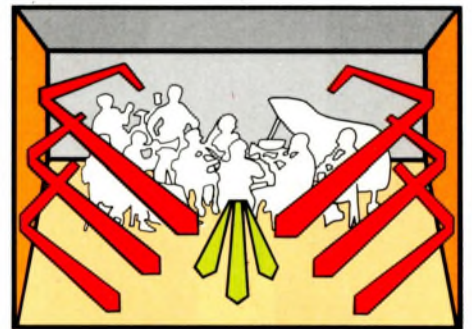
GAIN, SAM."



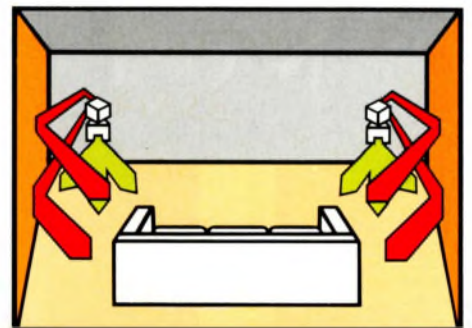
In all the bars and the best clubs in the world it has to be Bose loudspeakers. Does your home deserve any less?

The revolutionary Bose Acoustimass system, with speakers smaller than a bottle, will fill your room with beautiful sound, without compromising your living space.

The tiny cube arrays can be positioned almost anywhere, whilst the Acoustimass bass module can be hidden away, under your furniture, behind curtains or in a corner, yet still produce a crisp bass sound that seems to come from the cube array.



In club or concert hall you hear mostly reflected sound.



Bose Direct/Reflecting speakers reproduce this accurately all round.

This is only possible with Bose's patented Acoustimass technique! The bass sound is launched by two air columns (acoustic masses) instead of by a moving surface of a speaker.

The Acoustimass speaker system is available in black or white, and delivers up to 100 watts of the purest sound you've ever heard.

BOSE[®]
Better sound through research

Bose (UK) Limited, Trinity Trading Estate,
Sittingbourne, Kent ME10 2PD. Tel: 0795 75341.





M A R A N T Z.

N O T F O R T H E

C A S U A L

L I S T E N E R.

You don't buy Marantz hifi to hear music. You buy it to listen. To appreciate every aspect, every subtle nuance of sound in a musical piece.

Thirty years ago Saul Marantz said, 'for us the realistic reproduction of music is the essential premise'.

These words set the standard that continues to this day.

That's why Marantz still uses its own custom components and technologies throughout the entire hifi range. Because it's still the only way to achieve pure high fidelity. After all, there is just one ultimate test of musical perfection - listening.

marantz
PURE HIGH FIDELITY

CD 12 Reference Standard Compact Disc Player.





CHOICE SESSIONS

Things we hear . . . This month a CD-ROM based computer games machine which doubles as a compact disc player (yes, really!), and with its 'clip' player Philips brings the price of CDV down to £349.



GAMES PEOPLE PLAY

Paul Miller has fun and games with a CD player called the PC Engine

With CDV having taken us a step closer toward wholly integrated audio/visual systems, it appears that now even home games computers are drawing upon CD technology to expand their repertoire. The CD in this case is CD-ROM, where the 600MBytes storage capacity available on each silver disc is used to accommodate program data instead of 100 per cent audio data. For instance, Mirrorsoft has recently launched a CD-ROM version of *Defender of the Crown*, targeted at EGA PC owners equipped with ROM drive and interface peripherals. All great stuff, but still rather specialised.

As a result the practical use of CD-ROM drives in a unified home entertainment system is likely to originate from another source – the dedicated games console. One of the first games consoles to be launched was the *PC Engine*, conceived by NEC over a year ago as the heart of an upgradeable entertainment centre. The *PC Engine* is now imported by Micromedia and in its most basic form costs around £200 for both PAL and SCART video output formats. The *Engine* is not exactly a grey import but Micromedia has struck a less than favourable deal with NEC; for example the 8 bit Sega console retails for around £75.

The *Engine's* processing speed is a fast 18MHz (about three times faster than the Amiga) while its 8 bit CPU and 1Meg on-board RAM accommodate 512 colours and shades with simultaneous control of some 64 sprites! Games software is loaded in the form of 2Meg 'credit cards', and a library of some 30 or 40 titles is currently available, though these constitute a mix of both Japanese and English coin-op conversions. Either way the video output of my *PC Engine* contained no chrominance signal and so games could only be viewed in glorious black and white – a situation easily rectified by pressing a Philips *CM8833* medium-resolution monitor with SCART socket into service.

Philips is keen to promote the virtues of the SCART or 'Euroconnector', its separate audio, red, blue, green and fast blanking pins offering a visual clarity and resolution exceeding that available from any conventional PAL TV set. The complete absence of attribute clash, coupled with huge multi-coloured, fast response sprites brings the *PC Engine* up to arcade quality: classic 'shoot-em-up' coin-ops such as *Space Harrier*, *R-Type 1* and *Galaga 88* are virtually indistinguishable from the 'real thing'. The *Engine* even incorporates a six channel, eight octave sound chip to afford a basic two-channel stereo sound along with most games.

Nevertheless, alongside the superlative SCART video images the sound quality

PC-Engine with the circuit boards removed and disc from a CD arcade machine (above). Below, the range of PC-Engine CD-ROM gadgetry.



remains distinctly 'naïf'. NEC has addressed this problem by launching a dedicated CD-ROM package, the *CDR-30*, that links up with the *Engine* via a proprietary interface unit. The £280 *CDR-30* is based on a rudimentary portable CD player and may be used as such if detached from the interface/system controller (which costs an extra £160). Current CD-ROM discs contain separate audio and program data tracks, the latter being loaded into the *Engine's* RAM while the audio sections are commanded via the interface at the appropriate moment.

Recent estimates suggest that around 100,000 CD-ROM drives are currently in use

Software control: the on-screen display for the compact disc player facility.

around the world, but if only a fraction of *PC Engine* owners take the plunge, this figure is set to quadruple overnight. The beauty of this format is the vast storage space that is made available to the games programmer, the prospects for interactive and adventure-style games are almost boundless given the 300x increase in ROM space over conventional 2Meg cartridges or cards.

The cost of pressing a CD is also between five to ten times cheaper than the manufacturing cost of a sealed ROM cartridge, so CDs are likely to point the way ahead. As it stands, simply hook up the fully fledged *PC Engine* to your hi fi system and games such as *Defender* . . . and *Street Fighter* are launched at you with a blaze of CD quality stereo sound . . .

Of course, the pictorial data is still stored as a Bit-mapped (rasta) image so full-motion animation video style is not yet available. Remember, even the classic arcade games such as *Dragon's Lair* were based on the analogue Laserdisc system, with joystick commands calling up defined track sequences from the disc. The application of CDV for gaming purposes is not yet a reality – at best it would have to be interfaced with a computer where the CDV data could be re-configured for use in a glorified analogue system.

But what of the portable *CDR-30* itself? Well, it's a fairly basic 16-bit machine using a single time shared convertor and principal ICs culled from both the Sony and NEC range. For instance it offers both headphone and line outputs with elementary facilities such as track skip and all repeat. Technically the *CDR-30* is no great shakes either, though the resolution of -3.36dB at -90dB did come as something of a surprise. Its line output is phase-inverting and clocks in some 3.7dB down on the nominal 2V standard while THD and IMD hover around 0.1 per cent at 0dB, increasing to 5.6 per cent at -60dB.

The line output is reasonably flat but experiences a +0.5dB lift at 15kHz just as the headphone output demonstrates a rather lacklustre HF response. Stop-band noise is reduced to -26.3dB.

Subjectively the *CDR-30* was severely trounced by both the Technics *SL-XP6* portable and most equivalently priced full-sized models, such as the Marantz *CD65/III*. Via its line outputs the player sounded moderately detailed and tonally neutral but it was also rather lacklustre and uninvolving. Deep bass notes were conspicuous by their absence while stereo perspectives were mildly flattened, lending a thin and insubstantial feel to large scale orchestral works.

However, the player did not sound objectionably bright, coarse certainly, but not overly forward or aggressive. This said, I did notice some exaggeration of vocal sibilants even though this had a smearing influence rather than contributing to an icy coloration.

Neither NEC nor Micromedia make any



The PC-Engine CD-ROM system in its carrying case/interface unit - CD player on left, games console unit on right



Games: the famous and immensely popular R-Type on the PC-Engine.

great claims for the subjective quality of the player if only because, first and foremost, the *CDR-30* is a CD-ROM drive. As such it has other tricks up its sleeve. Once the *CDR-30* is connected to the *PC Engine* and the CD-ROM system card is loaded, a whole host of features and facilities become available. The system card generates a colourful icon-driven TV display that allows the *CDR-30* to be operated as a CD player, but using the screen menu and accompanying joystick as a kind of wired remote control!

Software-derived facilities include fast music search, direct track access, a 99-track random access memory, L/R level indicators, full track and time notation, A/B repeat, random play and intro search. These may be the sort of features that grace full-sized players costing upwards of £250 but then the Sonys and Marantzes of this world cannot play computer games . . .

Looking deeper into the crystal ball the next logical step forward will be taken once the CD-ROM XA (Extended Architecture) format gets off the ground. Standards for CD-ROM XA have been agreed between Philips, Sony and Microsoft allowing both program and audio data to be interleaved onto com-

mon tracks. The first drives are likely to appear in late '89 and will allow continuous visual scrolling (25 frames per second), together with continuous 2-channel 16-bit audio. Couple technology like this with the very latest 16-bit dedicated games console announced by Sega, and the prospect of an all digital audio/visual/games package does not seem quite so far-fetched after all.

CDV - WHAT NEXT?

Philips has launched a CDV 'clip' player priced at just £349. John Bamford speculates on the future of the medium.

The integration of audio and video seems to be a topical subject this month. Stereo TV broadcasting is imminent, and those fortunate enough to already own one of the latest hi-tech TV sets or (more likely) a hi-fi video recorder with the necessary on-board NICAM decoder can look forward to receiving high quality stereo sound along with their television pictures. Many programmes are being broadcast in stereo right at this moment, as test engineers are running checks and getting to grips with the new system. ITV and

Channel 4 are threatening to launch stereo in September; the BBC's line is that it's holding off until it can cover most of the country in one hit – scheduled for the autumn of 1991.

With so many exciting developments emerging in the progressing technology of audio-visual systems – not just NICAM stereo, but also S-VHS (for super quality video pictures, as near as dammit 'broadcast quality') and satellite TV too – one can't help wondering where exactly CD-Video is supposed to fit into the scheme of things. Do we really want to buy and collect feature films on large video discs? Can we really be bothered with having Eurythmics in concert or Tears For Fears' *Songs From The Big Chair* on unwieldy silver discs? My feeling is that improved picture quality or no, consumers would just as soon stick to the tapes they're familiar with. Apart from a very small minority of video picture buffs who get kicks from having near-perfect jitter-free freeze frame etc (facilities which are more crucial to schools and conference halls than people's living rooms), VHS tapes are considered by most viewers/listeners to be perfectly adequate. Besides, if you're building a library of tapes they look quite neat on the bookshelf too.

To my mind the discs which *are* attractive to consumers are the 12cm (5-inch) gold coloured 'video singles'. £4.99 for a disc which contains a five-minute pop video along with a further 20 minutes of music (the equivalent of a 12-inch single which would cost the best part of £4 anyway) seems almost too good to be true. Surely there's not a teenager in the land who wouldn't want to buy them?

But there's a catch. Young people who currently spend their pocket money on music video tapes play those tapes on their parents' VCRs. Clearly they'd love to buy CDV singles

– but they're unlikely to bother unless mom and pop have a CDV player.

I predict therefore (ahem) that it won't be too long before CDV players become de rigueur in packaged midi systems. During the past few years manufacturers have used graphic equalisers, Dolby NR, twin 'dubbing' cassette decks and, more recently, CD players to attract customers, this area of consumer electronics marketing relying heavily on 'feature counts' to sell products, not quality of high fidelity performance. Put yourself in the shoes of a marketing person for a moment and imagine how easy it would be to promote and sell a CD-based midi system which, for an extra £60 or so, could also play gold-coloured video discs when wired up to one of the household's many TV sets. It needs promoting with a massive TV-based advertising campaign, and the discs need to flood onto the market concurrently, but the vision of millions of homes worldwide soon owning midi systems which are 'CDV capable' doesn't seem that far fetched. It's all down to the hardware and software manufacturers colluding and getting it right.

So far they haven't got it right. But revolutions can't happen overnight. The CDV players you've seen reviewed in magazines to date are 'combi' players which play all sizes of video discs (5, 8, 10 and 12 inch) as well as 'ordinary' CDs. They work well enough, for sure, but to my mind are of limited commercial potential and destined to become dinosaurs. The sales pitch that they're CD players which cost rather more but have the added capability of playing video discs isn't quite strong enough to capture people's imaginations, primarily because the larger price tag is just a bit *too* large.

Perhaps this is where CDV clip (as in 'video clip') players come in. Philips' *CDV 185* is one such machine, a neat midi-sized component which to the outside world looks

much like any ordinary CD player. On the back panel there are conventional outputs for hooking the machine into a hi-fi system (although digital Out is coaxial only – there's no fibre-optic cable option), and there are also separate audio and video output sockets for AV systems and a multi-pin SCART socket (Euroconnector).

On the CDV front it does everything it should. Picture quality is superior to most home-owned VCRs, though variability in disc quality is thrown into sharp relief when viewing with a critical eye. Meanwhile on the 'ordinary' CD side of things the player is right up there with the best sounding players available today. The *CDV 185* employs Philips' dual 16-bit digital-to-analogue converter and four-times oversampling digital filter, and offers all essential operational and programming options. The remote control handset includes a 10-key pad for direct track access.

Used in a high quality hi-fi system the differences observed between this CDV clip machine and the highly regarded Marantz *CD65/11SE* were really neither here nor there – the kind of subtle differences which only the most hardened audiophile would regard of any consequence. The Marantz CD player has just a little greater sense of ease and space to the sound, and the treble sounds more natural and less 'steely'. However, bearing in mind the *CDV 185's* ability to play CDVs in addition to standard audio CDs this Philips machine is certainly mighty impressive.

At just £349 it's hard to resist. But for the medium to really take off record companies have got to leap straight in at the deep end. A handful of titles isn't going to persuade anyone that CDV is a desirable thing to have at home. The market needs to be flooded with countless titles – from Abba to Zappa and all points in between.



Philips' £349 CDV 185 'clip' player is hard to resist



ASPIRATIONS

After 'retiring' from the wine trade to concentrate on competition javelin-throwing, this month's host kitted out his aspirational interior with some of the most exotic hi-fi money can buy.



French bottles, both vinous and valvular, in the Staintons' basement (above). Nigel and his alternative foot warmers at table (right).



Selling three cases of vintage Chateau D'Yquem wine to fund a new found passion for hi-fi must be a lot easier when you've given up drinking. Even so the Sauternes, described as "the ultimate dessert accompaniment", only provided the power amplification for this extraordinary system which totals up at somewhere over £22,000 and includes some of the rarest audio exotica around. Ironically perhaps, the best of French wine has been replaced by the best of French valve monobloks (a pair of Jadis JA30s) in the fusty cellars of this 1852 house.

Welcome to the home of 29 year-old Nigel Stainton, who quit his city nine-to-five to re-pursue an early ambition of getting to the top in world-class javelin throwing. Nigel, teetotal in the name of sport, bought this Buckinghamshire home three

The French Connection



years ago and employed the London architect Ken Armstrong to "open it up" as it were, giving him and his acupuncturist wife three floors for spacious living. The back of the house overlooks the rolling Chilterns beyond a garden that looks like a football pitch – not just in terms of size, as Nigel explained. His two Irish Wolfhound dogs, Wendle and Strider, make a fair job of preventing grass growth.

Entering the house is a little like entering an art gallery, with paintings, some miniature, some man-size adorning the walls throughout. Four large abstract works are by Duncan Hulme – a friend from student days in Bath. On the chimney

breast which separates the dining room from the otherwise open-plan kitchen hangs a gloriously beached contemporary nude, by Day Bowman, bringing colour to the black and white tones on that side of the room. The kitchen, in spite of an Aga and the homely rows of pasta and pulses in jars, is tonally monochromatic and hi-tech looking. It also houses Nigel Stainton's previous hi-fi system – an Aiwa cassette deck and pair of Wharfedale *Active Diamonds* ... some upgrade!

The only evidence of prints are Victorian, city scapes of Paris, Rome and Naples, hung in matching Edward Lutyens frames in the drawing room, which borders

the other side of the dining area.

Three dimensional art is also in evidence such as the sculpted cephalopod in the dining room and a pair of hall tables. And you could even describe the candlesticks as art, "we were given six pairs for Christmas," explained Nigel. The drawing room also houses a collection of Victorian Doulton vases inherited from his father who died three and a half years ago. Art is something Nigel Stainton grew up with, the Victorian prints were his grandfather's and he describes his uncle as a collector.

Despite the greater value of some of his inherited works he appeared to prefer the contemporaries. Sitting in the dining room



he told me: "I enjoy the four major paintings in here because I know the people who did them and so can understand the process of what they're doing." Appreciating something more because you know its creator also applies to our host's very rare preamplifier which he preferred to other more expensive types he auditioned. Peter Sanhen, its maker, had visited several times while he was choosing his system.

The house and its contents incorporate a variety of styles drawn from different ages and different areas of the world. The French windows have a Japanese flavour to them, reflecting the clean cut lines of Armstrong's approach which combines clarity of form using traditional materials to create "simple but not simplistic" environments. The result is therefore

timeless and the hi-fi being 'on show' as opposed to hidden in cupboards didn't feel out of place in its drawing room corner.

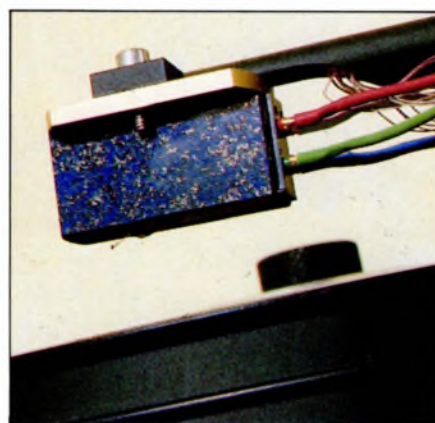
The opening up of the dining room also places its table directly above the cellar creating the theme, even if subliminal, of sitting on one's consumable investments – both vinous and valvular! And Nigel pointed out that the house had been designed to 'rotate around the table' – the dining room is an extension of the hallway, and it is the table (and the dogs who sleep under it) which first greets visitors.

The other floors of the house provide master and spare bedrooms, a study housing a computer used to keep training records and Mrs Stainton's acupuncture practice room (no jokes about 'pin money' please!). Previously redundant space

above the main bedroom has been turned into a bathroom under the eaves of the house. Bath-time involves climbing some steps before wallowing in one of those sunken tubs with the taps in the middle, next to a large circular window overlooking the west and hills. Isn't life a trial?

The system is (mostly) installed in the drawing room and sits in two identical Sound Factory *Tripod* stacks. The plain grey carpet and rag-rolled yellow walls of the room are offset by marbling above the picture rail around the room and grey marbled 'pillars' flanking the windows. Antique Persian rugs break up the floor space and the room focuses on the fireplace, a replacement of the original and often used – witness the carpet burns!

The hi-fi here fronts with the rare (and



The hi-fi is displayed in the drawing room, though the loudspeakers 'disappear' behind the music which begins its journey to them from the world's most expensive cartridge (left).

some might think odd) American *VPI* turntable, Swedish air-bearing *Airtangent* tonearm and Japanese Kiseki *Lapis Lazuli* cartridge combination. The latter is described as "the most exclusive moving coil cartridge in the world" – deriving its name from the Lazurite-rich stone flecked with Iron Pyrites (fools gold) from which its body is made. The finite life of such a cartridge makes depreciation a concern (for more humble mortals) every time you play a record – you're talking several pounds an hour here! The cartridge is highlighted in this setting by a matching cigarette box bought in Venice which Nigel "couldn't resist".

The record deck is imported by Moth Marketing and is described as being especially suited to air-bearing tonearms being

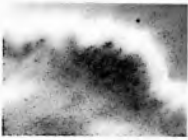
very heavy itself. It uses a Moth *Flutter Buster* two-speed power supply for cleaner mains. Vinyl is the main and preferred source but a Micromega CD player, Rotel tuner and Sony Pro-Walkman (ably used here as the cassette deck) are alternatives. The Sony's portability is handy for providing warm-up music and is used while limbering up before competitions.

These sources are connected via Audioplan *AF Incon* cable to one of Peter Sanhen's SP Audio *SPI.5* handmade solid state preamplifiers – an emergent species so far only available through KJ Westone. Five metres of van den Hul *MC Gold* cable then interconnect the signal with two Jadis *JABO* power amplifiers in the wine cellar. Supported on customised Sicomin Slabs the Jadis pair had been on for four days when we arrived so they were nice and warm! In fact you could feel their heat on your face but Nigel affirmed that they were not a danger to his supine wine collection which was maturing at just the right temperature.

Next to the brace of Jadis spare valves are also racked ready for use should any of those employed melt down (happily not a regular occurrence). Another of the cellar's occupants is the *Airtangent's* air pump which can burble away happily down there without being heard. The air passes through a tube (just like a fish tank pump) to the arm beam. Tiny jets of air between the beam and arm sleeve then support the linear tracking arm which is drawn hubwards by the stylus as it tracks the record groove with a near frictionless effect.

Hawsers of Audioplan *LS 12* loudspeaker cable are then employed to bi-wire the *Kontrast* loudspeakers on the other side of the floorboards above. The speakers can also be pulled out a few inches into the room for the preferred listening position and the hawsers have a handful of slack for this purpose.

Nigel visited several shops before deciding to buy his system from KJ Westone. His original intention had been to spend a lot less (in fact only about a quarter as



Matrix technology moves on . . . and now there are seven. Series 2 developments from B&W's three original Matrix 1, 2, 3 systems and famous 801 and 802 monitors, with Concept 90 CM1 and CM2 completing the range.



New models embodying the fruits

of our latest research through the music that inspired them. These speakers are in stock and available for demonstration in our demonstration rooms which may be booked in advance. B&W and Covent Garden Records will also be pleased to demonstrate any one of the B&W Matrix range for seven days in your home environment. We believe this is the only way to appreciate the original musical performance.*

LISTEN AND YOU'LL SEE



The **MATRIX** *Revolution*

COVENT GARDEN RECORDS
LONDON'S LARGEST COMPACT DISC SPECIALIST

84 CHARING CROSS ROAD, LONDON WC2H 0JA

FAX: 01-836 1345

TELEPHONE: 01-379 7635/7427

OPEN MON-SAT 10.00am to 7pm

*Phone for details and conditions – ask for Trevor, Robert or Mick.

much!) but his experience of the lack of realism of some cheaper 'expensive' systems he listened to was disappointing. The aim was to recreate reality in his fireplace; harking back to his enjoyment of art, he wanted to be aware of the people behind the music he told me. "It's essential to feel that the music is created by people and is not synthesised or artificial." Therefore the loudspeakers had to deliver exceptional imagery and soundstaging with a life-like dynamic range; they had to be able to disappear. If this was his aim he seems to have achieved it: "a lot of the time I think what are the speakers doing here? It's a wonderful sounding fireplace!" He also says the system creates an atmosphere even before the music comes on: "you can hear the ambient space of the hall before musicians start playing." The hi-fi was installed by Roy Gregory, latterly of KJ who paid several visits to the house while the system was being auditioned and set in place.

Nigel's favourite time for listening is "in the dark after people have gone to bed; the power supply is clean then and one's hearing is probably better." We were playing a Decca recording of Puccini's *Turandot* with the John Alldis Choir and London Philharmonic Orchestra. Nigel explained that he had recently seen the opera in London and had come home to "live through it again". And there were no criticisms of the system after this most acid of tests. Renewed interest in hi-fi also means he goes to live concerts now more than he used to.

Although opera and classical music are favourites, we also listened to some Fairground Attraction. Ella Fitzgerald and an especially musical Riverside Recording (1961) of Alberta Hunter and Lovie Austin's Blues Serenaders from the Chicago Living Legends series. One of the assets (or perhaps not) of a system like this is that you can hear the weaknesses and strengths in different recording techniques. There were a couple of original recordings tracks on the Ella disc and these and the Alberta Hunter music sounded extraordinarily lifelike with the promised disappearance of the loudspeakers. And it's sad, but the modern digital stuff just doesn't deliver.

The whole system has been 'Belted', a Gregorism for extensive treatment with (Peter Belt's) PWB Audio products which purport to improve (or at least change) one's perception of sound with a few 'magic' pieces of kit such as electret foils or a hand-held polariser. There isn't the space to go into the PWB process here (see *Choice* May 1988) – it's a contentious issue to say the least – but Roy did quite a good impersonation of the Leeds-based wizard when I asked him to take the PWB Platter Mat off for listening to a Miles Davies record. Playing it with and without the mat we were cajoled about the merits of the music à la PWB mode. Maybe I was having



Music is preferred on vinyl but the Micromega (above) is a suitable digital add-on for the discerning audiophile

a bad day, but I couldn't ascertain the demonstrated differences.

Entering the esoteric if ersatz areas of music making with high-end audio can be disappointing for some. It is only when you compare high-end equipment with its less ambitious contemporaries that you realise what it is you're paying for. And the ear is a natural economist; it's very good at making do with unreality or imperfections so that we get used to the hi-fi or audio sound. The problem, or obstacle most people balk at is that of equating the staggering leaps forward in price with the ever decreasing steps up in realism and sound quality. It is similar to a racing yacht or car – passion rules and you throw money at it without any regard to the real economies involved. But as Roy Gregory explained, cheaper systems "do less" and a set-up like this plays an active part in recreating a musical experience which is almost eerie once you start listening properly. And some would say it's even better than the real thing – at least you haven't got the distractions of the audience – sweet suckers 'n all.

What does the future hold for the owner of such a system beyond replacing the solid diamond cantilever on his *Lapis* at some

future date? Nigel's sporting aim is to take him to the Commonwealth Games in Auckland this winter. "If I win that then I'll buy another pair of Jadis amplifiers and bi-amp the system," he joked.

The system:

VPI HW19/11 turntable	£1,400
Airtangent/II tonearm	£2,000
Audioplan "X" Wire	£175
Kiseki <i>Lapis Lazuli</i> Cartridge	£3,500
Micromega CDF1 CD player	£1,600
Micromega Duo DAC	£600
Audioplan AF Incon	£200
Rotel RT850 Tuner	£160
Sony WMD6-C Pro-Walkman	£270
Peter Sanhen Audio SP1.5	£2,300
Jadis JA30 monobloks	£1,900 each
Audioplan Kontrast loudspeakers	£3,300
Sound Factory Tripod equipment supports	POA
Sicomini custom isolation slabs	£150 each
Torlyte isolation platforms	£40 each
vdH MC Gold Interconnect cable	£1,000
Audioplan LS12 Loudspeaker cable	£1,100

System supplied and installed by: KJ Westone, 26 New Cavendish Street, London W1. Tel: (01) 486 8262



PERSPECTIVES

A few weeks ago Philips held a seminar at its Eindhoven headquarters to explain bitstream D-to-A conversion, a 1-bit system with 256-times oversampling. Paul Miller was there, notebook in hand, and Sony has allowed us a sneak preview of a prototype digital amplifier which employs the new 1-bit circuitry. Beware, this is not for the technically faint-hearted.

The numbers game

'Perfect Sound Forever' was the slogan used for the launch of CD. Nevertheless this has not prevented the hi-fi industry's design and marketing departments from clubbing together and 'improving' CD's 'perfection' each year with 16-bit players followed by 18-bit and 20-bit units, further 'improved' by recourse to 2, 4, 8 or even 16-times oversampling. If this numbers game has not already confused the vast majority of consumers, then Philips and Sony are quite likely to do the trick once and for all when they unveil their 1-bit 256-times oversampling 'Bitstream Conversion' CD players later this year.

We've managed to obtain the first pre-production sample of this new 1-bit system – otherwise known as PDM or Pulse Density Modulation – enabling us to compare the theory with hands-on practical results. But before attempting to explain Bitstream conversion we'll first run through the basic principles behind sampling and quantisation – the backbone of CD technology.

Before any audio signal can be converted into a digital code, the continuous waveform must first be sampled into discrete time intervals. The actual time period of each sample must be short enough to avoid missing any change or fine structure in the audio waveform, a requirement that is satisfied by making the sampling rate (F_s) at least twice the sampled bandwidth. The mathematical proof of this is known as Shannon's or Nyquist's theorem and in the case of audio signals possessing an upper limit of 20kHz, a sampling frequency in excess of 40kHz is demanded.

At this stage the sampled waveform exists in discrete time 'slices' but still possesses a continuous amplitude. Its frequency spectrum is the same as the original analogue waveform but is contaminated by 'images' of this spectrum either side of the sampling frequency and its harmonics (F_s , $2F_s$, $3F_s$ etc). The former is called the passband while the latter is referred to as the stopband.

This explains why the sampling fre-

quency F_s must be more than double the sampled (audio) bandwidth; if it were not then the audio spectrum and its 'images' would merge, causing aliasing distortion. With the CD sampling frequency of 44.1kHz this leaves a gap of 4.1kHz between the highest audio frequency (20kHz) and the lowest stopband or image component ($44.1 - 20 = 24.1$ kHz). By filtering out all the stopband images the original passband audio signal is restored intact – without loss of information.

Nevertheless information is lost during quantisation – a process where the continuous analogue voltage is re-written as a finite series of uniform voltage steps. The sampled and quantised analogue signal now exists as a succession of discrete voltages over a period of discrete time intervals. In a 16-bit system there are 2^{16} of 65,536 discrete voltage levels (each of interval Q) available to describe the amplitude of the audio signal per sample. Clearly the quantisation error cannot exceed $\pm \frac{1}{2}Q$ but will exist as a random distribution (though with a uniform probability) between these limits.

The digitised signal now represents a direct combination of the original (audio) waveform plus the quantisation error. When quantising a low-level signal the quantisation error becomes less random and approaches a maximum, an effect that causes noise modulation – or granulation noise – upon reconstruction by a 16-bit D/A convertor.

The accuracy of the DAC's Most Significant Bit (MSB) has to surpass that of the LSB (within 0.5), because it is required to

determine whether the signal lies within the upper or lower half of its full scale level. So the final decision concerning the ultimate amplitude value of the waveform at the instant of sampling is made by the LSB.

Quantisation linearity is improved and granulation distortion reduced by the application of dither, a very low level Gaussian noise added to the quantised signal (during A-D and D-A processes) in order to move it through successive bit levels and so re-randomise the error. The quantisation process becomes most linear when the rms noise voltage is equal to $\frac{1}{2}Q$.

Having ensured that D-to-A reconstruction is at its most linear the output from the DAC must still be filtered to remove all the audio images that exist around the sampling frequency and its harmonics. This can be achieved by recourse to either a high-order brick-wall analogue filter or increasing the effective sampling rate in the digital domain to allow the use of a gentler analogue filter subsequent to reconstruction.

A digital oversampling filter computes an additional sequence of sample values between each original 44.1kHz 'slice' by treating each sample as an impulse that is windowed and then multiplied by a succession of coefficients stored in a ROM. A four-times oversampling digital filter will synthesise three extra sample values between each pair of points, thus instead of 44,100 points for each second of music you have 176,400. The 'rubbish' you want to remove is now shifted up the frequency spectrum.

Oversampling can be used to interpolate

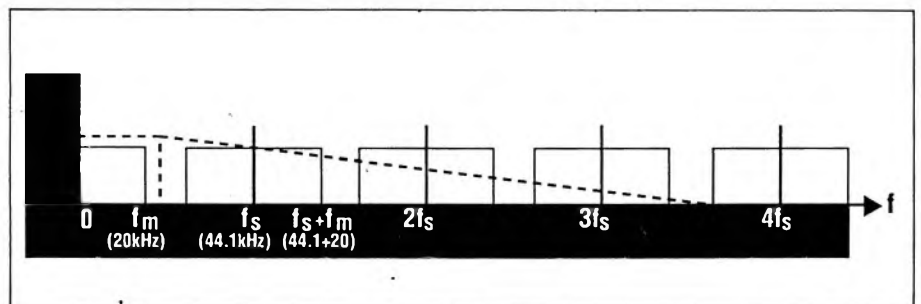


Fig 1. Spectrum of a sampled baseband audio signal. Dotted line shows brickwall filter and the effect of a more gentle filter with four-times oversampling.

between successive time intervals ($44.1\text{kHz} = 22.7\mu\text{secs}$) but cannot improve upon the final amplitude accuracy of the reconstructed signal – this is limited by the 65,536 discrete quantisation levels afforded by the 16-bit recording format. Nevertheless if the product of the stored coefficient and the sampled input data is resolved to less than 16-bits the amplitude linearity of the reconstructed signal could be degraded. Think of this like a calculator, 5 decimal places are obviously more accurate than 3.

More importantly oversampling can be implemented to either truncate the number of quantised bits (the digital word) or reduce any residual quantisation noise within the passband by distributing it over a wider sampling frequency. So in practice oversampling may enable, say, a 14-bit DAC to be used with 16-bit data or simply improve the S/N ratio of a conventional 16-bit conversion system.

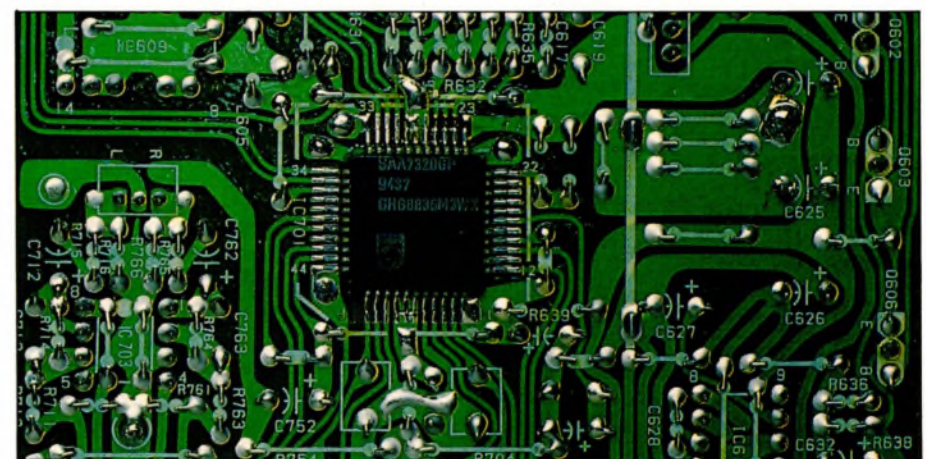
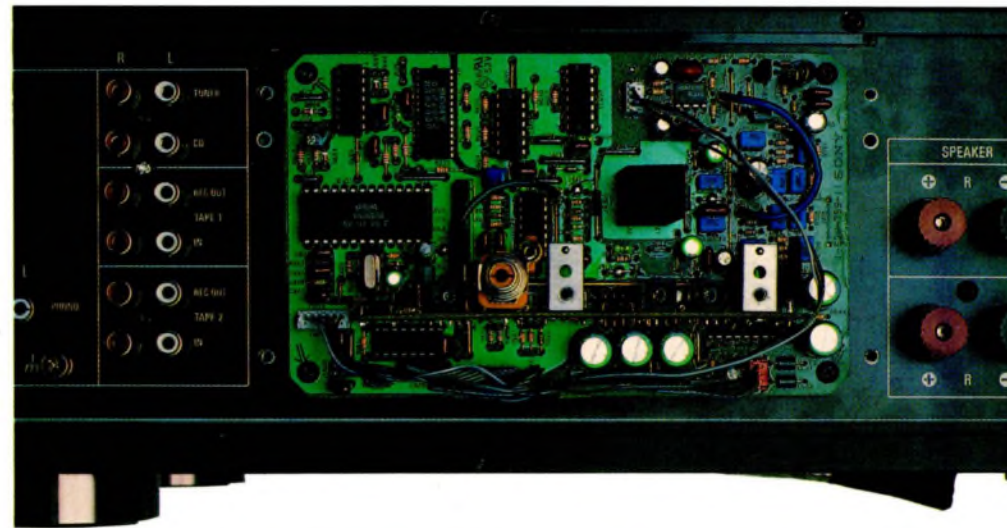
Oversampling followed by noise-shaping and quantising is utilised in the PDM system to convert the 16-bit binary samples into a 1-bit data stream clocked out at 11.2896MHz. The stream of ones and zeros is then converted into a train of fixed-height fixed-width pulses that vary in number (or density) depending on the amplitude of the final analogue waveform. In this case the PDM DAC is functioning as a digital device where the accuracy of the output pulses is determined by a quartz clock reference. A conventional 16-bit DAC operates over discrete current (amplitude) levels which are subject to ageing and drift, degrading linearity and incurring anomalies such as glitching or zero-cross distortion at the MSB.

Nevertheless the pulsed output from the PDM DAC still requires low pass filtering (LPF) to reveal the original analogue signal, though in this case the stop-band products manifest as a quantisation noise that increases in frequency to a peak level at 11.2896MHz. Fig (2) is a simplification of the $+1/-1$ pulse train emerging from the 1-bit PDM DAC and prior to entering the LPF whereupon the original sinewave (inset) is realised.

As the DAC generates more than 11 million pulses per second the pulse train is more likely to look like a continuous variation in signal density (fig 3), with lower amplitude audio signals being represented by less variation in the pulse density between the $+1$ and -1 reference points. When the $+1/-1$ fullscale pulse densities are equal there will be no net output while all other values up to peak level are determined by time averaging in the output integrator (LPF op-amp).

PUTTING THEORY INTO PRACTICE

We were fortunate to receive from Sony a pre-production sample of an amplifier to be known as the *TA-F630ESD* which is the first to feature an on-board D/A converter utilising the fruits of Philips' Bitstream



Rear view of Sony's up-and-coming TA F630ESD integrated amplifier with on-board PDM digital converter. Removing the cover reveals the digital housekeeping circuitry; and on the underside of the printed circuit board lurks the DAC-3 quad-flat package integrated circuit, the heart of the PDM system.

conversion technology. At the heart of the PDM system is a quad-flat package LSI known as DAC-3 or *SAA7320GP*, an integrated circuit that effectively replaces both the oversampling and DAC packages employed in conventional systems.

The 16-bit serial data input is addressed from a delay line RAM and subject to 4x oversampling using an integrated variant of the *SAA7220* filter. This is a Finite Impulse Response (FIR) transversal filter that generates three new samples between each original sample, thereby increasing

the sampling rate to 176.4kHz and providing at least 50dB of stopband rejection. The output word is formed by multiplying 30 audio samples from the filter RAM with 30 coefficients from the control ROM using a 16x12 array multiplier.

The result is added in a stereo accumulator which is also subject to 'digital feedback' of the quantisation error to provide a first-order noise shaping. Theoretically at least this yields an improvement in the S/N ratio of 13dB, increasing the nominal resolution to 18 bits – a precursor to the

noise shaping that is to follow.

The gain of the FIR filter is adjusted to account for the 0.5dB droop (@ 20kHz) of the subsequent 32x interpolating filter, nevertheless as the former is non-recursive a window is used to weight the multiplication of the coefficients and effectively truncate the extreme ends of the impulse response. The resulting aperture effect causes a peak at the cut-off frequency which accounts for the 0.08dB ripples in the passband frequency response (fig 4) and 12dB ripples in the stopband images (fig 5).

The sampling rate is then increased by a factor of 32 to 5.6448MHz by interpolating 31 intermediate samples between each of the input samples. Dither is also introduced but in contrast with conventional 16-bit systems a 352kHz sinewave is employed at -20dB, a very high level and one that requires the addition of 1 MSB. Subsequent to a further doubling of the sampling rate of 11.2896MHz (which also coincides with the master clock frequency) using a sample and hold circuit,

the 17 bit data stream is located in a noise shaper and quantiser.

These 17-bit words are then truncated by the quantiser to a 1-bit code while the use of 256x oversampling effectively spreads the resulting quantisation distortion over the entire 11.2896MHz spectrum. As the relationship between THD + noise and the sampling frequency must remain constant, increasing the number of samples per second will also reduce the noise level within the passband. For instance, 4x oversampling improves the passband S/N by 2x or 6.02dB so 256x oversampling should yield a theoretical reduction in quantisation noise of 16x or 24.1dB.

This figure in combination with the 1 bit of remaining data can only realise a S/N ratio of 31.9dB which is equivalent to that of a perfectly dithered 5-bit system. A 5-bit resolution is hardly adequate in the light of the 16-bit coding used for audio data and suggests that for a simple PDM system to offer true 16-bit linearity a sampling rate of $2^{16} \times 44.1\text{kHz}$ (= 2.89GHz) would be required. This is too fast a rate for today's

CMOS devices to accommodate and a far cry from the 11.2896MHz used in the practical system.

The higher measured resolution of the TA-F630ESD can be accounted for by virtue of the sophisticated noise shaping techniques employed by Philips in the SAA7320. Noise shaping makes use of the quantisation error derived from the truncation of the higher bit words and acts as an extension of the roundoff mechanism used in oversampling. Each error caused by truncation of a bit-word is added to the next so that the average error is shared between the two. With time-averaging the accumulated error is reduced to zero, retaining the 16-bit information despite being coded in 1-bit form.

So in the PDM system a truncated 1-bit code emerges from the quantiser and the remaining LF quantisation error is repeatedly fed back to increase its frequency. By feeding back double the original quantisation error the noise-shaping or time-averaging process takes on a 2nd-order characteristic. As the sampling rate is increased to 11.2896MHz in this system the time averaging process will have completed before the signal has returned to the passband, therefore the accumulated quantisation error is greatest at 11.2896MHz and falls off gradually towards the audio band. This is the basis of noise shaping.

A 4x oversampling convertor together with 1st-order noise shaping results in an improvement of S/N around 13dB, 16x oversampling with 2nd-order noise shaping offers a S/N of 42dB, while 256x oversampling and 2nd-order noise shaping offer an improvement of 102dB. This together with the remaining 1-bit of data offers an effective 18-bit S/N ratio of 108dB. Of course the real potential of this resolution can only be realised if the audio signal is first recorded using the PDM process. Ordinary 16-bit CDs will be perfectly compatible, of course, but the final S/N ratio will be limited by the 16-bit PCM format.

Philips' 2nd-order noise shaping moves the erroneous quantisation noise to higher frequencies while maintaining a relatively flat noise floor within the audio passband. This ultrasonic quantisation noise is then removed by the 3rd-order low pass filter (LPF), as is the residual 352kHz dither tone. Nevertheless the high level dither plays a vital role in linearising the performance of the noise shaping/quantisation process and helps prevent the generation of unwanted idle patterns.

Idle patterns appear to represent fluctuations in the expected output pattern of the +1/-1 pulses and will inevitably compromise the low-level linearity of the PDM DAC. The DAC itself uses a switched capacitor network to convert the 1-bit/11.2896MHz data stream into a series of analogue pulses. There are essentially two switched capacitors: one that charges in

FIG 2. Simulated PDM pulse train.

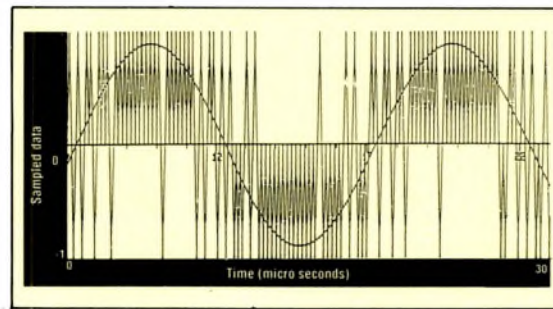


FIG 3. Practical example of a PDM datastream.

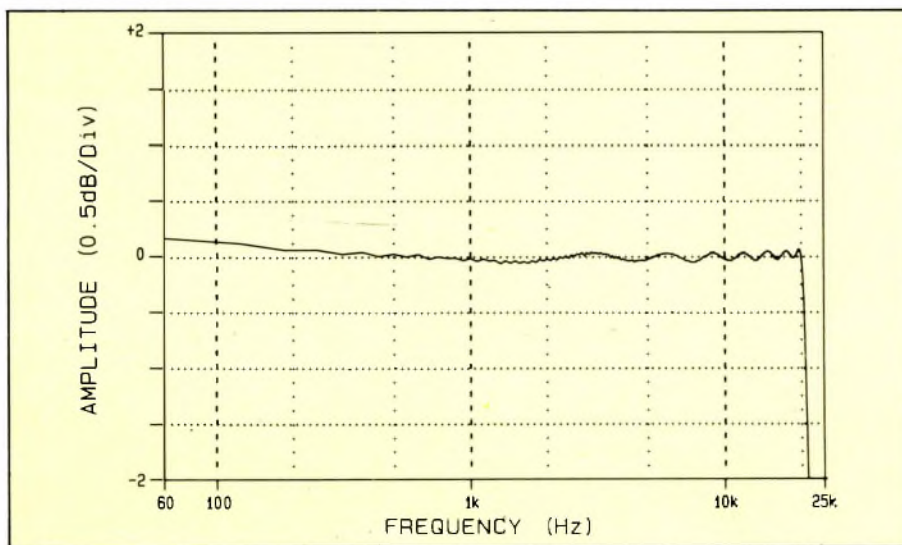
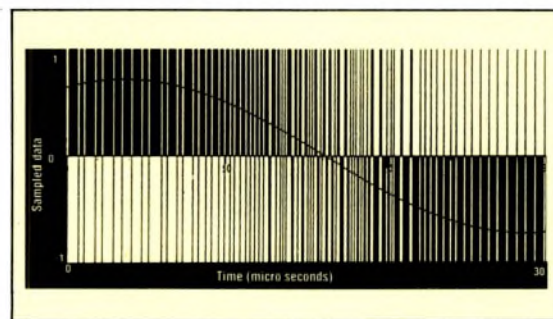


FIG 4. Sony TA-F630ESD amplifier - PDM frequency response.

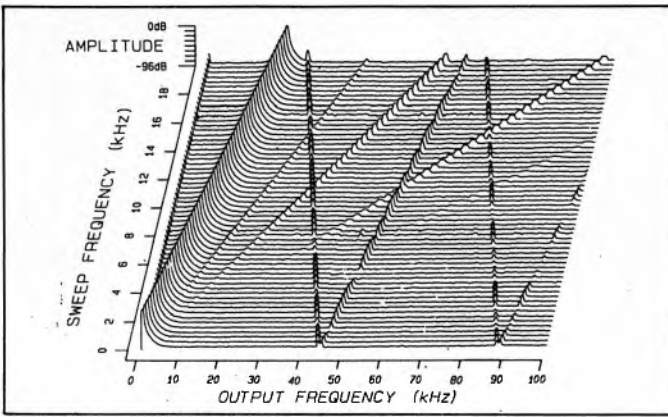


FIG 5. Sony TA-F630ESD PDM spurious output.

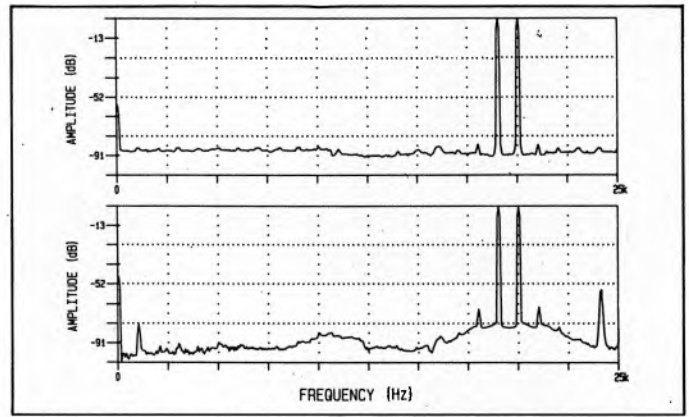


FIG 6. 16-bit converter (upper plot); PDM converter (below).

response to a logic '1' (producing the +1 pulse), the other responsive to a logic '0' (producing the -1 pulse).

After integration the measured THD at peak level was still quite high at 0.01 per cent though this actually reduced to 0.008 per cent at -10dB indicating a nonlinearity in the output op-amp rather than the converter. At peak level the output spectrum is also dominated by odd-order harmonics (fig 5), conflicting with theory. Channel separation proved to be a constant 84-86dB, while an A-wtd S/N ratio of 96.4dB was measured. This is somewhat inferior to that predicted by theory but the TA-F630ESD's associated analogue electronics have as much to do with this result. Furthermore the level-linearity of the PDM converter settled out at 15.7 bits, a result that is comparable with most conventional 16-bit/oversampled CD players and represents a magnificent effort for such a fledgling technology.

On the debit side I feel the operation of such convoluted noise shaping may be less effective with complex input signals. For instance, note the noise skirt surrounding the 19/20kHz signals on fig 6 (lower) compared to the broad and uninterrupted floor derived from a conventional CD player (fig 6, upper). As a result the leading and trailing edges of high frequency notes may not be so well defined, a contention that is reinforced by the smooth but smeared character of percussive recordings. Nevertheless the design engineers at Philips insist that the latest versions of the SAA7320 chip do not exhibit this phenomenon.

Other anomalies, such as the compression noted at peak level, 100 per cent THD on the crosstalk channel and odd-order distortion mechanisms below -30dB are likely to be related to the integrating op-amp.

Returning to the SAA7320, an RC network is used in parallel with the output op-amp as the primary arm of the 3rd-order Butterworth analogue filter. This gentle low-pass filter offers a -3dB point of 60kHz and will provide some 42dB of attenuation at 352kHz (the dither frequency) which also happens to coincide with the 8th oversampling frequency.

Bearing in mind the -20dB input level

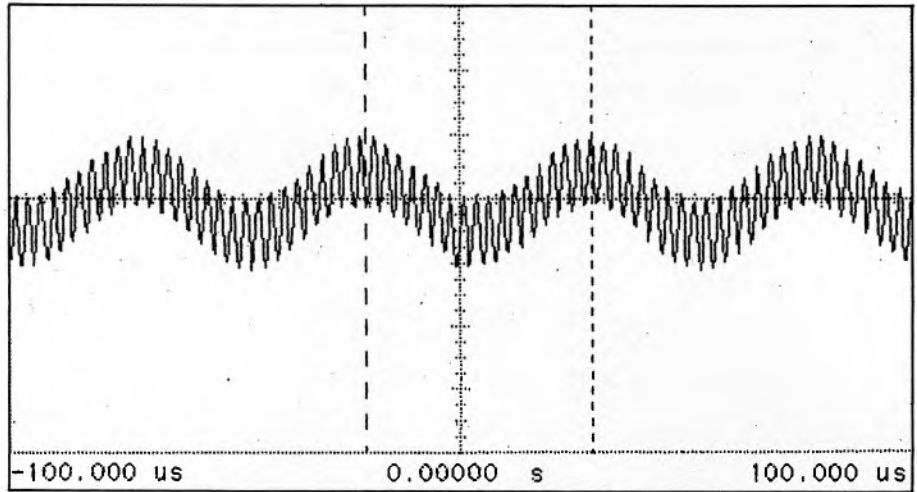


FIG 7. 352kHz dither signal modulated by 20kHz sine wave at -60dB.

this leaves the dither residual at -62dB relative to peak output, in this case 1.43mV rel. to 1.8V. Fig 7 shows the residual 352kHz dither signal being modulated by a 20kHz sine wave at -60dB. This contrasts with low-level HF waveforms derived from standard 16-bit CD players which are usually accompanied by some 10-80mV of RF noise. The lack of RF noise generated by the PDM system is, I suspect, just one reason why the format sounds smoother and richer than conventional players; it will also render the system more suitable for outboard D/A conversion in amplifiers, for example.

By way of conclusion I should note that the concept of Bit Stream Conversion, PDM, Delta Modulation or any such similar process is not exactly revolutionary. Nevertheless it is only in recent times that appropriately high-speed CMOS technology has become accessible for use in mass market products such as CD players. Furthermore I would imagine that the integration of oversampling filter, D/A converter and low-pass analogue filtering into a monolithic IC package (the SAA7320) makes it a rather more cost-effective option than the traditional 16-bit SAA7220/TEA1541 chipset.

Indeed I have reason to suspect that this was the prime motivation of its originators, the surprising 'analogue-like' subjective qualities of the SAA7320 coming as something of a bonus.

Only time will tell whether 1-bit PDM will replace the established 16-bit D/A con-

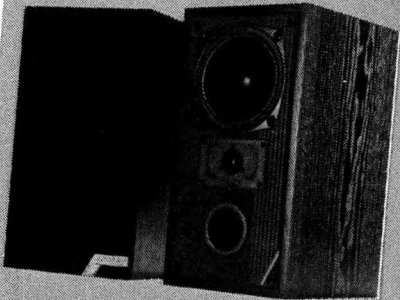
version process utilised by all current CD players, though it seems reasonable for the two formats to co-exist over the next couple of years. In the meantime an outboard D/A converter with switchable 1-bit PDM/16-bit DAC reconstruction might help to start the ball rolling...

TEST RESULTS

Sony TA-F630ESD Digital Amplifier	
Channel Balance, 20Hz	0.16dB
1kHz	0.15dB
20kHz	0.17dB
Channel Separation, 100Hz	83.7dB
1kHz	85.8dB
20kHz	84.5dB
L/R Phase Error @ 10kHz	0°
@ 20kHz	0°
De-emphasis Accuracy, 1kHz	+0.15dB
5kHz	+0.15dB
16kHz	+0.18dB
Signal to Noise Ratio (A-wtd)	96.4dB
THD (@ 1kHz), 0dB	-79.5dB
-10dB	-81.5dB
-30dB	-62.9dB
-60dB	-39.1dB
-90dB	-8.4dB
Dithered, -90dB	-6.3dB
CCIR IMD 0dB	-78.9dB
SMPTE IMD, 50Hz/7kHz	-75.9dB
400Hz/7kHz	-76.0dB
Suppression of stop-band IMD	54.1dB
Resolution at -30dB	-0.01dB
-40dB	-0.00dB
-50dB	+0.01dB
-60dB	+0.03dB
-70dB	-0.28dB
-80dB	-0.54dB
-90dB	-2.21dB
Peak Output Level, L	1.775V
R	1.807V
Availability	Autumn 1989

music made live...

MISSION
ELECTRONICS



Bartlett's money saving recommended systems speakers

Turntable	Amps	Speakers					
		Wharfedale Delta 30 Goodmans Maxin	Heybrook Point 5 Tannoy E11 AR 112 Mission 761	AR 122 B & W DM550 Gale GS210	Tannoy M15	Heybrook HB1 AR 132	Tannoy M20B
Dual CS430	AR A03	279.95	314.95	339.95	356.95	382.95	407.95
Dual CS430	AR A05	314.95	348.95	373.95	390.95	416.95	441.95
Dual CS430	Il+ ARCAM Alpha	288.95	322.95	348.95	364.95	391.95	416.95
Dual CS430	Denon PMA 250	249.95	284.95	348.95	326.95	352.95	377.95
Dual CS430	Marantz PM 35	271.95	305.95	331.95	447.95	373.95	398.95
Dual CS430	Marantz PM 45	314.95	348.95	373.95	390.95	416.95	441.95
Dual CS430	NAD 3020E	246.95	280.95	305.95	322.95	348.95	373.95
Dual CS430	NAD 3130	288.95	322.95	348.95	364.95	389.95	414.95
Dual CS430	NAD 3240PE	356.95	390.95	415.95	432.95	458.95	483.95
Dual CS430	NAD 3225	271.95	305.95	331.95	447.95	373.95	398.95
Dual CS430	Rotel RA810A	254.95	288.95	314.95	330.95	356.95	381.95
Dual CS430	Rotel RA820A	279.95	322.95	348.95	364.95	391.95	416.95
Dual CS430	Rotel RA820BX3	322.95	356.95	382.95	398.95	424.95	449.95
Dual CS430	Rotel RA840BX3	419.95	454.95	479.95	496.95	522.95	567.95
Dual CS430	Rotel RA870BX	229.95	263.95	288.95	305.95	331.95	356.95
Dual CS430	Yamaha AX300	271.95	305.95	331.95	347.95	373.95	398.95
Dual CS430	Yamaha AX400	314.95	348.95	373.95	390.95	416.95	441.95

Free cartridge, cable, 2-year guarantee, carriage*

All systems supplied with cartridge, speaker cable and 2-Year Parts and Labour Guarantee. Carriage is FREE For UK Mainland*. Please phone for competitive carriage rates overseas.

Price guarantee

If you can buy cheaper—including leads, carriage and 2-Year Guarantee—we will match it.

Prices correct for the life of this magazine, but are subject to change.

Stockists of A & R, AR, Arston, Audiolab, B & W, Denon, Dual, Exposure, Gale, Heybrook, Inca Tech, KEF, Linn, Marantz, Musical Fidelity, Mission, NAD, Nakamichi, Quad, Revolver, Rotel, Tannoy, Wharfedale, Yamaha.

Improved turntables (inc. cart)

Dual CS 505-1 Extra £21.00 Dual CS 505-3 extra £42.00
Ariston Q Deck Extra £50.00 Ariston Icon/Epic extra £124.00
AR EB101 Extra £119.00 Revolver Rebel extra £60.00
Revolver extra £93.00

CD instead of turntable front end

AR CDO6 extra £246.00 Denon DCD 610 Extra £93.00
Denon DCD 810 extra £136.00 Denon DCD 910 extra £179.00
Denon DCD 1520/2 extra £348.00 Marantz CD 583 extra £52.00
Marantz CD 65/2 extra £136.00 Marantz CD 65/2 SE extra £179.00
Marantz CD 75/2 extra £175.00 Marantz CD 75/2 SE extra £221.00
NAD 5220 extra £119.00 NAD 5240 extra £162.00 NAD 5320
extra £68.00
Rotel RCD 820B extra £102.00 Rotel RCD 820B x 2 extra £136.00
Yamaha CD x 630 extra £136.00 Yamaha CDX 710 extra £153.00
Yamaha CDX 810 extra £179.00

BARTLETTS

175 HOLLOWAY ROAD, LONDON N7. TEL: 01-607 2296/2148

Access, Visa cards accepted



READERS WRITE CHOICE ANSWERS

IT'S SHEEP WE'RE UP AGAINST

I read with interest your reviews of 20 CD midi systems in last December's issue of *Choice*. I am hoping to replace my present system later this year and am particularly interested in the Proton *AI-3000*, as the compact nature of this system is very appealing. However, I would appreciate it if you could clarify some of the remarks you made about the *AI-3000*. You gave it a good lab and sound rating but went on to say "the unit is attractively packaged and can be made to sound very good despite a woolly sounding amplifier" and yet it is still Recommended.

I have a keen ear for music and would notice any real blemishes, so perhaps you could say whether the Proton system is really worth its salt. Apparently, a pair of loudspeakers is included in the £549 price, which makes it all the more attractive.

WILLIAM J. DEACON,
WINDERMERE, CUMBRIA.

Alvin Gold's review of this system mentioned that the amplifier is the weakest link in an otherwise impressive unit, and that complex orchestral works didn't sound all that delightful. That said however, the tuner and CD player are of a much higher standard than is usually encountered in midi systems and thus it warrants Recommendation.

The amplifier isn't a disaster and was considered serviceable under most circumstances, and Alvin goes on to say, "With 'simpler' music which is less tonally and dynamically stressful the Proton copes much better and can display good analysis and refinement". Therefore, unless your musical tastes focus on large orchestral works this system would probably suit your requirements well, and the only way to improve upon it sonically would be to buy separates which would be more costly and less neat.

YOUR FLEXIBLE FRIEND

Whilst I am loathe to part with my old Pioneer *SX1250* receiver, I feel I have to recognise that it's probably no longer up to the standard of the rest of my

recently upgraded system. This consists of Alphason *Sonata/HR 100S MCS/AT-OC7* record player, Sony *333ESD* CD player, *K700ES* cassette deck and *TC366* reel to reel along with a combination of Rogers *LS3/5a* and Audio Pro subwoofer loudspeakers. I also have an old Philips turntable for playing 78s.

My requirements for an amplifier are consequently two phono and tape inputs with front panel MM/MC switching and exclusively RCA phono inputs.

I would very much prefer an integrated amplifier, but I wouldn't pursue this to the extent of limiting the required performance. As I am unable to audition equipment prior to purchase, a specific recommendation would be highly appreciated. Whilst I don't want to get into Krell prices, I have no particular limit in mind other than keeping within the law of diminishing returns.

R. GREAVES,
BEAUMONT, JERSEY.

As far as we know there's only one amplifier which fully satisfies your requirements as very few amps have twin phono inputs with front panel MM/MC switching and purely RCA sockets elsewhere. However, the Bryston 12B preamp does all this and more whilst maintaining a thoroughly audiophile approach to sound quality. This robustly made Canadian preamp retails for £995, whilst the less expensive and rather stylish Bryston 2B power amp costs £695. Flexibility doesn't come cheap, but these are reliable and elegant components which will do justice to the rest of your system.



The Bryston pre and power amplifiers fit the bill.

THE WELL WIRED SYSTEM

Your review of loudspeaker cable in issue 64 (November) was most interesting. When I bought my new amplifier, an Audio!ab *8000A*, I upgraded my speaker cable to DNM *Solid Core* but the resulting sound was curiously disappointing. With my *AR-6* loudspeakers I found the sound very hard and unpleasant. So I went back to my old 79 strand cable which I found to be far preferable, which just goes to prove that more expensive doesn't always mean better!

STEWART ORR,
GLASGOW.

What you've in fact discovered is that cables interact differently with different equipment, and with your equipment the stranded cable proved a better match than the solid core. However, in other systems the opposite often proves to be the case which is why Paul Miller considered DNM to be "too unbalanced for general consumption" and went on to say, "but excellent results have been obtained in sympathetic systems." So it's definitely a try before you buy cable.

And yes, more expensive is by no means always better – a look through the Directory will confirm as much.

TOTALLY WIRED

I'm thinking of upgrading my system – the reason being that I have a Saisho midi, 'nuff said. I should be grateful if you would answer the following questions: What are the different types of speaker cables, terminators and interconnect and how are they

which cables should I use with these components?

Finally, would you explain the difference between a tuner and a receiver?

ALAN BATES,
BASILDON, ESSEX.

Connecting up a hi-fi system is usually a fairly simple task as the majority of terminations on source components (ie cassette, CD, turntable etc) and amplifiers have been standardised to RCA phono plugs. 4mm sockets and/or binding posts are used for loudspeaker connections, although spring clips can be found on cheaper equipment.

Usually source components come with their own phono plug-to-phono plug interconnect lead, marked red and black for channel identification. This is used to link the player's output to the appropriate input on the amplifier. In the case of cassette decks, either two pairs of leads are used (for L/R play and L/R record) or alternatively a single lead with a five pin DIN plug at one or both ends does the same job. These, mercifully, are relatively uncommon.

Graphic equalisers are usually connected into the tape loop (ie the inputs and outputs for tape on the amp) with two phono-to-phono interconnects. The cassette deck is then connected to the graphic which has sockets for this purpose. If that sounds complex, ask your dealer to show you in the shop – it's much easier in practice.

Finally, a receiver is a tuner and amplifier combined in one box. Our receiver reviews in the May issue gave a more comprehensive idea of how they work, but fundamentally they save on components and space and usually represent good value for money.

TAPE OPTIONS

I want to make high quality recordings, whilst maintaining compatibility with my collection of compact cassettes. Therefore can you advise me whether I can buy a high quality cassette recorder that has the facility to play and record at double speed (3 1/4 ips) in order to improve on the quality available with normal speed recordings.

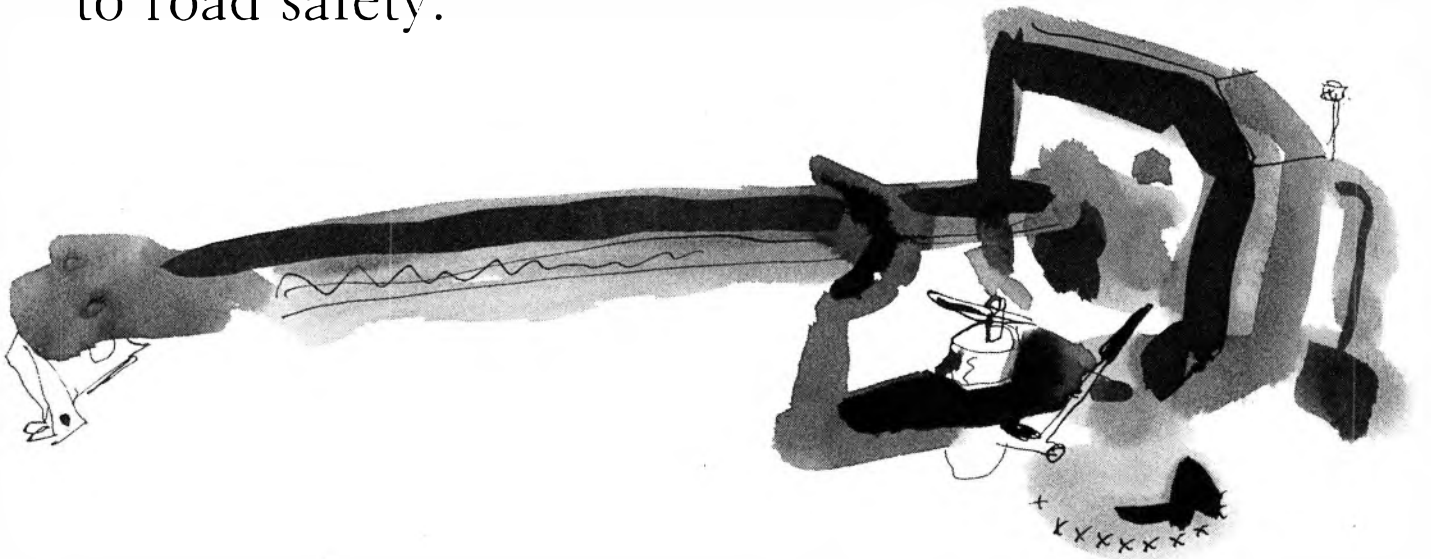
used within a system? I am thinking of using a turntable, CD player, cassette deck and graphic equaliser –

R O K

San

STAY AT HOME AND
listen to your records,

a major contribution
to road safety.



The Roksan Artemiz

The Cornflake Shop

37 WINDMILL ST. LONDON W1P 1HH

01 631 0472

Also, could you give me your opinion as to how the best compact cassette compares with FM encoded, helically scanned recording on VHS video tape.
DAVID COOPER-SMITH,
MILTON KEYNES.

The only company that might produce what you are looking for is Neal which is the only British cassette recorder manufacturer and primarily involved in the professional market. It may be worth contacting the company on (091) 4899379.

On the other hand you might be surprised at the standards achieved by some of the costlier models in the Nakamichi range. The CR-7E and Dragon models are renowned for the exceptional quality of recording that can be achieved with them. The Dragon is a totally manual machine that allows comprehensive control of recording and playback; the CR-7E gives you some help in this process. For full reports, check the reviews in issue 60 available through our mail order department.

The standard of fidelity available from recording on video is not bad and on a par with a lot of cassette decks. An apt analogy is that it's as good as FM radio, which is to an extent a result of the FM multiplexing system that it uses. However, with VCRs it's possible to use PCM digital processors (these convert from A-to-D and back from D-to-A at the same sampling rate as CD - 44.1kHz), such as the late lamented Sony PCM F1, to make digital recordings. It is possible to buy a Sony processor called the PCM 701 from HHB (tel: 01-960 2144) but it retails for £850 plus VAT which may be prohibitive. Alternatively, look for a secondhand F1 or 501 in studio and music magazines. But don't hang around; none of these units are still in production!

STARTING YOUNG

As possibly the youngest reader of *Choice* (I am 13) I don't have the money to buy my dream system. I did, however, receive a Kenwood CP-SR personal stereo for Christmas, despite my requests for a Sony pro. I decided to buy some good quality headphones with reasonable dynamic range and a fair amount of bass. In the end I chose some Bang & Olufsen Form 2s which I preferred to Sennheiser HD480s and Sony MDV-V3s, although I wasn't totally enthralled with the sound.

As I want to improve the sound quality of my system I have two options; either save up for a pro



Michell Gyrodek: unlikely to exaggerate sibilance problems.

Walkman or upgrade my headphones to Aiwa HP-X30 or Beyer DT 325s. Which would you recommend?
BEN NEWTON,
NORTHAMPTON.

If you wish to improve the fidelity of your system, ie its closeness to the original recording, then the Sony pro option is the most logical. However, if, which is more realistic, you would like to get a more enjoyable sound out of the Kenwood then further experimentation with headphones is a good idea. Headphones vary enormously in character and frequency balance and choosing the right one is really a matter of finding a good match for your source. As we aren't familiar with your Kenwood we can't give a specific recommendation, but you're on the right track with the models you mention. Happy hunting.

SIBILANCE DOWN UNDER

I am writing for advice regarding my hi-fi system which has reached a critical stage of upgrading. It currently comprises: Michell GyroDec/SME IV/Ortofon MC30 Super, Plinius pre/power amplification (a reputable NZ manufacturer) and Celestion SL600s on Atlas stands (filled with lead and sand), connected up with van den Hul and Monster cables. My problem arises because there are very few high-end dealers in New Zealand and the opportunity to audition equipment prior to purchase is somewhat limited.

Specifically, I upgraded the arm (originally Dynavector DV501) as it was smearing detail on loud passages and couldn't approach the clarity of a friend's LP12/Itok combination. I bought the SME on the basis of a dealer's recommendation and positive reviews, but subsequently I was plagued with upper mid hardness and prominent sibilance. I managed to tame this slightly by changing my old Dynavector DV-17D cartridge to the Ortofon, and replacing the alloy armbase with an acrylic one. Things aren't right

yet though. Information retrieval has improved but exaggeration of sibilance especially on female vocal persists. I'm not sure where to go from here - I can't audition the vdH MC1 which gets very good reviews and costs £380 over here. It's often commented on as being a good partner for the SME IV but must be ordered unheard. Should I perhaps look at the optional SME damper, or consider changing other parts of the system?

PATRICK TUOHY,
NEW PLYMOUTH, NZ.

To work out the cure, you need to pinpoint the source of irritation. From our experience of your front-end we would not place the blame here, rather suggest that the amplification and specifically the preamp would be worth investigating. If you can borrow another preamp, put it into your system and see if this has an effect on the sibilance problem, if not, put back your own preamp and substitute another power amp.

Should that fail to ameliorate the problem then attention should perhaps be turned to the turntable. Is it properly set-up and the cartridge correctly aligned? If it is, then the GyroDec may just be the culprit, and we would recommend you try another turntable - the Directory gives our opinion of a broad selection. Our personal recommendations are for the Roksan Xerxes and Townshend Rock, the latter being incapable

of creating sibilance by virtue of its cartridge damping trough.

SOLDER ON!

Hi-fi magazines including yourselves advise on the improvement in sound quality that can be achieved by using better interconnects, speaker cable etc. I have found this advice to be true and decided to make them up myself by buying appropriate soldering tools. It took a fair amount of practice to make a professional job, but I now have quality leads at a substantial cost saving.

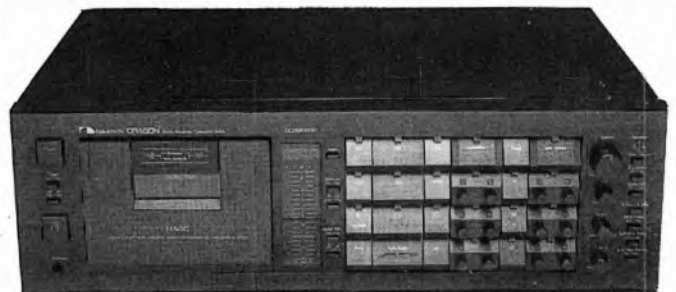
Without resorting to magazines which show how to construct amplifiers (who assume all their readers can solder anyway), it is difficult to find basic information on how to make good joints. I feel it would be useful if you reviewed the components, tools and solder types used to make up leads and produced an article on DIY interconnects
P. A. HUTCHINSON,
HEDON.

Shortly after we received your letter we ran a piece by Richard Black, entitled Tweaking Tactics in the April issue (no. 69), which gave some clues on interconnect construction and types of inexpensive cable that could be used. However, a more comprehensive article on soldering phono plugs would be a good idea and either Richard Black or Jason Kennedy will be set to task in the near future.

You may be interested to hear that we are running a special offer on WBT phono plugs and associated goodies which make interconnect building a more satisfying and painless experience.

EDITOR'S NOTE

Unfortunately we are unable to answer all the enquiries we receive. The letters we publish are those which we think will be of greatest general interest.



Nakamichi Dragon - when only the best will do.



FOCUS ON FREE RADIO

Radio Caroline may soon be moving into the hi-fi domain with an FM service. Dan Houston and photographer Chris Richardson braved more than the medium wavelength to see how the 25-year-old station is run.

A lonely rusting trawler, anchored in the North Sea 13 miles east of Margate, is home to the presenters and equipment that put Radio Caroline on air 24 hours a day, and is a useful stopover for passing flocks of starlings or a couple of journalists looking for a story.

The Free Radio station, first and last (so far) of the pirate radio ships broadcasting in this area, celebrated its Silver Jubilee on Easter Sunday and looks set to continue broadcasting in spite of IBA efforts to incorporate pirate stations by opening up the airwaves and offering local franchises. It avoids closure by being situated in international waters and exists with funding from foreign advertising.

The ship itself, the 1000-tonne trawler *Ross Revenge*, was built in Hamburg in 1960 and was designed to handle the ravages of the North Atlantic. It's the fourth to be used by Caroline and was bought in 1980 after the *Mi Amigo* sank. It has been broadcasting from beyond the mouth of the Thames Estuary since 1983, moving to its present position over The Falls sandbanks when the 12 mile limit was imposed in 1987. Mike Watts, the "captain" and engineer on board at the time of our visit explained that the ship was situated in an area ideally suited for broadcasting straight up the Thames estuary to London. Radio waves travel much better over water than land and as the daytime signal is usually only powered by about 3 kilowatts it needs all the help it can get.

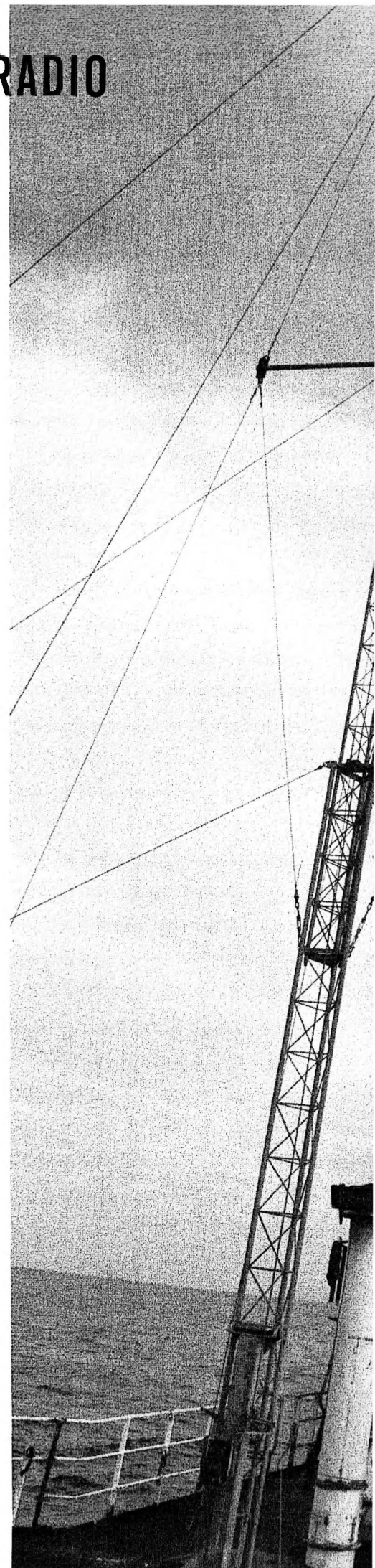
All the maintenance on the *Ross Revenge* has to be carried out in situ, and the ship hasn't been in port since 1983. Below decks the workmanlike brass fittings, wood panelling, fixed tables and chairs and cubby-hole bunks in the cabins

remain much as they were for the Icelandic and later British seamen who worked the boat. Postcards, pop posters and signed names of DJs on the bulkheads provide a patina of the ship's recent history. Entertainment on board is limited to TV, one of 200-odd tapes on a first generation video machine or relayed sound from the studio. There is a speaker in every cabin.

Radio Caroline broadcasts around the clock on one medium wave frequency (we're not allowed to say which) and through the night from ten p.m. on another which is shared by a Dutch station during the day. The latter show offers more obscure music from album tracks and is known as the Hippy Service though its programme director, 25-year-old Rob Harrison is about as far from T-Rex as he can get, wearing a T-shirt that looks more like a collection of Afghan prayer flags than clothing. Caroline's main service is described as CHR (contemporary hit radio) with a high 'golden' content of past hits.

The station is also paid to broadcast tapes of World Mission Radio, from Carolina in America's Bible Belt, on a shortwave frequency which is apparently 'bounced off' the ionosphere into Eastern Europe using a separate aerial (affectionately dubbed God's Aerial). The shortwave frequency is also used for Radio Caroline for four hours each day and has been picked up around the world. There was talk of teaming up with a Japanese station when we were on board.

At the time of our visit there were eight 'British' DJs aboard and three Dutch. Life is Spartan – you can't exactly get out to the cinema – and even one of the few pleasures of sea life – mealtimes – are a haphazard occurrence since there isn't a cook. The North Sea norm – rough weather – means



Pirates of the Airwaves



Disc jockey Dave Asher (above) at home in the studio surrounded by white horses.

that the staple diet tends to be cheese or peanut butter sandwiches. However, there were plenty of fresh vegetables on board, and three chest freezers holding enough food for three months.

Presenters tend to spend about six weeks on, six weeks off the ship, but one (Dave Asher) had been on air every day for 19 weeks when we arrived! Some come from other pirate radio stations such as the Voice of Peace in Israel (where both Dave Asher and the neat-and-tidy 'Coconut' had been before) or, like Rob Harrison, Radio Sunshine in the South of France. Others are new, cutting their teeth on a station where they say: "if you can make it here, you can make it anywhere". It's a job for the young and single and many regard Caroline as a way into more established (or establishment) radio stations. The BBC, Capital Radio and Radio Luxembourg have all recruited talent from Caroline.

The only girl aboard, Caroline Martin, was named after the station which, along with the fact that many of the presenters are younger than Radio Caroline, justifiably gives it the status of an institution. There are some older hands of course, dedicated to this unique cause for Free Radio, but the station's Irish founder Ronand O'Rahilly prefers to keep a low profile now. The significance of Easter Sunday relates to his grandfather's death during the 1916 Easter Risings.

Many *Choice* readers are probably wondering why we're bothering to cover a station that only broadcasts on AM with all the 'lack of hi-fidelity signal' that implies. (Although a decent tuner can often do wonders with AM.) The truth is Caroline often sounds better in the car or on a portable radio which can be positioned for optimum signal and then mainly in the South East, though several enthusiastic listeners



Speakers like these don't come rolling off conveyor belts, nor are they bought because they are photographed in moody looking settings. They are chosen by music lovers, because they are made by a company dedicated to hi-fi craftsmanship. A company also known for innovation and an uncanny ability to produce award-winning products that cost much less than . . . well, a great deal less than you might expect.

The HB100 speakers above are an example of painstaking development, design and construction.

Suitable for a wide range of systems they provide clean dynamic and balanced sound. The technicalities? An 8in bass unit, phased to integrate with a 19mm metal dome tweeter, a cabinet built to eliminate resonances; outstanding transient response; brilliant mid range clarity; superb musical detail and seamless integration between the drive units.

The participating stockists, listed below, will tell you more about the watts, the ohms and the kHz's. They will also demonstrate why the Heybrook HB100 speakers were *made for music*.



HEYBROOK

Heybrook Hi-Fi Ltd., Estover Close, Estover, Plymouth PL6 7PL
Telephone 0752 780311. Fax 0752 793954

Heybrook HB100 participating stockists

AYLESBURY
Aylesbury Hi Fi 0296 28790
BASINGSTOKE
Absolute Sound & Video 0256 24311
BATH
Paul Green Hi Fi Ltd. 0225 316197
BATH
Radford Hi Fi 0225-446245
BECKENHAM
Sevenoaks Hi Fi 01-658 3450
BISHOPS STORTFORD
The Audio File 0279 506576
BOSCASTLE
North Cornwall Electronics 08405 248
BRIGHTON
Jefferies Hi Fi 0273 609431
BRIGHTON
Sevenoaks Hi Fi 0273 733328
BRISTOL
Absolute Sound & Video 0272 264975
BRISTOL
Radford Hi Fi 0272 428247
BURTON-ON-TRENT
Grange Hi Fi 0283 33655
CAMBORNE
Camborne Audio Centre Ltd 0209 714286
CAMBRIDGE
Cam Audio 0223 60442
CANTERBURY
Westgate Hi Fi 0227 60329

CARDIFF
Audio Excellence 0222 28565
CHATHAM
Sevenoaks Hi Fi 0634 46859
CHELTENHAM
Absolute Sound & Video 0242 583960
COLCHESTER
Pro Musica 0206 577519
COVENTRY
Frank Harvey 0203 525200
DOVER
Dover Hi Fi 0304 207562
DUNSTABLE
Technosound 0582 663297
DUBLIN
Ceol Products 01-961 358
EASTBOURNE
Jefferies Hi Fi 0323 31336
GLASGOW
Stereo Stereo 041-248 4079
GLOUCESTER
Audio Excellence 0452 300046
GRIMSBY
Manders Hi Fi Ltd 0472 351391
GUILDFORD
Sevenoaks Hi Fi 0483 36666
HARPENDEN, HERTS
Studio 99 05827 6426
HARROW
Harrow Audio 01-863 0938
HULL
A. Fanthorpe Ltd 0482 223096
ISLE OF MAN
Manx Audio 0642 851 4373
LEEDS
Audio Projects 0532 304565

LEICESTER
Leicester Hi Fi Co 0533 539753
LIVERPOOL
Beaver Radio (L'pool) Ltd 051-709 9898
LIVERPOOL
Better Hi Fi 051-277 5007
LONDON
Sound Sense 01-402 2100
LONDON N1
Grahams Hi Fi 01-837 4412
LONDON W9
Robert Taussig 01-286 1728
LONDON NW5 (Swiss Cottage)
Studio 99 01-624 8855
LONDON W2
H L Smith 01-723 5891
LONDON SW1
Hi Fi Confidential 01-233 0774
LUTON
Technosound 0582 30919
MIDDLESBROUGH
Gilsen Audio 0642 248793
MILTON KEYNES
Audio Insight 0908 561551
MILTON KEYNES
Technosound 0908 604949
NORTHAMPTON
Listen Inn 0604 37871
NORWICH
Basically Sound 0508 70829
NOTTINGHAM
Nick Dakin (Hi Fi Ltd) 0602-783862
OXFORD
Absolute Sound & Video 0865 53072
OXFORD
Absolute Sound & Video 0865 85961

PLYMOUTH
Peter Russells Hi Fi Attic 0752 669511
POOLE
Movement Audio 0202 730865
PORTSMOUTH
Hopkins Hi Fi 0705 822155
READING
Reading Hi Fi 0734 585463
SEVENOAKS
Sevenoaks Hi Fi 0732 459555
SALE
Sound Decision Ltd 061-969 1074
SHREWSBURY
Shropshire Hi Fi 0743 232317
SOUTHPORT
Hi Fi Systems Ltd 0704 25079
STRATFORD ON AVON
Frank Harvey 0798 413345
SWANSEA
Audio Excellence 0792 474608
SWINDON
Absolute Sound & Video 0793 38222
TRURO
Truro Hi Fi ETS Ltd 0872 79809
TUNBRIDGE WELLS
Sevenoaks Hi Fi 0892 31543
WILMSLOW
Wilmslow Audio 0625 529599
WOOLWICH
Sevenoaks Hi Fi 01-855 8016
WORCESTER
West Midlands Audio 0905 58046
YORK
The Sound Organisation 0904 627108



have picked up the station from the other side of the country. This feature looks more at the mechanics of this unusual radio station which runs on the DJs' and engineers' (often one and the same thing) dedication and resourcefulness.

One of the first things that endeared me to Caroline is the human feel that the station has on air; records get stuck in the groove when the presenter has gone off to make a coffee or relieve himself, and there are frequent breakdowns (compared to other stations) giving the impression of engineers battling to get transmission going again in a tossing sea. The second is the lack of pretentiousness from the presenters, which combined with a high music content (of around 16 records an hour) makes shows enjoyable and easy to listen to. And (Glory Be!) there are no phone lines, ergo no chat shows.

The down to earth approach has developed to give the station "an overall sound" according to Steve Conway, the 24-year-old Irish programme director, who arrived three years ago to read and compile the news. "We don't like the 'jocks' to put over their egos too much because when they leave the ship it's very noticeable to listeners," he said. Instead shows are programmed using a computer to give presenters a list of songs to play. These consist of the current Top 40, new releases and hits from the past three decades giving Caroline a more timeless feel than other stations who cannot afford to play so many records by virtue of needle time agreements with the musicians union; the BBC for instance pays around £80 per record in royalty fees with a yearly bill of £22m to the taxpayer. Radio Caroline pays nothing.

The original 300-foot radio mast, used by Caroline since 1983, fell overboard after

being weakened in the October Hurricane of 1987. After seven days struggling to rig a jury mast the service was again transmitting, albeit with a much weakened frequency. Morale hit an all-time low during this period with only Steve Conway and one other 'jock' staying aboard to man the station until another aerial, strung between two hundred-foot masts, could be made. The diplexer, which allows Caroline and the Dutch pirate station to use the same mast for different frequencies, was also destroyed and for much of 1988 both stations had to share air time on one frequency.

Mike Watts told me that it had taken most of the year to hand-make another diplexer; Caroline started broadcasting around the clock again in October.

The guts of Caroline - three AC generators, three transmitters (an Amphiphase

and two RCA BTA-5G types from an Arkansas station for the medium wave frequencies) and transformers are to be found in the old spacious fish holds.

The ship itself (except for example the TV) uses DC power provided by two original generators in the old engine room with its miles of perplexing pale-yellow wiring and tubing and a cocktail of iron-filings and marine diesel smells. One of the most satisfying aspects of working on Caroline according to Mike Watts was that it allowed him to be involved in every aspect of radio engineering from the record player to the aerial. "Other radio engineers never get the chance to work on everything," said Watts. He, or the resident engineer, is also responsible for all the other engineering aboard. This was demonstrated on our second night when he fired up the trawler's 2,300 horse-power engine - no mean feat when all the original instructions are in Icelandic! This is done periodically to stop the cylinders (there are ten which weigh the best part of a ton each) from settling and crushing the rings. The engine is started using compressed air and it took a couple of blasts to get it going. In the end we were all shouting encouragement over the oscillating bass line and ringing tappets as the cold machinery staggered into life. Another five minutes saw Watts sitting in his oily overalls in the studio, wiping the grease from his hands as he presented his night-time show!

The two main broadcasting studios are just below bridge level and separated by a layer of soundproof glass; there's just enough room to swing a very small cat but they often become crowded with passing off-duty presenters stopping in for a chat. Through brass portholes the daytime view is of a lonely sea or the occasional passing ship. At night (unless visibility is bad) the lights of Margate on the horizon offer the seduction of a pub or change of diet only a



Caroline Martin, the only girl aboard - she was named after the station.



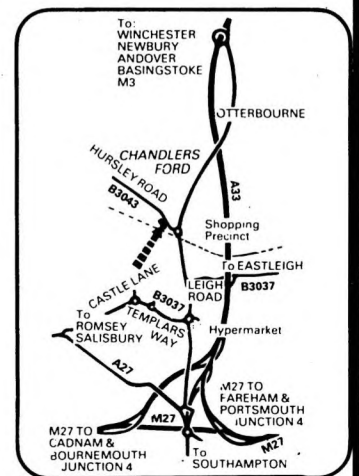
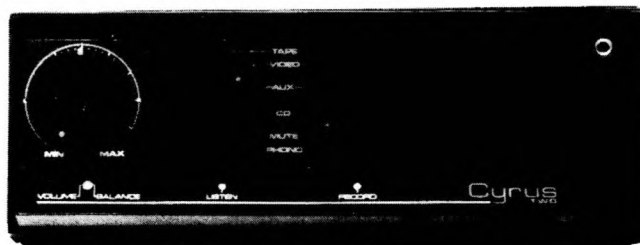
good dealer
 good equipment
 the foundation of a good music
 system
 from

Hampshire Audio Ltd

Kingfisher House
2-12 Hursley Road
Chandlers Ford, Hants SO5 2FU
Tel: Southampton (0703) 252827 & 265232

We stock selected items for:
 Aloï, Audiolab, A&R, Audio Technica, B&W, Celestion, Celet, Cliff Stone, Creek, Cyrus, Denon, Dual, Gale, Goldring, Gyrodek, Heybrook, Hunt, Infinity, Jordan, KEF, Koetsu, Linn, Marantz, Mark Levinson, Maxell, Meridian, Michell, Mission, Monitor Audio, Monitor PC, Musical Fidelity, Nagaoka, Nakamichi, Ortofon, Perreaux, ProAc, QED, Quad, Revolver, Revox, Rogers, Rotel, Sennheiser, Tannoy, Target Audio, Supex, Wharfedale, and others.
 Active systems on demonstration.

with
 The new **Cyrus** amps -



OPENING HOURS
TUES-SAT 10-6 THURS 10-8
CLOSED MONDAYS
(EXCEPT IN DECEMBER)



A degenerate Apollo of the airwaves: Rob Harrison and T-shirt. The station still preaches "loving awareness".

few minutes drive away, yet are impossibly distant in this setting.

Records in the Caroline daytime studio are played on a couple of Russco Studio-Pro decks (direct-drive, of course) using the industry-standard Stanton cartridges which tenaciously grip the groove even in the roughest sea conditions. An ancient Gates Dualux valve mixer, using dials rather than sliding controls also acts as a preamplifier for the one JBL 55 VX wall-fixed studio monitor (zero need for stereo here folks!) which is powered by a dusty Quad 405 power amp wedged into a corner under the DJ's console.

The one purist element we can cite here is that Caroline jocks get an all-valve sound! The equipment on the other side of the glass, used by Caroline DJs at night, is the same but for the newer Technics SL1210 turntables (the Russcos date from the mid-seventies) and a Philips monitor. The studios also use cart machines which carry jingles and advertisements as well as some songs taped from other radio stations. Steve Conway explained that in the best piratical traditions this would be done when bad weather made it impossible to get new releases. Tapes are made and edited together using either the Teac or Revox A77 reel-to-reel machines which are also used for relaying 'God's Service'. These 'carts' would then be used until the pukka record arrived but Conway related that on one occasion a tape had been put together using 17 sections taken from both TV and radio services and was preferred to the original when it arrived. "So we stuck with our version," he laughed.

All the equipment has been chosen for its reliability and ruggedness to suit this location. When the sea's getting up everything acquires its own energy and takes off unless it's fastened down.

So far CD machines haven't been used (for reasons of dubious reliability) but Mike Watts said that DAT machines would probably be the best upgrade in the studios since the archive material could be recorded onto tape in the rotating order in which it is played at present.

A potentially more important improvement would be the launching of an FM service once a new permanent aerial, and the necessary equipment, is installed. Plans for the FM service (initially in mono) have reached the stage where the equipment has apparently been bought, and evidence of the new aerial littered the deck of the Ross Revenge. The existing aerial is only a temporary structure built to replace the jury rig of early '88. Talking about it brings back memories to Steve Conway and Mike Watts who told me they had used a piece of piping which had run the length of the ship and was originally used for cod liver oil.

The presenters all remembered (with varying degrees of rancour) the reek from the 50-foot pipe even after it has been flushed with sea water for two days. The pipe was welded on to the redundant trawl boom and hoisted up to provide a 100-foot mast while a second slightly lower mast was erected on the after deck with the aerial slung between. The aerial itself looks a bit DIY-ish, consisting of four wires kept apart with galvanised spreaders and

insulated with porcelain blocks – the jury rig had been insulated with an old lavatory! It perfectly illustrates the spirit of Caroline; using any means available to stay on air. Around the deck the electromagnetic atmosphere is tangible in places – you can put your hand onto something and get an electric shock although the ship's danger area is 'fenced off' for obvious safety reasons.

The dawn of our last day on board saw a flock of starlings clustering about the rigging after overnighting on the ship. The sea was calm and the only sounds were faint music from the studios and the angry squawks of the birds as they landed on the aerial wires, causing sparks but otherwise no injury. Later that day, as we prepared to leave the ship, a small fire broke out in the transmission room, and broadcasting was shut down for about 25 minutes. This is the sort of thing that makes all but the most enthusiastic listener re-tune. The fire was more like a puff of smoke from the diplexer which had shorted across in one place. Mike Watts climbed into the menacing-looking coils of metal above the transformers and proceeded to saw away the offending piece of material!

As the tender pulled away the ship again took on her look of isolation, the riding lights confirming her stationary position to other shipping for miles around. Transmission resumed and Caroline crackled back into life with the Gloria Gayner song: *I Will Survive*. And if the station can draw on the free spirits that have kept it on air for the best part of the last quarter century Caroline probably will survive.

If you think these are silly prices –

SYSTEM 1
DUAL CS 430 TURNTABLE
'NEW MODEL'
MISSION 70 MK II SPEAKERS
ROTEL RA 810 AMPLIFIER

SPECIAL SYSTEM PRICE ONLY
£239.90

SYSTEM 2
DUAL 503.1 TURNTABLE
WHARFEDALE DIAMOND III
SPEAKERS
ROTEL RA810 AMPLIFIER

SPECIAL SYSTEM PRICE ONLY
£279.90

SYSTEM 3
REVOLVER REBEL TURNTABLE
MISSION 761 SPEAKERS
ROTEL RA820 Bx3
AMPLIFIER

SPECIAL SYSTEM PRICE ONLY
£399.90

SYSTEM 4
DENON DCD 610 COMPACT DISC
CELESTION DL6 MKII
SPEAKERS
DENON PMA 250 AMPLIFIER

SPECIAL SYSTEM PRICE ONLY
£449.90

PHILIPS CD 473 COMPACT DISC
FULL FEATURE NOW

SAVE £70 WAS £249.95 **£179.95**

MISSION 70 MKII SPEAKERS
SUPER BUY NOW

SAVE £30 WAS £109.90 **£74.90**

6 MONTHS INTEREST FREE CREDIT*
ON ITEMS OVER £200

you should see our complete mail-order list (why not ring Lesley?)



These six great hi-fi bargains are just a selection from our wide-ranging stock of hi-fi separates. You know you're getting a bargain when you buy direct from Cleartone, because as leading retailers we have tremendous buying power. Just select the hi-fi of your choice, fill in the details on the form at the bottom, and send it to us.

You can either pay in full now by money order, cheque or credit card, or take advantage of our INTEREST FREE CREDIT OFFER. **EXAMPLE: SYSTEM 1 (ABOVE) CASH PRICE £279.90 10% DEPOSIT £27.90 FOLLOWED BY 6 EQUAL PAYMENTS OF £42.00 APR 0%.** Licensed Credit Broker. All credit subject to status. Written details on request. Prices correct at time of going to press.

FREE!
CARRIAGE FOR ORDERS IN EXCESS OF £250 (UK MAINLAND ONLY)

Even if you don't see the hi-fi separate that you have in mind in this ad, you will most probably find it in our mail-order leaflet which lists hundreds of items. Why not phone Lesley, our Direct Mail expert, and ask for a copy? Always check our prices before you buy hi-fi from anyone else. (24 hour answering service).
TEL: 0204 399617
Offers subject to availability.

CLEARTONE
BEST FOR PRICE AND ADVICE ON HI-FI



235 BLACKBURN ROAD, BOLTON BL1 8DR. Tel: 0204 399617
BRANCHES AT MANCHESTER · ALTRINCHAM · ROCHDALE · WOLVERHAMPTON

ORDER FORM We will send your hi-fi via Securicor.†
I enclose Cheque/Postal Order for £ _____ Expiry Date _____
Access/Barclay Card No. _____
I wish to buy: _____
I request a credit agreement under your deferred till June 1989 payment scheme Signed _____
(PLEASE COMPLETE IN BLOCK CAPITALS)
NAME: _____
ADDRESS: _____
DAYTIME TEL. NO. _____
SEND TO: MAIL ORDER DEPT.,
235 BLACKBURN ROAD,
BOLTON BL1 8DR.
TEL: 0204 399617

HFC

DMP CD OFFER

Special offer to Hi-Fi Choice readers. Save £5 on DMP compact discs.

Digital Music Products is a CD-only jazz label imported from the USA by leading audio specialist Absolute Sounds. As an introduction to the superb quality of DMP CDs, *Hi-Fi Choice* is offering its readers DMP CDs at a special price of £13.00 each, £5 off the recommended retail price.

As part of its exclusive deal with *Hi-Fi Choice*, Absolute Sounds is offering automatic free membership of the DMP Club as soon as you place an order for a DMP CD.

Membership of the DMP Club entitles you to:

- Select any of the CDs in the DMP catalogue at special discount prices.
- First option on all new DMP releases.
- DMP's quarterly newsletter, which keeps you up to date on all the new releases, live tours, and forthcoming projects by DMP artists. The newsletter also features regular competitions in which you could stand to win any number of the hi-fi accessories distributed by Absolute Sounds.

CD-443: TriCycle, Flim & the BB's
Voted best jazz CD of 1985 by readers of Digital Audio in the US, combining pop melodies and jazz improvisation. Arguably the definitive DMP album, TriCycle has become a standard demo CD for stretching hi-fi loudspeakers to their limits.

CD-447: Tunnel, Flim & the BB's
Flim & the BB's second album for DMP voted best jazz CD of 1986 by readers of Digital Audio magazine. A collection of joyful, melodic songs superbly played and recorded.

CD-451: Incredible Journey, Bob Mintzer Big Band
A must for all jazz and big band lovers, Incredible Journey features Mintzer supported by some of America's finest jazz musicians – including Michael and Randy Brecker, Peter Erskine, Lawrence Feldman and Marvin Stamm.

CD-453: NY Cats Direct, John Tropea

Brilliant New York guitarist John Tropea plays bluesy, improvisational jazz which alternates between thoughtful, melodic passages and electrifying blues solos. Supporting musicians include Steve Gadd and David Spinozza.

CD-454: Big Notes, Flim & the BB's

Another tour-de-force from jazz quartet Flim & the BB's. Superb sound, joyous, uplifting music – and . . . (yup, you guessed it) . . . voted best jazz CD of 1987 by readers of Digital Audio magazine.

CD-455: Lighthouse, Billy Barber

One of the most popular DMP recordings, and rightly so – Barber's second album for DMP is full of beautiful melodies and heartfelt tunes. Barber's piano playing is stunning, accompanied throughout by an array of imaginative keyboard and synthesizer sounds.

CD-459: Brazilians, Manfredo Fest

Blind-from-birth jazz legend, Manfredo Fest returns to the world of recording with this stunning CD invested with the rhythms and melodies of Brazilian jazz. Fest's piano playing throughout is inspired, as are the pure vocals of Roberta Davis.

CD-460: Thom Rotella Band, Thom Rotella

DMP discovery Thom Rotella combines melodic acoustic guitar with funky electric solos on this mainstream jazz CD. Great sound – the recording was a prototype for one of the first Sony R-DAT demos.

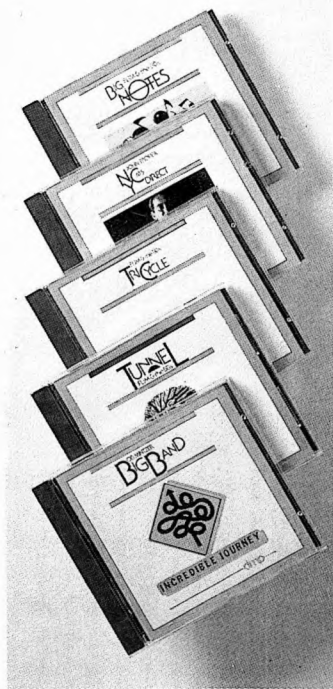
CD-461: Spectrum, Bob Mintzer

Spectrum is still fired with the big band sound of Mintzer's earlier DMP albums, but also sees the acclaimed saxophonist and composer experimenting with quintet and quartet arrangements. A superb collection.

CD-462: The Further Adventures of Flim & the BB's, Flim & the BB's

The BB's fifth album for DMP and perhaps their best to date. Once

again the band's characteristic blend of dynamic jazz, driving rhythms and pop melodies combine to form a memorable collection of songs.



TO ORDER DMP COMPACT DISCS

(Tick selections)

- CD-443: TriCycle, Flim & the BB's
- CD-447: Tunnel, Flim & the BB's
- CD-451: Incredible Journey, Bob Mintzer Big Band
- CD-453: NY Cats Direct, John Tropea
- CD-454: Big Notes, Flim & the BB's
- CD-455: Lighthouse, Billy Barber
- CD-459: Brazilians, Manfredo Fest
- CD-460: Thom Rotella Band, Thom Rotella
- CD-461: Spectrum, Bob Mintzer
- CD-462: The Further Adventures of Flim & the BB's, Flim & the BB's

PAYMENT

- I enclose my cheque/PO made payable to Dennis Publishing for _____ selections at £13.00 each
Total _____
- Please charge my Access/Barclaycard/American Express/Diners Mastercharge (delete as appropriate)

Credit card number _____
Expiry date _____
Signature _____
Name _____
Address _____
Postcode _____
HFC 71

Please send order form with payment to:
Hi-Fi Choice Mail Order
PO Box 320
London N21 2NB



MARKET RESPONSE

In our exclusive market survey Dan Houston polls specialist dealers on loudspeaker sales asking them about market trends and reliability.

Estimates on the present size of the British loudspeaker market put the retail value at somewhere around £45m. However, the market is split between units sold with midi systems and music centres and those sold as separates. In this dealer survey we are more concerned with the separates side where for a change local (or British) manufacturers rule the roost, especially among specialist dealers selling higher quality product.

Even the Japanese audio giant Sony has 98 per cent of its models made by British firms. Most (around two thirds) of the 500,000 pairs of British loudspeakers made in a year are exported, according to John Dawson, Managing Director of A&R Cambridge, who has access to figures covering most of the specialist British Loudspeaker community. These figures would not include the likes of Sony or Rotel but to put perspective into the picture Sony alone claims to sell half a million pairs of loudspeakers in this country.

One large area of the separates market, according to John Dawson, is with midi system upgrades where the addition of a decent pair of British loudspeakers usually makes a huge difference (for the better) in terms of sound quality. "In general £300 midi systems have loudspeakers which cost around £10 a pair," John told us. This was born out by several retailers, although where customers had existing separates systems with reasonable loudspeakers dealers on the whole felt that one would do better to upgrade from the front-end (source) of the system, confirming that loudspeakers are only as good as what goes before them.

While this is true, it doesn't mean that a £70 pair of speakers will function beautifully at the end of a system costing thousands of pounds. Rob Dowse, of Definitive Audio pointed out that this had been the case in the late '70s following Linn Products' reversal of an earlier trend which centred the system on the loudspeakers. Dowse claimed that with "neutral sounding components" he could achieve a

similar sound from a £2,000 system and £400 speakers as from a £400 system and £2,000 loudspeakers. "To advocate a system heirarchy is a nonsense," expounded Dowse, "a hi-fi system is only as good as its weakest link; one should try to apportion equal amounts of budget on each component."

The most diverse area of the market is in the more expensive category where electrostatic, horn and ribbon speakers have enthusiastic followers alongside the more conventional box and cones type. And Analog Audio noted that subwoofer systems were becoming more and more popular, providing bass in a system where large cabinets might look out of place.

For this edition of Market Response – the fourth for loudspeakers since November 1987 – we received replies from 40 dealers covering 70 brands on sale in the UK at the moment. Of course not all dealers sell all makes; on average individual dealers stock ten brands. The most common brands here are all British: Mordaunt-Short, A&R Cambridge, Celestion, Heybrook, KEF, Mission, Tannoy and Wharfedale.

The nature of this survey, which relies on a random approach by sending out a mailshot to specialist dealers up and down the country, means that in general only the most common brands the dealers stock are covered. The aim of the survey is to provide readers with a distillation of the views and experience (over the last six months) of many dealers as well as providing a guide on the current popular models. Market response complements the main review topic each month but concentrates on different criteria such as reliability. Because the survey is limited to specialist or independent dealers rather than large retail chains we don't pretend the picture is 100 per cent accurate for the UK at present. The survey is a poll and should be seen as such.

RELIABILITY

Loudspeakers are about the most reliable of all hi-fi products by virtue of being fairly simple in

terms of components which can go wrong. As a guideline to quality control across the board we asked dealers for the percentage of loudspeakers arriving faulty and calculated a mean of 1.7 which tallies with earlier findings and makes them the most reliable hi-fi component to leave the factory. Dealers also pointed out that much of this (small) figure was due to damage in transit – causing damaged cabinets. In the past we have noted dealers' comments on poor quality of finish such as peeling vinyl, especially on budget models though happily none mentioned it this time.

The most common failing according to dealers was blown drive units owing to customer misuse. Doug Brady Hi-Fi told us that "most speaker damage is caused by under driving them" (tweeters get blown when an under powered amplifier is driven too hard causing distortion). But even this is on the wane as more manufacturers introduce protection circuitry. The introduction of this has decreased the incidence of burn-outs to the stage where several dealers told us that manufacturers were replacing drive units free of charge, giving a sort of unofficial permanent guarantee on their products. Replacing drive units is such a simple job according to John Smith of Audio T that he advocated customers doing the job themselves, sending the faulty unit to the manufacturer and then putting in the new one (which hopefully arrives by return).

While poor amplifier matching (usually discovered at the height of the party, when one of your guests puts the amp into hardclip in an effort to sonically milk the moment) was a general cause for concern, Horns of Oxford told us that metal dome tweeters were also prone to customer damage. It's a small point but probably worth remembering if you have this type of speaker with the grilles off and in reach of small children with especially hard, stubby fingers.

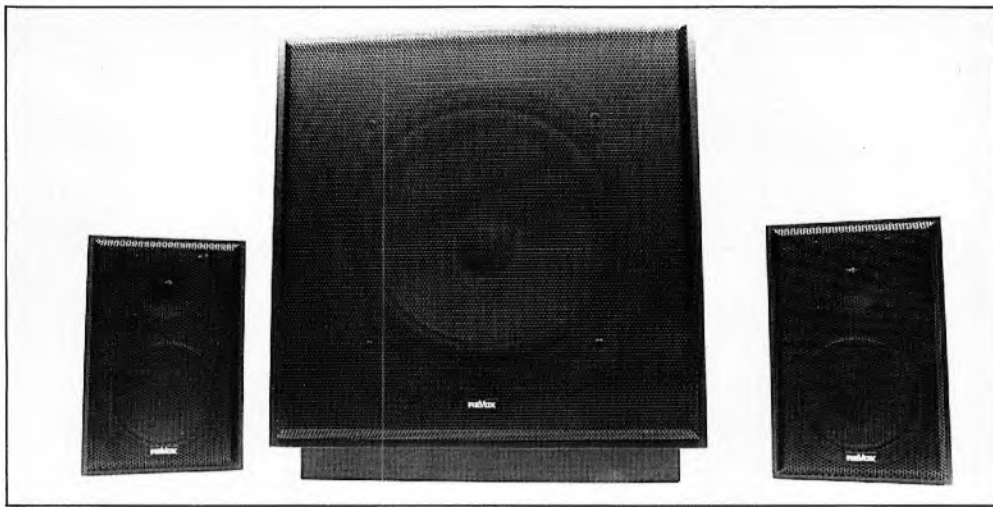
If your speaker does blow up or break down most dealers would repair it themselves rather than

send it back to the manufacturer. (This is assuming you don't want to follow John Smith's advice or if the model is still under guarantee.) With the parts in stock many said they would only take "hours" to fix the fault, but on average repairs take one-and-a-half weeks. If the speaker has to be returned to the manufacturer (for a crossover fault or if it is very old) the approximate turnaround time is two and a half weeks. Here some manufacturers score higher than others and we asked dealers who was fast at dealing with repairs and who was slow.

The fast brands were cited as Linn Products followed by Mordaunt-Short, Celestion and Castle Acoustics. Slow brands were said to be Tannoy (with an average of ten weeks) and Musical Fidelity, though dealers also noted generally that some of the Japanese were difficult in this aspect. Steve Harris for Tannoy denied the figure of ten weeks saying: "that's way over the top. We are aware of the problem and are not as fast as we would like to be, but we are just changing the system and improving it at this very moment."

We asked dealers for their most and least three reliable brands and calculated the results on a points system. Where brands were given plus and minus points we have taken the difference. It should be noted that the more a dealer sells of a product the more faulty models he is likely to find, but in the past we have found dealers are usually aware of this and give considered replies – often from their computer records. The most popular brands, in order are: Mordaunt-Short (25 pts), Rogers (24), Linn (21), JPW (20), Mission and Monitor Audio (18 each) and Celestion (17). Unreliable makes were given as: Wharfedale (-13 pts), Rotel (-12) and Acoustic Research (-6).

Fred Clayton for Wharfedale pointed out that his company's market was usually aimed at people buying their first or second hi-fi system. "Ninety plus per cent of problems with loudspeakers are due to customer misuse," he explained,



Back to bass: satellites and subwoofers (Revox model here) are a growing trend.

"by the time someone is buying a Rogers or Linn loudspeaker they know far more about hi-fi and how to treat it. We are bound to have a higher failure rate because we cater for the cheaper end of the market."

It was good to see that Mission has jumped from being mentioned as unreliable in our last survey to among the top reliable names this time.

STAND UP

Loudspeaker stands to mechanically couple the transducer to the floor are becoming considered as essential as the boxes themselves by some dealers. Most of our correspondents say they could easily demonstrate improvements to the sound by placing loudspeakers on proprietary stands. In the last survey we found that dealers sell stands with 76 per cent of their loudspeakers. The exception seems to be where a customer needs speakers for the bookshelf. We heard from several dealers that they might sell loudspeaker stands which were the same price as the loudspeaker itself. Several dealers agreed that one could spend £100 on stands and £200 on loudspeakers and that this would sound better than a pair of £300 loudspeakers on their own.

Rob Dowse (who has an interest as Pirate Stands' manufacturer) said that if someone wanted to spend under £300 on loudspeakers he would recommend £125 JPW AP1s on Pirate *K2 Legs* which would cost £275 altogether. This certainly sounds like a radical alternative to JPW's AP3 and its own stand for around the same price, but Dowse said that he couldn't arrange a better package.

While it seems that more and more people accept the need for loudspeaker stands in their system Angela at Grange Hi-Fi

said that in the budget end of the market (around £80) it was very difficult to sell a pair of stands.

Manufacturers are now making their own stands to suit individual loudspeaker models and this is a popular option especially with Linn, Heybrook, Celestion and JPW loudspeakers. Of course these stands don't have to be used with the manufacturer's own loudspeaker models and many have a wider popularity. Many loudspeakers also come with integral stands. However, specialised stand manufacturers are still most popular, with Target stands followed by Foundation Audio leading the pack. The heavy Pirate stands have also become popular especially among Snell users and there were several mentions for Appolo and Sound Factory stands. There are many different types of stand to choose from (we had replies covering 26 brands) and we found the three most popular types are Target's budget model *S41* retailing at £23.25 followed by Linn's £45 *Index* stand – the cheapest from its range, and the Foundation Audio *Fred* (£65). Dealers mentioned that it was important to buy rigid and heavy stands which were welded and pre-filled with lead and shot rather than the type you bolt together yourself.

CABLE

Once you've chosen loudspeakers and stands some decent loudspeaker cable will probably be offered. Again the advantages are audible and easily demonstrated according to dealers who told us they sold specialist cable with over 70 per cent of their loudspeakers. Cable comes in various shapes and guises and it is important to get a type which is synergistic with the rest of your system.

Brentwood Hi-Fi told us that: "it is essential to match the

speaker with the rest of the system from the point of view of wiring used internally in the speaker, amplifier and front-ends as well as interconnects and loudspeaker cable." We should point out that there is no scientific evidence to back this up but the point is to choose a cable that will work with rather than against the system. Several dealers mentioned that choice of loudspeaker cable could be seen as a final tuning touch with certain types able to brighten up dull loudspeakers and vice versa.

QED's 79 strand loudspeaker cable has consistently been found to be a best seller and is still voted top by dealers in this survey. At 90 pence a metre this is hardly surprising. What is more surprising is the nomination by six dealers of Rotel's *Supra 4mm* cable (£2.49 per metre) as their best seller. Linn's *K20* cable (£2 per metre) was the next most popular and there were also nominations for Monster's *Superflex* at £2.50 per metre. The results bear out comments on the audible improvements dedicated loudspeaker cable can make to a system and are good for the hi-fi cause in general.

THE BEST SELLERS

We asked dealers for their top three selling loudspeaker models in three different price brackets. The results are calculated on a points system; five for the best seller, four for the second, three for the third and then added up.

Budget below £149

1) Celestion <i>DL4</i>	44
2) Mordaunt-Short <i>MS10</i>	42
3) Tannoy <i>Eclipse</i>	38
4) Heybrook <i>Point Five</i>	33
5) JPW <i>AP1</i>	25

Of these the Heybrook *Point Five* and Tannoy *Eclipse* were also listed best sellers in our January issue Market Response on loudspeakers.

Mid Price £150-£300

1) Monitor Audio <i>R300MD</i>	34
2) Tannoy <i>Mercury S</i>	33
3) Linn <i>Index Plus</i>	27
4) Mordaunt-Short <i>MS35Ti</i>	24
5) Celestion <i>DL8</i>	24

Both Linn and Tannoy models also did well in January.

Top Price over £301

1) Snell <i>Type K</i>	30
2) Rogers <i>LS7T</i>	30
3) KEF <i>104</i>	26
4) Celestion <i>SL6si</i>	25
5) Monitor Audio <i>R852MD</i>	16

Snell has stolen the show ousting Monitor Audio to fifth place, though Rogers and KEF are holding their own.

PARTICIPATING DEALERS

Our thanks to the following dealers for helping us compile this survey:

Aerco Ltd, Woking, Surrey.
 A. Fanthorpe Ltd, Hull, Humberside.
 Analog Audio, Finchley, London N12.
 Aston Audio, Alderley Edge, Cheshire.
 Audio Insight, Stony Stratford, Milton Keynes.
 Audio South, Farnham, Surrey.
 Audio T, London NW6.
 Brentwood Music and Hi Fi Centre, Essex.
 Cambridge Hi-Fi, Bedford, Beds.
 Chew and Osborne Ltd, Saffron Walden, Essex.
 Cleartone Hi-Fi, Wolverhampton, West Midlands.
 Covent Garden Records, London WC2.
 Definitive Audio, Brighton, East Sussex.
 Doug Brady Hi-Fi, Covent Garden, London WC2.
 Elite Hi-Fi, Harrogate, Yorkshire.
 Gilson Audio, Middlesbrough, Cleveland.
 Grange Hi-Fi, Burton-on-Trent, Staffordshire.
 Hi-Fi Experience, Camden, North London.
 Holborn Hi-Fi, Aberdeen.
 Hopkins Hi-Fi, Portsmouth, Hampshire.
 Horns Ltd, Oxford, Oxon.
 Island Compact Disc Centre, Ramsey, Isle of Man.
 Kensington Hi-Fi, West London.
 Lyon Audio, Stanway, Colchester, Essex.
 Moorgate Acoustics Ltd, Rotherham, Yorkshire.
 Newbury Audio, Newbury, Berkshire.
 Nottingham Hi-Fi Centre, Nottingham.
 Now That's Hi-Fi, Portsmouth, Hampshire.
 O'Brien Hi-Fi, Wimbledon Village, London.
 Peter Russell's Hi-Fi Attic, Plymouth, Devon.
 Pro-Musica, Colchester, Essex.
 Radlett Audio, Radlett, Hertfordshire.
 Rogers Hi-Fi, Guildford, Surrey.
 Stereo Stereo, Glasgow, Strathclyde.
 Steve Boxshall Audio, Cambridge, Cambs.
 The Cornflake Shop, Windmill St, London W1.
 The Sound Room, Norbury, Croydon.
 University Audio, Cambridge, Cambs.
 Zeus Audio, Belfast, Antrim.
 And one anonymous.

ESSENTIAL NUMBERS.

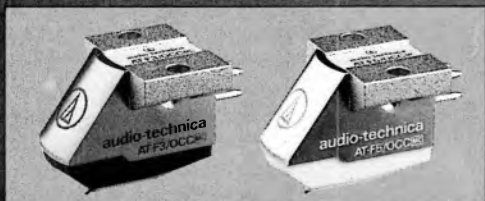


NEW HORIZONS IN ANALOGUE TRANSDUCING

In the constant perfection of record reproduction, Audio Technica unveil their latest numbers . . . AT-OC7 and AT-OC9. Having an almost identical 'on paper' specification, both incorporate varying elements of the newest technology in materials and micro-engineering, many of them developed originally in applications for NASA and the hi-tech aerospace industry. The result is a sound quality previously considered unattainable in the sub £500 category.

Whilst the list of technical achievements is endless, the true test is in the listening. Press comments include . . . *'the OC7 is a superb sounding cartridge; there's no other way of looking at it. Its treble articulation and dynamics are exceptional'* — *NEW HI-FI SOUND*. *'I will say with certainty that the OC9 is one of the very best cartridges I know, and can give it my strongest and most enthusiastic recommendation'* — *HI-FI REVIEW*. Please contact Audio Technica for complete reprints of these together with the reviews of Hi-Fi Answers, Gramophone and Hi-Fi News. Better still, call in for a personal audition at BADA and specialist audio retailers and find out why AT-OC7 and AT-OC9 are now essential numbers in today's top flight analogue systems.

ATPF3 and ATPF5 . . . the successful start to AT's outstanding 'mc' family.



	AT-OC9	AT-OC7
Frequency Response (Hz)	15-50,000	15-50,000
Output Voltage (1 KHz, 5cm/sec)	0.4mV	0.3mV
Tracking Force (gm)	1.25-1.75	1.25-1.75
Weight (gm)	7.8	7.8
Stylus	Square shank elliptical	Square shank elliptical
Magnet Mould	Titanium-Oxide/Potassium mix	Ceramic
Yoke-Piece	Vanadium based metal	Soft Iron
Coils and Terminal Pins	PC-OCC	PC-OCC



The only complete transducer family

CARTRIDGE • HEADPHONE • MICROPHONE • VITAL LINKS



audio-technica

□ INNOVATION □ PRECISION □ INTEGRITY

Technica House, Lockwood Close, LEEDS LS11 5UU. Tel: 0532 771441



CHOOSING AND USING . . . LOUDSPEAKERS

A pair of loudspeakers is as personal as a pair of shoes. A little care spent in choosing and correctly using will pay long term dividends.

If you're planning to spend one or even several hundred pounds on a new pair of loudspeakers, it does make sense to take at least as much care over the decision as one would in buying a pair of shoes. If you get the shoes wrong your feet will protest, so if you get the loudspeakers wrong your ears will rebel, and you will find yourself not using the system as much.

The first step on the road is to try and specify one's own personal and particular requirements, he writes glibly, opening several cans of worms. It is possible to do this on a basic, simplistic level, checking the price, size and intended location. But there are real benefits for those prepared to take a little more trouble. With a little care, the assistance of the data in this book, and (hopefully) the co-operation of a skilled retailer the end result can be that much more worthwhile.

SETTING THE BUDGET

Those buying just loudspeakers will have a pretty good idea of the money they have available, which as ever is the fundamental bottom line of any purchasing decision. But there is – and always has been – controversy over the proportion of a budget that should be devoted to loudspeakers, vis à vis that spent on the other components.

Ten years ago conventional wisdom recommended devoting as much as possible to the loudspeaker, as it was regarded as the weakest link in the chain. An alternative philosophy, pointing out that the loudspeaker could do nothing to compensate for an inadequate source, switched attention towards turntables and amplifiers.

When setting the loudspeaker budget, it is vital to allow sufficient funds for a decent stand or support, and good quality connecting wire. From £200, for example, one should probably allocate £140 for the speaker itself, £50 or so for stands, and maybe a tenner for the cables.

PERSONAL PREFERENCES

Where one listener may be barely conscious of the subtleties of stereo imagery, another will take particular pleasure in pin-pointing musicians within a recorded acoustic. Likewise those who listen predominantly to electronic rather than acoustic instruments are liable to sacrifice coloration in favour of dynamic impact.

While a magazine can assist in presenting these alternatives, it is only through skilled demonstration that an individual can be confronted with the different but equally valid options to make an educated choice for himself.

At the time of writing I am temporarily living with a £1,000 system which suits me very well, but which certainly represents one extreme. It consists of a £600 turntable with £200 amplifier and £80 loudspeakers on £100 stands. At the other (rather less) extreme, another could enjoyably combine a £500 remote control multi-source midi-system with £500 worth of high performance, low coloration loudspeakers and stands. But unless one actually has the opportunity to hear the difference between these two very distinct approaches, how can one possibly have any basis for making a choice?

SITING IS IMPORTANT

The site chosen for loudspeakers is often as influential as the choice of loudspeakers themselves. Over the years I have used open stand locations, both with conventional box speakers and panel types, and also stand-mounted wall-backed designs. Each has its own strengths and weaknesses and imposes its own characteristics on the sound, so again personal preference enters into the equation.

Having chosen the siting, one may then choose the loudspeakers and stands to suit. Alternatively, choose the speakers you like in the shop, and then move them around at home until they sound to your taste.

The end result comes from a

complex interaction between the loudspeaker, its support, its site, the acoustics of the room, and the general characteristics of the driving system. That is rarely entirely predictable. For those intending to spend a fair amount of money, it is not unreasonable to expect the luxury of a home demonstration, and/or the option to return and change a pair which do not suit after a day or two.

BIG ONES OR LITTLE ONES

For any given budget there is an obvious choice between large or small loudspeakers. One instinctive reaction is to favour



The KEF C75 – a good value package – and you don't need a stand.

the big one, particularly if it has lots of drive units, but others will plump for a miniature or compact on aesthetic grounds. In fact the differences and trade-offs are much more subtle and far-reaching.

Fundamentally, the larger the box the more extended the bass is for the same specific loudness. Ultimately a good big 'un is going to beat a good little 'un on loudness and bass extension, hands down. But it is also going to cost a great deal more. The large enclosed volume remains the route to extended bass, and this in turn adds 'weight' and 'scale' to the sound. But it can also reveal the low frequency inadequacies of the sources, be they the equipment or the recordings themselves.

Big speakers suffer from several innate disadvantages. Large box enclosures are expensive to build and ship, and represent an undesirably large surface area of unwanted radiation, which can colour the sound and blur stereo precision. Extra drive units do increase power handling, but bring problems of crossover complexity and unit integration.

Little speakers can prove more fragile if used for the occasional party, and are certainly not at their best when trying to recreate the power and drama of rock or a full concert hall acoustic.

MODUS OPERANDI

Given the excessive number of different models competing for attention, manufacturers are inclined to make much of the uniqueness of their particular brew. As a result the industry has become riddled with buzz words to describe any single type of engineering solution, and this leads to the sort of stereotyping which entirely misses the point of loudspeaker engineering.

Examples are legion, from the bextrene bass/midrange cones of the early 'seventies through to the latest metal dome tweeters which are currently springing up everywhere. The result is that people talk of a 'metal dome sound' as something desirable (or not) per se, whereas in fact there will be a whole range of different metal dome sounds, in all probability some distinctly more 'equal' than others.

The underlying axiom is that great loudspeakers are not created by adopting a quick technological 'fix'. Indeed, history has often shown that the 'radical innovation' is a mere flash in the pan, with benefits in one area more than offset by unforeseen penalties elsewhere.

Technology has steadily improved the performance of loudspeakers over the years, and some innovations have proved decidedly worthwhile. But the whole is much greater than the apparent sum of the parts, and the buyer would do well to bear this in mind.

Thomsons

'of Great Baddow'



If you walk along the High Street, Great Baddow, in the direction of the "Blue Lion", next door to the public house you will find, tucked away in the corner, THOMSONS TV, HI-FI AND VIDEO. It has its own car park alongside the shop, a most useful asset.

THOMSONS, established in 1959 has always been a family business, you will find that the third generation will provide you with helpful friendly advice on your equipment needs, maintaining their longstanding excellent reputation.

ACOUSTIC RESEARCH, AIWA, DYNATRON, JVC, KENWOOD, LUXOR, MITSUBISHI, MORDAUNT-SHORT, QED, ROBERTS, TANNOY and TOSHIBA products are currently on sale. Comprehensive TV and video rental facilities are also available.

THOMSONS provide a full after-sales service and have an extensively equipped workshop in Great Baddow, ensuring that their customers are in no doubt about where to go for unbeatable professional attention.

KENWOOD

MIDI SYSTEMS AND COMPONENT HI-FI

Thomsons

2 HIGH STREET, GT BADDOW
CHELMSFORD 71465

T H E N A T U R A L C H O I C E

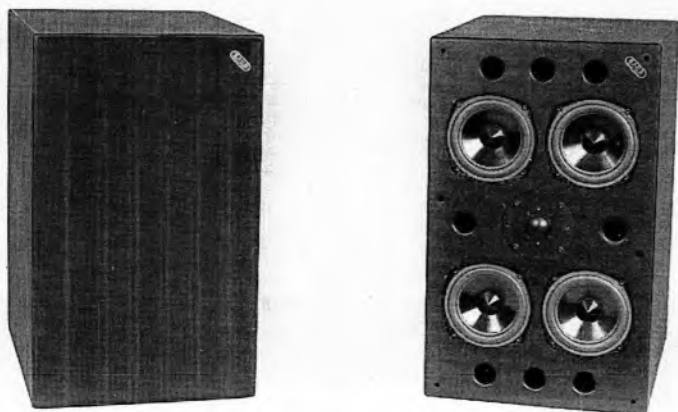
Rogers



Manufactured by Swisstone Electronics Limited, 310 Commonside East, Mitcham, Surrey CR4 1HX, Tel No: 01 640 2172, Fax No: 01 685 9496, Telex: 893980 Rogers.
Distributed by Audio Influx Corp. N.J. USA, Plurison P.Q. Canada, Audio 2000 NSW Australia, Excel Hi Fi Hong Kong, Denco Audio New Zealand, Atlas Hi Fi Singapore.

ACOUSTIC ENERGY AE4

ACOUSTIC ENERGY LTD., 3A ALEXANDRIA ROAD, EALING, LONDON W13 0NP. TEL: (01) 840 6305.



Acoustic Energy hasn't been around all that long, but must definitely be considered one of the more exciting new arrivals on the scene. The technology underpinning the whole range is the use of metal diaphragms for all drivers – the small AE bass/mid as well as the less unusual Elac anodised metal dome tweeter. Various combinations of these two drivers are then mounted in compact but heavily over-engineered cabinets which have a decidedly ProAudio appearance, and a decidedly over-engineered, ProAudio price-tag of £1,800 per pair to boot.

Brick-built privies have nothing on this. The AE4 cabinet looks as if it could have been purpose built for the safe transportation of nuclear isotopes. It's not that large, but then neither were the baby AEs, and you wouldn't have wanted to drop one of those on your toe either. The basic carcass and baffle are full 25mm MDF, and this is further stiffened and mass loaded by two internal panels and a 12mm thick plaster-like high density lining.

The superficial implication of the 'cross-head' baffle configuration of four small bass/mid drivers surrounding a central tweeter (see pic) is that the sources of treble and bass/mid become effectively coincident, which should assist crossover integration and stereo coherence. But a further implication is a great disparity between the effective sizes of these separate sources, which leads to a substantial discontinuity in terms of the relative directivity of the small tweeter and large multiple midrange array. This in turn has important consequences for the way the speaker radiates energy into the room, on and off axis.

Then there are the £550 a pair stands, crafted in the sort of metalwork that made the age of steam so glorious, each of which effectively doubles the room bulk taken up by

the speaker. Two massive fluted pillars minimise reflections and leave plenty of fresh air underneath the hefty top and bottom castings that accommodate the spikes.

The four bass/mid units are each only 100/130mm in diameter, so the ensemble really only corresponds to the area of a single 200mm unit, operating into a shared single enclosure reflex loaded by eight small but well shaped ports. The crossover uses steep 24dB/octave slopes, with bi-wire/bi-amp options available. There's plenty of 'shove' from the substantial magnets, plenty of sensitivity in the midrange at least, and plenty of power handling. The AE4s go mighty loud!

TEST REPORT

Specifying sensitivity is difficult when the basic 1m response is as uneven as this. Any figure from 85-90+dB could be defended, though round about 90dB is pretty representative. The grille has very little effect, though the pair match might have been a little closer at the low end of the tweeter range.

Out at a 2m microphone distance the midrange focusing looks much less serious, and the overall response is impressively extended to around 40Hz, though there is still some unevenness and more than a suggestion of the 'three-humped' effect, particularly off-axis. These factors are both confirmed in the room averaged response. The acoustic consequences of a midrange unit that has an acoustic diameter of 30cms is seen in the off-axis losses between 800Hz and 2.5kHz. Impedance is benign.

SOUND QUALITY

With heroic endeavour, JK and I managed the four separate two-man lifts needed to get the AE4s into place without letting on to the rest of the panel, who in turn responded with a disappointing lack of enthusiasm. There

are two reasons for this. First, there is no way to cope with such a prominent midrange when level-matching in a blind listening presentation without losing too much bass and treble. And secondly, any speaker that is decidedly 'different' tends to attract censure through unfamiliarity under these conditions.

Added subsequently, the AE4 reveals its underlying strengths alongside its somewhat strange presentation. For my money (and Jason's, for that matter) it has an almost uncannily realistic and superior ability to track dynamic changes, which in turn can be remarkably informative about the whole recording process (which is not always a pleasant experience).

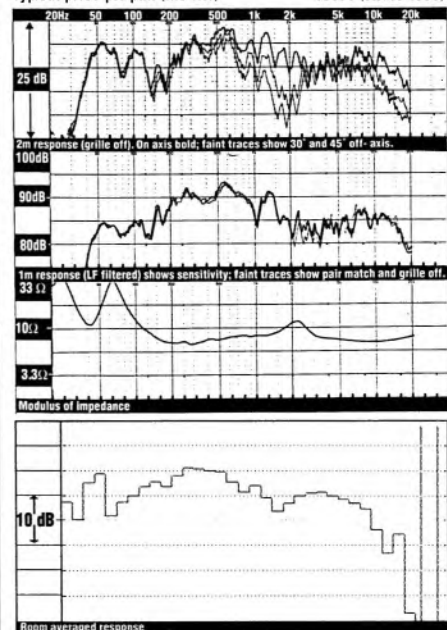
On the negative side, the imaging is phasey, having noteworthy 'sweet spots' but shifting and defocusing with comparatively small head movements. And the sound is fundamentally unbalanced, and discoloured in consequence.

CONCLUSIONS

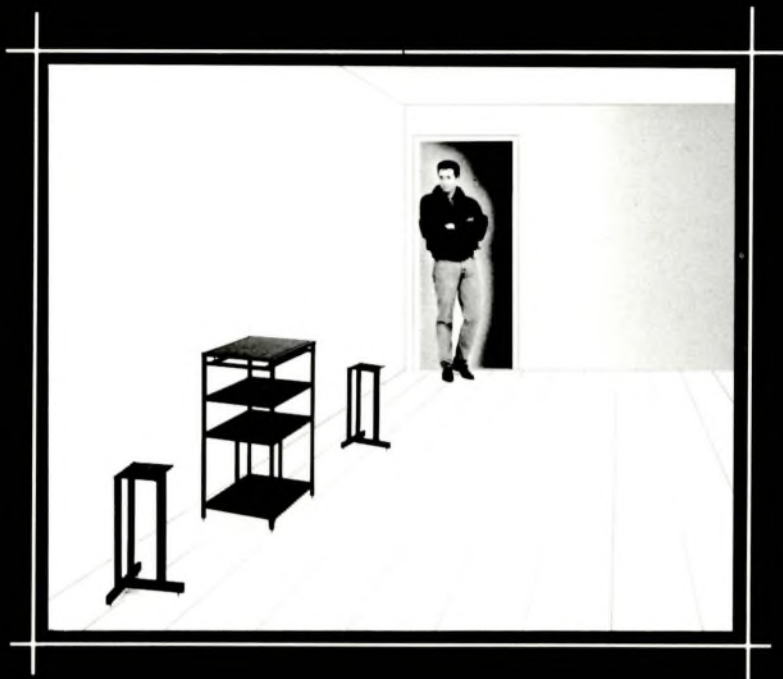
It is wrong and has flaws – more so than the smaller AEs. But it also has a certain monumental magnificence, visually and sonically, for which some might be tempted to barter a grandmother or two.

TEST RESULTS

Size (height x width x depth)	54 x 32.5 x 44cm
Recommended amplifier power	20-300 watts
Recommended placement	on matching stands in free space
Estimated frequency response (2m)	40Hz-20kHz, ±5dB
Estimated LF rolloff (-6dB ref midband)	40Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	90dB
Impedance characteristic (ease of drive)	very good
Forward response uniformity	below average
Typical price per pair (inc VAT)	£1800 (stands £550)



BEFORE ANYTHING ELSE...



TARGET 
AUDIO
PRODUCTS



THE SOUND BASE TO YOUR SYSTEM

*specialist speaker stand
and rack manufacturers*

FOR FULL LITERATURE AND DETAILS OF YOUR LOCAL STOCKISTS PLEASE CONTACT:

Target Audio Products: Unit 3&4 Townsend Centre,
Blackburn Road, Houghton Regis, Dunstable LU5 5BG, England.
Telephone (0582) 472037 Fax: (0582) 472039

ALEXANDER 566

PRESENCE AUDIO LTD., THE OLD POST HOUSE, PLUMMERS PLAIN, HORSHAM, W. SUSSEX RH13 6NU. TEL: (0403) 891777.



Alexander is new company on the hi-fi scene, hailing from the Bristol area and introducing a range of unusual looking steel-jacketed miniature (or rather near-miniature) loudspeakers which are capable of making serious sounds. *Choice* looked and listened to the more expensive and recent *Aurora* last Autumn, with quite positive results, and the smaller £160 *566* has every prospect of proving even more competitive, particularly for the customer on the lookout for something which is both discreet and distinctly different from the ordinary run of the mill.

The steel case isn't the only unusual feature. The shape is as tall as any and as deep as many ordinary bookshelf models, though less than half the usual width. In fact it's only just wide enough to accommodate the main driver, and reminds one more of a box file or large encyclopaedia than a loudspeaker. But don't be tempted to slip them in amongst the books against the wall. For good or ill, the balance is voiced for free space siting, and there's a rear port too which shouldn't be boxed in either.

The fixed grille is metal too, an expanded open weave which offers protection but not obscurity, which is a pity as the SEAS drivers don't look particularly prepossessing. The main driver here has a paper cone of just 90mm diameter, which has about one third of the radiating area of most bookshelf speakers. This driver is actually used full range, which perhaps contributes a little to the treble unevenness, the crossover consisting of just a single 1st-order feed to the tweeter.

That one of our *566* main drivers went duff when measured is incontrovertible. Whether it was working properly when the listening tests were carried out is of course anybody's guess, but chances are all was OK, and it seems most likely that the failure occurred during the measurement programme, speci-

fically during the pre-conditioning warm up period.

With hindsight, given the small diameter of the midrange unit also being used for the bass here, a minute or two of 20Hz at 3V might have been too much for the *566* to cope with, so apologies may be in order. But without pulling the bass driver to pieces – a manufacturer's prerogative on protocol grounds – it is impossible to say whether we were unwise, or simply unlucky.

Despite an urgent request for a replacement bass driver, this could not have been received within the time frame available for the test equipment. And in fact it never turned up at all, so sighted listening performance became a monophonic experience.

TEST REPORT

As can be seen from the trace, the first model worked fine up to 2kHz before dying until the tweeter came in, while the second filled in the gap very neatly. The pair match looks a bit dodgy but this may have been due to the fault. The good one showed a fine overall bass-to-treble balance with a gently falling characteristic. Bass extension is quite surprisingly good, achieved at the expense of distinctly below average sensitivity though without compromising the 'easy' amplifier load characteristic.

However, the responses within the overall trend are also marred by significant unevenness, particularly through the treble range but also around the crossover region. The off-axis responses are predictably good, while the room-averaged response clearly shows how well this tiny speaker can drive the room.

SOUND QUALITY

The *566* was rated a little below average overall, which seems about right to my ears and is

fair enough at the price. The surprising thing is that apologies for the small size are largely unnecessary, though one panelist noted: "bass is not seriously present", and others felt that it could have been 'quicker'. Experiment confirms that the recommendation for free space siting is quite correct; attempting to 'fill in' the bass by wall reinforcement merely adds an unwelcome 'chestiness'.

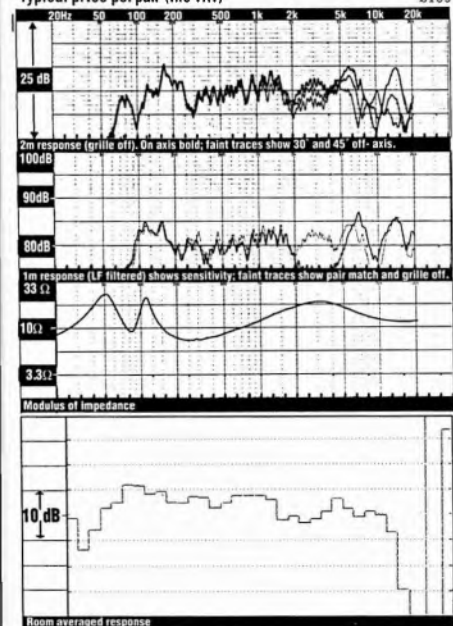
The slightly 'lumpy' presentation did cause a few reservations amongst the listeners, notably because of a mildly 'boxy' mid-band and occasional presentation inconsistencies. But this design is also easy on the ear, sounding clear and detailed, with fine stereo width and nicely projected vocals, albeit within a limited dynamic range envelope.

CONCLUSIONS

Power handling is limited, especially from vinyl discs, loudness is inevitably restricted too, and the *566* isn't a particularly smooth or even performer. But even if it doesn't look much like one, it undoubtedly sounds like a real loudspeaker, coming close to recommendation. The odd shape and siting considerations taken together both create and limit its appeal: one – or two – pairs would make a natural match for a stereo TV or surround video system, for example.

TEST RESULTS

Size (height x width x depth)	40.5 x 11 x 16cm
Recommended amplifier power	20–60 watts
Recommended placement	stands in free space
Estimated frequency response (2m)	65Hz–20kHz, ±5dB
Estimated LF rolloff (–6dB ref midband)	70Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	83dB
Impedance characteristic (ease of drive)	very good
Forward response uniformity	fairly good
Typical price per pair (inc VAT)	£159



ALLISON CD6

ALLISON ACOUSTICS LTD., 2 WASHINGLEYS, BROAD GREEN, CRANFIELD, BEDS MK43 0JD. TEL: (0234) 750517.



Allison Acoustics is a long established US company that has been unrepresented in the UK for a number of years. Roy Allison himself headed up AR's engineering department for many years before setting up his own operation more than a decade ago, so the New England influence is pervasive – cabinet network and drivers are both reminiscent of pre-European AR product.

Allisons have an unusual shape, but whereas the majority are tall, slim floor-standing models, this compact £300 model forms an almost perfect cube, and should be sited at ear level against a rear wall. The largish bass/mid driver fires upwards through a plastic grille, while the unusual lozenge-shaped grille on the front provides a nice styling touch while concealing nothing more surprising than Allison's normal proprietary tweeter – itself a quite interesting design. The whole unit is nicely wood veneered and attractively contemporary in appearance.

The tweeter in fact boasts what Allison describes as a Convex Diaphragm (though the expression 'nipple profile' is a shade more evocative); the shape is claimed to simulate the motion of a pulsating hemisphere. The bass/mid driver, also of Allison's own design and manufacture, has a largish (c190mm) treated paper cone.

The cabinet is MDF throughout, finished in black lacquer, walnut or oak wood veneer. The main driver baffle is 24mm thick, the other panels 19mm, while the box shape ensures fine rigidity. Gentle 1st and 2nd order crossover slopes are used, operating at a low 2kHz, and a 'Power Guard' self-resetting protection system is incorporated.

TEST REPORT

This unusual loudspeaker achieves a remarkable bass extension considering its

modest box volume. The sensitivity through the midrange is significantly below average on our normal method of measurement, though that is really rather misleading because of the effects of wall reflection on the upward firing midrange. Subjectively and practically speaking, the CD6 has slightly above average sensitivity. However, the impedance is low throughout.

The response in free space (ignoring ground effects) seems pretty even right from 50Hz up to 1kHz, but the normal forward axis measurement technique reveals a substantial suckout in the crossover region, which in practice will be filled in by indirect sound from the upward firing midrange. The room-averaged response suggests that any practical effects may not in fact be very severe, and certainly less so than the sweep tests indicate, but some integration problem clearly does exist.

An additional trace was also taken with the CD6 against a rear wall, and this had the effect of elevating the range from 50-100Hz by about 6dB. All of which suggests that the flattest response might well be obtained with the speaker sited a little out from the wall. This would certainly be worth trying if the sound is a little boomy in the recommended position.

SOUND QUALITY

Amongst the group of speakers assessed on this occasion, the CD6 was one of comparatively few to have real bass extension and weight, despite its compact dimensions. This is partly because there is in fact rather too much when sited as specified, and our operator observed that they might have sounded better a little out from the wall. Another commented: "A bit of a thumper; bass is there (at last), but not the tightest, smoothest or sharpest."

Accepting the rich and rather heavy balance, the panel just lay back and enjoyed the CD6's extended bandwidth. The Allison is a lie-back-and-enjoy sort of a loudspeaker. It's not the most precise sound, nor the most dynamic, and the wall reflected midband does introduce some unevenness and character of its own. But stereo is pretty good nonetheless, the sound remains clear, unfused and uncluttered even when working hard with complex material, and – most important of all – everybody liked it.

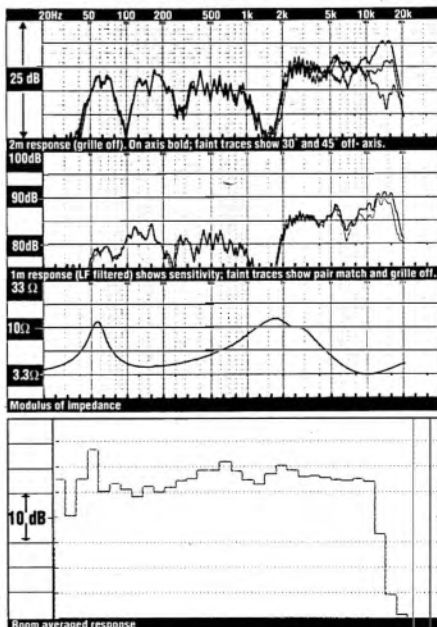
CONCLUSIONS

The CD6 is most notable in the ability to create a sound of genuinely large scale from rather less than a cubic foot. Even taking the wall/room matching aspects into account, the test results are a little uneven, and the bass a bit strong, while my own subsequent listening does suggest that it is a shade idiosyncratic and something of an acquired taste. But it's an interesting enough proposition to deserve Recommendation on grounds of domestic discretion. However, I suspect it could well offend some UK purists, either on grounds of coloration or a slight overall blandness.

TEST RESULTS

Size (height x width x depth)	28.5 x 28.5 x 28.5cm
Recommended amplifier power	20-100 watts
Recommended placement	on stands near rear wall
Estimated frequency response (2m)	45Hz-20kHz, \pm dB
Estimated LF rolloff (-6dB ref midband)	45Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	88dB
Impedance characteristic (ease of drive)	needs good current capability
Forward response uniformity	fairly good in practice
Typical price per pair (inc VAT)	£290

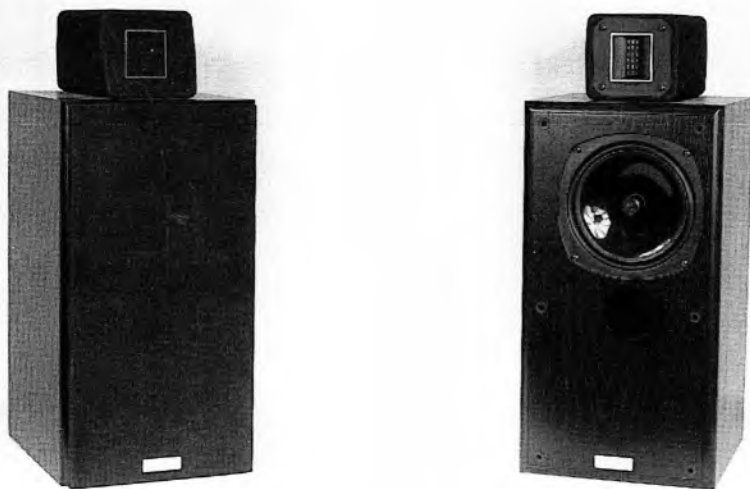
*limits depend on measuring axis and conditions



ALPHASON ORPHEUS

ALPHASON, 190-192 WIGAN ROAD, EUXTON, NR. CHORLEY, LANCS PR2 6JW. TEL: (02572) 76626.

RECOMMENDED



Alphason is best known as a manufacturer of top quality tonearms, but more recently has branched out into other mechanical areas, first with a top quality turntable that has been very well received, and now with a couple of loudspeaker models.

The *Orpheus* is the more expensive of these, selling at an upmarket £800 per pair, though it doesn't look or feel in any way overpriced. The main enclosure is generous in size and solid in build, with a substantial, slightly offset main driver for bass and mid-range duties.

Perched aesthetically rather awkwardly on top of each sits a square tube, which has a more serious function than to simply dissuade the owner from applying a potted palm. In fact it houses a small planar (area-driven) tweeter, and sets it back a few centimetres from the main baffle, presumably to align the acoustic centres of the two drivers – a benefit which may be offset somewhat by unwanted reflections from the short shelf this creates in front of the tweeter.

Whereas the cabinet itself is very nicely finished with real wood veneers and radiused baffle edges, the stocking-masked shuttlecock tube with its silly little matching grille does detract somewhat from the chunky and purposeful overall effect.

There are grilles for both sections, though it's the sort of speaker system that looks best unclad. The large grille for the main box is nicely enough shaped, but the smaller creation for the tweeter tube looks slightly ridiculous. Magnetic repulsion (a misplaced staple?) prevented one of these from being pushed properly into place!

The reflex-loaded enclosure is built up from 18mm MDF, with further stiffening provided by internal bracing, and further damping is applied using material similar to that employed on the *Sonata* turntable platter.

Our samples came in an obligatory black stained finish, but alternatives are listed in walnut, rosewood, mahogany, teak, or anything else you care to think of.

The bass/mid driver is a decent diameter (155/175mm) Audax unit with TFX polymer cone. A prominent phase plug protruding from the polepiece in the centre should help smooth its high frequency rolloff, which is quite important as the only crossover is a solitary 1st-order inductor wired in series with the same driver. Alphason's unusual planar tweeter is described as an Isodynamic, by which I understand that the 'voice coil' is effectively uncoiled and fixed to a small sheet of polymer sited within a powerful magnetic field. It is claimed to have only 10 per cent of the moving mass of a conventional tweeter, yet have the power handling to withstand 400°C. Though fused, it is unprotected by any crossover, and we certainly didn't manage to do them any mischief.

TEST REPORT

The *Orpheus* has an impressively even overall balance, characterised by a gentle rising-with-frequency trend, which at least makes a pleasant change. The sensitivity is pretty close to average and bass is well extended too, at a sensible level for the intended close-to-wall site. The impedance characteristic requires an amplifier capable of driving a 4ohm load, which should be the rule rather than the exception when partnering £800 loudspeakers, though those who favour valve amps should take note.

Despite the good overall response, there is also rather more unevenness than is desirable through the midrange due perhaps to the wide driven overlaps. The net 'lumpiness' being bound to add a degree of unwanted character. The pair match is close and the grille better discarded.

SOUND QUALITY

Happily my own positive reaction to the *Orpheus*' delicate and informative sound was corroborated under blind conditions by the listening panel. It's not a 'big' sounding loudspeaker, and certainly benefits from some rear wall boost, but get the site right and it will balance well enough.

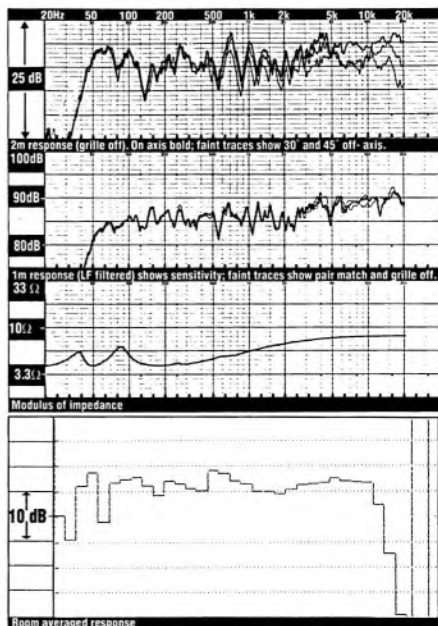
Bright, fast and detailed, clear and open, yet also notably unfatiguing, coloration is well controlled and vocals are particularly natural. The stereo imaging was a little sensitive to listener position and head movement, though at its best it could be very good indeed. One listener expressed some disquiet over the 'different' treble quality; another would have appreciated more speed and 'slam'. But the net response was very favourable.

CONCLUSIONS

A bit oddball in appearance, the *Orpheus* shows thoughtful and progressive engineering throughout, providing low coloration and good stereo with wall mount convenience. Not a snip at £800, it nevertheless clearly deserves Recommendation.

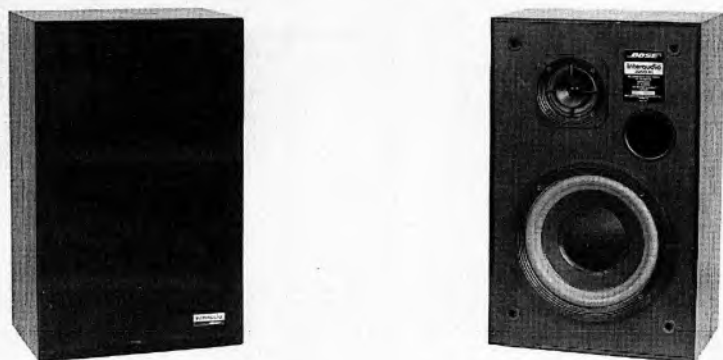
TEST RESULTS

Size (height x width x depth)	65.5 x 28 x 34cm
Recommended amplifier power	20-100 watts
Recommended placement	on stands near rear wall
Estimated frequency response (2m)	45Hz-20kHz, ± 6dB
Estimated LF rolloff (-6dB ref midband)	43Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	87dB
Impedance characteristic (ease of drive)	needs good current capability
Forward response uniformity	fairly good
Typical price per pair (inc VAT)	£800



BOSE INTERAUDIO 3000XL

BOSE UK LTD., TRINITY TRADING EST., MILTON REGIS, SITTINGBOURNE, KENT. TEL: (0795) 75341.



Bose has spent the last 20 years as one of America's most creative and commercially successful loudspeaker manufacturers, and as one of the most controversial for some occasionally bizarre theories of acoustic propagation. Until now any Bose to appear on the UK domestic and Pro markets was bound to be a bit weird in some way or another, and likely to be packaged with enough technical BS to keep any reviewer busy for a while.

There's a dinky little brochure with the Interaudio series too, but these look a very different kind of animal from the more elaborate Boses I've encountered in the past. As conventional and conservative as anything in the project, the £140 3000XL (and its 1', 2' and 4000XL siblings, which will have to wait for another occasion) provide quite a lot of box for the money, but at the expense of ingredients which look decidedly cheap, bordering on the downright nasty.

It's certainly quite a while since I remember coming across a 3-inch paper cone driver for the treble range. Domes of one sort or another, give or take the odd annulus (beg pardon) have been mandatory for serious UK hi-fi speakers since around the time that CD was introduced. Bose's reason for the cone is the quest for high efficiency/sensitivity, while the directivity difficulty associated with large radiating area treble units is claimed to be overcome by a 'Wideangle Lens'.

The basic ingredients are all fundamentally cost efficient, as they say, which means steel frame drivers with small magnets, a simple 3-element crossover (which includes a filament resistor to protect the tweeter against overload damage).

The box is built throughout from 3/4-inch chipboard, and I was unable to find the 'internal cabinet bracing' (beyond the panel interfacing) promised in the leaflet. The

anonymous vinyl wrap is restricted to top, bottom and sides, while back and front are textured black. Finishing strip picture-frames the baffle (not too neatly), but a raw painted chipboard edge is seen on the back, along with a pair of spring terminals.

Ordinary is a polite enough description for the baffle design, with plastic badge and trim around the drivers and port. The tweeter is offset from the centre line, with no attempt to mirror image the pair. And the plastic frame grille has the thickest, squarest acoustic profile I've seen. The fact that it doesn't provide much impediment may be more a reflection of what is there to impede than of the integrity of the grille itself.

TEST REPORT

Sensitivity may be one design aim, though the 89dB or so of our rating is nothing special by current standards. However, in this instance it has not been achieved by sacrificing bass extension, which is maintained down below 50Hz – very generous for a model of this size and price. The impedance is benign too, so there's been no sneaking of extra drive current either.

But the other side of the coin is simply that the response is ragged, verging on the boom'n'tizz on axis, and clearly struggling a bit through the crossover region. The off-axis tweeter performance clearly suggests the 'Wideangle Lens' is just so much BS. This was taken in the worst case rotational direction, which will in practice apply to one channel only. (Users might try experimenting by inverting one of the speakers so that the tweeters are always nearest the innermost edge. You could get better stereo, though you might take on a slight list.)

Although the unevenness is visible in the room averaged response, especially the treble peak, the overall balance is quite good,

and well maintained at low frequencies.

SOUND QUALITY

The cheap and rather old fashioned ingredients were readily detected by the panel under blind conditions, one listener's notes referring to "a coarse boombox from you know who... all a bit PA like". Another, again with no foreknowledge, referred to "poor timing – totally unnatural in the great American tradition".

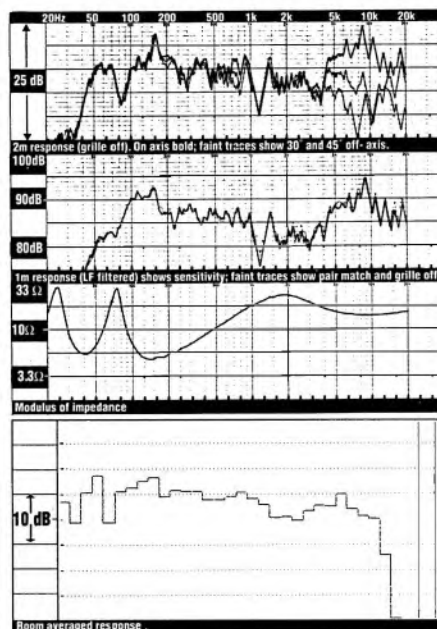
The bass is perhaps this speaker's best justification. It isn't in any way subtle, or particularly quick – indeed 'boxy' was the most common adjective amongst the panel comments. But it does pack a punch, and there's sufficient to satisfy even the followers of Jah Rastafari (who I bet would go a bundle on the 4000!).

CONCLUSIONS

The 3000XL's saving grace is that it can develop a genuine element of scale from a compact, inexpensive package. The price to be paid is a degree of coarseness in visual and sonic presentation that significantly lags the market's current standards.

TEST RESULTS

Size (height x width x depth)	46.5 x 29 x 23cm
Recommended amplifier power	15–80 watts
Recommended placement	on stands in free space
Estimated frequency response (2m)	40Hz–20kHz, ±7dB
Estimated LF rolloff (–6dB ref midband)	45Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	89dB
Impedance characteristic (ease of drive)	good
Forward response uniformity	poor
Typical price per pair (inc VAT)	£140



B&W DM550

B&W LOUDSPEAKERS LTD., MARLBOROUGH RD., CHURCHILL IND. EST., LANCING, W. SUSSEX. TEL: (0903) 750750.



Sussex-based B&W has one of the most impressive loudspeaker research establishments in the world, and an equally remarkable export record to back up the fact. The range – or ranges to be more precise – start with a couple of popularly priced *DM* models like the £150 *550* featured here, and extend up through models featuring advanced matrix cabinetwork to studio monitors at ten times the price.

However, the *DMs* – notably the *700* and *710* – have long been favourite budget speakers in the UK, and the *550* is really just following the line of succession from the *700*. B&W has never been tempted to cheapen these products in order to try and cheat inflation, so the price has risen steadily to its current £150. But for that you get the latest technology in a contemporarily styled, small bookshelf package with fine build and finish. Thankfully, corners have been left uncut down in Worthing.

Compared to its predecessor, the *550* has seen several developments. Arising out of the cabinet research tools that helped create the Matrix technology, the baffle here has an advanced structural plastic composite on a chipboard base, the whole some 25mm thick. It looks sharp too, with two contrasting greys and an embossed logo, without in any way transcending the boundaries of good taste.

The grille is equally smart, showing good design detail to minimise reflections. The sealed box cabinet has decent quality vinyl covering in black or walnut woodgrain, and this extends to picture framing and plain back panel with socket/binder terminals and fuse protection.

The *550* is designed to work well in free space or on a shelf against the wall – something of a compromise arrangement but perhaps a necessary part of coping with the real world.

Both drivers are B&W designed and made. Bass/mid duty is handled by a 125mm paper cone unit, while the tweeter is a 28mm aluminium dome device inherited from the *Matrixes*. The crossover uses 1st and 2nd order arms for low and high pass respectively.

TEST REPORT

The sensitivity is a little below average, at around 85dB/W, but this is not much of a price to pay for maintaining useful bass extension down to 60Hz or so. The open-air response sets are all reasonably tidy, though with less than perfect control around the crossover region. The grille's influence is fairly slight, though you're still better off without it, while the pair match shows a 1.5dB discrepancy around 4-6kHz.

The off-axis output runs very close to the on-axis trace up to 10kHz, confirming the sound acoustic design. Divergence thereafter is attributable to the comparatively large diameter tweeter used. The room averaged response confirms the slightly depressed crossover region and a slightly 'hot' lower treble, plus a bass alignment which would probably respond well to a little wall assistance. The impedance is resolutely conservative, posing no problems of compatibility with any amplifier – even those of the midi system persuasion.

SOUND QUALITY

Auditioned in free space, the panel was divided in its reaction to the *550*, admiring the precision, especially in stereophonic terms, but regretting the lack of scale and 'welly'. There was good agreement in the descriptions of the sounds produced, but the differences come in the interpretation and weighting of those factors.

Subsequent listening does favour some wall assistance in boosting the lowest

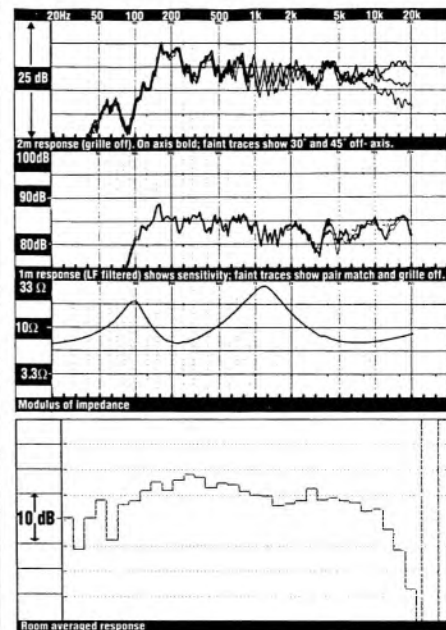
octaves in order to achieve a reasonable degree of scale. The bass still sounds a bit lazy, but does help counterbalance the slightly exposed treble. Ultimately this speaker does not have a particularly wide dynamic range, and can become uncomfortable on complex material at high levels. But it does offer fine precision for the price, and maintains fine control when used within its capabilities.

CONCLUSIONS

The *DM 550* is realistically priced, generally well engineered and beautifully packaged and presented. The sound is precise and quite accurate, capable of very good stereo but lacking in scale and 'welly', so it will merit consideration by considerate flat dwellers rather than party throwers.

TEST RESULTS

Size (height x width x depth)	35 x 20.5 x 22.5cm
Recommended amplifier power	20-70 watts
Recommended placement	on stands 0.5m from rear wall
Estimated frequency response (2m)	70Hz-20kHz, ± 3 dB
Estimated LF rolloff (-6dB ref midband)	70Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	very good
Forward response uniformity	very good
Typical price per pair (inc VAT)	£149





GLOSSARY

The Hi-Fi Choice dictionary of audio terminology, explaining all the weird and wonderful adjectives used by our reviewers, as well as technical abbreviations.

AM: Amplitude modulated; see 'Medium Wave'.

ACOUSTIC BREAKTHROUGH: Sound that gets into the turntable and hence the cartridge from the air and thereby creates a risk of acoustic feedback.

ACOUSTIC FEEDBACK: If any sound in the room can find its way through the body of the record deck to the cartridge stylus, then that sound will be reproduced from the loudspeakers, along with the wanted programme material. If too much of this sound from the loudspeakers is picked up by the cartridge in this way then a vicious circle of acoustic feedback will be created.

ACTIVE: Speaker systems which contain electronic crossovers and where the drive units are connected directly to power amplifiers.

ALIGNMENT PROTRACTOR: A device used to minimise the lateral tracking error of a cartridge/arm combination.

AMPLITUDE: Size or magnitude; hence the amplitude/frequency response, known normally simply as the frequency response, which describes the relative loudness of the system at different frequencies with a constant input voltage.

ANECCHOIC: Without echo; a special room or 'chamber' with thick sound absorbing materials on all surfaces to prevent reflections.

ARM MASS: More accurately called *effective* arm mass, because it is *not* the weight of the arm on a pair of scales. It is the mass of the arm and cartridge combination that appears to be concentrated at, and thus felt by, the stylus tip which is tracking a record groove. There is nothing inherently good or bad about arms with light or heavy effective mass; what matters is the manner and choice of their combination with cartridges of different compliance and the low frequency resonance produced by such combination.

AZIMUTH: With reference to tape and cassette recorders, the alignment of head gap to tape path.

BALANCE: 1) The overall relative loudness perceived at different frequencies (eg bass, treble); 2) the accuracy of the match between the two channels of a stereo transducer (eg cartridge or pair of loudspeakers).

BANDWIDTH: A range of frequencies with presumed defined upper and lower limits.

BASS: Lower part of the frequency spectrum.

BELT DRIVE: The motor has its rotational speed geared down to the required platter speed (33 $\frac{1}{3}$ rpm for LP discs) by a rubber or similar resilient belt which runs round a small pulley on the motor shaft and a large pulley attached to or part of the platter.

BEXTRENE: A plastics material frequently used for bass and mid-range cones.

BIAS: (*turntable/arms*) Because the cartridge on a pivotal arm is being drawn across the record surface by the stylus tracking at an angle offset from the pivots, groove friction produces an imbalance of lateral force. Bias is the application of a compensatory lateral force acting in the opposite direction.

BIAS: (*tape*) This refers to a high frequency current passing through the record head which allows the audio current also passing through the head to produce reasonably linear magnetisation of the tape at all levels permitted by the combina-

tion of each machine with the tape. The lowest level of bias is required for ferric cassettes, a slightly higher one for ferrichrome, an even higher one for chrome or pseudochrome, and the highest for metal.

BOTTOMING: The stylus scraping on the distorted rounded bottom of the groove due to incorrect stylus geometry.

CANTILEVER: The thin rod or tube that connects the stylus to the armature and hence the cartridge body.

CAPACITANCE: An element of electrical impedance that is particularly important when matching pickup cartridge, arm leads and amplifier input characteristics to achieve a flat frequency response from discs.

CLIPPING: This is reached when a circuit is overloaded and overdriven, resulting in bad waveform distortion and audibly unpleasant effects.

COLORATION: A general term used to describe the audible effects of distortions, particularly in loudspeakers and record players. These are usually caused by frequency response irregularities and/or resonances.

COMPATIBILITY: The selection of interdependent components to achieve optimum system performance; notably arm/cartridge mass/compliance matching, cartridge electrical loading, or loudspeaker compatibility with amplifiers.

COMPLIANCE: A measure of the springiness of the cantilever/armature seen from the stylus, expressed in compliance units (Cu), where 1 cu = 10⁻⁶ cm/dyne.

CROSSOVER: An electrical circuit which uses combinations of inductors, capacitors and resistors to divide the signal from the power amp into the required frequency bands and with any necessary equalisation for feeding to the individual drive-units of the speaker system.

CROSSTALK: The leakage from one channel to the other in a two channel stereo system.

CUTTER: Mechanism used to cut recorded signal onto lacquer master; consists of turntable, lathe, cutting head, cutting and servo amps.

DIN: German standards body, responsible amongst other things for a popular range of standard plugs and socket specifications.

DAMPING: A means of controlling resonances by means of a resistive medium (electrical, mechanical, or acoustic depending on situation).

DECIBEL (dB): A logarithmic unit that is convenient for expressing ratios that span a wide range on a linear scale. For simplicity it can be regarded as a measure of relative loudness.

DISTORTION: Literally this can mean any deviation from the original, but usually refers to harmonic rather than intermodulation distortions when not specified.

DOLBY: Covers various signal processing/deprocessing systems, but normally refers to the B & C noise reduction systems used in cassette record/replay, and the B system used for music-cassette replay.

DOPING: A technique involving the application of damping to a loudspeaker driver cone in order to assist in controlling resonances.

DOWNFORCE: The weight, measured at the stylus, which holds it down in the groove.

DRIVE UNIT (DRIVER): The term used to distinguish the loudspeaker unit itself, be it bass, midrange, treble or fullrange in application, from the complete loudspeaker system which combines drive units, cabinet and crossover into a total design.

DROPOUTS: Momentary reductions of programme level due to inadequate head/tape contact caused by oxide particles shedding off the tape onto the head gap, or inadequacies in tape transport or tape.

DYNAMIC RANGE: The ratio in dBs between the quietest sound that can be successfully recorded and the loudest which can be accepted without serious distortion on an average programme.

EFFECTIVE MASS: The inertia, or mass-controlled resistance to movement, of a device, particularly important with regard to tonearms.

EFFICIENCY: The amount of acoustic power delivered for a given electrical input power.

ELECTROSTATIC: A principle employed in some loudspeaker transducers using static electricity effects to set up a polarising field within which the modulated transducer medium moves.

ELLIPTICAL STYLUS: A specially shaped stylus profile that makes the 'plan view' radius along the length of the groove smaller than the 'elevation view' contact radius viewed from the front.

EQUALISATION: (*general*) The deliberate modification of frequency response, usually in response to some engineering limitation or deficiency.

EQUALISATION: (*tape*) This refers to the necessary change in frequency response required of an amplifier so that overall flat frequency response is obtained from a tape medium. Equalisation is required both on record and replay. Any tape recorded on a good cassette recorder should have the same inherent response when played back on another correctly set up machine, since all playback equalisations should have been standardised. These standards are normally specified by the time constants of the circuits involved, eg 79 μ s or 120 μ s (see 'Microseconds').

FARAD: Measure of capacitance.

FM: Frequency modulated; often used to describe radio transmissions of high fidelity potential on the VHF band.

FARAD: Measure of capacitance.

FERRITE ROD: A short rod type aerial used for AM reception; may be fitted internally or externally to a tuner or receiver.

FERRO-FLUID: A magnetic fluid which is introduced into the voice-coil gap to provide damping and/or improved cooling.

FILTER: A circuit (normally) used to restrict the bandwidth of a system; may be fixed or switchable.

FREQUENCY RANGE OF SPECTRUM: Can refer to any particular group of frequencies, but commonly applied to the audible band from 20 to 20,000 cycles per second (Hz), extending from the deepest bass to the highest audible harmonics.

FREQUENCY RESPONSE: The variation in output over a frequency range, particularly of a transducer; can be expressed as a range with decibel limits, or depicted graphically.

Hz (HERTZ): 1 Hz = 1 cycle per second and is a measure of frequency which corresponds to musi-

cal pitch (the higher the frequency the higher the pitch).

HF: High frequency.

HARMONIC: Harmonics are the whole number multiples of a base frequency called the *fundamental*.

HARMONIC DISTORTION: The addition of unwanted harmonics to a signal.

HUM: A low frequency interfering sound produced by break-through or interference from mains wiring or circuitry.

IHF: American Institute of High Fidelity, an important standards body.

IEC: An international standards body.

IMPEDANCE: Measure of resistance (and reactance) in alternating (ie audio) signals; this is of some importance in the compatibility of both cartridges and headphones with amplifiers. For convenience sake is measured in ohms.

INTEGRATION: Used to describe the success with which the output from two drive units combine to give smooth output through the crossover region.

INTERMODULATION (IM): A form of distortion arising from two or more signals producing non-harmonic signals that correspond to the sum or difference of the two frequencies.

KILO (k): prefix meaning one thousand.

LED: Light Emitting Diode; an indicator light.

LF: Low frequency.

LATERAL FRICTION: The resistance to movement of an arm and cartridge combination in the horizontal plane (ie across a record), caused by friction in its bearings.

LINEAR: A transducer that produces an output that exactly portrays its input over the required operating range is described as linear, and is hence distortion free. Hence also nonlinearities (distortions).

LINE-CONTACT: A special stylus profile that extends the ellipse, increasing contact length up and down the sides of the groove.

LOAD OR LOADING: The impedance (including resistive and reactive components, ie ohms, mH, pF) seen by one component looking back to its interconnected component; of importance in compatibility of cartridge/amp, and amp/headphone.

'LOUDNESS': An equalisation circuit frequency switchable on amplifiers which is designed to compensate for presumed hearing characteristics at low listening levels by boosting bass and treble.

MOL: Maximum operating level of tape normally referring to 5% distortion of 315Hz or 3.15kHz.

MEDIUM WAVE: An AM transmission band incapable of high fidelity signals.

MICRO-(μ): Prefix for units meaning one millionth of.

MICROSECONDS (μ s): The time constant of a resistor capacitor combination involving a frequency response change (equalisation).

MIDRANGE, MIDBAND: The central part of the audible frequency range where the ear is most sensitive.

MILLI-(m): Prefix for units meaning one thousandth of.

MODULATION: The audio signal is 'stored' by means of modulations within a medium, eg the 'wiggles' in the groove of a plastic disc, or the

magnetic coding on a tape.

MODULATION NOISE: An additional noise added to tape noise, which increases with the degree of modulation of the tape, caused by the properties of the magnetic coating. This noise has most of its energy near the modulation frequency (causatory tone).

MOVING COIL: A transducer (eg cartridge or headphone) where the signal is generated by the movement of a coil within a magnetic field.

MOVING MAGNET: The most common form of cartridge transduction, where the magnet moves while the coils are held relatively stationary.

MULTIPLEX FILTER (MPX): A circuit which introduces severe attenuation at supersonic frequencies to decrease interference encountered with the output from some stereo FM tuners.

NANO (n): Prefix meaning a thousandth of a millionth of.

NOISE: Random unwanted low level signals.

NOISE MODULATION: An unwelcome breathing effect that can be heard on some programme material, produced by poor noise reduction systems, or circuits.

OCTAVE: Two-to-one ratio of pitch or frequency.

OFFSET ANGLE: The angle measured between the centre line of the pickup cartridge and the line which joins stylus and arm pivot point.

OHM: Unit of electrical impedance (including reactance) or resistance; also kohm, where 1 kohm = 1,000 ohms.

OVERHANG: The extent to which the cartridge stylus extends beyond the centre of the platter is critical, and controlled by fore and aft adjustment of the cartridge on the arm.

PASSIVE: The most common type of system, where drivers and crossover are driven from a single power amplifier.

PEAK RECORDING LEVEL: A level above which distortion becomes apparent. This distortion is introduced when the oxide particles almost reach magnetic saturation, and thus will accept no more level.

PHONO: The most commonly used plug/socket combination in audio components.

PICO (p): Prefix meaning one millionth of a millionth of.

POBT: An opening in a cabinet which is tuned to characteristics of the bass driver and the enclosure volume to provide reflex type bass-loading.

POWER AMPLIFIER: The part of an amplifier that provides power to drive the loudspeakers: usually integrated, it is sometimes a separate component.

PREAMPLIFIER: The part of an amplifier that accepts the input signals, sorts them, applies any necessary equalisation, and then passes the signal to the (normally integral) power amplifiers.

PRESENCE: A quality of forwardness or immediacy in a sound balance, generally related to an upper-middle frequency response boost.

PRINT-THROUGH: A pre- or post-echo of a loud signal created by magnetisation occurring from one layer to an adjacent layer after the tape has spooled or been recorded.

Q: A measure of the magnitude and shape of a resonance; the higher the Q, the sharper and more severe in amplitude the resonance.

REFLEX: a system of bass loading (using port or ABR) which offers improved efficiency and bass power handling at the expense of subsonic control compared to a sealed box.

RUMBLE: The low or medium frequency sound produced mechanically by any moving parts in a turntable, mainly the motor and platter bearings.

SENSITIVITY: The volume of sound output for a specific electrical voltage input.

SEPARATION: As between the two channels of a stereo pickup; see *crosstalk*.

SHIBATA: A special stylus extending the elliptical to a 'line-contact' type of profile.

SIDE-THRUST: A force acting on cartridges in pivoted (ie not parallel tracking) arms, due to the stylus/vinyl 'friction' acting along the line of the offset angle; hence bias or side-thrust compensation.

SIGNAL-TO-NOISE, SIGNAL/NOISE, S/N: The difference in total output when an applied signal is removed.

STYLUS: The specially shaped piece of diamond in contact with the groove and connected to the cantilever.

SUBSONIC: Below the audible range, ie below 20Hz.

SQUARE WAVE: A signal which consists of a fundamental plus a (theoretically infinite) series of odd (3rd, 5th etc) harmonics in a precise phase and amplitude relationship. It is useful for examining transient performance, symmetry, resonance control and 'ringing'.

THD: Total harmonic distortion.

TRACING: The following of the groove modulations by the stylus; hence for example tracing distortion, caused by the inability of a spherical stylus to trace the high frequency inner grooves on a disc.

TRACKABILITY: The ability of cartridge to cope with large amplitude modulations (or of the arm and cartridge to follow the groove itself properly).

TRACKING ERROR: The discrepancy between the truly tangential angle at which a record is cut and the slightly off-tangential angle at which it is tracked by a stylus on a pivoted arm during some parts of the arm's travel.

TRANSIENT: Signal of very short duration.

TREBLE: Upper part of frequency spectrum, typically above about 3kHz.

TWEETER: A small drive unit designed to operate over the high frequency range.

ULTRASONIC: Frequencies above audibility, ie greater than 20kHz; also *supersonic*.

VERTICAL TRACKING ANGLE (VTA): The angle at which the plane of motivation of the stylus is set with respect to the vertical when viewed from a side elevation of the cartridge. Should match the 20° cutter standard.

WEIGHTING: A factor or function that is applied to a measurement to increase its relevance and usefulness.

WOOFER: A drive unit that operates over the bass portion of the audio range.

WOW AND FLUTTER: Low and high frequency pitch variations (from poor tape transport of turntable platters with speed drift).

AT OVER £100 THIS COULD LEAVE YOU FEELING A BIT LIGHTHEADED.



How do we convince you and your wallet to part company with more than a hundred pounds for a set of headphones?

Well, not any old headphones, you understand. These are a bit special (at this price they have to be!)

Do we tell you that the Beyer DT 990 and DT 770 are compatible with compact disc players? Yes, but who doesn't?

Or, do we mention that you can listen to anyone from Mozart to McCartney, while someone else in the room is playing the organ? (an unlikely event, we admit, but you never know what turns people on).

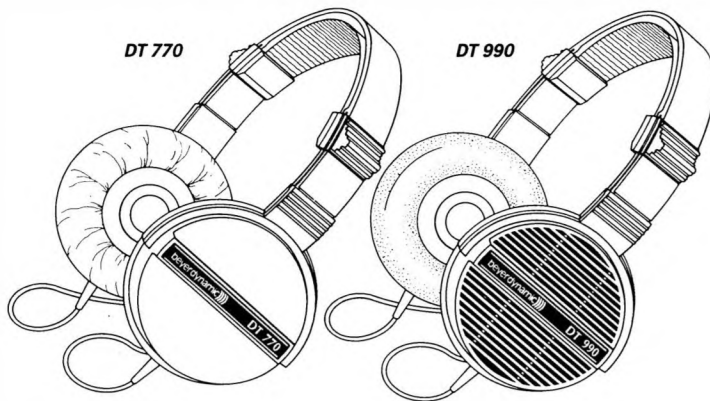
Perhaps we could persuade you that it will go nicely with other status symbols, like your Porsche.

Wait a minute, though, we haven't mentioned the most important thing, yet. The sound.

If we can blind you with science for a moment, here are just a few outstanding features that should help to convince you.

The DT 990 is an open headphone with an unbelievable frequency response of 5-35,000 Hz. The

unique technology used to achieve the very low mass of the diaphragm and moving coil assembly (only 20% of that found on a typical competitor's headphone), results in an exceptionally transient response and a reduction in the non-linear distortion, qualities normally found only in the best electrostatic headphone.



The DT 770 closed headphone combines the latest transducer technology with a unique bass reflex system. This achieves a superb bass response with well defined sound image, plus excellent pulse characteristics.

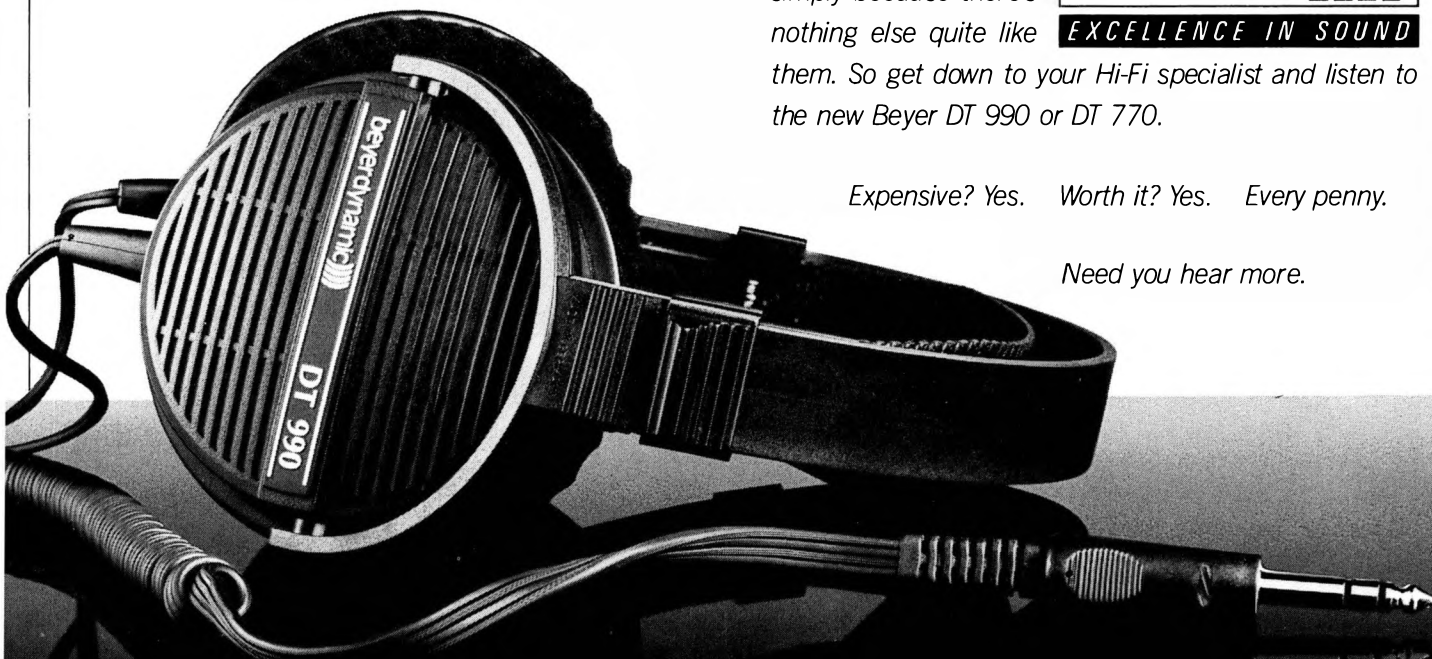
As you would expect they are both light, very light, and extremely comfortable.

You must hear them to appreciate their real value. You just can't compare them to anything else, simply because there's nothing else quite like them. So get down to your Hi-Fi specialist and listen to the new Beyer DT 990 or DT 770.



Expensive? Yes. Worth it? Yes. Every penny.

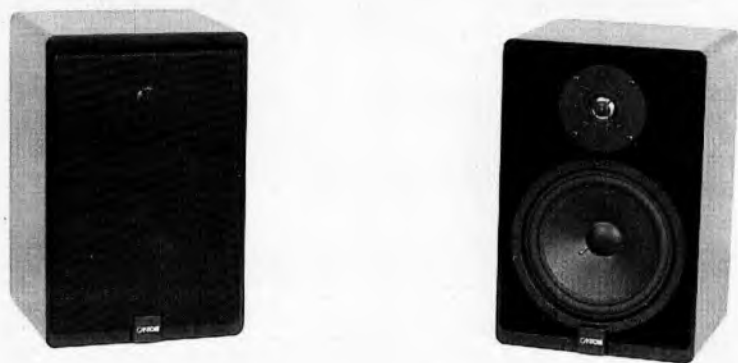
Need you hear more.



CANTON KARAT 20

ORTOFON UK, DENMARK HOUSE, TAVISTOCK IND. EST., RUSCOMBE, TWYFORD, BERKS RG10 9NJ. TEL: (0734) 343621.

RECOMMENDED



Canton is a comparative newcomer to the UK market, though it is well established in its German homeland. The *Karat* series offers something a little different – not to say a shade Germanic – in presentation, with nicely radiused cabinet edges and top quality finishes, plus an unusual, semi-transparent non-detachable metal grille. It's not for me to say whether you'll like it or not, but it's worth a pat on the back for adding a touch of distinctiveness in an increasingly standardised field.

Choice has previously assessed the *Karat 60*, which delivered a very respectable sound quality, albeit at a highish (and recently increased) price. The £300 *Karat 20* also looks a shade expensive for its size – it's more or less the same size as the half price B&W *DM550*. However, it's beautifully presented and finished for all that, in a smooth, hard, matt black paint of some sort.

We've received no accompanying propaganda, nor any response to a questionnaire covering basic engineering details. And I'm reluctant to take a crowbar to such a pretty little box, so the precise nature of the innards must remain a mystery. The cabinet feels reassuringly solid and dead to the knuckle test, and is featureless apart from a little (sealed) hole in the rear to hang it on the wall, and a terminal block which is good for bare wires but irritating with 4mm bananas.

The two drivers consist of a pulp cone bass/mid unit of about 140mm diameter, plus a 25mm metal dome tweeter partly covered by a plastic phase compensation disc.

TEST REPORT

A sensitivity rating of 87dB/W corresponds pretty closely with both objective and subjective findings, not to mention the overall average for hi-fi speakers the world over. This is

combined with a pretty good bass extension for the size of the box, but at some expense of a distinctly low impedance characteristic – below 4ohms here and there. Choose a partnering amplifier with plenty of current capability.

The various response traces show very good consistency with one another. The *Karat 20* is quite impressively flat through all the middle octaves, but fundamentally can't resist subscribing to the boom'n'tizz philosophy of hi-fi reproduction by means of a little kick up at each end of the band. The off-axis responses are very well controlled, though they do reflect the comparatively large driver diameters being used.

Some wall reinforcement can be used to fill out the low bass, but the speaker will tend to boom in the 100-200Hz region if sited too close. Hanging on the wall in the manner intended does not look like a very good idea at all.

SOUND QUALITY

In many senses the *20* is an impressive performer which was well liked by the panel, particularly considering its modest dimensions. The major flaw is that the sound is determinedly, if only slightly, over-bright, and this in turn tends to become somewhat fatiguing.

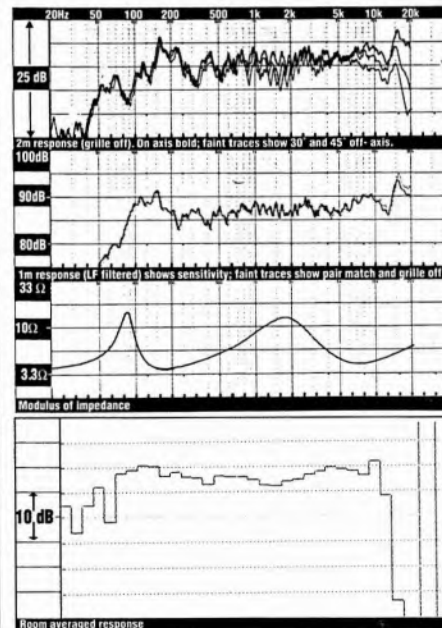
But that is the only serious criticism. For the rest it's a satisfying little loudspeaker, sounding lively and dynamic, tight and transparent with good stereo imaging, fine articulation, detail and clarity. The bass doesn't extend particularly deep, but there's enough to generate some sense of scale (assisted, psychoacoustically, by the little bump no doubt). Complex material is handled with aplomb – and without the sort of muddle that tends to leave lesser models sounding confused.

CONCLUSIONS

This is a sonically engaging and refreshingly unusual looking loudspeaker which delivers an impressive sound quality from a compact enclosure. The slightly over-bright treble might put some people off, and the price is a little on the high side too, but if the aesthetics and sonics both appeal this may be worth paying, so cautious Recommendation is appropriate.

TEST RESULTS

Size (height x width x depth)	34 x 22 x 20cm
Recommended amplifier power	20-70 watts
Recommended placement	on stands 0.5+m from rear wall
Estimated frequency response (2m)	50Hz-20kHz, ± 5 dB
Estimated LF rolloff (-6dB ref midband)	55Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	87dB
Impedance characteristic (ease of drive)	needs good current delivery
Forward response uniformity	good
Typical price per pair (inc VAT)	£300



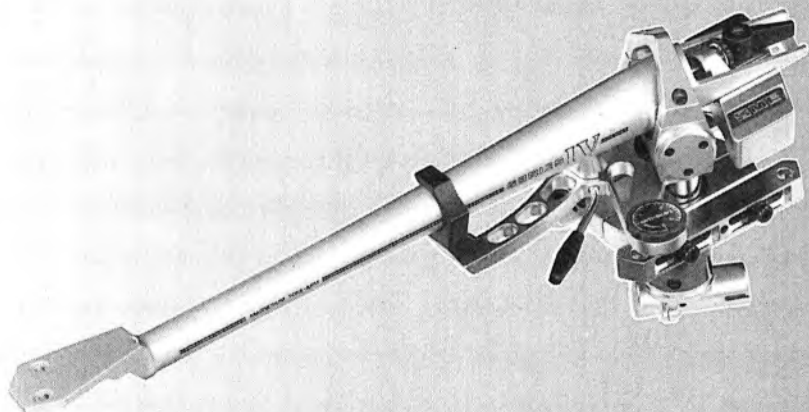
THOROUGHBREDS

Since 1962 we have received eighteen prestigious awards for our precision pick-up arms. One of the models shown here could well transform the performance of your deck and cartridge, realising, probably for the first time, the full potential of your L.P. records. Glance through one of our instruction books, sometimes 24 pages with more than 40 illustrations, to appreciate the attention to detail. Only SME arms provide the precise adjustments essential for true cartridge performance and the build quality to minimise sound colouration. Insist on SME, the thoroughbred arm, to update your present equipment.

SERIES V flagship of the range, acknowledged by leading international authorities with the Audio Component of the Year Award in Japan, the Federation of British Audio Award for Excellence and the Absolute Sound International 'Golden Ear' Award for Pick-up Arm Design in the United States.



SERIES IV owes much to Series V technology. Although at a lower price, it retains the unique one-piece magnesium tone arm, dual lock base and other advanced features. Selected for the Federation of British Audio Source Component of the Year Award, 1988.



SERIES 300 embraces three models: the 309, 310 and 312. The influence of the classic V will be clearly seen but here the aim has been to meet the needs of a broader market in which price, alternative arm lengths and an interchangeable shell facility are important considerations. The Series 300 offers performance and manufacturing excellence unmatched by many more expensive arms.



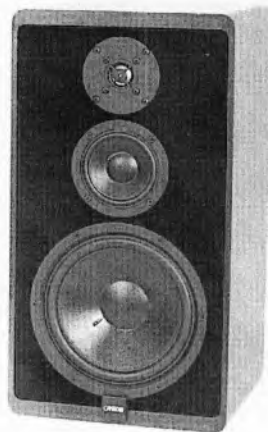
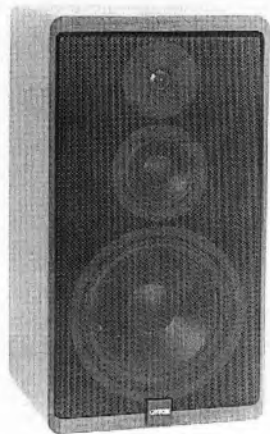
SME
The best pick-up arm in the world

Write or phone for advice and descriptive leaflets. Our sales and service departments would be happy to hear from you:

SME Limited, Steyning, Sussex, BN44 3GY, England.
☎ (0903) 814321 ☐ (0903) 814269

CANTON KARAT 40

ORTOFON UK, DENMARK HOUSE, TAVISTOCK IND. EST., RUSCOMBE, TWYFORD, BERKS RG10 9NJ. TEL: (0734) 343621.



This well established West German manufacturer has not long been available in the UK, but has a broad range which *Choice* is steadily getting around to testing. Thus far we have encountered three *Karat* models that bracket the middle price sector of the market. All have a strong house style in presentation, featuring fixed black metal grilles and nicely rounded cabinet edges, plus a tasty line in cabinet finishes – the currently Eurofashionable reddish mahogany wood veneer in the case of the '40 here, and the '60 covered in January.

One might have expected the '40 to lie about halfway between the £300 '20 (covered on the preceding page) and the £600-when-we-tested-it '60, so it was a bit of a surprise to find a £550 pricetag, which seems rather on the expensive side. In fact the '60 now costs nearer £650, and the '40 is very much a slightly scaled down '60. (For the record, there's no '50, though there is a '30.) And also for the record, that's only one of Canton's several ranges.

As near as dammit, the '40 is a '60 cut down by about 15 per cent in the major dimensions of cabinet and bass unit diameter. The result has much the same squat, purposeful appearance while looking considerably less bulky. In outline it's all rather old fashioned looking, from the days when narrow baffles were not considered desirable on lateral distribution grounds, and the world was dominated by ten and twelve inch drivers.

We didn't receive any engineering details on this model in time for the review, but it seems a pretty safe bet that much of the content parallels the '60 pretty closely. It's a conventional three-way sealed box, with 170mm pulp cone bass and 70mm mid drivers operating up to a high tech metal dome tweeter (a caesium/manganese/aluminium alloy, since you asked). Cabnetwork is thick MDF.

TEST REPORT

Given the similarity to the '60, comparison of the measured performance is bound to be interesting, though this needs cautious interpretation in view of the new test procedures adopted for this edition. Sensitivity is at least 2dB less (more in the midband), but the bass extension remains much the same. Once again, this is a 4ohm loudspeaker, and in fact drops below 3ohms at a power-demanding 120Hz, and so will welcome a current-generous amplifier.

Even allowing for the fact that a change in microphone has boosted the upper treble in the latest room averaged response measurements slightly, it is the lower treble where the '40 looks exposed, while the entire midband is depressed several dB from the flat condition – and compared with the '60's performance on this test. The 2m response for the '60 showed a depression of about 5dB in axis, where here the '40 loses more like 8dB.

It is difficult to divine why this *Karat* should be so much less well balanced than the other two, and it is even harder to understand why this should be the case in such a modest three-way design whose bass and treble drivers could probably bridge the midrange gap on axis by themselves, even without the assistance of a midrange filler unit.

SOUND QUALITY

In a sense, the bass and treble boost provided by the *Karat 40* seems a little like switching in the loudness button (that was fitted on that amplifier you used to own five years ago before you saw the light). For one thing, this makes it rather difficult to match levels accurately for comparison purposes – the '40 sounds 'louder' than it is, and so is turned down at the expense of the midrange.

In fact the panel was split in its reactions,

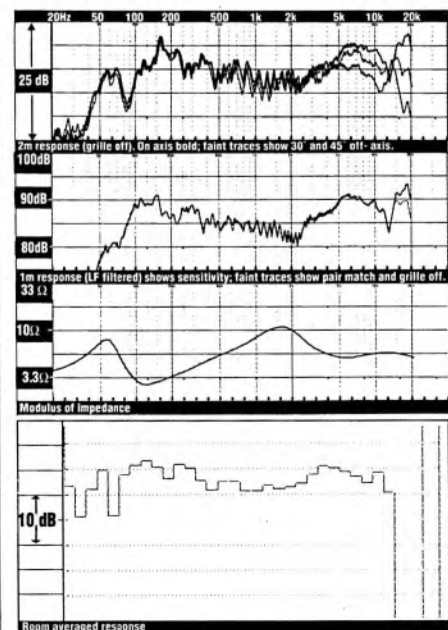
some presumably seduced by the 'bigger' balance, others upset by a lack of transparency and depth. Certainly some of the lively, dynamic qualities of the Canton drivers and cabnetwork are evident, and the enclosure volume is at least big enough to bring a reasonable sense of scale to the soundstage. But the boom'n'tizz effect did manage to put off several listeners, and to a fairly marked degree.

CONCLUSIONS

The '40 must be considered the most disappointing of the three *Karat's Choice* has sampled to date. Like the '60, it looks like an old fashioned three-way, but unlike the '60 it also tends to sound rather too much like one as well. Given a more neutral balance it could stand a better chance, but on current form it must be the one for the nostalgia freaks, and for those who bemoan the passing of the loudness button.

TEST RESULTS

Size (height x width x depth)	50 x 27 x 27cm
Recommended amplifier power	20–100 watts
Recommended placement	on stands in free space
Estimated frequency response (2m)	50Hz–20kHz, ± 5dB
Estimated LF rolloff (–6dB ref midband)	50Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	88dB
Impedance characteristic (ease of drive)	needs good current delivery
Forward response uniformity	below average
Typical price per pair (inc VAT)	£550



To get perfect hearing try this eye test.

Hi Fi Experience is a very different type of Hi Fi outlet. It's the very best.

It's designed for people who want to see and hear the best selection of the finest equipment technology has to offer, and who want to hear expert sound advice, not sales patter.

You'll find demonstration rooms at your disposal, where you can hear a system, or combination of separate pieces of equipment in total privacy.

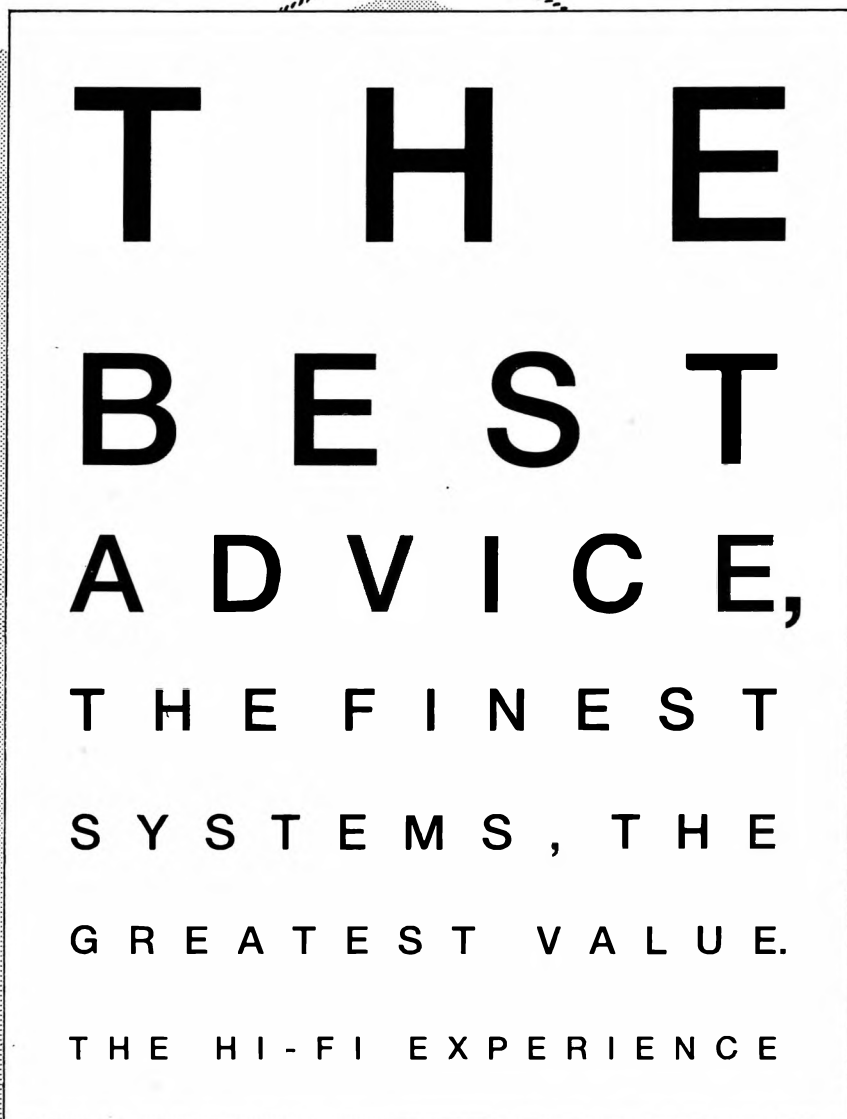
When you've made your choice, we'll offer to install it in your home – not merely deliver it – free of charge. In addition we offer a 14 day no quibble exchange period, and a full two year guarantee.

The best choice

Each of our branches has a fantastic selection of hi-fi equipment, with one common factor. Quality.

Take the Mission range of speakers for example.

Combining state of the art technology with good design, they sound as good as they look. But don't just take our word for it. Hear for yourself, at your local Hi Fi Experience.



HI-FI EXPERIENCE

You'll like the sound of us

BADA
THE ULTIMATE IN
SOUND ADVICE

LONDON

Tottenham Court Road, London W1
Lion House, 227 Tottenham Court Road
Tel: 01 580 3535

Open as usual during refurbishment.

Our Lion House branch is currently being extensively refurbished to be the hi-fi store for the nineties. Don't be put off by the scaffolding, most of the new stock is already in, and we're open for business as usual.

Alfred Place, London WC1

32/34 Alfred Place, Store Street Tel: 01 631 4917

Camden, London NW1

2/4 Camden High Street Tel: 01 388 1300 (round corner from Mornington Crescent tube)

YORKSHIRE

Bradford Rawson Square (near John St Market)
Tel: 0274 309266

MIDLANDS

Birmingham Superfi, 67 Smallbrook . Queensway.
Tel: 021 631 2675

Leamington Spa 49 Park Street Tel: 0926 881500

SCOTLAND

Glasgow 145 Bath Street Tel: 041 226 4268

CELEF CF2 NIMBUS

MARCEL AUDIO LTD., MARWAIN HOUSE, CLARKE RD., MOUNT FARM, BLETCHLEY, MILTON KEYNES MK1 1LG. TEL: (0908) 271818.



Celef made a welcome reappearance on the UK market last Autumn, with a range of three meteorological models. The £160 *Cirrus* did well in the last *Choice: Loudspeakers* group tests, so this time round it's time to assess the middle model in the stratosphere – the £230 *Nimbus*. Next time we may get a shot at the £360 *Stratus*. This is called rationing, or a logical progression; take your pick.

There are no particular surprises about the package, but then Celef is hardly known for introducing ground-breaking technology. Drinking straws apart, the key to Celef's early success was much more a matter of producing a nicely balanced package at a realistic price. And quite a lot has to do with the particular talent and experience in voicing loudspeakers of one Stuart Tyler, who is also responsible for the ProAc range.

Logical progression is very much the word here. The similarity of *Nimbus* to *Cirrus* is such that they could have popped out from the same pod, only *Nimbus* is the Cannonball. £50 extra buys a bigger bass unit and box, reflex-loaded instead of sealed-box on this occasion, though not much else. But this in turn should give more bass and/or sensitivity and/or power handling, possibly at some expense of smoothness in the crossover transition (which is just what it does, see later).

In fact the enclosure is about half as big again in volume terms, while the main polypropylene Peerless driver cone is up from 130mm to 160mm. The tweeter remains the same 25mm Peerless soft dome with short cavity, as apparently does much of the crossover judging by the impedance curves.

Presentation is not a forte, particularly considering the professionalism being shown by some of the larger pacemakers in this area. The kinder adjectives include unexceptional, self-effacing, discreet, but just plain boring comes closest to the mark, though at

least the vinyl woodgrain covers all six faces, with neat picture framing.

It's a 'largish bookshelf' model that deserves decent stands, and looks as if it should be fairly flexible about positioning. The only item of decoration seems to be the pair of gold-plated Michell-style terminals, and they're hidden around the back. The heavy wooden frame grille could be considered equally anonymous were it not for the name check in the corner, and at least it has some profile chamfering around the tweeter area. The cabinetwork is substantial enough 19mm particle board, with no bracing or damping, while the main driver magnet looks surprisingly small for a reflex-loaded design.

TEST REPORT

The basic balance of the *Nimbus* is flat enough from bass to treble, but it is also somewhat uneven along the way. There are clear areas of prominence in the upper bass and around 1kHz, besides a loss of energy around 2kHz, which is bound to have subjective repercussions. The off-axis curves show good correspondence but the tweeter traces congregate a little at 5kHz.

Comparison of room-averaged responses for *Cirrus* and *Nimbus* (same room, slightly brighter mike this time) show the differences quite clearly. The larger main driver of *Nimbus* has exacerbated the 'three-humped' response effect quite significantly by deepening the crossover notch a few dB, which is a pity, and by adding 3.5dB to all frequencies below around 100Hz, which is a very worthwhile bonus. Sensitivity is also boosted, by a couple of dB more.

The pair match is pretty good, though the grille is probably better left off. The impedance stays at a reasonable level throughout, though there are sharp changes around the crossover.

SOUND QUALITY

The *Nimbus* received a somewhat mixed reaction from the panelists, ending up around the median for the group as a whole, at what is probably pretty close to the median price (I'll leave you to work that out). But I'm happy to admit I liked what I heard, describing the model as "integrated and informative, if a shade edgy". Another referred to "plenty of life and vibrancy" and enjoyed the clarity, but also criticised a lack of 'weight' and detail resolution.

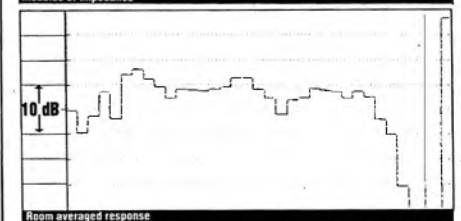
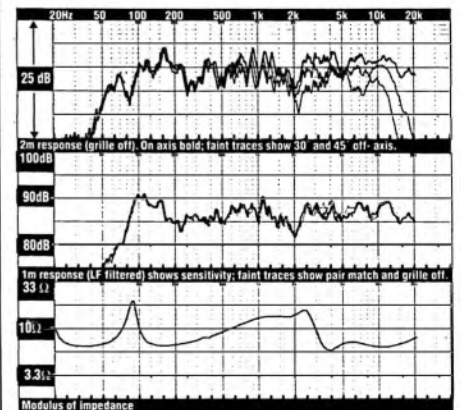
Subsequent sighted listening confirmed the bouncy, lively but also rather untidy sound, with the balance variations clearly introducing a fair amount of character and coloration. It was also interesting to note that this speaker responded rather well to wall siting, which seemed to help things along a bit by filling in underneath the slightly exposed mid bass.

CONCLUSIONS

The *Nimbus* is a borderline case. For my money the extra bass extension and dynamic range make it well worth the extra £50 on the price of the *Cirrus*. But I also accept that the sound is a trifle 'untidy', losing some spatial and timbral cues in the process. Like I said, it's a borderline case...

TEST RESULTS

Size (height x width x depth)	46 x 25.5 x 24cm
Recommended amplifier power	10–80 watts
Recommended placement	on stands in free space
Estimated frequency response (2m)	55Hz–20kHz, ±4dB
Estimated LF rolloff (–6dB ref midband)	55Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	88dB
Impedance characteristic (ease of drive)	fairly good
Forward response uniformity	fairly good
Typical price per pair (inc VAT)	£230



Uxbridge Audio

Dear Sir

Wembley Park,
Middlesex.

The EXCELLENT service, personal attention and professionalism I found with your staff, compels me to write this letter.

Having embarked on the daunting task of looking for the right music system I visited many Stores and purchased a lot of literature. I was attracted by your advertisement in What Hi-fi magazine. First class sound quality was my top priority and from another article in the same magazine I had made up my mind to purchase a system recommended therein.

A quick phone call to your Shop to find out whether you had them in stock and I was lectured on how a Music System should be purchased . . . "Have you listened to it? How do you know you will like it's sound? It isn't the same as buying a washing machine, when it has to be taken on faith that it will do the job as you want it. It is more like buying a musical instrument, where personal preference dictates. You do not need to be an expert, you only need to listen to it and decide for yourself . . ."

Not too keen on the lecture, I was, none the less, taken up by what he said, and decided to pay you a visit. This turned out to be QUITE AN EXPERIENCE! After listening to a few systems I had already decided I would be buying my own combination and not the one recommended in the magazine. A music system should, indeed, be listened to, before purchasing. In addition, the personal attention, friendly, untiring and "non pushy" attitude of your sales assistant, Jas, turned the daunting prospect of choosing the right hi-fi into a most pleasant experience.

When I first read the letter from a satisfied customer in your advert I didn't think it genuine. But after my experience I know just what he meant. I echo him in commanding you and your staff and I will not hesitate to recommend you. I, once again, thank you for the help in choosing my system and the excellent service and attention I have received at and since it's installation.

Wishing your Company every success

Mrs. F. Monteiro

BADA
THE ULTIMATE IN
SOUND ADVICE

TWO DEMONSTRATION ROOMS • 7 DAY EQUIPMENT EXCHANGE OR REFUND • UNBIASED ADVICE

MAIL ORDER ANYWHERE • 2 YEARS GUARANTEE PARTS AND LABOUR • FULL INSTALLATION SERVICE

0% INTEREST FREE CREDIT • TURNTABLES SET UP AND FULL REPAIR FACILITIES

UXBRIDGE AUDIO
278 HIGH ST. UXBRIDGE
MIDDX. Tel: 0895-30404 Multi-line
OPEN 10 TILL 6 - 6 DAYS A WEEK

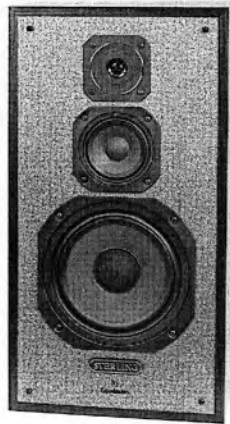
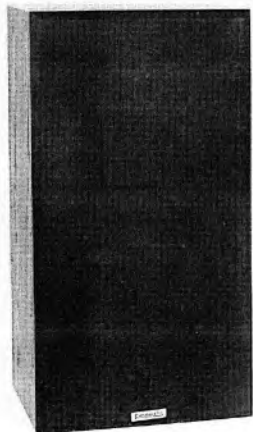
*Music from the best
equipment at all
price levels*

ACOUSTIC ENERGY • A&R CAMBRIDGE • AR • ARISTON • CAMBRIDGE
AUDIO • CREEK • CYRUS • DENON • DUAL • EPOS • EXPOSURE
HEYBROOK • INFINITY • JPW • KEF • LINN PRODUCTS • MANTICORE
MARANTZ • MERIDIAN • MICHELL • MISSION • MONITOR AUDIO • NAD
NAIM • NAKAMICHI • QED • QUAD • REVOLVER • ROGERS • ROTEL
RUARK • SANSUI • STAX • TANNOY • THORENS • TRIO/KENWOOD
WHARFEDALE • YAMAHA



GOODMANS STERLING POINT 5s

GOODMANS LOUDSPEAKERS LTD., 1 & 3 RIDGWAY, HAVANT, HAMPSHIRE PO9 1JS. TEL: (0705) 492777.



Goodmans is the least specialist loudspeaker brand in the important TGI group, having lent its name recently to all manner of consumer electronics products, including microwave cookers and TVs. But alongside these distribution ventures the company has remained faithful to its loudspeaker history, has successfully revived the miniature *Maxim* concept, and is also running a range of conventional box loudspeakers under the *Sterling* banner, covering most of the popular price points.

The *Point 5s* certainly provide a very generous size box for the £139 asking price. Presentation is smart enough, if unexceptional in the context of today's market (with at least one bit of less than convincing 'black woodgrain' vinyl trim starting to come unstuck). 'Walnut' is an option.

The front baffle has the sort of styling and presentation which encourages removal of the grilles, at least amongst those who wish to draw attention to their loudspeaker's mottled silver baffle finish.

If levering off the grilles, do take care not to leave an unprotected foot underneath; they're that solidly built, on heavy wooden frames.

The vertical in-line three-driver line-up probably looks impressive to the untutored eye. All is nicely finished, but the shallow pulp cone Goodmans bass and mid units do look a shade old fashioned in today's context. The Audax tweeter dome looks metal, but in fact uses a titanium coating on a polymer former.

The construction is sound enough, if inevitably oriented towards cost effectiveness. The large box panels are only 15mm thick, but the midrange isolation tube neatly doubles as a fore-and-aft brace between baffle and back. The crossover uses gentle 2nd-order slopes.

TEST REPORT

Sensitivity is a generous enough 89dB or so, and the impedance is mild too, but bass extension is a little less than might have been expected from the cabinet volume. The response is held within quite close limits across the band, with little sign of any crossover problems, though there is clearly a slight bias towards the low frequency end of the spectrum.

However, the room-averaged response does provide an alternative view in this instance, suggesting that the *Point 5s*' total forward radiation is rather mid-prominent, perhaps through the added off-axis output provided by the three-unit configuration. Moreover, this prominent region is also a little lumpy. The pair match is quite tolerable, and the grille actually had surprisingly little effect on the axial response.

SOUND QUALITY

Although the *Point 5* does show positive attributes, the panel's overall ratings were quite consistently pretty low. And the speaker certainly doesn't sound as big as its box size implies, a corollary of the highish sensitivity.

There was some praise for the quick, lively bass character, but further up the band the sound seemed much less dynamic and free, while stereo, subtlety and transparency all seemed lacking.

Indeed, the *Point 5s*' sensitivity should well suit it to playing loud, but the sound seemed to 'clog up' all too readily when this model was required to perform enthusiastically.

CONCLUSIONS

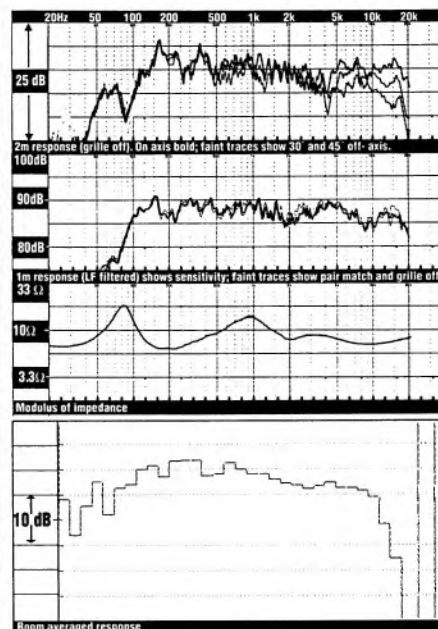
Although one might be tempted to dismiss the *Point 5* as a cynical marketing exercise in creating the greatest perceived value at the

lowest price, this is an oversimplification. In fact I believe it's an honest – and in some senses successful – attempt to produce a competitive contender, but to a product specification which looks increasingly outdated. Simple three-way designs such as this made more sense ten years ago when voice coils were much more easily cooked by user over-enthusiasm.

What the *Point 5* does provide is plenty of sensitivity, but at a price in terms of subtlety that doesn't really make a lot of sense.

TEST RESULTS

Size (height x width x depth)	56 x 29 x 26cm
Recommended amplifier power	10–100 watts
Recommended placement	on stands in free space
Estimated frequency response (2m)	60Hz–20kHz, ±4dB
Estimated LF rolloff (–6dB ref midband)	60Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	89dB
Impedance characteristic (ease of drive)	very good
Forward response uniformity	good
Typical price per pair (inc VAT)	£139



HECO INTERIOR 430S

ZENONLEC LTD., 10a THE BROADWAY, NEWBURY, BERKS RG13 1BA. TEL: (0635) 528636.



Back in the days when the Rank Organisation was the major player in UK hi-fi manufacture, Heco was the German wing of an operation which included both Wharfedale and Inghams, so it's hardly surprising that there was no real attempt to distribute the brand in the UK. Following the Rank pullout, each company has continued to operate entirely autonomously.

Heco has long been a significant player on its German home market, with a turnover of 30 million something or other and 70 or so employees engaged in driver manufacture and system assembly. Now the products are being introduced to the UK by Zenonlec. Distribution will take time to build up, since the brand has the extensive and mature product range that befits such a well established operation.

The £399 430S comes near the top of the *Interior* range. It's a tall, sensibly slim, floor-standing enclosure which in our case was finished in a nice plain textured matt black. This is to be replaced by presumably representative samples of the black-ash-or-walnut vinyl plague. But (with the most delightful irony) patriotic customers will be able to pay a little extra for red, white or blue.

Sadly the baffle has not been styled for grille-free operation, since the latter looks acoustically most unpromising, even though a range of coloured grille cloths makes a further attractive option for the interior designer.

There is a single tweeter and two 150/170mm bass/mid drivers, one placed near the top just below the tweeter, the other just below the halfway line. The tweeter is offset, but the pair is not mirror-imaged.

Heco regards this as a two-way design built on top of a subwoofer – the lower driver rolls off early and operates within its own sub-cabinet. From this perspective the

design is comparable to a conventional bookshelf model where the stands are replaced by the extra cabinet and sub-driver, which is both logical and cost effective.

Construction and build is nothing special – presumably that comes as part of the package in the upmarket *Superior* Heco range. The box shape and the internal partition will provide some stiffness, but the panels are still large for 17mm chipboard. The German ancestry is seen in generous terminals which are a pain to use with 4mm banana plugs, and the lack of any provision for spiking the enclosure to the floor. Since the UK demands proper spikes – for good reason, given the usual performance advantage – doubtless Zenonlec will get some sort of UK conversion kit organised soon.

TEST REPORT

The 430S registers a close to average sensitivity, and the bass shows useful extension, though part of this is due to a determinedly 40hm load (following normal continental practice).

Despite the large size and odd baffle geometry, the various response traces are all amongst the flattest in the project, and even the offset tweeter shows good HF distribution when measured the 'wrong' way. However, the grille does interfere somewhat, there is a mild discontinuity around the HF crossover, and mild lumpiness on- and off-axis in the midband. But the room integration is clearly very good indeed, with just a mildly depressed presence and slightly exposed treble.

SOUND QUALITY

Sited as intended on the floor and clear of side and rear walls, the 430S was warmly received by the panel, due in no small part to the fine subjective balance across the fre-

quency range and providing a convincing impression of scale, albeit with a slightly unruly extreme top end.

If the 430S is a fine speaker for simply relaxing in the same general vicinity, it is a little less rewarding for the more demanding listener. Such factors as coloration, stereo imaging and dynamics are rather less convincing than the best, and I suspect the spike-factor (lack of same) is partly responsible, and also that the rather prosaic driver technology helps to inhibit a degree of musical insight. The end result adds an element of blandness and a mild lack of precision to an otherwise rather impressive sound.

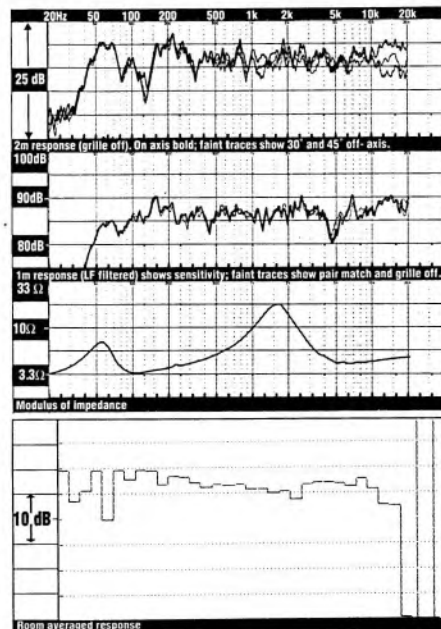
CONCLUSIONS

The 430S provides an auspicious *Hi-Fi Choice* debut for the Heco brand, while upgrading superficials like the grille and the floor interface could effect a significant further improvement.

The fundamentally good balance and thoroughly sensible basic design suggests cautious Recommendation, for a product which perhaps will have greater appeal to the more casual user interested in the attractive cosmetics than to the die-hard enthusiast.

TEST RESULTS

Size (height x width x depth)	85 x 24 x 27.5cm
Recommended amplifier power	15-100 watts
Recommended placement	on floor in free space
Estimated frequency response (2m)	43Hz-20kHz, ±4dB
Estimated LF rolloff (-6dB ref midband)	43Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	88dB
Impedance characteristic (ease of drive)	needs good current delivery
Forward response uniformity	very good
Typical price per pair (inc VAT)	£399



JBL TLX12

HARMAN (AUDIO) UK LTD., MILL STREET, SLOUGH, BERKS SL2 5DD. TEL: (0753) 76911.

RECOMMENDED



One of the longest established and most successful loudspeaker brands in the world, JBL has always been regarded as offering the quintessential 'West Coast' sound from the US of A. Historically the 'JBL sound' probably had much to do with frequency response aberrations, but the quality of driver engineering has played an equally important role in building the reputation. Not for nothing is the company a world leader in studio monitoring loudspeakers.

However, all that background seems to have very little to do with the object under scrutiny on this particular page. The *TLX*s are domestic hi-fi loudspeakers, and the *'12* is a pretty little bookshelf-size model, at least on five faces. The fact that it is the genuine US-made article is confirmed by the characteristic US rear panel blind spots of bare painted chipboard carcass edging and spring-loaded bare-wire terminals – just big enough to take a 4mm plug, at a push.

Ignore the back panel and this model is as well finished as the best Europeans – indeed it's almost a dead ringer for the B&W *550*. The baffle is nicely finished in a spongy material, and the edges are chamfered to match the grille and minimise the visual impact. The latter has a quite deep frame, though the thickening process is staggered.

Left with the grille removed, JBL's proprietary pleated titanium metal dome tweeter is an obvious point of interest. It is mounted slightly offset from the centre line so as to minimise baffle edge diffraction effects, but no attempt has been made to produce left- and right-handed versions for optimum stereo performance. This means that unless the speakers are auditioned directly on axis, each speaker will provide a slightly different tweeter response. A solution for the horizontal plane would be to turn one model upside down, though this might

introduce vertical plane discrepancies.

The only decoration is a stick-on name and address label with the JBL in company orange. This sits next to the offset tweeter and frankly unbalances the aesthetics – it looks tacky, to adopt the jargon. I'd be tempted to try and peel it off and put it on the back where it belongs, but I'm not going to try it because of what might happen to, or be left behind on, the foamy baffle finish.

The bass/mid unit has a 130mm laminated polymer cone, while the box is built throughout in high density chipboard, trimmed in an attractive matt black vinyl. There's none of yer 'black ash' nonsense here, and very smart it looks too.

TEST REPORT

Our measurements show the *TLX12* hovering around the 87dB/W mark for sensitivity, which is an average enough rating, achieved with pretty decent bass extension down to around 55Hz and with an entirely tolerable impedance characteristic. The response traces all show a reasonably flat overall balance, with surprisingly close parallels with those taken for the larger *LX44* model featured on the next page.

The *'12* doesn't have the bass reach of the bigger model, nor quite the same midband and crossover smoothness, while the treble peak is also rather more exposed, particularly with one of the two samples. But it does show much the same basic character nonetheless.

SOUND QUALITY

The panel reacted warmly to the 'boppy' little *'12* with its tight, light bottom end. Coloration is modest and detail, stereo and balance are all fundamentally good. The 'fizz' at the top, and a mild loss of drama and 'speed' were the most common criticisms.

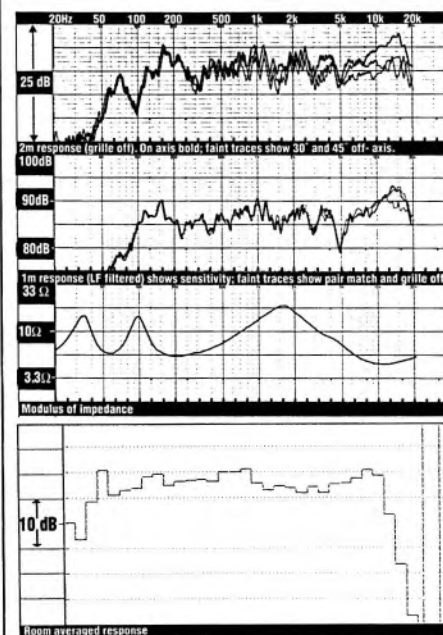
My own positive reaction was happily reinforced during subsequent 'hands-on' experience. The *'12* is fast, quite tidy and coherent. I prefer the sound with grille on, because the treble is always threatening to draw a little too much attention to itself. The sound is not always comfortable, and some might find the balance a little cold and analytical, but it's undoubtedly informative nonetheless. And they don't sound as small as they look either!

CONCLUSIONS

The slight treble 'sting', and an individual's personal reaction to it is the main point at issue here, dictating a 'try before you buy' approach. With that qualification, the competitively priced *TLX12* obviously deserves Recommendation.

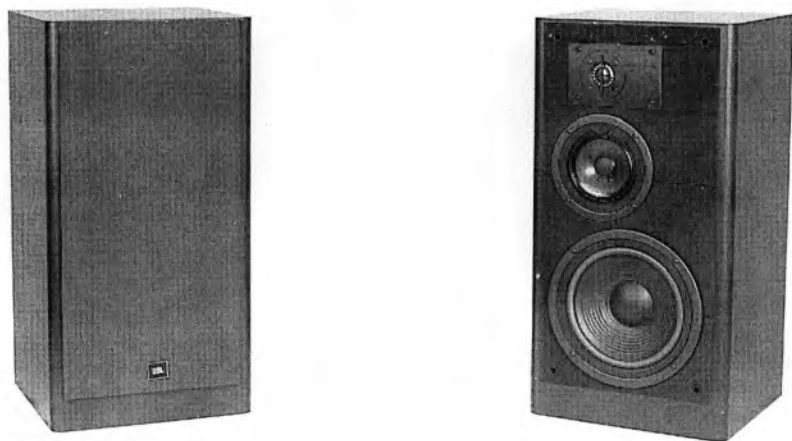
TEST RESULTS

Size (height x width x depth)	37 x 23 x 23cm
Recommended amplifier power	20–70 watts
Recommended placement	on stands 0.5m from rear wall
Estimated frequency response (2m)	55Hz–20kHz, ±5dB
Estimated LF rolloff (–6dB ref midband)	55Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	87dB
Impedance characteristic (ease of drive)	fairly good
Forward response uniformity	fairly good
Typical price per pair (inc VAT)	£149



JBL LX44

HARMAN (AUDIO) UK LTD., MILL STREET, SLOUGH, BERKS SL2 5DD. TEL: (0753) 76911.



One of the historical pioneers of high performance loudspeakers, and widely regarded as the doyen of the West Coast American sound, JBL is active in most professional as well as hi-fi markets, and has always had a strong reputation as a manufacturer of 'high tech' drive units, capable of prodigious sound outputs and power handling.

Where the tiny *TLX12* on the previous page is essentially a conventional bookshelf hi-fi loudspeaker, the \$340 *LX44* is much more the sort of model that fits in with the JBL tradition. Its substantial three-way reflex-loaded box would probably be classed as a bookshelf model over in the US of A, but is certainly on the large size for current (mis-guided?) UK aspirations. In point of fact, however, it is slightly smaller than a Spendor *BC1*, which itself was considered quite small a decade ago.

The three-way concept may have become unfashionable on the UK market (due in no small part to the influence of said *BC1* amongst others), but there are certainly theoretical advantages in splitting the frequency range into three bands, each handled by a dedicated driver, notably in power handling, sensitivity and horizontal off-axis distribution. Whether these outweigh the added complexity of the three-way system remains one of The Great Debates.

The box at hand feels hefty enough, but then so it would with three JBL magnets and nearly two cubic foot of volume. From the outside the cosmetics are first class, with some neat design touches. The baffle-edge post-forming minimises the visual impact as well as improving the acoustic performance, and possibly the same could be said of the spongy blanket that covers the baffle and doubles as a driver sealing gasket. The grille is covered in a nice contrasting grey, allowing the gilt badge to wink at you in time with the

bass when you wind the wick up. The rear terminals are chunky enough to accept the most monstrous of cables – or 4mm plugs for that matter.

The one – possibly serious – concession to costs seen on the outside is the lack of mirror imaging despite the offset driver array – a situation which is bound to compromise stereo performance, and which is more serious with large than small boxes.

Under the skin the economics of the hard commercial world are more apparent. There is some carefully placed wadding but the panels are only 18mm high density chip-board, with no damping pads, though a circumferential brace adds rigidity. The complex crossover has good quality components but is PCB mounted with spring connection to driver terminals. There's no separate box for the midrange either, though cross-interference may be minimised by a magnet which occludes the back of the mid cone entirely (possibly not such a good thing).

TEST REPORT

The test results for the *LX44* make pretty impressive reading, both in isolation and particularly in context with the smaller *TLX12* assessed under the same conditions: good correspondence and improved smoothness and bandwidth are both evident. Although the sensitivity rating is only a shade above average than that of the '12, the '44 does in fact sound significantly louder in room, due to the extra bandwidth, which extends down to an impressively low 40Hz.

The in-room averaged response summarises the '44 very well. It is a little strong in the bass, gently downtilting most of the way to the presence region until adding a little sting in the top. There's a touch of the 'loudness button' effect here, though for the most part the results are rather impressive.

However, the 2m response shows that the tweeter only flattens out when comfortably off axis – and that was made using the least favourable direction of rotation.

SOUND QUALITY

Overall, the sound of the *LX44* must be considered a mild disappointment overall. The bass power and extension both attracted praise, creating a real sense of scale, but the total effect could be a shade overwhelming. And the slightly 'tizzy' exposed treble was another focus of attention.

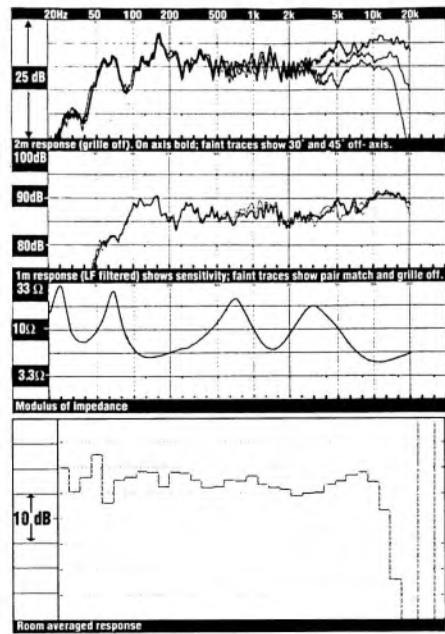
Although the speaker sounds balanced enough in between, it was not considered particularly informative or dynamic. The muddly middle simply lacks the transparency that simpler two-way systems are often better able to achieve, even at the expense of excavator bass.

CONCLUSIONS

In many ways such a promising package in terms of cost and performance, the *LX44* fails to live up to expectations sonically, providing yet another example of how much more difficult (and expensive) it is to match the subtleties of the best two-way performance within a three-way package.

TEST RESULTS

Size (height x width x depth)	58.5 x 30 x 29cm
Recommended amplifier power	15–120 watts
Recommended placement	on stands in free space
Estimated frequency response (2m)	45Hz–20kHz, ±4dB
Estimated LF rolloff (–6dB ref midband)	40Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	89dB
Impedance characteristic (ease of drive)	fairly good
Forward response uniformity	good
Typical price per pair (inc VAT)	£340



JPW SONATA

JPW LOUDSPEAKERS LTD., UNIT 1, RICHMOND WALK, PLYMOUTH, DEVON PL1 4LL. TEL: (0752) 607000.

BEST BUY



From the heart of the West Country, JPW has been around a number of years now. Assisted by favourable local labour conditions, the company has steadily grown a successful business based on three quite similar medium sized bookshelf models with real wood finish, competitively priced between £125 and £210.

The brand new *Sonata* is altogether smaller, and altogether less expensive. The potential volumes involved in hitting a price point below the still psychologically significant £100 could enable JPW to change gear and move up into an altogether bigger league.

Whether it is really sensible to try and make real hi-fi loudspeakers for under £100 must remain questionable, given the severe cost constraints. But as long as a substantial slice of the UK market demands such products, manufacturers will make the necessary compromises. Indeed the task of trying to create satisfying sounds out of a £100 pair of boxes must represent one of the pinnacles of loudspeaker design achievement.

One thing that is remarkable about the *Sonata* is that the finish is again real wood, rather than some species of synthetic – and on all six sides as well. I wouldn't have described it as a very pretty real wood finish – in fact I'm not sure I don't prefer some of the better imitations – but it does go to show what can be achieved, with a little assistance from those detained at Her Majesty's pleasure.

Such a speaker inevitably follows the standard formula pretty closely, though with good attention to detail, possibly at the expense of the aesthetics. The small box and even smaller bass/mid driver plus Audax tweeter is pretty much de rigueur, though it's nice to see a serious attempt to chamfer the grille profiles, for example, and to provide substantial

socket/binder terminals.

More specifically, the Elac bass/mid unit uses a 110mm paper cone with a 15mm rubber surround. Crossover rates are very gentle, 1st-order (6dB/octave), on both arms, so all is simple and hardwired. Neath the tree wood lies a 15mm thickness of MDF, with Acoustilux wadding and dovetailed joints too, so there's been no under-the-skin skimping. Recommended siting is six to eighteen inches from a rear wall, though full wall mounting is also possible.

TEST REPORT

The *Sonata* doesn't have to make any apologies as far as the test programme is concerned either. Sensitivity just barely reaches average in the important 150-500Hz area (an octave either side of middle C), and output drops steadily towards the crossover region by about 4dB *in toto*, with some recovery thereafter, especially on-axis.

The midrange is a little uneven, but no more so than most, and treble too could be smoother, but the bass is well enough extended considering the modest box size, and the impedance represents an innocuous enough load. The room integration is particularly impressive, variations through mid and treble amounting to little more than ± 2 dB. The pair match proved close, and the grille has little negative influence.

SOUND QUALITY

There's always one, isn't there? One cheap little loudspeaker that does unreasonably well in the blind listening tests, I mean, embarrassing many more expensive models. Well this issue it's the *Sonata*, whose basically good balance and fine design integrity takes it firmly into the top ten.

I have to admit I wasn't so impressed myself, regarding it then – and now – as

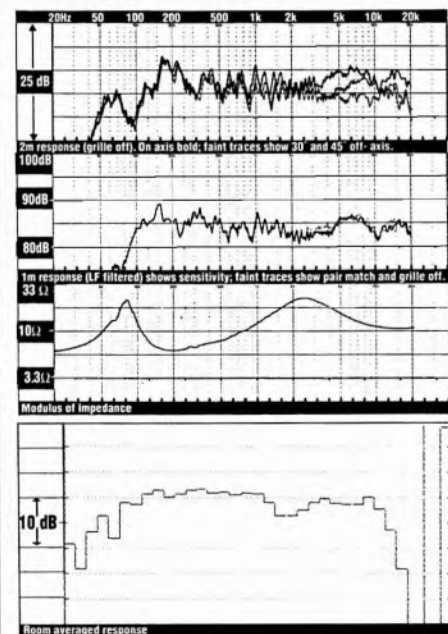
rather boxy and also unruly in the treble. But I am comprehensively outvoted by a panel who praised the lively, 'foot-tapping' character, and the open and clear sound with fair space and good 'body' and weight. And I have to admit I can see their point of view: the *Sonata* has a rare freedom that tends to promote contrasts and make music interesting. The sound is inherently 'quick' and dynamic, delivering good discrimination between different instruments, although the inherent constraints of the low cost drivers – the tweeter in particular – are something of a limiting factor on the ability to distinguish more subtle shadings.

CONCLUSIONS

The *Sonata* nearly didn't make it into this month's review project, since the first samples fell off the back of a lorry on the way. Whoever found it must have known what they were doing, for it's an obvious Best Buy on all counts. Real wood, good measurements and an inviting sound at £100 – it's a genuine enthusiast's loudspeaker at a nearly silly price. Though I'm still not sure I could live with that tweeter myself.

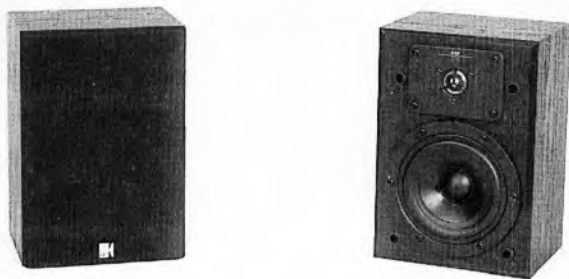
TEST RESULTS

Size (height x width x depth)	32 x 23 x 20cm
Recommended amplifier power	15–60 watts
Recommended placement	on stands quite near rear wall
Estimated frequency response (2m)	55Hz–20kHz, ± 3 dB
Estimated LF rolloff (–6dB ref midband)	55Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	very good
Forward response uniformity	good
Typical price per pair (inc VAT)	£99



KEF C15

KEF ELECTRONICS LTD., TOVIL, MAIDSTONE, KENT ME15 6QP. TEL: (0622) 672261.



The initials KEF may have stood for Kent Engineering Foundry as a matter of historical record, but KEF The Loudspeaker Engineers has probably contributed more than any other to the advancements in the science and technology of loudspeaker design over the past two decades.

Not that you'd expect to find much of this technology proclaiming itself too obviously on what is the least costly and most humble in an extensive range. But it's a racing certainty that just as much trouble has gone into mixing and matching the ingredients, using the most advanced computer modelling techniques, in a product whose price dictates it will become one of the company's most popular models.

However, £100 doesn't buy a great deal of hi-tech hi-fi loudspeaker these days. To describe the *C15* as a shoebox would be to imply a delicacy of footwear which this reviewer hasn't seen since childhood – it even looks small against that stereotype miniature, the *LS3/5A*.

Tiny it may be, but it's as perfectly formed as anything at this cost-conscious end of the market. And in fact it has been aligned for optimum balance with free space siting, for which some sensitivity has been sacrificed, rather than attempting to make use of room boundary reinforcement.

All is black vinyl (with a walnut option), and the only model identification is a discrete sticky label fixed onto the metal frame of the tweeter, and another tiny label on the terminal moulding. The carcass is clad in a good quality wood-grain vinyl, which neatly overlaps the plain finish baffle and rear panel. The grille has a rather thick plastic frame from the inside but neatly radiused verticals on the outside, and aesthetics suggest this speaker will probably be preferred with grille in place.

The Tonegen aluminium dome tweeter is something of a surprise at the price, as is the gold glint from the 4mm socket/binder terminals, though there's little else in the way of frills. The bass/mid driver, assembled by Elac but designed and sourced or manufactured by KEF, has a tiny 90mm polypropylene cone with a wide surround termination operating in an inside frame diameter of about 110mm. Such a small box needs no extra bracing, particularly since the back is recessed, and will certainly be very rigid using the 15mm cabinetwork. The network is quite complex, using 2nd and 3rd order crossover arms plus a 3rd order bass alignment.

TEST REPORT

The sensitivity is indeed below average by a couple of dBs, and the impedance drops to around 4ohms in the power hungry 200-300Hz region, but the bass extension is maintained within 6dB down to around 60Hz, which is pretty remarkable considering the size of the box.

The various response sets show the fundamentally flat balance that KEF so consistently manages to engineer into even quite humble products, though in each trace there is evidence of some loss of energy around 2-4kHz, through the crossover region. The grille would also appear to be better avoided, as its major influence seems to be to deepen and broaden the crossover depression. And the room-averaged response does suggest that a little bass boundary reinforcement might well be successful, and is certainly worth trying.

SOUND QUALITY

The first reaction of one panelist appears to sum up the *C15* rather well: "ultimate, tight-focused presentation; leaves bass out in the cold but sounds precise and detailed; just a

little too much top for comfort, but at least there's no bass boom".

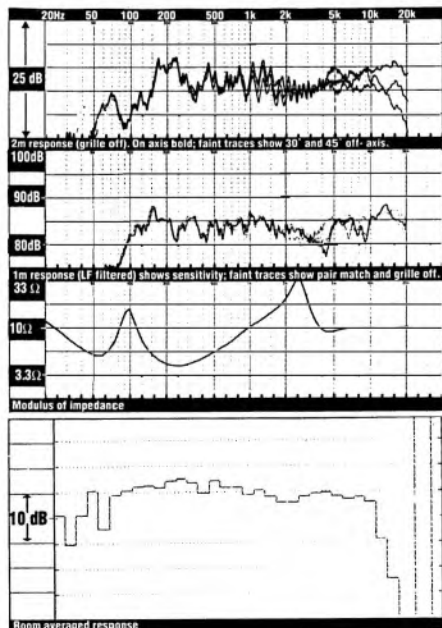
The overall rating from the panel placed this little KEF only a little below average overall, which is very impressive under the circumstances. It was marked down for the lack of bass weight, 'scale' and for some constriction of dynamics, but compensated for this through fine reproduction of the stereo soundstage and good total coherence. One listener felt the whole effect was a little over-engineered and processed, and certainly there is a tendency towards blandness. But even an unwillingness to create offensive noises tends to be something of a rarity at these sort of prices today.

CONCLUSIONS

The *C15* clearly deserves strong Recommendation for its fundamental competence in delivering most of the bandwidth with good precision from a tiny package at a very competitive price. But it still seems faintly bizarre to me that such a model should have been designed for free space siting, with the implication that it should ideally require the use of a pair of stands each approximately three times the height of the loudspeaker itself!

TEST RESULTS

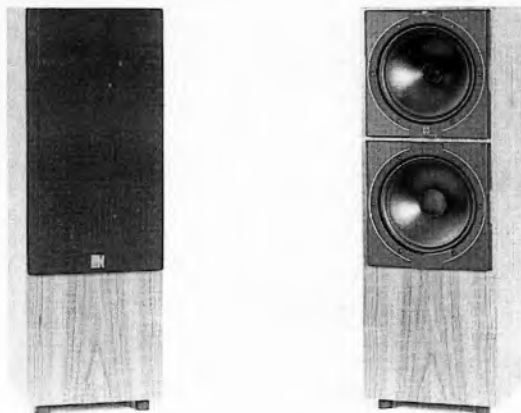
Size (height x width x depth)	26.5 x 18 x 14cm
Recommended amplifier power	20-60 watts
Recommended placement	on high stands in free space
Estimated frequency response (2m)	70Hz-20kHz, ± 3 dB
Estimated LF rolloff (-6dB ref midband)	60Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	85dB
Impedance characteristic (ease of drive)	fairly good
Forward response uniformity	good
Typical price per pair (inc VAT)	£100



KEF C75

KEF ELECTRONICS LTD., TOVIL, MAIDSTONE, KENT ME15 6QP. TEL: (0622) 672261.

RECOMMENDED



KEF's 'C series' models are the 'popularly priced' range that run from the diminutive £100 C15 reviewed on the previous page to the £600 top-of-the-line, floorstanding C95. The £350 C75 featured here is just one notch down the ladder, and appears to sacrifice little more than 8Hz of bass extension, through employing a normal and smaller closed box instead of using a coupled cavity for the bass end.

The package here looks very good value, on paper at least. Slim, floorstanding loudspeakers are like that; they offer a decent total enclosure volume without taking up any more room space than a bookshelf speaker placed on a proper stand – and you don't have to pay out for the stand either, which is another bonus.

Besides an eminently logical box shape, the C75 features KEF's radical new *Uni-Q* driver – a 200mm bass/mid unit that cunningly houses an ultra-compact tweeter on the polepiece at its centre.

This tweeter miniaturisation has been enabled by new rare earth magnets with greatly improved power/bulk ratios, but the important fact is that the 'acoustic centres' (effective sound source) of the two drivers may be made coincident through the crossover region. Which in turn should ensure a high seamless transition between midrange and treble, maintaining good uniformity on- and off-axis. The down side (there's always a down side) of placing the tweeter in the throat of the bass unit is that a moving conical section is not necessarily the best immediate working environment for a tweeter.

Besides the special *Uni-Q* driver operating across the full range, the C75 has an additional 170/200mm bass unit, which gives an effective driver area roughly equivalent to a single 300mm driver, without the cabinet

width penalty of the single unit approach.

The whole package is very nicely finished and presented, in a good quality, textured vinyl 'walnut' (or 'black ash'), though there's nothing fancy about the standard 18mm cabinetwork. There are clever plastic covers for the spikes to provide a (compromised) alternative for those with valuable wooden floors. The rear panel has just a single pair of terminals, which are nice chunky gold-plated Michells suitable for plugs or bare wires.

The drivers would be worth a paragraph to themselves were space available, with their clever clamping frames and what not. Cones are polypropylene, the tweeter polyamide, and the crossover is complicated – 1st order to the bass-only unit, 2nd order to the *Uni-Q* bass/mid plus 4th order to the tweeter (it wouldn't do to horn-load its resonance), while the bottom end has a 3rd order alignment.

TEST REPORT

KEF tightly specifies its products, and our measurements don't fall that far short, given their much more primitive nature. The C75 is quite sensitive, with respectable bass extension and an acceptable impedance characteristic (assuming it doesn't keep on dropping above 20kHz!). The responses are basically well controlled and flattish, albeit a little 'warm' in the bass and slightly 'dished' through the upper mid and lower treble.

The off-axis 2m traces are most noteworthy in confirming the complete absence of crossover unevenness, which after all is the whole point of *Uni-Q* – the down side being somewhat greater directionality than more conventional systems, presumably due to the unusual geometry around the effective source.

SOUND QUALITY

The combination of seamless crossover integration and respectable bass extension was quite enough to swing the panel very positively in favour of the C75, despite some misgivings over the 'warmth' of the overall balance (possibly aided and abetted by an unfortunate floor interaction).

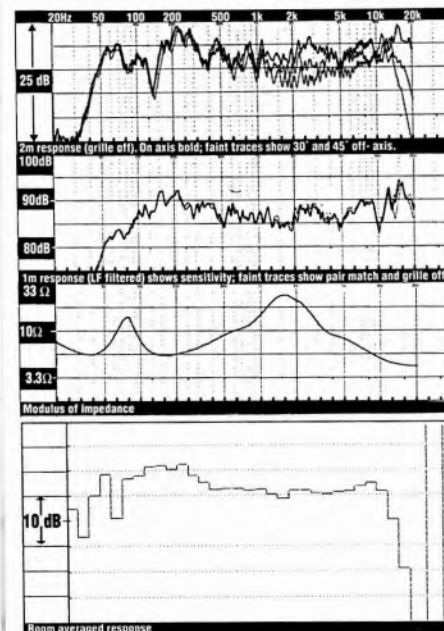
Vocal integration is particularly impressive, and detail is communicated in abundance, albeit with slight 'thickening' and 'boxiness'. Ultimately, the bass still has KEF's characteristic laziness and softness, but it seems a small price to pay for obtaining fine stereo imaging without having to fix your head in a vice.

CONCLUSIONS

The coherence benefits of *Uni-Q* were clearly audible to the panel and myself, and I've tried thrashing the bass end in a vain attempt to hear unwanted intermodulation effects, so it appears that the system works well. The rest of the package is pretty damn good too at the price, if a shade warm and lazy for some tastes perhaps. Recommendation is mandatory – even quite enthusiastic.

TEST RESULTS

Size (height x width x depth)	72 x 24.5 x 25.5cm
Recommended amplifier power	15–150 watts
Recommended placement	on floor in free space
Estimated frequency response (2m)	48Hz–20kHz, ± 4dB
Estimated LF rolloff (–6dB ref midband)	45Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	90dB
Impedance characteristic (ease of drive)	acceptable
Forward response uniformity	very good
Typical price per pair (inc VAT)	£349



COVENT GARDEN RECORDS

AT

84

**CHARING CROSS ROAD
LONDON WC2H 0JA**

Tel: 01-379 7635/7427

Fax: 01-836 1345

Open Mon - Sat 10.00 am - 7.30 pm 2 mins from Leicester Sq Tube

**THE COMPLETE SERVICE TO ALL MUSIC LOVERS
AT LONDON'S FINEST COMPACT DISC CENTRE**

NEW RELEASES

Classical full price new releases only £9.95 and mid price £6.95 per CD for the first 30 days after issue: Decca, DG, Philips, EMI, CBS, RCA and selected others.

LISTENING FACILITIES

Not only the cheapest new releases in town but also full individual listening facilities - listen before you buy.

7,000 CDs IN STOCK

A continually updated and growing stock of the best classical, jazz and popular compact discs.

SECONDHAND

Secondhand CDs bought and sold, on sale from £5.99.

TOKEN SCHEME

Unique scheme of one token for each CD you buy (value £10.95 and over) entitles you to a free CD when you have collected ten to the value of £10.95.

SPECIALISTS IN CD PLAYERS

Over 45 CD Players in stock and on demonstration. From £149 to £2,000.

QUALITY AUDIO

We stock an excellent range of some of the best audio equipment and loudspeakers available from famous names such as B&W, Quad, Meridian, Mission, Cyrus, Arcam, Rogers, Sony, Nakamichi, Sennheiser, Denon, Rotel, Marantz, Pioneer, Revox, Monster Cable, Yamaha, Technics, Celestion and more.

DELIVERY AND INSTALLATION

Free delivery in the London area on selected Hi-Fi systems. Installation service provided. Orders actioned within 24 hours subject to stock availability.

DEMONSTRATION

Two private demonstration rooms to audition your future purchase. Demonstration room can be prebooked. Just phone to make an appointment.

SERVICING

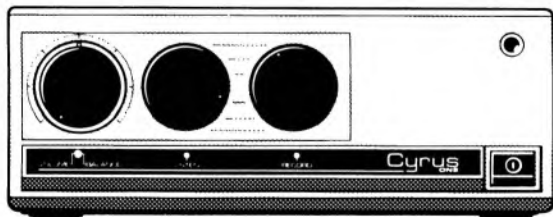
Full up-to-date department for servicing and CD Player up-grading by qualified technicians.

DAT

Digital Audio Tape on demonstration.

CDV

**COMPACT DISC VIDEO NOW ON SALE AND DEMONSTRATION
PHILIPS, MARANTZ AND PIONEER IN STOCK
FULL RANGE OF 5", 8", AND 12" CDV FROM £4.99**



New range of Mission loudspeakers now in stock and on demonstration. Also stockists of full range of Mission speakers from the 761 to 765.

PCM 2 CD Player
Cyrus 1
Cyrus 2
PSX Power Supply

£499.00
£199.00
£299.00
£229.00

The superb new CD Player, the PCM2 and the improved Cyrus 1 and 2 amplifiers. These outstanding products set new standards for reproducing music as it was performed.

**COVENT GARDEN RECORDS
PRESENT**

NOW IN STOCK AND ON DEMONSTRATION

MISSION ELECTRONICS

£50 OFF

WHEN YOU BUY A CD PLAYER

Bring this coupon in during
MAY/JUNE
and get £1 off your next
50 CDs over £6.99 this year
Also available on Audio
Components over £500.

Sale & Special offer goods excluded Valid until end of JUNE 1989

HFC 06/89

£6 OFF

ON PURCHASE OF 5 CDs OVER £9.95

84 Charing Cross Road, London WC2
No Tokens Given
Valid to end of JUNE 1989

HFC 06/89

£1 OFF

ON PURCHASE OF 1 CD OVER £9.95

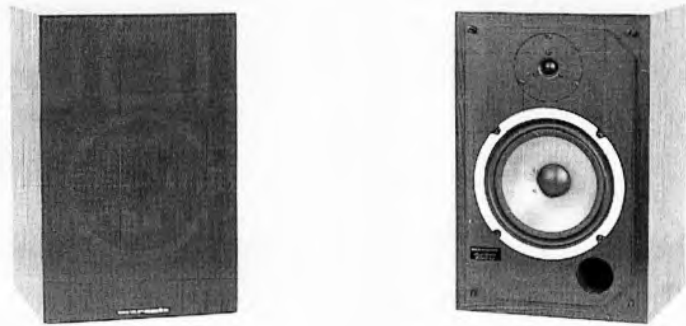
84 Charing Cross Road, London WC2
No Tokens Given
Valid to end of JUNE 1989

HFC 06/89

MARANTZ LD50DMS

MARANTZ AUDIO (UK) LTD., 15-16 SAXON WAY IND. EST., MOOR LANE, HARMONDSWORTH, MIDDX UB7 0LW. TEL: (01) 897 6633.

BEST BUY



Marantz is not a loudspeaker brand that instantly springs to mind, but this largely autonomous Philips subsidiary has a long speaker tradition which goes back to well before the Philips takeover.

The UK and European distributors have taken great pains to maintain this tradition, combining Marantz design expertise with local manufacturing to create a number of models whose prime objectives might have been to partner packaged separates and midi systems, but whose performance has more than justified independent lives as specialist loudspeakers.

It was about eighteen months ago that we tested the *LD20DMS*, priced then at £130 and now around £150. The £200 *LD50DMS* shows a strong family resemblance, preserves much the same slightly squat shape, but increases the linear box dimensions by about 18 per cent all round, a strategem which goes much of the way towards doubling the enclosed volume.

Quite frankly it's not the prettiest design I've come across. The *LD50DMS* looks a bit dumpy and anonymous. But there's some neat attention to detail, particularly the way the baffle and grille integrate.

Although the wrap has a presentable enough woodgrain vinyl, neither back nor front do more than paint bare chipboard and MDF edges. So for aesthetic reasons the grille is best left in place and the speaker sited with its back close to a rear wall. Which is not where it's designed to be operated, ho hum. So it's back out to free space and chipboard butts in full view, American style.

One distinguishing feature adopted by no other is the use of three rear terminals for Marantz's three-filament bi-wiring equivalent, known technically as one-and-a-half-wiring and providing separate returns from each driver alongside a common signal line.

This is claimed to be just as effective as four terminal connection for passive operation, but I wouldn't fancy trying to bi-amp this model. And somewhere out there in Marantz land I see this pile of unwanted red terminals, getting bigger and bigger.

The box is standard enough 15mm stock, with a horizontal circumferential brace, but the centre part of the baffle adds a further 13mm thickness of MDF, shaped to match the grille frame and accommodate the drivers. One reason for keeping the grille on is the rather tacky appearance of the transparent polypropylene main driver cone with its white surround trim. This is one size up from that used on the *20* – a 150mm cone with wide surround on a 200mm frame. The tweeter is a 19mm soft dome with short front cavity – possibly a Scan.

No details were received to accompany this loudspeaker, and dismantling it so as to find out what was inside raised more than one bead of sweat. This box is exceedingly well screwed together.

TEST REPORT

Our sensitivity comes out at 87dB, pretty much the overall average for all loudspeakers, while the impedance stays commendably high throughout the range, apart from a sharpish cusp in the crossover region. The various response sets are impressively flat, with a pretty close pair match.

Apart from a slight midrange prominence around 800Hz-1kHz, a mild loss of energy around the crossover, and a slight extreme treble axial peak, the response is almost completely flat, and shows good on- and off-axis correspondence and very respectable bass extension to around 50Hz. The clever grille arrangement is even smarter than it appears. Removing the grille actually added quite a nasty notch in the 1m response

around 5-6kHz, so this often better discarded item should be kept firmly in position.

SOUND QUALITY

While I have to admit the '50 isn't a personal favourite, the rest of the listening panel warmed to the sound of this Marantz, placing it well up the lists of the day's entertainment. The balance is as near as dammit right, barring a slight overall warmth – which is just as the measurements later confirmed.

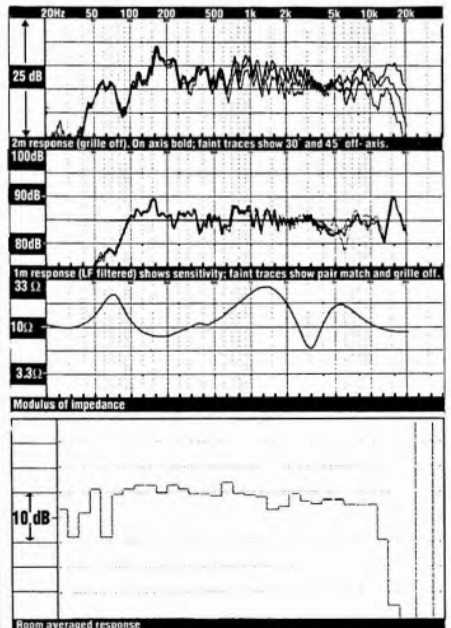
The sound presentation is very precise, coherent, controlled and well integrated, with fine stereo placement in width and depth. Coloration is limited to a degree of 'hollowness' noted by two panelists, while vocal rendition is particularly good. There is a certain 'laid back' quality which perhaps continues to serve CD better than vinyl, and the reflexed bottom could hardly be accused of excess speed. But the whole "oozes competence", to quote one panelist.

CONCLUSIONS

If I didn't have a few personal doubts I'd rate this a Best Buy straight away. As it is, I still think it merits the BB flag, but caution that it should be tried in situ/system prior to irrevocable funds transfer and close of sale.

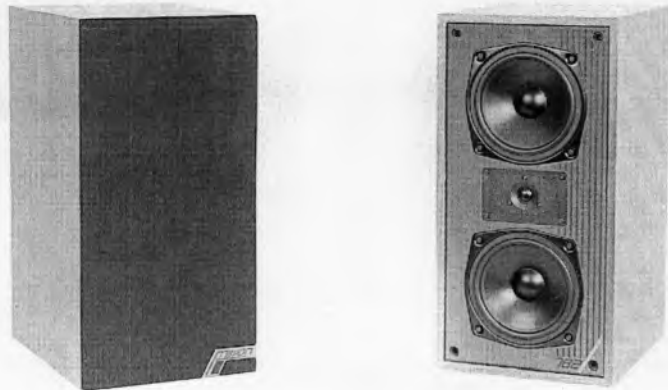
TEST RESULTS

Size (height x width x depth)	42.5 x 27 x 28cm
Recommended amplifier power	20-100 watts
Recommended placement	on stands in free space
Estimated frequency response (2m)	50Hz-20kHz, \pm 4dB
Estimated LF rolloff (-6dB ref midband)	50Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	87dB
Impedance characteristic (ease of drive)	fairly good
Forward response uniformity	very good
Typical price per pair (inc VAT)	£200



MISSION CYRUS 782

MISSION ELECTRONICS, STONEHILL, HUNTINGDON, CAMBS PE18 6ED. TEL: (0480) 52777.



Manufactured by Mission Electronics, the Cyrus brand has established a unique and fashionable niche in specialist hi-fi amplifiers, based on an impressive combination of top quality presentation and finish with fine subjective performance.

A tuner and CD player have also been graced by the Cyrus logo, but hitherto loudspeaker specialist Mission has avoided using the Cyrus brand on any loudspeakers. However, the marketing die is now cast, and the £340 782 is one of two such Cyrus models to appear, designed and presented to provide the subtle distinction (and distribution exclusivity) of the Cyrus sub-brand. There's a smart pair of £80 Cyrus stands to go with them too.

In some respects the distinction is perhaps a little too subtle. The grille is the same as that used for the 762, and the 763 – and the 764 for that matter. Apart that is from the snipping out of a central bar which would otherwise have lain right across the tweeter with this particular driver configuration. There's even the Mission flash across the bottom corner, to further confuse the Mission/Cyrus identity puzzle. But then you probably won't want to use the rather tacky grille anyway if you're a Cyrus owner, particularly as the cabinet is so nicely veneered in real wood, and the baffle attractively and discreetly decorated.

Even the back carries the wood veneer, which is ironic considering the siting recommendation of 4-8 inches from a rear wall. There are bi-wire speaker terminals, while the braced carcass is strongly built from 19mm MDPB with 26mm MDF for the baffle.

The driver line-up is a little unusual. The tweeter is mounted halfway up (or down) the baffle, flanked above and below by two apparently identical 120/140mm bass/mid drivers, each with mineral loaded polypropylene

cones. Such an approach gives a total radiating area equivalent to a single 200mm unit, with corresponding benefits in sensitivity, bass extension and power handling. It also provides a pseudoconcentric baffle geometry, in the sense that the two equal midrange sources are equidistant either side of the tweeter, and all are vertically in line. However, two such sources do not behave as one in every respect, and the distribution from such arrays can be quite complex.

TEST REPORT

The various response traces all confirm a distinct frequency characteristic, whereby output drops steadily by at least 5dB from the (quite sensitive) bass end up to the (average sensitivity) lower treble, before recovering back to almost the same level as before in the extreme treble. This downward trend is even more pronounced in the room-averaged trace, with a full 8dB drop. One cannot call such a broad trend a suckout – indeed the crossover and unit integration all looks rather well managed. But there is a substantially 'dished' overall shape which is bound to have subjective repercussions, and will probably lead to a rather dull, 'loudness contour' type of sound.

The twin bass driver configuration helps provide the good low frequency extension and sensitivity, but is also responsible for the rather low impedance, which will require a good quality amplifier with plenty of current available. The pair match was good, and the grille is comparatively harmless.

SOUND QUALITY

The 'loudness contour' effect implied in the measurement is regrettably evident in the sound of the 782 and this tends to swamp its other more subtle but nevertheless significant virtues. The overall sound remains reso-

lutely 'thick', bass heavy and presence recessed, whatever the siting. Indeed, moving the speakers forward from Mission's close to the wall recommendation only tends to leave the upper bass rather over-exposed.

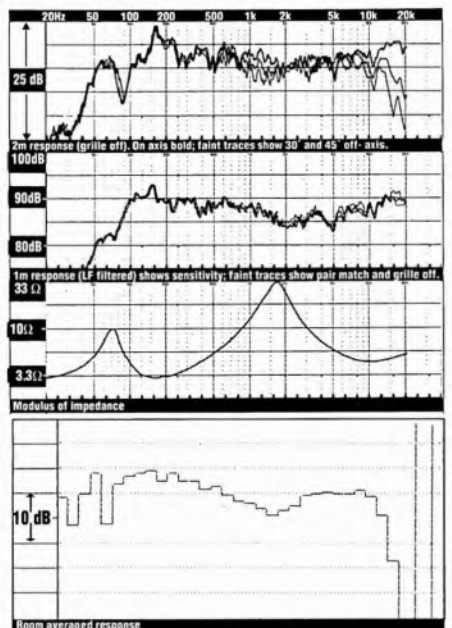
Back against the wall, the 782 does show very impressively stable imaging and little coloration (beyond that created by the balance). You can hear balance shifts resulting from cancellation lobes by moving the head up and down in front of the speakers, but in practical and lateral terms the stereo is very precisely focused. Despite being over-heavy and a tad detached in the bass, the Cyrus still manages to sound engagingly 'boppy' and 'lively', bounding along and driving the room quite energetically, and creating quite a good impression of scale. However, it ran out of steam before the NAP250 driving it, so the ultimate loudness capability is not all that great.

CONCLUSIONS

Too 'wrong' in basic balance for formal Recommendation, the Cyrus 782 is still an attractive loudspeaker visually, musically and stereophonically, with enough good points to be worth serious consideration.

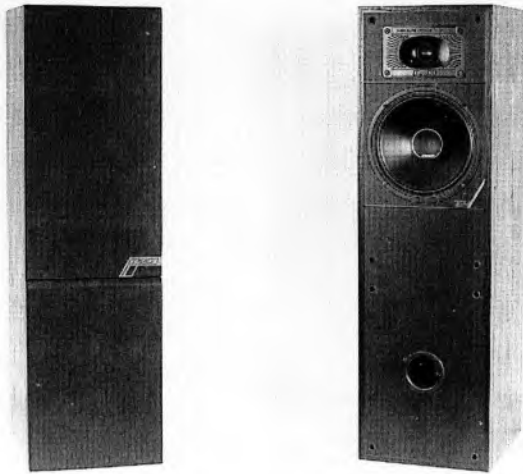
TEST RESULTS

Size (height x width x depth)	50 x 25 x 32.5cm
Recommended amplifier power	10–60 watts
Recommended placement	Cyrus stands 0.5m from wall
Estimated frequency response (2m)	50Hz–20kHz, ±3dB
Estimated LF rolloff (–6dB ref midband)	50Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	90dB
Impedance characteristic (ease of drive)	needs generous current delivery
Forward response uniformity	good
Typical price per pair (inc VAT)	£340 (stands £80)



MISSION 764

MISSION ELECTRONICS, STONEHILL, HUNTINGDON, CAMBS PE18 6ED. TEL: (0480) 52777.



Two major paradigms in *Choice's* loudspeaker reviewing policy are to be as fair and evenhanded as possible towards all manufacturers, large and small, while at the same time trying to cover all the most important new models to appear. Such policies come to grief, however, when a major player such as Mission (or for that matter KEF) introduces a complete new range.

After some years with only minor changes, Mission revamped its entire loudspeaker range last Autumn, with five new '76 series' models, and is now supplementing that with a couple of brand new '78 series' models being marketed under the *Cyrus* logo. The January and March issues of *Choice* covered the 761, 762 and 763, with some pretty positive results all round, so for this project we're still trying to catch up, including this large floorstanding 764 alongside one of the *Cyrus* models.

The 76s have much to do with perceived value for money, offering generous cabinet volume for the money alongside smart, up to date and slightly assertive styling, plus modern drive unit technology. Indeed the £260 763 was remarkable in providing a decent size floorstanding enclosure for little more than the price of a bookshelf speaker plus stand, and the £400 764 extends the same concept a logical, if rather small step further.

In fact it's 9cm higher, and takes the same floorplan space, has the same vinyl finish and floorspikes, even the same grille, alongside a second grille to cover its low down port. The baffle is left as a textured matt black, and the net result is a much more monolithic appearance which is rather less attractive than the 763, grilles on or off, and which is designed for siting 6-8 inches from a rear wall.

The driver line-up also resembles the 763, or for that matter the small bookshelf 762. The 165/180mm largish main driver has a polypropylene cone, mineral loaded in this

instance, so not transparent like that in the 763. The tweeter is also shared with the 2 and 3, its cast frontplate advising of the 'super ellipse impedance transformer' – which is longhand for a short horn.

Extra terminals permit bi-wire connection, and the separate arm crossover uses 2nd-order (12dB/octave) slopes. Cabinetwork is quite elaborate – it has to be with a box this big. The baffle is 26mm thick MDF, the carcass 19mm MDPB, while shelf bracing and bitumen panel damping is also used.

TEST REPORT

Making something of a surprising contrast with the smaller *Cyrus* model tested under similar conditions (though paralleling the 763 pretty closely), the big floorstanding 764 is not particularly sensitive, though it does offer generous bass extension and a kind load to the amplifier.

Again resembling the 763, but offering just a little more low bass output, the overall response trends are nice and reasonably even – creditably so for such a large enclosure – if characterised by a slight net loss of energy around 1-2kHz. Indeed, the room-averaged response does suggest that wall reinforcement might prove rather over the top, though this did not prove to be the case in practice. The pair match is reasonably close, and the half-grille has only a small effect upon the response.

SOUND QUALITY

The 764 did well enough overall on the listening tests, aided in no small part by my personal enthusiasm for an all too rarely found genuine bass extension, though also splitting the panel between 'likes' and 'not likes'. It's basically a pretty good allrounder, with nice balance and real extension, but it is also a shade 'soft' and 'lazy', muting both enthu-

siasm and detail, and causing some congestion and mild 'cuppy' coloration in the mid-band.

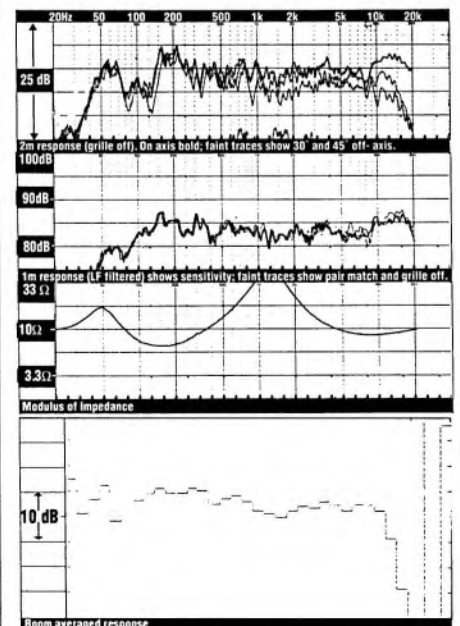
Subsequent sighted listening confirms the good balance and extension, and the ability to handle wall siting without boom. While the sound is pleasant and eminently listenable, it is also unmistakably lazy. I kept wanting to turn it up louder than my *NAP250* can go, in order to get some real energy into the room (whilst wondering whether the speaker itself could handle much more power).

CONCLUSIONS

This well balanced package does indeed offer good perceived value, with its large enclosure conferring an unusually extended bottom end at a competitive price. But it doesn't really offer anything more overall than the prettier, cheaper and only slightly smaller 763, and suffers a little by the comparison.

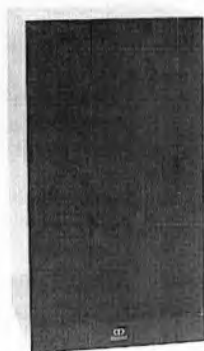
TEST RESULTS

Size (height x width x depth)	86 x 25 x 32cm
Recommended amplifier power	20–70 watts
Recommended placement	0.5m or more from wall
Estimated frequency response (2m)	40Hz–20kHz, ±4dB
Estimated LF rolloff (–6dB ref midband)	43Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	very good
Forward response uniformity	fairly good
Typical price per pair (inc VAT)	£400



MONITOR AUDIO R300/MD

MONITOR AUDIO LTD., 34 CLIFTON ROAD, CAMBRIDGE CB1 4ZW. TEL: (0223) 242898.



Monitor Audio has recently had great success with an extraordinary variety of middle market models, offering various sizes and finishes between £350 and £500 and largely based around an exclusive gold-anodised metal dome tweeter.

However, the vast majority of speakers sold cost significantly less than £300, so MA has always kept some lower price points covered too. The £200 *252MD* has certainly been the most successful of these, though it has so far evaded *Choice* scrutiny (situations whose juxtaposition is entirely coincidental, I am sure). The £250 *R300/MD* reviewed here is just one step up the ladder – or one down from the £300 *352/MD* that was Recommended in January this year, if you prefer.

The presentation and finish somehow doesn't quite match the more expensive models. The baffle is at least veneered, providing an attractive appearance with grille removed. But the picture frame trim was quite tatty on one of our samples, and the back is painted chipboard – regrettable considering the proposed siting.

But the wood is real and the package smart enough, if a trifle anonymous in the black stain of our samples. Oak, mahogany and walnut might make a more interesting proposition, and are available options at no extra cost.

The *300MD* is a medium sized bookshelf model, designed for open space siting on proper stands, and is heftily built for its size, from 18mm high density board. Long strips reinforce the sides internally, and a wadding liner is glued firmly in place, though unusually for a sealed box, the enclosure itself is largely unfilled. A fairly simple crossover is hardwired to the drivers and mounted on the back of the one-pair terminal moulding.

Monitor Audio must take some credit for

helping switch the industry on to the delights of metal dome tweeters, though now such components are increasingly commonplace, and mentioned, as in this instance, as a matter of record. The quite large bass driver used here has a 150mm doped pulp cone on a 180mm pressed steel frame, and was very securely mounted with T-nuts. Although there is some attempt to chamfer the profile around the tweeter, the grille is better avoided because it looks so boring.

TEST REPORT

Aided no doubt by the large and light main driver, the *300* manages to combine decent sensitivity and bass extension while presenting an easy impedance load to the amplifier.

However, and probably as a by-product of the main driver's characteristics, the responses all show a significant loss of energy in the crossover region, and a little too much going on in the upper bass. Nor are the traces particularly even, while the off-axis output of the tweeter is also rather less than might have been expected. The pair match is acceptable enough, and the grille is sonically pretty innocuous.

SOUND QUALITY

Perhaps surprisingly, this was one speaker where listeners showed a preference for CD rather than vinyl programme sources. Reactions were rather negative overall, and surface noise on vinyl seemed to be unduly emphasised.

The overall rating was significantly below average, reflecting some underlying disquiet over a balance which departs sufficiently from neutral to impose a distinct character, leading to a degree of inconsistency in the reproduction of the different types of material used in the test programme.

The sound is a bit 'small' and 'warm', lack-

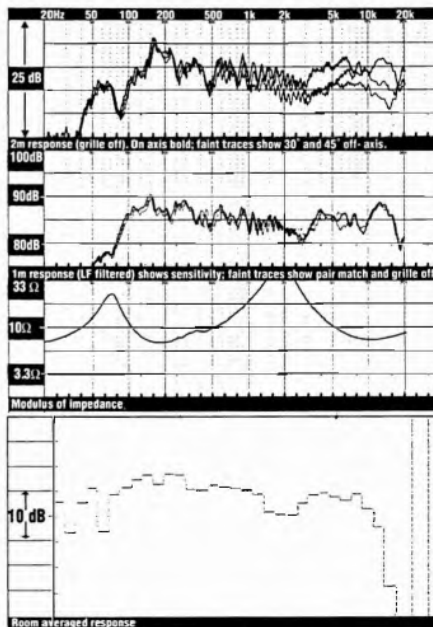
ing a little in dynamics and energy but essentially 'tidy' with good vocal separation and image width. Clarity and order are high on the agenda too, though there is also an element of 'boxy' coloration and some depth constraint.

CONCLUSIONS

In many ways this looks an attractive package, with its sensible size and shape and nicely understated aesthetics. However, driver integration should be better at this sort of price, and that factor probably accounts for the lack of enthusiasm shown by the listening panel. All in all, it's a bit of mixed bag, that just possibly suffers from the attempt to combine a low tech cone bass/mid driver with a high tech dome tweeter.

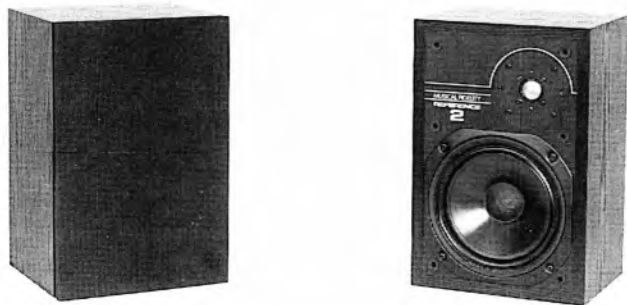
TEST RESULTS

Size (height x width x depth)	47.5 x 25 x 30.5cm
Recommended amplifier power	15–100 watts
Recommended placement	on stands in free space
Estimated frequency response (2m)	50Hz–20kHz, ±4dB
Estimated LF rolloff (–6dB ref midband)	50Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	88dB
Impedance characteristic (ease of drive)	very good
Forward response uniformity	fairly good
Typical price per pair (inc VAT)	£250



MUSICAL FIDELITY REFERENCE 2

MUSICAL FIDELITY LTD., UNIT 16, OLYMPIC TRADING ESTATE, FULTON ROAD, WEMBLEY, HA9 0ND. TEL: (01) 900 2866.



Known first and foremost as one of the UK's fastest growing amplifier manufacturers, successfully competing at home and overseas with a wide range of often exotic designs, Musical Fidelity has already had something of a hit with its first loudspeaker designs. The two *MC* series models were both enthusiastically received by *AG* in previous *Choice: Loudspeakers* projects, combining metal dome clarity with good speed and dynamics.

The *MC* twosome is now joined by a *Reference* pair, which in many respects represent a repackaging job. The driver pairs used in the *MC*s are mounted in smaller, less costly enclosures, saving £100 on the purchase price, and aligned to benefit from siting rather closer to the rear wall. This practice is further encouraged by the lack of proper finish on the rear face.

The *Reference 2* is a simple two-unit sealed box, selling at a reasonable enough £199. With the grille in place it looks pretty nondescript, but the grille looks something of an afterthought in any case, compared with the efforts that have gone into decorating the front baffle – and has amongst the least promising acoustic profiles I have ever seen. A note warning of its likely ill effects on the sound should be stuck prominently on the inside frame.

This is clearly a speaker for those who prefer to show their baffles. And there's no hiding these ones, such is the hue of the blue which encircles the tweeter's shiny metal dome, besides identifying the model against a contrasting white manufacturer's name check. I wouldn't give them houseroom, myself – an observation that alone should ensure widespread commercial success.

The rear panel may not match the front aesthetically, but it's beefy enough and is inset to act as a brace for the wrap. Twin, chunky socket/binder terminals provide for

normal or bi-wired connection. Top quality crossover components and drivers are used, including an Elac-sourced 25mm anodised metal dome tweeter and a largish (150/180mm) polymer-coned main bass/mid driver. The shape, construction and carcass thickness all contribute towards a very rigid box, quite lightly damped with a fibrous filling.

TEST REPORT

The *Reference 2* is quite sensitive, and has clearly been carefully optimised for siting close to a rear wall, whereupon reasonable bass output should be available down to around 50Hz. With this extra bass reinforcement, the response up to the treble crossover is well high copybook – there's some unevenness, but not too much.

However, things get a little ragged above 1.5kHz, and there is a significant amount of energy loss on all traces. Since the pairs are mirror imaged, the off-axis 2m traces show the 'good' side, which again shows good engineering. And given the improvement in the mid treble with the grille removed, you'll just have to put up with those blue graphics, whether you like them or not.

SOUND QUALITY

The panel found the *Reference 2* a little hard to come to terms with, perhaps as it was one of comparatively few 'wall mount' models included in this particular group of loudspeakers. Or perhaps because auditioning is carried out with grilles fitted. The overall ratings came out at around average, which ain't bad for two hundred quid, but this is partly due to some confusion over the particular mixture of strength and weakness that was detected here.

The overall balance is rather rich, warm and a little dull, and while the bass was con-

sidered somewhat uneven. It is also quite quick and expressive, providing an articulate enough foundation. However, the dulled balance counters some of the good work done in the bass. It's inclined to help vinyl by reducing the impact of surface noise, but it also probably helps to draw attention to the rather uneven and somewhat coloured upper mid, which added a degree of 'quack' to some vocals.

CONCLUSIONS

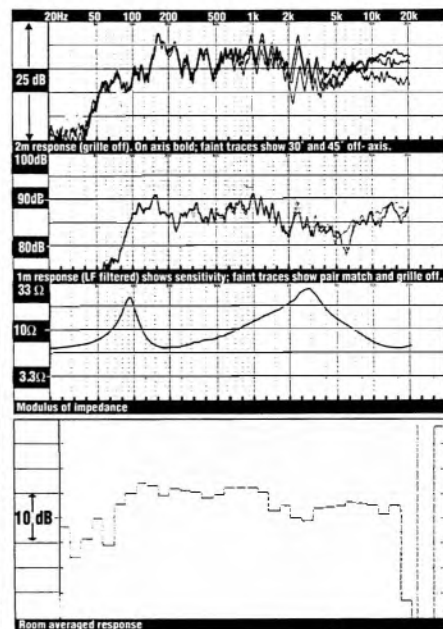
Undoubtedly something of a curate's egg, the *Reference 2*s provide a surprisingly big, rich sound from surprisingly compact boxes that can be tucked away against the wall, though the dazzling baffle graphics will ensure they won't be overlooked by visitors. Basically lively and quite informative, the performance is somewhat marred by a dullish balance and some mid coloration.

Editor's note: After this assessment had been completed we learned that MF has changed the Reference 2, using new drivers. We will endeavour to review the new model later in the year.

TEST RESULTS

Size (height x width x depth)	38 x 25 x 20cm
Recommended amplifier power	15–100 watts
Recommended placement	on stands near rear wall
Estimated frequency response (2m)	50Hz–20kHz, ±4dB*
Estimated LF rolloff (–6dB ref midband)	50Hz*
Estimated midrange sensitivity (ref 2.83V, 1m)	88dB
Impedance characteristic (ease of drive)	very good
Forward response uniformity	good
Typical price per pair (inc VAT)	£199

*assumes near wall reinforcement



THE SWEETEST SOUNDS ARE JUST OFF THE M25



MARANTZ CD75



NAKAMICHI
CDP-2E CD PLAYER



GOODMAN GCD550



DENON DCD810



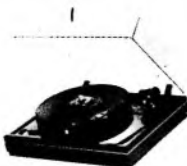
NAKAMICHI CR3E
CASSETTE DECK



TEAC 919
CASSETTE DECK



ALPHASON SONATA
"THE No. 1 TURNTABLE"



TOWNSHEND
"THE ROCK"
TURNTABLE



MUSICAL FIDELITY
& MVT PRE-AMP
P270 POWER AMP



NAKAMICHI CR5E
CASSETTE DECK



INFINITY
8 KAPPA
LOUDSPEAKERS



MORDAUNT-SHORT
SYSTEM 442
LOUDSPEAKERS



LUXMAN KD117
DAT PLAYER
In stock NOW!



CAMBRIDGE AUDIO CD2
COMPACT DISC PLAYER



MARANTZ CD94/CD94
COMPACT DISC PLAYER &
D/A CONVERTER



QUAD FM4
TUNER
34 PRE-AMP
306 POWER AMP



SPENDOR SPI
LOUDSPEAKERS



TOWNSHEND
GLASTONBURY II
LOUDSPEAKERS

Shop & Home demonstrations given

ADC, AKG, Alphason, AR, Ariston, Audio Technica, Avance, B&W, Beyer, British Loudspeakers (BLQ), Bose, Cambridge Audio, Castle, Cemac, Chord, Citation, DA-CAPO Amplifiers, Decca, Denon, DNM, Dual, EAR (Esoteric Audio Research), Foundation, Gale, Glanz, Goldring, Goodmans, Grado, Harman/Kardon, Hunt, Infinity, JBL, Jecklin, Kenwood, Kiseki, Koss, Logic, Luxman, Manticore, Marantz, MDM, Milltek, Mordaunt-Short, Musical Fidelity, NAD, Nagaoka, Nakamichi, Onkyo, Ortofon, Philips (CD), Proton, QED, Quad, Rata, Revolver, Rotel, Ruark, Sansui, Sennheiser, Shure, Spendor, Systemdek, Tannoy, Target, Thorens, Torlyte, Townshend 'The Rock' turntable & Glastonbury II loudspeakers, Trio, Van den Hul, Vecteur, Wharfedale, Yamaha, etc.

NOT ONLY HI-FI IN BRENTWOOD

BUT ALSO COMPACT DISCS, RECORDS & CASSETTES

"THOUSANDS OF CDs - THOUSANDS OF RECORDS - THOUSANDS OF CASSETTES"

★★★ IN STOCK ★★★

Most importantly we offer: *FIRST-CLASS PRODUCT CHOICE*
ATTRACTIVE PRICES
FRIENDLY, HELPFUL SERVICE

We stock all types of music and spoken word, but concentrate mainly on classical music. Not only will you find a choice of performance on mainstream repertoire but also you will discover recordings of many lesser-known works. We have musically knowledgeable staff to help you as well as the *Penguin Record Guides*, back issues of *Gramophone*, catalogues, etc., for reference in the shop.

All products are keenly priced (including our vast back catalogue!) with many bargains and sale items at all times. There is also a voucher scheme.

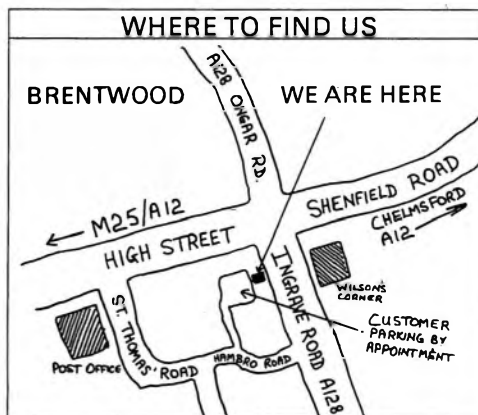
HAVE YOU HEARD ABOUT OUR VOUCHER SCHEME?

You will receive one voucher for every £10 spent at our normal selling price (but every £5 in respect of CDs, records & cassettes). 12 vouchers collected will entitle you to one compact disc from stock at HALF PRICE (6 vouchers for a record or cassette).

WHAT MORE COULD YOU WANT?

So we look forward to seeing you soon?

WHERE TO FIND US



BRENTWOOD MUSIC & HI-FI CENTRE

Ground & First Floor

2 INGRAVE ROAD, BRENTWOOD, ESSEX

Tel: (0277) 221210

Corner of Brentwood High Street and Ingrave Road (A128)

On-site customer parking by appointment.

Easy to reach — 5 mins. from M25.

NVA CUBE 1

NEVE VALLEY AUDIO, 1 CHURCH FARM, HATLEY ST. GEORGE, NEAR SANDY, BEDS. TEL: (0767) 50532.

RECOMMENDED



NVA is a classic example of the small British company, based largely on the creative ideas and energy of one man. Such products tend to be individualistic – even idiosyncratic – but also intrinsically more interesting than those created by committee or under the shadow of technological overkill. NVA started out with amplifiers – inevitably given the principal's earlier role as 'Mr Tresham' – but has since progressed to include a turntable and some loudspeakers, each of which is far from conventional.

However, the *Cube 1* isn't entirely Richard Dunn's own work. We roped him in for listening test duties, and he was amused to note we were also reviewing an Allison 'Cube' (see earlier) – the current version of a speaker which he acknowledges as a major influence behind the NVA *Cubes*. The configurational similarity between these two designs is made the more obvious by their collective dissimilarity from the herd.

The £600 *Cube 1* looks quite severe and aggressive with its shiny black finish and prominent, gilt-studded metal grilles, though the shaping of the latter engenders a mildly Art Deco flavour which is rather attractive. There's also a very impressive pair of heavily welded pillar stands. Massive, undamped and very, very rigid, these cost £200 and were used extensively throughout this month's tests, with positive results on most loudspeakers.

The speakers themselves are pretty substantially built too, and certainly very heavy for the size, with verbal warnings not to attempt to dismantle the heavily sealed construction. Traditionally the cube-shape is reckoned to be undesirable, since the main modes of the main dimensions coincide, though RD reckons the intrusion of the cone itself negates such a simplistic model, which sound plausible enough.

The driver configuration is pretty unconventional. The main bass-mid unit fires upwards, one tweeter forwards, and another sideways – outwards, to be specific (something I should have mentioned to Jason before the listening tests started. . . .). Such an arrangement has repercussions that could take pages to discuss, but in a nutshell it's a 'semi-omnidirectional' that will interact rather more with the room than more conventional boxes. It's an approach that some like – myself as an *Isobarik* user, for example – but which others react against: it tends to make the room somehow more part of the system, but this in turn is inclined to overwhelm the subtle spatial cues in (rather rare) genuinely stereophonic recordings.

TEST REPORT

I'm given to understand that these loudspeakers have never been measured before, and should point out that measuring omnis is a pretty debatable area, so most credence should be given to the room-averaged response. But no apologies are really necessary, since the normal 'axial' response is pretty well controlled, if a little uneven, and bass is pretty well extended too, especially considering the small cabinet volume.

Sensitivity looks to be on the low side, and the impedance is such that a good quality amplifier should (and would) be used, but the in-room sound is a couple of points louder than the 1m trace would suggest. The room response itself shows an unusually smooth character which is somewhat 'forward' in the upper mid/presence band – the inverse of a 'loudness' characteristic.

SOUND QUALITY

Even the wrong way around (!) the *Cube 1s* did respectably enough, and were very warmly received when sited correctly

(assisted no doubt by being used on their own stands). Subsequent experiment suggests that precise siting is quite critical, particularly in obtaining the best bass balance. On the blind tests, everyone but yrs truly liked the speaker, and my reservations had more to do with failing to come to terms with the 'differentness' factor.

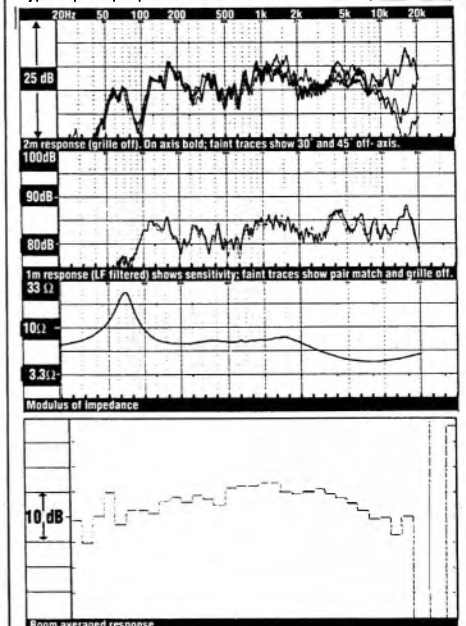
The forward, 'bright' balance is certainly the most obvious characteristic. Most of our listeners considered that this mild aberration stayed within reasonable bounds, though there is a latent tendency for aggressiveness, and a slight 'reedy' 'thinness' that could interact badly with a different system. Stereo depth does seem a little constrained, but the sense of scale and 'air' is very impressive – one listener referred to a "wall of sound effect". Clarity, dynamics, information, speed and pace are all decidedly better than the norm.

CONCLUSIONS

Quite expensive but attractive, compact and well built, this unusual design was sufficiently well liked to ensure Recommendation, though the presentation is idiosyncratically different from most. It's probably the nearest thing to a 'baby *Isobarik*' on the market, and this alone should ensure a wide circle of friends.

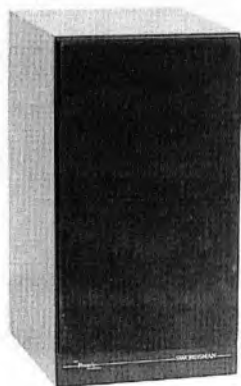
TEST RESULTS

Size (height x width x depth)	33 x 32 x 32cm
Recommended amplifier power	20–100 watts
Recommended placement	on stands 0.5m from rear wall
Estimated frequency response (2m)	52Hz–20kHz, ±5dB
Estimated LF rolloff (–6dB ref midband)	52Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	85dB
Impedance characteristic (ease of drive)	fairly good
Forward response uniformity	fairly good
Typical price per pair (inc VAT)	£600 (stands £200)



RUARK SWORDSMAN

RUARK ACOUSTICS LTD., UNIT 2, ANNWOOD LODGE IND. EST., ARTERIAL RD., RAYLEIGH, ESSEX SS6 7UA. TEL: (0268) 728890.



Ruark is a small Essex manufacturer of some years standing, and is particularly noteworthy for a very natty line in cabinetwork and presentation, at comparably high prices. Our only experience hitherto has been a rather disappointing encounter with the upmarket £700 *Broadsword*, and there is also a £1,700 *Accolade* listed in the range, though the *Sabre*, at £300, is probably the company's best known model.

Continuing the tradition of antique armaments, though with a little personification thrown in for good measure, the *Swordsman* covered here comes in quite low down the price scale, at a smidgeon below £200. It lacks the brass machinehead screws of the upmarket models, but still manages to look smart and attractively distinctive, despite the ubiquitous black finish.

In fact I would go as far as to suggest that it is probably the prettiest, as well as one of the most discrete models in the whole test group. The finish is excellent, and the textured matt black (or white!) surface makes a refreshing, smarter alternative to increasingly tedious vinyl woodgrains (according to your fashion correspondent). The shape looks right, the drivers are neatly mounted, and the baffle graphic is discrete, and visible with or without the grille in place. The latter also looks smart, with a slim profile set slightly out from the baffle.

It's a classic small sealed-box bookshelf model, best placed a little away from walls and corners on proper stands. Sourced from Vifa, the drivers look fairly low cost items. Bass and midrange duties are the responsibility of a small 120/140mm doped paper cone unit, while the tweeter is a 25mm polyamide soft dome, with ferrofluid damping/cooling. The crossover is a simple, hardwired item, using 1st and 2nd order roll-off rates.

The reason for the sharp, clean finish is probably that the speaker is built throughout from Medite, a machinable fine grain fibre-board. This is 15mm thick, and an internal shelf brace provides some stiffening while acoustic foam damps the enclosed air mass.

TEST REPORT

In happy contrast to our *Broadsword* experience, the *Swordsman*, acquitted itself quite respectably in our measurement programme. Sensitivity is a fair bit below average, but this is only likely to perturb the odd headbanger who probably wouldn't choose such a delicate looking speaker anyway. Modern amplifiers have plenty of power in reserve for less sensitive loudspeakers, and the payoff is usually rather better bass extension for the box size, which is certainly the case here.

The basic response looks pretty good in overall balance terms, on each of the various traces, and the bass looks well aligned for operation a little out from the wall. There are two isolated areas of mild prominence, around 600-900Hz and 3-5kHz, the latter a little exposed just above an energy loss in the crossover region, while the treble is just a little strong, especially right on axis. The impedance trace is benign.

SOUND QUALITY

The *Swordsman* didn't do badly in the listening tests, but neither did it become the object of any great enthusiasm. The overall rating comes in a little below average, which is perfectly respectable for the price. And even though it seems unlikely to set any new subjective performance benchmarks, there was certainly little serious complaint on the part of the panelists.

"The sound is basically pretty well behaved, but it also inherently somewhat bland and boring", according to one. "Bright

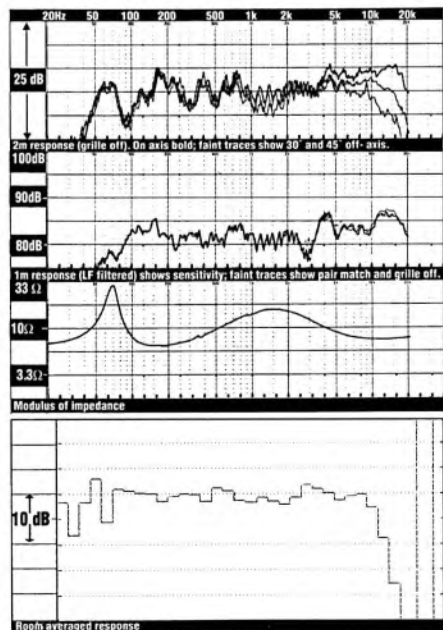
and perky without sounding 'thin', it sounds like a small box but creates a pleasant sense of air around the instruments", according to another. My further subsequent listening does find the *Swordsman* somewhat bland and self-effacing, but that may not be such a bad thing in certain system contexts.

CONCLUSIONS

This pretty looking loudspeaker measures quite satisfactorily and is offered at a very realistic price. The sound quality is a little too bland for formal recommendation, but it remains worth considering if the aesthetics appeal, subject to personal audition.

TEST RESULTS

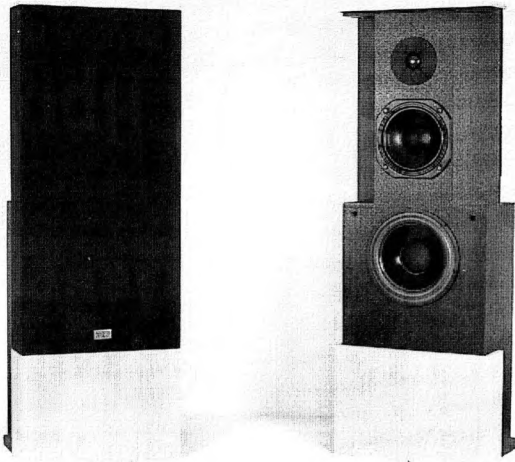
Size (height x width x depth)	38.5 x 20 x 27.5cm
Recommended amplifier power	20-70 watts
Recommended placement	on stands 0.5m from rear wall
Estimated frequency response (2m)	50Hz-20kHz, \pm 4dB
Estimated LF rolloff (-6dB ref midband)	50Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	84dB
Impedance characteristic (ease of drive)	very good
Forward response uniformity	good
Typical price per pair (inc VAT)	£200



SD ACOUSTICS OBS

SD ACOUSTICS LTD., UNIT 1, 39-43 HIGH STREET, NEW MALDEN, SURREY KT3 4BY. TEL: (01) 949 1623.

RECOMMENDED



Named after Danish designer/proprietor Steen Doessing, SD Acoustics has been operational for a few years now, in both professional and the more upmarket hi-fi sectors of the speaker market. The hi-fi models are unusual in both appearance and driver layouts, providing welcome distinctiveness in a world that's all too dominated by black chip-board boxes.

The SD style was set with the £1,000+SDI – an obelisk-like device which reveals separate bass and midrange/tweeter enclosures and baffles separated by clear space when its black cloak is removed. Much the same unusual configuration is employed for the £700 OBS model reviewed here, but on a smaller scale with less costly ingredients.

The result is much less obeliskian, and much more downright good looking. For my money, when dressed in the nice light oak (?) panelling used for our samples, this is by far the prettiest speaker in the project. Partly because it isn't devoting half the styling exercise towards trying to make itself disappear, but just because it is elegantly proportioned. It's high and wide considering the modest enough enclosed volume of the reflex-loaded bass box.

But that only takes up the bottom half of the speaker. The individuality of the OBS lies in the initials which presumably translate as 'open baffle speaker', referring to the shaped, narrow profile board on which the midrange and metal dome tweeter are mounted, left open at the rear so that the 135mm doped paper ITT midrange unit operates as a dipole. The top plate comes in a hardwood finish to match the front plinth – black or light ash or walnut – but the rear is less well thought out and finished, which is a pity in a freespace design. Though spikes were not supplied, screw holes to take them are (rather badly) fitted into the base, plus three

terminal pairs for tri-wiring/-amping.

TEST REPORT

The open air pen traces recorded for the OBS look rather dramatic, but in fact this has more to do with the problems of finding the correct measuring axis, and the difficulty of measuring any multi-unit design where the distance between the drivers is as great as the distance to the measuring microphone. For that reason the 1m response is best ignored, except as a guide to the sensitivity; with hindsight some further experimentation with the microphone height might have given a more representative result.

The 2m response still shows difficulty with the driver array, but the midrange is now much better filled in. The room-averaged responses, taken at about 4m distance from speaker to mike, is undoubtedly the most representative of the speaker's balance – essentially correct right across the band, if still rather lumpy through the regions where the drivers overlap, and with some highlighting of a peak in the lower treble (4.5kHz). Sensitivity looks to be round about average, while both the pair match and the grille effects leave some room for improvement. The impedance demands a fair amount of current in the upper bass.

SOUND QUALITY

The SD did passably well on the listening tests, conducted prior to the discovery that spikes could be fitted underneath, while my subsequent sited experimentation suggests that spikes *must* be fitted to get anywhere near the potential of the design. The practical sensitivity at a normal listening distance is actually pretty good, even though it doesn't go quite as loud as I would like.

Unspiked, the generous scale of the sound is still appreciated, plus an inviting if slightly

phased stereo image capable of creating good depth. The sound is commendably unstressed, implying plenty of headroom, but dynamic range, detail and 'speed' are all a little lacking. And there's a high frequency 'squeak' that never quite goes away, though its severity varies from track to track.

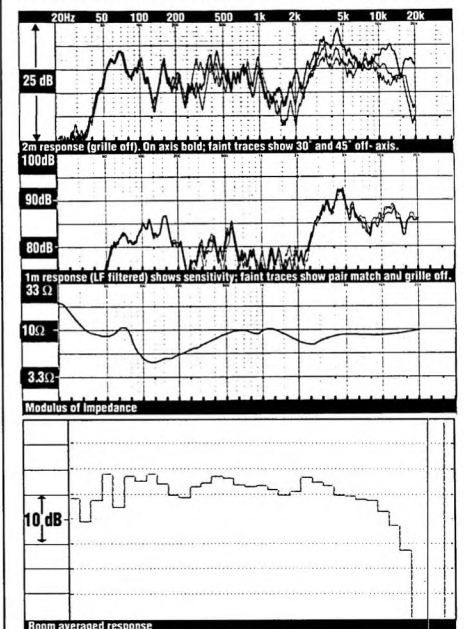
Spiked, the OBS really comes to life. It all suddenly sounds taut and very coherent musically – almost tight – with a delightful 'hear through' midrange transparency, and a superb sense of timing. The presentation is still a bit untidy, almost 'blowsy', and that laser-like treble is still there. But it somehow becomes almost forgiveable – I actually found myself feeling sorry for the poor little tweeter rather than being irritated by its imperfections.

CONCLUSIONS

On the basis of the price, the measurements and the listening test findings, I had no intention of Recommending the OBS when I brought them in for the half-day or so it takes to write one of these reviews up. Half a day later I have no alternative, having wasted hours listening to records instead of writing up the review. Recommended then, but only if you promise to check out your personal tolerance to that tweeter first.

TEST RESULTS

Size (height x width x depth)	102 x 35 x 25cm
Recommended amplifier power	20–100 watts
Recommended placement	spiked to floor in free space
Estimated frequency response (2m)	45Hz–20kHz, ±6dB
Estimated LF rolloff (–6dB ref midband)	45Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	fair
Forward response uniformity	fair
Typical price per pair (inc VAT)	£695





*Finding his desire for
audio-visual p-u-r-r-fection
unfulfilled, Rupert looked for,
and found, his true home.*



Chew & Osborne
HI-FI · TELEVISION · VIDEO
COMPACT DISCS · CASSETTES

... sounds outstanding

148 HIGH STREET · EPPING · ESSEX (0378) 74242 · 26 KING STREET · SAFFRON WALDEN · ESSEX (0799) 23728 · 70 SOUTH STREET · BISHOP'S STORTFORD · HERTS (0279) 656401

Bill Hutchinson

HI-FI, AUDIO & C.D. Centre

* Sales * Service *

ROTEL KENWOOD

marantz Technics

CRISTON Dual KEF AIWA

DENON **TANNOY** JVC

Mordaunt-Short **AR** PIONEER

YAMAHA ACUSTIC RESEARCH MISSION

*Leading loudspeakers. Plus
all leading brands. Our aim is to provide the
highest level of service and value available in
Scotland*

43 SOUTH CLERK ST EDINBURGH

031 667 2877

43 HOPE ST GLASGOW

041 248 2857



NO 1 FOR
SERVICE
AND VALUE



kj

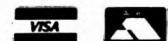
NEW CAVENDISH
STREET W1
CITY OF WESTMINSTER

**STOCKTAKE
CLEARANCE**

A massive clearance of demonstration, second-hand and some new stock from now until Saturday, 3rd June when we take stock for our financial year end. If you're looking for a particular item (or items) then check whether we handle the brand and then give us a ring or call in. We should be able to offer you a good deal.

Don't forget we can offer a range of credit plans to spread payment over anything from six months to three years. Over six months we offer INTEREST FREE CREDIT (0% APR).

BRANDS STOCKED: Air Tangent, Albany, Alphason, Arcam, Apogee, Audiolab, Audiolab, Audio Research, Avance, Beard, B & W, Cambridge, Croft, Celestion, DNM, Denon, Dual, Epos, EAR, Foundation, Goldmund, Harbeth, Heybrook, Jadis, KEF, Koetsu, Kiseki, Kinergetics, Krell, Kuzma, Linn, Linn, Magneplanar, Marlin Logan, Mantecore, Marantz, Meridian, Michell, Milltek, Mod Squad, Musical Fidelity, NAD, Naim, Nakamichi, Nitty Gritty, Oracle, Pink Triangle, PS Audio, Quad, QED, Rata, Revox, Revolver, Rotel, Rogers, Stax, SD Acoustics, Sonus Faber, Spica, SME, Sumo, Slate Audio, Systemdek, Tannoy, Vayd, Wharfedale, Yamaha, Zeta.



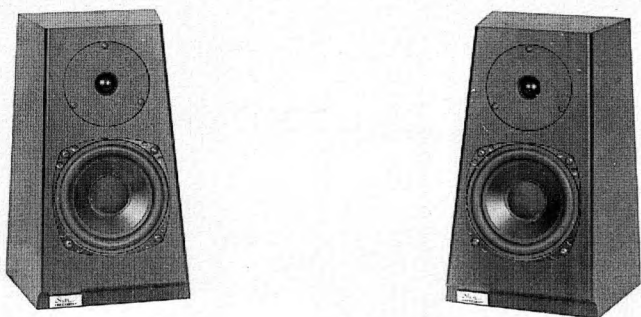
**K. J. West One 26 New Cavendish Street,
London W1M 7LH**

Telephone: 01-486 8262/8263. Fax No: 01-487 3452
Open: Monday-Saturday 10am-6pm, Thurs. until 7pm.

SHAN SHIMNA

AUDIO DIMENSIONS, 506 UPPER NEWTOWNARDS ROAD, BELFAST BT4 3HB. TEL: (0232) 655135.

RECOMMENDED



I don't suppose many readers will have heard of Shan Acoustics, its *Shimnas* or *Carns*. I know I hadn't, until these mysterious packages arrived from a Belfast address, smelling strangely of glass fibre and epoxies. This really is a brand new start-up company, which made a debut appearance at a recent Northern Ireland hi-fi show. And it is also clearly a small scale, grass roots operation too. There's none of the technology transplant hype that characterised the Strathearn Audio disaster (a '70s prototype for the de Lorean affair); Shimna appears to be honest enthusiasm based on intelligent application of existing technology.

Pong apart, on opening the boxes I found in one a pair of small but carefully (not quite perfectly) formed miniature loudspeakers, attractively tapering on three of the vertical faces with nicely radiused baffle edges to boot. Inside the other box was a pair of matching pillar stands, with wicked looking spikes below and a flat top plate for Blu-tack coupling the speakers.

The result is elegantly tiny – and therefore entirely appropriate to the elegant, tiny rooms we all occupy over here in Southern England, according to Shan's David Wilson. Just how diminutive can be judged by the gale of laughter when the curtain was dropped at the end of a hard day's listening!

There's not a whole lot you can say about miniatures, save to note that the average size of hi-fi loudspeakers continues to shrink steadily, so they're obviously part of the growth segment of the market. The *Shimnas* come in towards the top end of the miniature market, and at £280 are somewhat less expensive than the very similar looking Ariston *QLN1*. The *Carn-45* stands will neatly take account of the £75 difference.

The justification for what is a highish price irrespective of the competition must lie

in the special, distinctly heavy cabinet. Baffle, top, bottom and sides are a single very rigid and 'dead' moulding in mineral-loaded resin of some sort. Polymer concrete is the company's term. Finish, in a smooth matt black cellulose, is good apart from slight pockmarking around the edge of the top plate.

They're still experimenting with the mix, I understand, so some further refinement is to be expected, and textured and coloured finishes are also to become available from May. Marks wipe off easily, though the rigours of multiple reviewing caused a chip or two which could be tricky to rectify. No grille is supplied, but sculpted foam covers are available for £12/pair.

The rear is a separate panel bonded firmly into place. It is less well finished but will probably be hidden as this speaker should be sited pretty close to a wall, to help the bass a little. Two sets of speaker socket/binders provide for bi-wiring or bi-amping in addition to conventional operation with the supplied jump leads. And there's also a very tiny, shaped port.

The bass/mid duties are handled by a small Peerless driver with 90/110mm poly propylene cone. The tweeter is a 19mm soft fabric Vifa dome with short cavity loading. The crossover is simple, with just 1st-order roll-off for the main driver and 3rd-order feed to the tweeter.

TEST REPORT

Such a tiny miniature is bound to sacrifice bass extension and/or sensitivity. Both here are well enough balanced to give respectable bass with some wall assistance, while still having sufficient sensitivity to give respectable loudness with the typical amplifier.

The response trend looks well balanced overall, if a shade uneven through the mid-

range and crossover region – notably the prominence at 1.5kHz and dip around 3kHz. Indeed, the room response confirms a fundamentally very good balance, limited perhaps by the quality of drivers and crossover integration.

SOUND QUALITY

Perhaps the panel was a little off-guard, at the end of a long day's listening, but the *Shimna* certainly came out better than it had any right to expect, helped undoubtedly by the fine subjective balance. The lack of box coloration in the normal sense confers a relaxed naturalness, politeness and lack of muddle, at least on simple material, that normal sawdust speakers seem hard pushed to match.

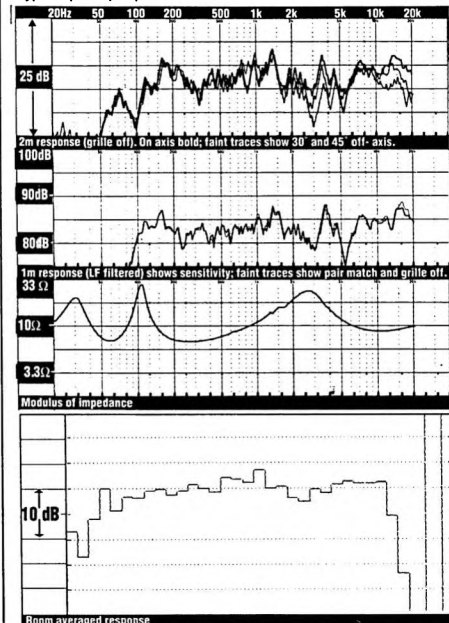
However, when the going gets tough with loud, complex material, the *Shimnas* have some trouble keeping up, particularly in the bass. Small speakers do have limited dynamic range, shown here by increasing mid-range untidiness when pushed.

CONCLUSIONS

The *Shimna* has done well enough to merit Recommendation on subjective grounds. But the fine cabinet performance deserves further refinement in the drivers and their integration to achieve its full potential.

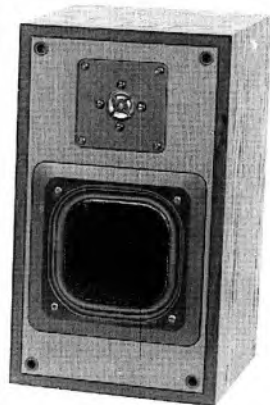
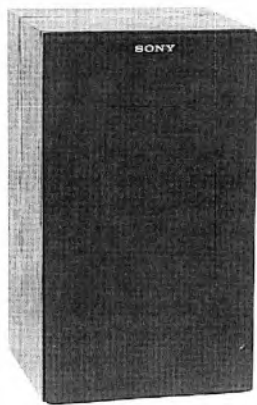
TEST RESULTS

Size (height x width x depth)	31 x 16 x 17cm
Recommended amplifier power	20–60 watts
Recommended placement	on stands near rear wall
Estimated frequency response (2m)	65Hz–20kHz, ±4dB
Estimated LF rolloff (–6dB ref midband)	65Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	84dB
Impedance characteristic (ease of drive)	good
Forward response uniformity	fairly good
Typical price per pair (inc VAT)	£280 (stands £75)



SONY APM-101ES

SONY UK LTD., SONY HOUSE, SOUTH STREET, STAINES, MIDDLESEX. TEL: (0784) 467000.



A major world player in the global consumer electronics business, Sony may not be the first name to spring to mind when considering loudspeakers. Many people covet and are prepared to pay a premium for a *Trinitron* TV, and Japanese electronics fit neatly into the hi-fi stereotype, but the British hi-fi enthusiast has always retained a patriotic taste in loudspeakers. And with the odd exception, Japanese brands don't get much of a look in at the serious end of the market.

Whatever the blinkered perceptions of stereotyping, *Choice* has assessed numerous Sony-branded hi-fi speakers over the years, many of these originating from the company's German Sony-Wega operation. Most have in fact done rather well, helped no doubt by the suspension of prejudice that accompanies the placing of an acoustically transparent curtain between loudspeaker and listener.

In fact, this model's predecessor was a confident Best Buy some eighteen months ago, so the prospects for the *101* look promising. The model has *ES* status, which implies limited distribution alongside upmarket hi-fi separates. However, hitting the highly competitive £100 price point doesn't leave any room for the sort of luxury touches which normally grace *ES* electronics.

A word of caution is necessary too. Sony worked hard to get this pair ready in time for the review, particularly since the original pair came off second best in an accident with a forklift truck or some such. But they're definitely pre-production samples (No 002), designed and built by Sony-Wega in Germany. Mass production manufacturing for the UK market is to be undertaken over here, by one of the UK's leading OEM suppliers. So there's more than a slight risk that our samples may not be fully representative.

As mentioned, the presentation is a little nondescript with the tacky grille in place,

though the black woodgrain vinyl box is generous enough in size – and heavy in weight – considering the price tag. It's reflex-loaded with a rather large rear port, and the rear panel is properly finished, so it's presumably intended for open space siting. The woodwork is only 13mm or so thick, though there's a brace across the baffle and a chunky square of wood glued onto the inside back panel.

The drivers add a bit of hi-tech zing at the price too, at least on the surface. The square, flat *APM* diaphragm bass-mid unit corresponds to a small 120/140mm conventional driver, and has a very generous magnet. The tweeter looks like a small metal dome unit with a phase compensation plate ahead of the diaphragm. The crossover was clearly prototypical on our samples.

TEST REPORT

The tweeter's excessive enthusiasm is clearly the main weakness of this design. One might have forgiven the 1m axial HF plateau as the 2m set is pretty respectable, especially a little off-axis. But the room-averaged response confirms significant excess energy, corroborated in the listening tests. Although the comparison is difficult to make due to different measurement conditions, the room balance does differ quite markedly from that obtained with the earlier *10ES*.

Elsewhere the response is a little uneven here and there, particularly around the crossover region, but there is also a slight bass 'bump', so the end result also risks following the boom'n'tizz' road. The sensitivity is a shade below average, and the bass is well extended, thanks in part to the little bump. The impedance won't trouble a midi system, never mind a proper hi-fi amplifier.

SOUND QUALITY

The panel had a rather mixed reaction to the

101. The midrange quality is as good as its predecessor – which means pretty damn good by any standards – but reactions to the somewhat unruly extreme top and bottom did vary from one listener to another. Indeed, qualitatively the treble was well enough liked by most, but there was just too much of it, giving a tendency to overexpose vinyl surface noise in consequence.

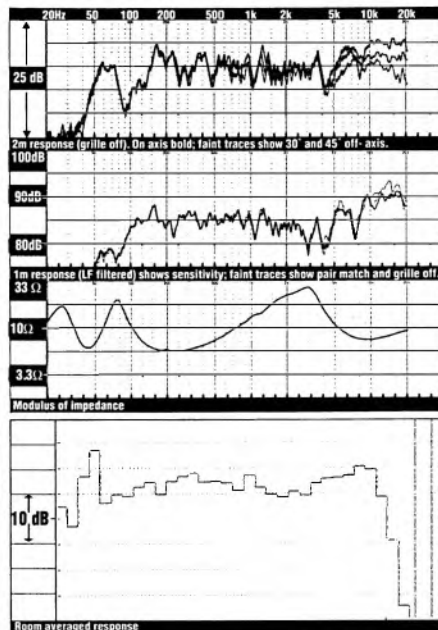
The little bass bump does help provide some sense of scale, but this artifice did not deceive the panel: "forgiveable small size" was one typical comment. But the stereo performance is top rate by any standards, the *101* creating a believable soundstage with some precision and depth.

CONCLUSIONS

In many ways a logical progression from the Best Buy *APM-10ES*, the *101ES* is different, but not necessarily an improvement. Our experience of this early sample suggests that the treble output of the new metal dome tweeter is a little too strong, which will mitigate against use with vinyl sources. However, the fine midrange and stereo qualities in a generous and well finished box are still more than sufficient for Recommendation at £100, especially for CD based systems.

TEST RESULTS

Size (height x width x depth)	39.5 x 22.5 x 23.5cm
Recommended amplifier power	15–60 watts
Recommended placement	on stands in free space
Estimated frequency response (2m)	50Hz–20kHz, ±5dB
Estimated LF rolloff (–6dB ref midband)	52Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	very good
Forward response uniformity	fair
Typical price per pair (inc VAT)	£100



SONY APM-181ES

SONY UK LTD., SONY HOUSE, SOUTH STREET, STAINES, MIDDLESEX. TEL: (0784) 467000.



We got talked into reviewing pre-production samples of two of the three new Sony *ES* models being introduced for 1989, the *APM-181ES* being the top of the range, a full three-way model, generously built and specified and selling for a very reasonable £300. There's also a £200 *'141* – a two-way plus reflex ABR in a very similar size box. As far as I can work it out, the *'141* and *'181* drop into slots either side of that now being vacated by the five year old *22ES*, though the design links are quite tenuous.

Finish is predictably good, given the Sony name, and nicely understated in black and grey plastics and metals. Happily, since this design must be kept away from walls, the woodgrain effect covers the back, alongside the high port and low terminals.

The ingredients look promising enough too, especially the high tech *APM* bass driver with its nodally driven honeycomb diaphragm. However, the conventional nature of the other two drivers is some sort of admission that *APM* itself may not be so essential after all, besides costing more. The square bass unit has the same area as a 160/180mm cone unit, the mid uses an 80mm paper cone, while the tweeter has a metal annulus/dome with phase compensator.

The very generous box itself appears solidly built from thick, 21mm and 23mm particle board, reinforced with a number of braces. However, unlike the *101ES* samples, none of the driver screws had been properly driven home. Indeed attempts to rectify the situation showed that true tightness could not be achieved before the first sounds of splintering particle board. Either T-nuts are needed or a higher density baffle material.

TEST REPORT

This larger Sony delivers a very impressive set of test results, especially in terms of the

neat and well ordered frequency responses on- and off-axis. There's some 'lumpiness' in the upper bass/lower mid, and a little excess brightness too. The pair match is best described as 'prototypically close', and grilles were not supplied.

However, the overall response is in fact rather bass heavy, very gradually dropping some 5dB in total between 60Hz and the treble crossover. The recovery thereafter is only visible on the axial trace, so it will be better to sit without directly facing either enclosure. Sensitivity is just about average, but the bass extension is substantially better than that. The impedance drops to around 4ohms around 150Hz, so a beefy, good quality amplifier will be needed.

SOUND QUALITY

The *'181* did rather well on the listening tests, but unfortunately this says just as much about listening tests as it does about the Sony, and highlights a problem I for one don't know how to solve. When presenting speakers 'blind' it is essential to try and 'match levels' from one to the next. One tries to avoid dramatic contrasts between successive models, but prediction before the event is difficult. In the *'181's* case, much of the enthusiasm expressed was a direct result of a massive 5-10dB of extra bass output at all frequencies below 100Hz compared to its predecessor.

The panel responded with Pavlovian predictability, self included, to the sudden appearance of any bass – feel the width, and all that. The main problem is that there's rather too much of it, and none of it is particularly quick or informative. The *'181* also suffers from a little too much 'boxiness' which prevents it from 'disappearing' acoustically, plus a little 'sting' lurking at the treble end of the range too, for those who may

be sensitive to such things.

That's not to say it isn't an impressive performer – rather the reverse in fact; it's altogether too impressive, thanks partly to the mild 'loudness effect' created by the balance. The sound is full and dynamic, with lots of 'headroom' and plenty of detail. The stereo was pretty good even before I tightened up the midranges and tweeters, and to be fair it handles CD very much better than vinyl.

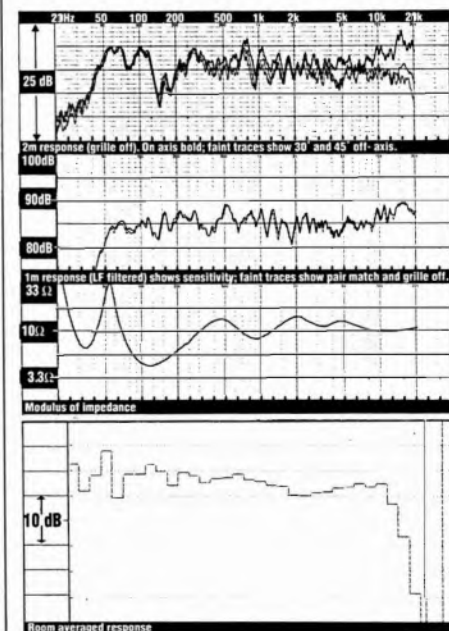
But we come back to the 'loudness' paradox. It sounds seductive at low levels, so you turn it up. But long before you get to the limits of either amplifier or speaker, the bottom and top excesses become intolerable. Exit dynamic range.

CONCLUSIONS

When I came to write up this review I was wondering how strong a recommendation this model was going to get, but a day's 'hands on' experience has left me altogether less positive. The *'181* can deliver a very impressive sound, particularly from CD at low and medium levels, but it's not particularly informative musically and gets uncomfortable if its capabilities are exploited. And prototype or not, I can't forgive the loose screws, nor the difference that tightening them made.

TEST RESULTS

Size (height x width x depth)	57.5 x 29 x 36cm
Recommended amplifier power	15-100 watts
Recommended placement	on stands well clear of walls
Estimated frequency response (2m)	40Hz-20kHz, ±4dB
Estimated LF rolloff (-6dB ref midband)	40Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	87dB
Impedance characteristic (ease of drive)	fair
Forward response uniformity	very good
Typical price per pair (inc VAT)	£300



A MOVING EXPERIENCE

(with apologies to the reader)

The well-informed enthusiast will confirm that demonstration is a fundamental element in choosing the equipment that will give you lasting pleasure playing music in your home. Indeed the quality of dealer may be judged from demonstrations — how convincingly these back up what they say they think will suit you and suggest you ought to buy. A great deal 'tho, is due to the dealer's long experience in the setting up of systems for musical felic'ity.

The warmth of family business plus the skills that have been added over sixty years of trading have combined for Grahams Hi-Fi to make them most respect'd in the field of specialist dealers. In premises quite unfavour'ble (a warehouse site near Kings Cross)

our happy home has operat'd for nigh on twenty years; but the traffic's getting heavier (and some would say much louder) the parking's more congested, the dem rooms aren't that perfect e'en tho' they were among the first (not quite the best) to be set up here in England.

We're proud to make th'announcement that Grahams Hi-Fi's moving not far — about ten minutes — it's quite a quiet area with lots and lots of parking and the chance in our new building to do things even better — we'll have among the finest demonstration rooms in Europe; in all, the proper premises to complement a service (not to mention installation) which has earned our reputation both at home and overseas.

Our policy will continue of carefully selecting the best of all those items that are brought to our attention, equipment that is able to reproduce the message and communicate the essence, yea, the spirit of the music. It may well be for the first time (perhaps — we might be boasting) in the whole United Kingdom that appointments can be taken for any one of five new dem rooms, acoustically unrivall'd and specially designed to provide the vital background for easy relaxation. So please do dial our number and make yourself a booking, let's show you our new building can provide the perfect context for optimal selection of your choice in sound and music.

Visit Grahams! End your searching!



GRAHAMS HI-FI, CANONBURY YARD, 190A NEW NORTH ROAD, LONDON N1 7BS PHONE: 01-226 5500

VICTORIA AUDIO

3 Warwick Way
Victoria
London SW1



Tel: 01-630 9444
9.30am-6.30pm
Mon.-Sat.

**MAIL ORDER
FREE CARRIAGE
Anywhere in the U.K.**

ARISTON	AUDITION
Q DECK.....£139.00	THE NEW
ICOM.....£199.00	'AVALON' TURNTABLE

OAKLEY IMAGE PRE-AMP

Denon
Rotel
Oracle
Jeff Rowland
Infinity
Sennheiser
Gale
Conrad Johnson

BOSE

101.....	£139
205.....	£199
301.....	£269
401.....	£399
AM5 Black.....	£499
AM5 White.....	£499
RM1.....	£179



The "Rock" Original

STOCKIST OF:

ALPHASON, AUDIO TECHNICA, A&R CAMBRIDGE, ARISTON, BOSE, B&W, BEYER, CASTLE, DYNAVECTOR, ELITE, FOUNDATION, HARMAN KARDON, JBL, KUZMA, MANTICORE MANTRA, NAKAMICHI, ONKYO, QED, TARGET, TOWNSHEND, VAN DEN HUL and SME and CAMBRIDGE AUDIO

★ SINGLE SPEAKER DEM ROOM ★

If an
advertisement
is wrong
we're here to
put it right

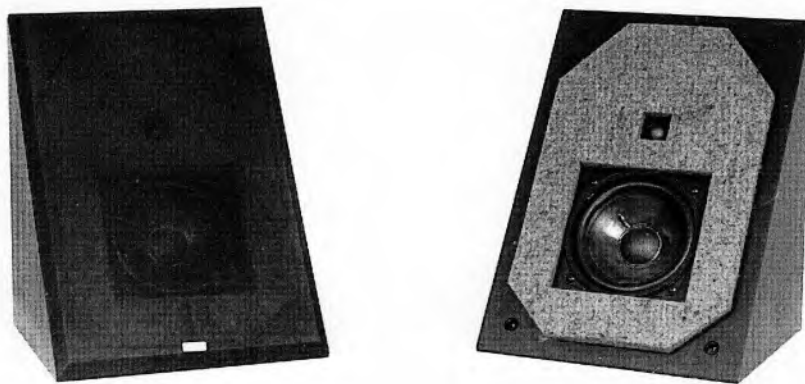
If you see an advertisement in the press, in print, on posters or in the cinema which you find unacceptable, write to us at the address below.

The Advertising Standards Authority ✓

ASA Ltd. Dept 3, Brook House,
Torrington Place, London WC1E 7HN

SPICA TC50

PRESENCE AUDIO LTD., THE OLD POST HOUSE, PLUMMERS PLAIN, HORSHAM, W. SUSSEX RH13 6NU. TEL: (0403) 891777.



By the standards of an industry where fashion and marketing dictates regular change, the distinctively shaped Spica *TC50* – all the way from Santa Fe, New Mexico at £595 a pair – has been a rare case of stability for a number of years. For that very reason we left it out of the last loudspeaker group test, under the mistaken assumption that all was as before. But in fact there have been numerous detail modifications, so by rights this should be deemed a Mk 2 version (or a Mk something anyway), even though the name and shape remain unchanged.

The basic layout has changed little too, if at all, and without an earlier sample for direct comparison the untrained eye would be hard pressed to identify differences. The almost aggressive tilted slab front and uncompromisingly triangular profile remain the most obvious statements – a challenge to potted plant lovers everywhere.

The nearly transparent grille has a thick frame, but this butts up to a very thick 'acoustic blanket' that closely surrounds the two driver diaphragms for several centimeters in each direction, so its influence will be minimal.

Besides being distinctive and inherently pretty rigid, the cabinet shape helps to reduce and distribute internal reflections and modes, and 'time align' the distance from each driver to the listener. However, the shape tempts one to assume that they may be tucked away on a shelf or stand against a rear wall, and so take up very little space. This is assuredly not the case: the *TC50* is a free-standing model that is intended to work best on a proper stand with plenty of fresh air around. (But it's also a small box that doesn't have much low bass of its own, so you're welcome to experiment.)

Finish is textured matt black over the baffle and back, enlivened by the normal basic

varieties of tree wood on the sides. Standards are high enough, though there's nothing flashy. The entire box is built in 19mm MDF (it used to be part chipboard), and damping is now raw cotton rather than wool. Drivers are Audax made: a 25cm soft dome tweeter and a 130/150mm treated paper cone bass/mid driver. The latter is clearly custom-doped by Spica.

TEST REPORT

Despite a fairly high sensitivity in the mid-range area, 150-500Hz, the responses all drop some 6-7dB in the crossover region, recovering thereafter in the treble. Considering the compact enclosure volume, low frequency extension is acceptable.

The impedance is very much a 4ohm load which suggests that an amplifier with generous current reserves will provide the best match; that said, most modern transistor hi-fi separates are likely to fill the bill without difficulty. The pair match is pretty close, and the grille has virtually no effect – its frame is shielded by the heavy acoustic blanket which covers the whole baffle. It is quite difficult to identify differences between the two Spica models, which at least suggests that the test programme as well as the speakers offer pretty good consistency.

SOUND QUALITY

The listening panel liked the sound of the Spica, which is inherently open and articulate, generating an impressive soundfield with lots of space and air, albeit a little boxy and limited in low frequency extension. Timing is good, and the sound manages to inform without resort to over-brightness. The slightly recessed presence region is audible as an element of character, and does tend to leave the treble above a shade exposed, while the low frequency end adds a slight general-

ized 'warmth' and 'thickening'.

Not particularly strong on dynamics and drama – if anything a little too well damped in the bass – there's a controlled precision, focus and coherence that reminds one of the better miniature loudspeakers. And although it loses out a little on midrange integration, it does offer the compensation of extra bass 'wellie' and dynamic range over the genuine tinies.

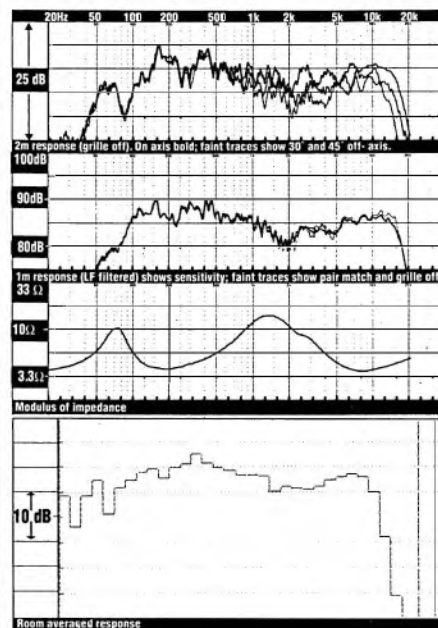
Direct comparison to the *SE* is unavoidable, for the two are surprisingly different in sound, and this leaves me by no means disenchanted with the base model. While the *SE* provides a bigger, faster and more lively sound, it does so without retaining quite the precision and coherence of the standard model.

CONCLUSIONS

The *TC50* Mk-whatever-it-is-now continues to provide a solid, monitor-like sound with good precision and predictability, having many of the qualities of a top miniature plus a little more bass and dynamic capability. At £595 it's a niche product whose continued success with a specific constituency of enthusiasts should be assured.

TEST RESULTS

Size (height x width x depth)	40.5 x 33 x 29cm
Recommended amplifier power	20-80 watts
Recommended placement	on stands in free space
Estimated frequency response (2m)	52Hz-18kHz, ± 4 dB
Estimated LF rolloff (-6dB ref midband)	55Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	88dB
Impedance characteristic (ease of drive)	needs good current delivery
Forward response uniformity	fairly good
Typical price per pair (inc VAT)	£595





JOIN THE CROWD AT THE ... DOUG BRADY HI-FI SALE

APOGEE CALIPER £1995
 APOGEE DUTELTA £2950
 MAGNAPAN MG3 £1895
 MAGNAPAN MG2B £895
 KRELL KSA SO/II (MINT) £1995

KRELL KSA 80 £3100
 KRELL KMA 100 £3999
 KRELL KSA 100/II £1999
 AUDIO RESEARCH D11S £1890
 AUDIO RESEARCH D125
 (MINT DEMO) £3995

CELESTION SL700 £999
 INFINITY KAPPA 8 £1495
 ALPHASON SONATA £549
 GALE 301 £199
 ROTEL RL850 (PAIR) £99



Doug Brady Hi-Fi

Kingsway Studios,
 Kingsway North,
 Warrington, Cheshire.
 (0925) 828009.
 Open six days.

401 Smithdown Road,
 Liverpool L15 3JJ,
 Merseyside.
 (051) 733 6859
 Closed on Wednesday.

14/18 Monmouth Street,
 Covent Garden,
 London WC2H 9HB.
 (01) 379 4010.
 Open seven days.

BRADY'S THE MUSICAL EXPERIENCE!

SALE LIST

MONITOR AUDIO MA952 £4
 LINX POWER I £650
 MUSICAL FIDELITY MVT3 £11
 MUSICAL FIDELITY P172 £4
 ACOUSTIC RESEARCH AR22I
 (PAIR) £130
 ACOUSTIC RESEARCH AR18 £



High
 Quality
 Audio
 Equipment

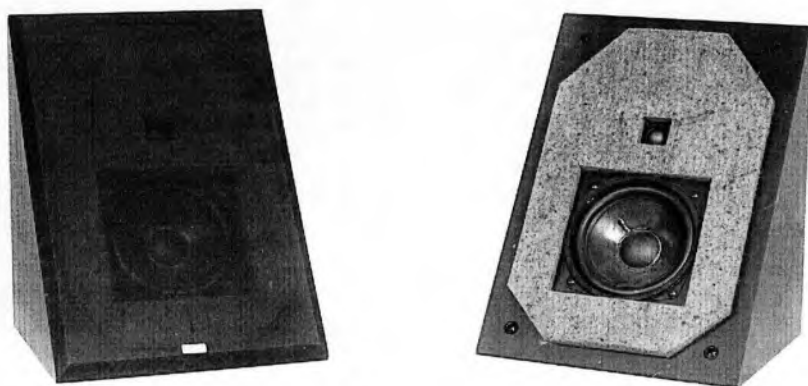
'Sonata' is a
 Hi-Fi choice
 Best Buy
 1989

JPW LOUDSPEAKERS LTD

OCEAN QUAY RICHMOND WALK PLYMOUTH DEVON - Phone 0752 607000

SPICA TC50 SE

PRESENCE AUDIO LTD., THE OLD POST HOUSE, PLUMMERS PLAIN, HORSHAM, W. SUSSEX RH13 6NU. TEL: (0403) 891777.



As a penance for failing to review the updated *TC50* last time around, we got talked into doing two nearly identical *TC50s* on this occasion, leaving the poor author struggling for an introduction. The standard model already costs a substantial £595, while the *SE* modifications that originate in the UK add a further £200.

This takes the *SE* into pretty exotic territory. In this limited project alone it has to compete against models with superficially much stronger USPs (marketingspeak: unique selling point) – the isodynamic Alphason, the open baffle SD and the NVA *Cube* +stands all have more obvious sales-room presence than a Spica with an extra set of terminals on the back.

Those extra terminals (and gold plating on all four) are the only signs visible from the outside, and permit bi-wiring or bi-amping configurations. But the engineering within has also been reworked, substituting standard wiring with Vecteur LC/OFC solid core, applying damping material to the side panels, and stiffening up the quite large baffle with additional bracing.

For the rest we have the familiar triangular prism cabinet shape. Although the Spica is intended for free space siting, the wood veneer is only applied to the two sides, and this seems a bit cheapskate at £600, never mind £800.

TEST REPORT

The results overall are virtually identical to those for the standard model, which is presumably as it should be. Sensitivity is fairly high in the midrange area, 150-500Hz, but drops some 6-7dB in the crossover region, recovering thereafter to a mildly peaky treble. The response traces all reveal this 'saucer-shaped' characteristic pretty consistently.

Low frequency extension is reasonable, and the off-axis traces show fairly good correspondence with the axial, considering the directional nature of the comparatively large bass/mid driver and baffle. The impedance is well enough controlled, though very much a 40ohm load which will demand current reserves from the partnering amplifier.

The pair match might have been closer, given the price, and the standard model was slightly better here, though that is probably mere happenstance. The grille has been properly engineered to have virtually no effect.

SOUND QUALITY

I suppose it's all pretty predictable really. The *SE* was bound to do less well on the blind tests than the standard model, wasn't it? Murphy's Law dictates such paradoxes, leaving it to mere mortals to attempt an explanation. So rather than attempting to unscramble pages of panel notes, I have taken the easier course of setting the loudspeakers up again one after the other and listening to them.

In some senses the *SE* does represent an obvious improvement. Even in the 'default mode', using the same single cable run and a pair of jump leads, the difference is immediately – indeed quite strikingly – obvious. As to whether one actually prefers one or other alternative *melange*, that's another matter, and cue for a short philosophical digression.

The trouble with loudspeakers is that the whole is invariably more important than the sum of the parts. And the standard Spica *TC50* now just about qualifies as one of those timeless classics which have achieved such a holistic identity all of their own, flaws notwithstanding. (Other obvious examples are the BBC *LS3/5A*, Spendor *BC1* and Quad *Electrostatic*, none of which is perfect but each of

which has its unique identity and strength.)

When I originally started in this business, working for Spendor, one of the first lessons I learned about making monitoring loudspeakers was that the purpose of life was *not* to produce a better *BC1*; the much harder job was to go on producing *the same BC1*. It's harder partly because bought-in materials change like quicksand beneath one's feet, but also because any changes, for better or worse, affect the unique identity.

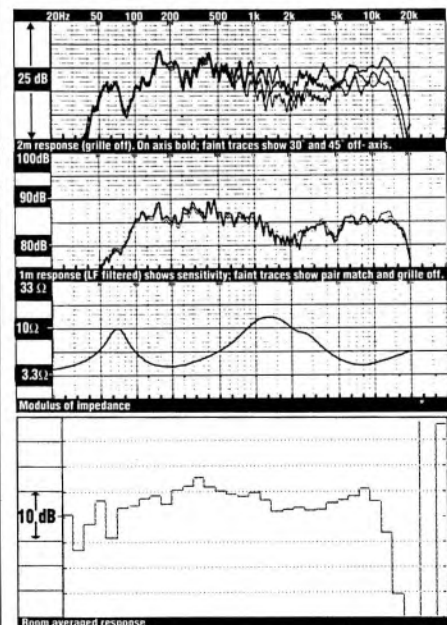
Back to the point, the *SE* 'unshackles' the Spica sound from the box, adding substantial extra height and width to the soundstage. But it also loses some of the coherence, rhythmic integrity and essential Spicanness in the process.

CONCLUSIONS

The *TC50ES* shouldn't really be considered an upgrade on the *50*. It's really a quite different loudspeaker. Nor is it necessarily the better speaker overall, though it does have much greater potential for the enthusiast wishing to experiment with tweaking, fine tuning and evolving an audiophile system based on good quality compact loudspeakers.

TEST RESULTS

Size (height x width x depth)	40.5 x 33 x 29cm
Recommended amplifier power	20–80 watts
Recommended placement	on stands in free space
Estimated frequency response (2m)	52Hz–18kHz, ±4dB
Estimated LF rolloff (–6dB ref midband)	55Hz
Estimated midrange sensitivity (ref 2.83V, 1m)	88dB
Impedance characteristic (ease of drive)	needs good current delivery
Forward response uniformity	fairly good
Typical price per pair (inc VAT)	£795



SOUND BEYOND THE FINAL FRONTIER

Audio
PROJECTS

45 HEADINGLEY LANE, LEEDS 6
0532 304565



1st choice in East Anglia for Quality hi-fi . . .


QUAD
SME

TDL
ELECTRONICS

ORACLE

ROKSAN

ROGERS AUDIOLAB
ROYD JPW
QUAD PINK TRIANGLE
ARCAM MISSION
ROKSAN HEYBROOK
NAD SYSTEMDEK
DUAL SNELL
DENON WHARFEDALE
TDL MICHELL ENG.
A&R GOLDRING
ORACLE SENNHEISSER
SME AUDIO-TECHNICA
ROTEL CELESTION
SONY ES BEARD
QED MARANTZ
SPENDOR SOUND ORGANISATION

- OPEN 9am to 6pm
MONDAY TO SATURDAY
(or by appointment)
- PROFESSIONAL INSTALLATIONS

- FULL DEMONSTRATION
FACILITIES AVAILABLE
- FREE CUSTOMER
CAR PARK OUTSIDE

Lyon Audio
Hi-Fi Sound & Design Specialists



16 PEARTREE BUSINESS CENTRE
PEARTREE ROAD, STANWAY, ESSEX
Tel: COLCHESTER (0206) 560259



Credit Arranged - details on request



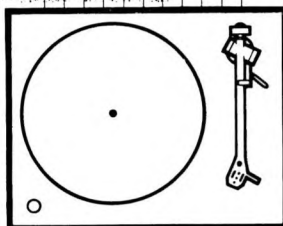
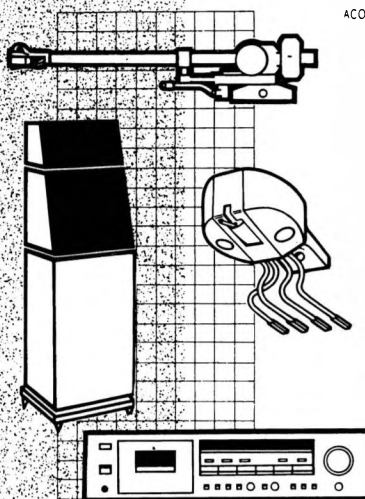
g
the
sound
gallery

ALL CONSULTANTS ARE
THE SAME. AREN'T THEY?

THE SOUND GALLERY HAS
ESTABLISHED AN ENVIABLE
REPUTATION FOR ITS
PROFESSIONALISM IN THE
RECOMMENDATION AND
DEMONSTRATION OF DOMESTIC
HI-FI. WHATEVER YOUR BUDGET,
WE CAN PROVIDE YOU WITH THE
HIGHEST LEVEL OF MUSICALITY.

SO WHY COME TO US?
FOR SERVICE. IT'S FRIENDLY YET
INFORMATIVE. PROFESSIONAL
YET COST-EFFECTIVE. TRY IT!

65 CASTLE STREET
HIGH WYCOMBE BUCKINGHAMSHIRE HP136RN
TELEPHONE (0494) 33682



ACOUSTIC ENERGY ■
AUDIOLAB ■
A + R ■
B & W ■
CAMBRIDGE ■
CREEK ■
CELESTION ■
DENON ■
EPOS ■
GOODMANS ■
HEYBROOKS ■
KEF ■
LINN PRODUCTS ■
MORDAUNT SHORT ■
MARANTZ ■
NAD ■
NAIM ■
NAKAMICHI ■
REGA ■
ROTEL ■
SENNHEISER ■
TANNOY ■
WHARFEDALE ■
YAMAHA ■



PROGRESSIVE AUDIO

Lessons in music...

Systemdek IIX/Helius Scorpio/Goldring 1010
Sugden A25 + JPW P1

Rock/Excalibur/ATF-5

Kelvin Labs Junior Pre/Power + Proac Super Tablettes

Valdi/Kuzma Stogi/Goldring Eroica
Audio Innovations Series 500 + Snell Type JIII

Kuzma Stabi/Kuzma Stogi/Audio Technica OC-7
Kelvin Labs MC1/M30 + Proac Mini Towers

Michell Gyrodek/SME IV/Koetsu
Kelvin Labs MC1/M60 + Proac EBS

Voyd/Helius Cyalene/Audio Note
Audio Innovations 1000/2nd Audio Triodes + Snell Type C

We give you six of the best!

Progressive Audio is situated 5 mins. off the M2 at Rainham, Kent.
First class, no obligation demonstrations of these systems
or of the superb equipment listed below, with pleasure,
either here or in the comfort of your own home.

MICHELL VOYD SYSTEMDEK ROCK KUZMA STABI VALDI
REGA ARMS EXCALIBUR HELIUS SME KUZMA STOGI
AUDIO NOTE GOLDRING KOETSU ORTOFON AUDIO TECH. MILLTEK
ARIA ROSE AUDION AUDIO INNOVATIONS QUICKSILVER
SUGDEN ALBARRY INCA TECH MYST KELVIN LABS
TOWNSHEND GLASTONBURY'S PROAC SNELL SPICA JPW CELEF
MARANTZ CD PLAYERS KIMBER SUPRA VECTEUR PIRATES
COMING SOON! LATEST MODELS FROM CROFT AND TDL

PHONE: DAVE on (0634) 389004 or STEVE on (0634) 366216

TANNOY DC1000

TANNOY PRODUCTS LTD., THE BILTON CENTRE, CORONATION RD., CRESSEX IND. EST., HIGH WYCOMBE, BUCKS. TEL: (0494) 450606.



Tannoy is the T in the TGI Group, a recent amalgamation of three important UK speaker companies which has already started making further acquisitions. Hitherto, however, each of the three seems to have pursued much the same product development pattern as before the merging, and each has its own quite separate identity within the marketplace.

Tannoy has the most famous and longest established name of all, and is still very active in the PA field where its original reputation was made, though studio monitors and domestic hi-fi loudspeakers are no less important. Tannoy's dual concentric (DC) driver, predecessor of that used in the DC1000, also lays claim to being one of the most famous and longest lasting designs in the history of loudspeakers.

The clever trick lies in mounting a special horn-loaded tweeter down in the throat/voice coil area of the bass driver, using the latter's cone as part of the horn flare, a physical near coincidence that greatly assists crossover integration.

Once popular in both hi-fi and studio roles, the steadily shrinking size of domestic hi-fi speakers has left the original 12inch and 15inch DCs out in the cold (but still in the studios), so now Tannoy has updated the design substantially and is reintroducing two DC systems to the domestic market. The £200 DC1000 covered here is the smaller model, designed for free space stand mounting.

With the grille on it could easily be mistaken for a Mercury or some such, such is the anonymity of the black woodgrain vinyl box (there's rosewood plastic too). I suppose one would call it a medium bookshelf size model, though the recommendation is for Blu-tack coupling to pillar stands. The enclosure uses quite elaborate energy absorbing bracing, a

19mm baffle and 15mm sides, in high density chipboard. Two pairs of high quality Michell terminals provide a bi-wiring facility.

Neath a decidedly unpromising looking grille, the baffle shows unusual restraint by Tannoy's standards. There's a bit of bright blue around the driver and for the badge, but none of the attention grabbing graphics of the Mercury, you'll be pleased to hear.

Then there's a reflex port, and what looks like a single bass/mid driver with the dust dome left off, and a sort of turbine-like casting sitting there in the throat (that's the tweeter). To fit it in, a large 42mm voice coil is used for the 150/170mm polypropylene main driver cone. The hardwired crossover maintains gentle slopes with 2nd- and 1st-order arms.

TEST REPORT

Although there are areas of similarity to the DC2000 tested a few months ago, the differences are much more marked. The basic response traces look reasonably well ordered, albeit a shade short of energy in the crossover region, from 1.5-5kHz. The room-averaged response, however, shows that the aforementioned dip is preceded by a rather prominent midband, exacerbating the net effect. Comparison to the room curve taken for the 2000 (same room, slightly brighter mike this time around) shows that '1000 is much less even and smooth, with a much more obvious crossover dip and midrange prominence.

Sensitivity is high, and bass extension reasonable nonetheless, though one feels perhaps a little wall assistance might be beneficial. The pair match is OK, but the grille is definitely better left off. The off-axis curves show good correspondence with the axial trace, but tend to emphasise the somewhat directional nature of the DC tweeter.

SOUND QUALITY

The panel showed a depressing lack of enthusiasm for the DC1000, in rather marked contrast to the sort of praise that seems to have become Tannoy's by tradition over the past few years. Individuals were "not fond of this one", finding it "only passable all round", "not very endearing and somewhat amusing".

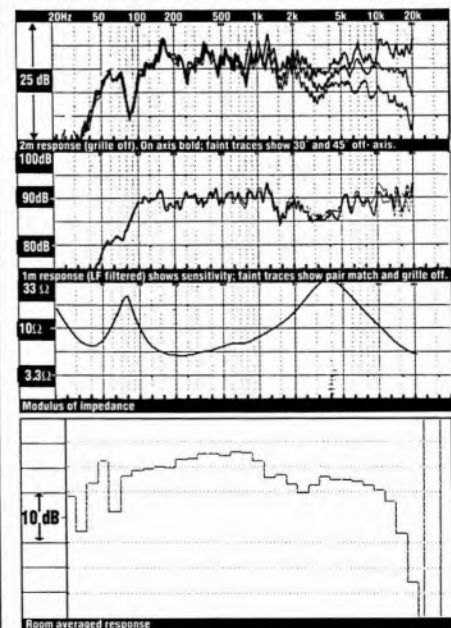
The sound is quite 'big', though not particularly clear or coherent. There is some exaggeration of sibilants, and vinyl surface noise is not treated kindly, while the resolution of fine detail seemed obscured by an overall 'thickness' – an excess of 'body' over 'bite' perhaps? Worried by the panel's unexpectedly negative reaction, I carried out subsequent auditioning at some length, only to find myself in pretty broad agreement.

CONCLUSIONS

A superficially attractive package in terms of size, price, loudness and technology, the DC1000 does show certain measurement oddities and these may well be reflected in the disappointing subjective findings, which make a surprising contrast to our positive reaction to the 2000 reviewed in the January issue.

TEST RESULTS

Size (height x width x depth)	50 x 24 x 25cm
Recommended amplifier power	10-80 watts
Recommended placement	on stands in free space
Estimated frequency response (2m)	50Hz-20kHz, ± 4 dB
Estimated LF rolloff (-6dB ref midband)	53Hz
Estimated midrange sensitivity (rel 2.83V, 1m)	91dB
Impedance characteristic (ease of drive)	fairly good
Forward response uniformity	fairly good
Typical price per pair (inc VAT)	£199





Our latest generation technically advanced loudspeaker modules and systems are among the finest in the world and only made to order.

Our unique custom design service can offer a range of performance and design options far beyond anything else available.

If you are considering spending between £300 and £50,000 for a loudspeaker system, please contact us first. We may open up possibilities beyond your wildest imagination.

E. J. JORDAN DESIGNS

THE DAK, MANORBIER,
SOUTH PEMBROKESHIRE SA70 8QR
Telephone: 0834 871209

LINN - NAIM - DENON - ONKYO - HEYBROOK - AR - BLO

EXPOSURE - A&R - CASTLE - TARGET - AIWA - LINX AUDIO - ROKSAN

MARANTZ - QED - MISSION - CREEK - ROTEL - CAMBRIDGE AUDIO - REGA

Who Cares?

mike manning AUDIO

The Hi-fi Emporium

Closed Mondays 110 Middle Street, 0% finance details on request
Yeovil, Somerset

Telephone (0935) 79361



INCA TECH - MONITOR AUDIO - ION SYSTEMS

MISSION IN CHESHIRE

ELECTRONICS



MISSION 761



MISSION 762



MISSION 763



MISSION 764

THE COMPLETE NEW MISSION RANGE IS IN STOCK AND ON DEMONSTRATION

We are also stockists for: MUSICAL FIDELITY, ALLISON, TARGET, AR, AIWA, ARCAM, AUDIOLAB, B&W, CELESTION, DENON, HEYBROOK, KENWOOD, MARANTZ, MONITOR AUDIO, MORDAUNT SHORT, NAD, PIONEER, QED, ROTEL, TANNOY.

★ FREE INSTALLATION ★ 2 YEAR GUARANTEE ON ALL HI-FI ★ FREE EASY PARKING



SWIFT OF WILMSLOW

St. Anns Parade, Parsonage Green, Wilmslow, Cheshire.

Telephone: 0625 526213

BADA

THE ULTIMATE IN SOUND ADVICE



TECH TALK

Paul Messenger explains the new test procedure used in this month's loudspeaker reviews.

Although still based on Martin Colloms' original test format, this edition sees a number of major practical changes and simplifications to the measurement test programme. Most notable is the decision to use an open air instead of an anechoic environment for the 1m and 2m response tests, and the substitution of Neutrik for B&K analogue test gear. The room-averaged response measurements are the same as before, save that the B&K mike used previously was replaced by a Technics model with a smaller diameter capsule and therefore different directivity, resulting in a 'brighter' HF here.

THE LISTENING TESTS

The 'blind' listening tests took three days of about five listeners each, making up more than thirty separate presentations of about half an hour each. Split evenly between vinyl and compact disc, the programme provided as broad a range of music as possible. Care was taken to try and 'normalise' the relative volume of each loudspeaker, though differences in frequency balance, bass extension and room drive unavoidably get in the way.

Choice of ancillary components inevitably influences the type of sound, possibly by as much as the room itself, and is one potential source of prejudice I know no way of avoiding. The drive system consisted of Naim amplification and cables sourced from Linn *Sondek/Troika*/Naim *ARO* vinyl disc source and Marantz *CD85* CD player. One decision made before the listening started was to leave the grilles on, simply because all speakers ought to work properly that way. And to avoid introducing another substantial variable we decided not to use bi-wiring.

Save for the floorstanding designs and one or two models which had been specially supplied with their own stands, all the speakers were used on the stand supplied with the NVA *Cube 1*. Less well known than the Heybrook *HBS1* stands used previously, and at £200 an unlikely combination with, say, JPW Sonatas, these certainly played their part in improving

the sound of the system as a whole, especially in stereo terms, and naturally make much more sense with upmarket models.

The majority of speakers were sited about 90cms from a quite reflective rear wall, and a little further from variable, less reflective side walls. Wall-mount designs were moved back against the rear wall. The room itself is quite large (4.5m x 5.5m plus bay) complicated in shape, with beams, fireplace and recessed doorway.

Subsequent personal 'sighted' listening was conducted on an *ad hoc* basis for about 4hrs per loudspeaker, allowing further experimentation with alternative stands and cables and the opportunity to confirm (and occasionally deny) the panel judgements.

The main listening programme consisted of extracts from the following vinyl and compact discs: *Take One - Live*, Stocktons Wing (Revolving, REVL2); *Simple Dreams*, Linda Ronstadt (Asylum, K53065); *Reckoning*, Grateful Dead (Arista, DARTY9); *Jazz Sampler*, Totti Berg etc (GMCD 6239); *Vivaldi Largo*, Pehrsson/McGraw (BIS CD-271); *Imperial Bedroom*, Elvis Costello (FBEAT XXLP17); *Mendelssohn Scottish Symphony*, LSO/Maag (Decca SPA503); *Borderline*, Ry Cooder (Warners 256 864); *Josquin*, Tallis Scholars/Phillips (Gimell CDGIM 009).

My particular thanks go to Jason Kennedy for all his hard work on the blind listening tests, and to Chris Bryant who carried out the room-averaged measurements. Thanks are also due to the patient and persevering listening panelists: John Bamford (*Hi-Fi Choice*), Geoff Hill (Goodmans), Xavier Wilcox (Roksan), David Inman (KEF), Richard Dunn (NVA), Martyn Lester and John Musgrove.

MEASUREMENT TEST PROGRAMME

Whereas the room-averaged measurement has remained much the same, the anechoic tests have been replaced by open-air measurements, using Neutrik equipment in place of B&K. This was done partly to keep

escalating costs under control, but also for the improved flexibility of a single (instead of four) site operation. Open-air tests do have one theoretical advantage over the chamber in providing a more accurate response at very low frequencies, though in practice this is more than offset by the problems of ground reflection affecting midbass accuracy, not to mention avoiding the wind and the weather.

The room-averaged response test, developed by Martin Colloms, has consistently proved to be the most accurate predictor of subjective performance. The latest set of tests use a Technics instead of a B&K microphone, which comparison suggests adds about 3dB at 4kHz, 5dB at 8kHz and 10dB at 15kHz. More usefully, the 'ideal target' now appears to be a flat characteristic to 20kHz, in place of the gentle roll-off that the best balanced loudspeakers gave with the B&K mike. The room itself, which affects the low frequency 'fingerprint' of the room measurement, was the same as in January and March '89, though different from those used prior to that. This low frequency unevenness should be largely ignored as it is due to the dominant influence of the main modes of the specific room.

This technique does not take account of any additional rear wall reinforcement; the speakers are mounted away from walls so as to minimise the room effects. Results are certainly relevant to the performance of normal box loudspeakers, but can be a little unpredictable with designs with different forms of room drive, and with different ratios of direct-to-reflected sounds.

For the 2m responses the speakers were mounted 1.2m off the ground (0.6m for the larger enclosures) and 3m in front of a large flat wall, with no other structures in the vicinity. The tests were carried out without low frequency filtering on a windless day, across the full bandwidth from 20Hz to 20kHz. The microphone was aimed at the midpoint between midrange and treble sources for the main axial traces. The speakers were then rotated (clockwise viewed

from above), and repeat traces taken at 30° and 45° off-axis.

The strongest trace shown is the axial one; off-axis traces were made in red and green and will reproduce more faintly (if unpredictably, given the nature of photolithography). To paraphrase that great quote from TV snooker: "for those of you watching in black and white, the green trace stays mostly underneath the red one". Such ambiguity is largely irrelevant, since the trends, smoothness and correspondence, particularly around the crossover region, are the important factors. The lack of LF filtering allows the low frequency extension to be assessed under genuinely anechoic conditions.

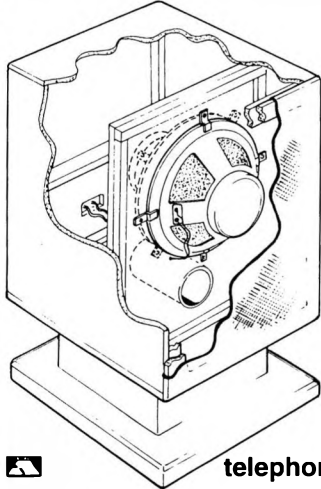
Although the 2m response lacks the resolution of the 1m trace, it represents a better idea of how the output from the different drive units becomes integrated away from the immediate vicinity. Indeed, in some respects it provides a 'half way' position between the 1m and the room averaged responses, both in terms of resolution and in the relationship to the listening experience, and is particularly useful in observing the pattern of crossover integration across the horizontal listening window.

Measured at 1m with an input of 2.83V (corresponding to 1watt, assuming 8ohms), the 1m axial response represents the nearest thing to an industry standard, and enables an assessment of sensitivity (as far as this is possible, given the errors introduced by variations in frequency response). Fainter (red and green!) traces show the variations between the two samples of a pair and the influence of removing the grille (where feasible); where relevant this is also described in the text.

The impedance variations of each loudspeaker is plotted to establish the current/voltage ratio demanded by the from the driving amplifier. Low impedance demands heavier currents, though modern transistor amplifiers are unlikely to have difficulty with loads above 3.3ohms, except perhaps if there is a sharp change near a low point.

£150 + £125 = £1000?

Add our £125 sub-bass unit to your £150-per-pair "Best Buys" and your system will sound as if it has LARGE (and expensive!) speakers. Although very compact, this ingenious Push-Pull design will fill-in that missing "Bottom Octave" and can be sited almost anywhere in the room—without affecting the stereo image. It can be connected directly into systems with medium sized speakers (87-90 dB sensitivity).



The Wilmslow Audio CPP sub-bass speaker kit contains 2 10" drive units, flatpack cabinet kit (inc. stand) machined from smooth MDF for easy assembly, low pass filters, grille fabric, reflex port etc.
 Dims. (inc stand): 571x366x336mm
 Amp. suitability: 20-120 watts
 Impedance: 8 ohms
 PRICE £125 inc. VAT plus carr/ins £11

telephone credit card orders

WILMSLOW AUDIO LTD.

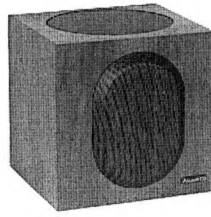
35/39 Church Street, Wilmslow, Cheshire SK9 1AS Tel: 0625 529599

Call and see us for a great deal on HiFi (Closed all day Mondays)

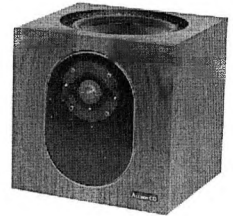
DIY Speaker catalogue £1.50 post free (export \$6)

O'BRIEN hi-fi

QUALITY EQUIPMENT ON DEMONSTRATION ON MOST OF THE BEST BUYS



ALLISON CD6



MARANTZ CD7511

- FAMOUS NAMES IN HIGH FIDELITY EQUIPMENT FROM A&R (CAMBRIDGE) • AR • BEARD • CAMBRIDGE AUDIO • CELESTION • DENON • DUAL • GLANZ • HADCOCK • HARMON • KARDON • HELIUS • HEYBROOK • HITACHI • KEF • LINN • LOGIC • MARANTZ • MICHELL • MORDAUNT-SHORT • MERIDIAN • MISSION • MONROSE • MYST • NAKAMICHI • NYTECH • OAK • ORTOFON • PINK TRIANGLE • QUAD • QED • REVOLVER • REVOX • ROGERS • ROTEL • SONY • SUPEX • SYRINX • TECHNICS • THORENS • YAMAHA

95 HIGH STREET, WIMBLEDON VILLAGE, LONDON, SW19. 01-946 0331
 • CREDIT FACILITIES (Trinity Finance APR. 38.4%. Written details on request)
 • SERVICE FACILITIES • ACCESS/BARCLAYCARD
 • FULL ORDER & EXPORT SERVICE • Opening Hours: Tues-Sat 9-5.30.

HIFI MAILLOTS

	ROCK		KEF	
RUARK		MISSION CYRUS		TEAC
M. A	MERIDIAN		NAKAMICHI	A. T
	ROTEL	TECHNICS		REVOLVER
ITL	PIONEER		KENWOOD	ION

▲

31 ST. CUTHBERTS STREET BEDFORD 0234-325035

CAMBRIDGE HI-FI

1-3 HAWTHORN WAY CAMBRIDGE 0223-67773

REAL HI-FI HATCHES IN HAVANT.

For further information or to book a demonstration, ring us on the number below. Alternatively, visit our newly refurbished shop for helpful, professional advice.

Target, Audion, Castle, Sennheiser, Nagaoka, S.M.E., Rotel, That's Tape, S.M., Denon, Kenwood, S.D. Acoustics, Kuzma, Pink Triangle, Dual, Castle, Tannoy, Audio-Technica, Q.E.D. Accessories, Pi, Rotel, Albarry, Kiseki, Alexander, Tri

THE HI-FI SPECIALISTS
 27, Market Parade, Havant Hampshire. PO9 1PY
 Tel: (0705) 473952
OPEN: 10-6
 (Mon 10-2, Thur 10-8)

ACOUSTIC ENERGY

COMPACT Music



LOUDSPEAKERS: CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

Paul Messenger rounds up the speaker tests with summaries of the best of this month's group.

A major strength of the large multiple review project is the way common threads and trends are brought into perspective. As a group, the thirty or so covered here make up a realistic enough cross section of the market, with most 'types' sufficiently represented, so that the obvious patterns emerge. For example, the correlation between sound quality and a smooth room-averaged response is clearly quite close.

However, the hi-fi loudspeakers paradox is that the small box with small main driver – selling anywhere from under £100 to well over £300 – more often than not beats most of its physically bigger rivals in terms of mid-to-treble integration through the crossover region, throwing in superior stereo imaging besides. But the price which must invariably be paid is some lack of or limit to dynamic range, bass extension and loudness capability, in one or other combination. In a word: scale.

Improving this fundamental limitation means moving up a size, typically by using a bigger main cone, twin main drivers or a three-way system, along with an obligatory larger basic box.

But each of these approaches brings at least one specific problem along in its wake. The large cone, typified by the Marantz, offers simplicity but requires great subtlety in execution. Double or multiple driver systems (eg Cyrus, Acoustic Energy) create potential balance/distribution problems which are difficult to resolve.

Both history and theory point towards the three-way offering the best solution. But the subjective findings here reinforce those from earlier projects by confirming just how difficult it is to get such a design right. The conventional Canton, Goodmans, JBL and Sony three-ways all disappointed, and only the more elaborate and expensive open-baffle SD avoided the boxiness that seems to be prevalent here.

If the traditional three-way looks increasingly dated, it's nice to see steady progress on most other fronts. KEF's *Uni-Q* driver is one obvious 'high tech' success, while I particularly welcome the experimentation with room drive and distribution shown by the Allison and NVA semi-omnis.

BEST BUYS AND RECOMMENDATIONS

From the 30 new models assessed, 13 appear in this list, of which two achieve Best Buy status, which is pretty much as usual. And much as usual, the hardest part of the project is drawing in these dividing lines – dividing lines which look all too sharply discriminating when committed to paper.

The point to emphasize is that a lack of Recommendation is not intended as a condemnation. Even though some may be judged more equal than others, comparatively few are truly unequal these days.

Tradition and common sense dictates that this listing is organised in order of ascending price, even though it might be just as interesting to list according to size, to loudness or whatever.

Since there are still plenty of people anxious to spend no more than £100 on a pair of speakers, the industry will continue to

supply models to meet that demand, even though the cost constraints limit performance severely, at least in dynamic range and loudness. However, there's nothing to stop clever engineers from providing the fine midrange integration and stereo of the £99 **JPW Sonata**. This combination in a real wood box of reasonable size is the obvious Best Buy of the project.

Hard on its heels come two Recommended models: the miniscule **KEF C15**, (£109), which is just as well integrated but has less 'wellie', and the **Sony APM-101ES** (£100) which has rather more 'wellie' but a less ruly tweeter.

Similar in size but at a slightly higher price, the £150 **JBL TLX12** is a lively little performer that also joins the Recommended lists. It has much in common with the Sony, plus a little more 'go' and balance.

But the prize of balance and neutrality – and the second Best Buy rating – is reserved for the rather larger and more dynamic £200 **Marantz LD50DMS**, which is something of an object lesson in how to integrate a 160mm cone with a 25mm dome. Both the Musical Fidelity *Reference 2* and Celef *Nimbus* provide lively alternatives that are worth considering, but neither manages the same trick as convincingly.

The next two Recommended

models don't give you more for your money, but do provide some individuality. Both the £280 **Shan Shimna** and the £300 **Canton Karat 20** offer fine performance within the dynamic constraints of their respective sizes, plus classy aesthetics to boot.

The £290 **Allison CD6** abandons strict standards of neutrality in the quest for a different method of room drive. The result is very impressive bass extension from a small and conveniently sited enclosure.

Showing even the Marantz something about crossover integration, the £350 **KEF C75** does much to prove the case for the *Uni-Q* driver in a compact, floorstanding package with a slightly 'rich' balance.

The £400 **Heco Interior 430S** may not offer the last word in audiophile incisiveness (it doesn't!), but it does deliver a remarkably even and largely neutral, full bandwidth sound from a generous box at a reasonable price.

The final three Recommended models are more or less the same sort of price, but are as different from each other and from everything else in the project that comparison becomes almost impossible. Each has strengths the others lack, and makes its own compromises.

The **NVA Cube 1** costs £600, but reserve another £200 for its excellent stand. It's a semi-omni, so is bound to sound a bit quirky and will react unpredictably with the room, and probably the system. It likes to be played loud and get it in the right place and the right time to find more than a touch of magic.

The £800 **Alphason Orpheus** is more conventional, and more predictable, but great fun nonetheless. Phasiness apart, the isodynamic tweeter could put you off metal domes for life.

However, my personal favourite has to be the £700 **SD Acoustics OBS**. Despite a frequently unruly tweeter, it's not only very pretty, but also has rare bounce, life and coherence; however, it does need a fair size room.



Our two Best Buys – the £90 JPW Sonatas and the £200 Marantz LD50DMS.

DEALER GUIDE

Analog Audio

First Class Separates from
AR, Denon, Dual, Harmon/Kardon,
Jamo, Kenwood, Luxman, Marantz,
Mordaunt Short, NAD, Onkyo, Proton,
Rotel, Teac, Thorens, Tannoy, Yamaha

**FULL DEMONSTRATION
FACILITIES AVAILABLE**

Access and Barclaycard Welcome.

ANALOG AUDIO
849 HIGH RD., LONDON N12. 01-445 3267



6 ABBEY ST, CARLISLE. TEL: 0228 46756
(Hi-Fi & Service Centre)

Products we stock include:-

Linn-Acoustic Research-Mission-Cyrus-Technics
-Marantz-Kenwood-Aiwa-Denon-Dual-Pioneer-Akai-
Ariston and Philips.

"Demonstration Facilities" "Part Exchange Welcome"
"Free Delivery & Installation" Access & Visa accepted
"Cumbria's Premiere Hi-Fi Centre"

SHROPSHIRE HI-FI THE HI-FI SPECIALIST

ARISTON, AUDIO TECHNICA, CAMBRIDGE AUDIO, CELEF,
DENON, DUAL, HEYBROOK, INFINITY, ION, MANTRA,
MORDAUNT SHORT, MUSICAL FIDELITY, MONITOR AUDIO,
MARANTZ, NVA, PROAC, QED, ROTEL, TARGET, TEAC,
TANNOY, ROKSAN

Demonstration Room, Free Parking, Free Installation, Repairs

CLOSED THURSDAY

**SHROPSHIRE HI-FI, ST. MICHAEL'S STREET,
SHREWSBURY 0743 232317**

SMC GROUP

AUDIO VENUE

24 CHURCH ROAD, CRYSTAL PALACE, LONDON SE19 2ET
TEL: 01-771 7787

Stockists of: Linn Hi-Fi, Naim Audio, Creek, A&R, Denon, Dual,
Revolver, Marantz, BLQ, Yamaha, etc.

2 single speaker demonstration rooms, Instant Credit Facilities.

All equipment delivered & installed. Comprehensive turntable rebuilds etc.

Interest Free Credit. 2 year warranty.

Open 10-6pm - Closed all day Wednesday

SHROPSHIRE'S HI-FI CENTRE!

Quad
B&W

Kenwood
JVC

Celestion



Onkyo
A&R

Nakamichi

Beyer Dynamic
Dual

AVON Hi-Fi Limited

12 Barker Street, Shrewsbury (0743) 55166



ROTEL



DENON



Norman H. Field

Hi-Fi

Technics

ALBANY HOUSE,
HURST STREET,
BIRMINGHAM B5 4BJ

Telephone: 021-622 2323

HI-FI MARKETS
The place where people are always buying

YAMAHA



ASHTON AUDIO VISUAL SPECIALISTS

TARGET, RUARK, THORENS, ARISTON, WHARFEDALE,
TDK, THAT'S, SONY, ROBERTS, CELESTION, MORDAUNT-SHORT,
TANNOY, KENWOODJVC, TOSHIBA, JBL, LINX, MONSTER CABLE,
VAN DEN HUL, DENON, MARANTZ, PROTON, NAD, ROTEL, AR,
NAKAMICHI, INCATACH, QUAD

6 HIGH STREET SOUTH, DUNSTABLE, BEDFORDSHIRE.
TEL: 0582 608003

Diner's Club - American Express - Visa - and Credit Brokers
Open Monday to Saturday 9.00am - 5.30pm (6 on Fridays)



Sound Approach

THE HI-FI DEALER FOR PEOPLE WHO LISTEN TO
MUSIC

★ EXCLUSIVE AREA STOCKISTS OF FULL RANGE OF
NVA AMPS, TURNTABLES & SPEAKERS, ON
PERMANENT DEMONSTRATION

★ HOME INSTALLATION & DEMONSTRATION

161 UNTHANK ROAD, NORWICH
Tel: 0603 622833

Open Monday - Saturday 9am to 6.30pm - 6 days a week



CHOOSING AND USING . . . VIDEO RECORDERS

Some of the latest Hi-fi VCRs come equipped with S-VHS and NICAM decoders for receiving stereo TV broadcasts, so now's the time to get serious about video . . .

If any move was ever well timed, this group test of ten video recorders must qualify. We're presently living through a watershed for what is often euphemistically described as home entertainment – for this year sees the coming of age of domestic video.

This is no empty slogan. The importance of video to the buying public is demonstrated by the fact that penetration into British homes now exceeds 50 per cent. But up until now TV and video have tended to be treated as something entirely separate from the normal audio media.

For some time however, there's been a move to improve both the video and the audio quality of video recorders and TV sets alike as a necessary prelude to a proper integration between the two. Hi-fi video is obviously an important element in the story, and so is Dolby Stereo, the ambient 'surround sound' system used in many recent feature films. The weak link of course is on the broadcast side. Although TV sound is well up to normal hi-fi standards, it has always been in mono and unjustly or otherwise has rarely attracted much audiophile interest. But TV sound is – or shortly will be – freed of the shackles of mono by the introduction of NICAM stereo. NICAM – an acronym for Near Instantaneous Companding And Modulating – is the missing link that will help facilitate the much feted integration of video with audio. And then we have S-VHS, a system which does for picture quality what the other developments promise to do for the sound.

Let's take a brief look at each of these developments in turn. S-VHS finally drags picture quality into the same ballpark quality

area as broadcast TV itself; it should see out any further dramatic developments (like true digital video) until high definition TV arrives. And there's no reliable date for that. S-VHS is, quite simply, the concept of high fidelity applied to the picture component of domestic video. Its time is due if it isn't overdue.

S-VHS, which like VHS was developed by JVC, is an offshoot of VHS, but compatibility is not 100 per cent. In fact S-VHS tapes won't produce a picture on an ordinary VHS recorder unless you explicitly select VHS mode when recording. But ordinary VHS tapes *will* play as usual on any S-VHS deck. There are no bars to upgrading apart from cost.

A technical description of S-VHS is beyond the scope of this feature, but the basics include an increase in luminance (detail) bandwidth to 5MHz from 3MHz, increasing FM deviation from 1MHz to 1.6MHz for reduced noise and subtler tonal gradation, and better separation between chrominance (colour) and luminance signals to reduce cross modulation effects. (You'll have observed this annoying effect where detail is mistranslated as colour, producing flickering and colour casts on fine check patterns for example.) One way of expressing the improvements to picture clarity is by the number of horizontal lines resolved, which is better than 400 with S-VHS, up from about 260 for VHS, and well in advance of what's received off air.

Colour is much improved by S-VHS. There's less shadow noise, and colour registration with the detail monochrome part of the picture is improved. S-VHS protagonists even claim that an

S-VHS half speed recording is better than normal speed VHS. This is an over-simplification, but the reviews cover this more fully.

Much of the available improvement, which is little short of dramatic, can be seen with any good television, especially those fitted with SCART (Euroconnector) sockets. However, optimum performance requires a TV receiver with a purpose made connector, either a SCART reconfigured with separate so-called Y (luma) and C (chroma) connections, or preferably a so-called S-Video socket, which looks like a miniature 4 pin DIN. There aren't many of these yet. I used a JVC AV-S250 for these tests, because it is so equipped.

NICAM will be just as important to the future of video, but not really as a measure to improve sound quality, which is the usual suggestion. It is, rather, an effective means of distributing a digitally encoded *stereo* signal alongside a normal broadcast television signal without the risk of the co-channel interference that can plague matrix stereo, as used in countries that were quicker onto the stereo bandwagon. To keep transmitted bandwidth down a variety of measures are adopted including data compression using a vaguely dbx-like compansion algorithm. But the compansion is unlocked using a key transmitted along with the signal, an elegant technique that avoids many of the problems of compression. Primarily developed by the BBC, it's in danger of becoming a de facto world standard, for satellite as well as terrestrial broadcasting. It is a highly effective system of hi-fi standard that gives results roughly comparable to FM stereo sound broadcasting, albeit with rather better signal/noise and a greater immunity to AM and other sources of interference.

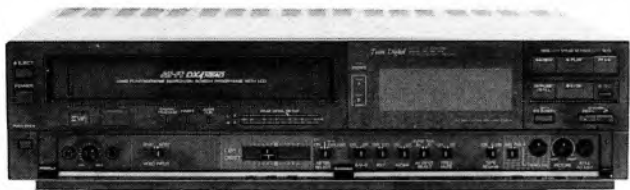
NICAM receiver and decoding circuitry can be built into television sets, but many people whose existing TVs don't have NICAM will welcome the alternative of acquiring NICAM in a video recorder, especially as

it means they will be able to record in stereo. To do this, the recorder must be Hi-fi capable.

'Hi-fi' (with a capital 'H') is the awkward generic title given to the system in which video recorders record a full frequency (20kHz) stereo signal as an FM modulated signal mixed in with the helically scanned video signal. The sound is sandwiched between the chroma and luma signals, and is thus utterly distinct from the linear edge audio track which is strictly lo-fi.

Thus all NICAM recorders – and, indeed, all S-VHS recorders for domestic use – have a Hi-fi record capability as standard. The system is claimed to be the next best thing to CD, and by implication beating on the door of perfection. It isn't so. The system is a bag of compromises, and even at its best it tends to lack some of the subtleties of truly fine sound reproduction. But Hi-fi video sound has improved considerably in the last few years, and is now pretty good. One very important benefit of Hi-fi is that half speed (LP) working doesn't greatly affect sound quality, though I can't let this go without noting there are subtle effects which invariably favour standard play (SP).

Many other features are offered by recorder manufacturers, and it's inevitable that a good deal of space in each review is given to a blow by blow account of the highlights. Some – like LP mode – are important. It doubles the playing time of a tape but at some cost to picture quality. Linear sound also suffers, and badly. Other features you'll find include various 'trick frame' modes like variable slow motion, sometimes achieved without noise bar effects. In the main such things are not a lot of use for normal applications (on the evidence, most of the manufacturers with products represented here wouldn't agree). The comment applies even more forcefully with most so-called digital effects like solarisation or stepped play, which amount to little more than pretty effects.



State of the art performance from the Mitsubishi HS-B70.

DEALER GUIDE

MANDERS HI-FI LTD

For Nakamichi, Quad, Dual, Hafler, Luxman, Denon, Revox, Sansui, Harman-Kardon, A+R, Thorens, QED, Spondor, Monitor Audio, Rotel, Ariston, Revolver, Technics etc.

2 Edward St, Grimsby,
Humberside
0472-351391



Hi-Fi Specialists

- A&R
- Castle
- Dual
- Mordaunt-Short
- Musical Fidelity
- Pioneer
- Philips CD
- Spondor
- Trio/Kenwood
- Yamaha
- Ariston etc.
- B&W
- Denon
- Marantz
- Monitor Audio
- Nakamichi
- Rotel
- Revox
- Thorens

Two-year guarantee
Private listening room
Excellent comparator demonstrations

54 Chapel St., Chorley, Lancs.

Telephone (02572) 71935

Hastings Hi-Fi CONSULTANTS

32 WESTERN ROAD, ST. LEONARDS. (0424) 442975

Selected Hi-fi from -

EXPOSURE, MUSICAL FIDELITY, QUAD, NAKAMICHI, HARMAN KARDON, MONITOR AUDIO, ROGERS, TANNYOY, CYRUS, NAD, REVOLVER, MANTICORE, GALE, MARANTZ, ROKSAN, ELITE, AUDIOLAB, CELESTION, HEYBROOK, & Many more.

- OPEN TUES-SAT 9.00-6.00
- FULL DEMONSTRATIONS - IN STORE & IN HOME

BUY! SELL! EXCHANGE!

We accept for cash or exchange ALL 2nd hand Audio & Video equipment.

Everything accepted in ANY condition - absolutely NOTHING refused!

MUSIC & VIDEO EXCHANGE
56 Notting Hill Gate, London W11
Open 7 days 10am-8pm
Tel: 01-727 0424

Active Audio

sound systems

- Alwa ■ AR ■ A&R Cambridge ■ Ariston ■ Bose ■ Celestion
- Denon ■ Elite ■ Heybrook ■ KEF ■ Marantz ■ Mission Cyrus
- Monitor Audio ■ Musical Fidelity ■ NAD ■ Onkyo ■ Pioneer
- Rotel ■ Revox ■ Rogers ■ Sansui ■ Wharfedale ■ Yamaha

BRANCHES IN DERBY & TAMWORTH

Active Audio
12 Osmaston Rd
The Spot
Derby
☎ 0332-380385



Active Audio
29 Market St
Tamworth
Staffs
☎ 0827 53355

BUY, SELL, EXCHANGE & REPAIR CENTRE FOR TV, VIDEO & HI-FI

- ★ NEW & RECONDITIONED EQUIPMENT
- ★ FULLY GUARANTEED
- ★ COMPETITIVE PRICES
- ★ TECHNICAL ADVICE GIVEN
- ★ EXPORT ORDERS WELCOME
- ★ FULL BACK UP AND REPAIR SERVICE
- ★ FOR PERSONAL & PROFESSIONAL SERVICE



CANAL BRIDGE AUDIO VISUAL
172 Caledonian Road, London N1 0SG



01-837-8741



DOUGLAS SHOP NOW OPEN ON LOCH PROMENADE 0624-815521

ISLAND COMPACT DISC & HI-FI CENTRE

WHARFEDALE • A&R CAMBRIDGE • CELESTION • PHILIPS • JBL • HARMON KARDON • MUSICAL FIDELITY • SNELL • SUGDEN • TEAC • MARANTZ • A&R • LUXMAN • BEYER DYNAMICS • PARLIAMENT SQUARE RAMSEY, ISLE OF MAN • ARISTON • AUDIO INNOVATIONS • MICHELL

OPENING TIMES MON-SAT 9-5.00PM

DEM FACILITIES

TEL: (0624) 815521



CHICHESTER HIGH FIDELITY

Appointed stockists of A&R Cambridge, Denon, Castle, Creek Audio, Goldring, Linn, Naim, Quad, Rega, Rogers, SME, Monitor Audio, Nakamichi, Roksan, Royd, Spondor, Tannoy

7 St. Pancras, Chichester
Telephone 0243 776402
(Closed all day Monday)

AKAI VS-75EK

AKAI (UK) LTD., 12 HASLEMERE HEATHROW ESTATE, SILVER JUBILEE WAY, HOUNSLOW, MIDDLESEX. TEL: (01) 897 6388.

BEST BUY



The basic rollcall of features in this attractive, slimline design includes Hi-fi sound and of course a NICAM stereo decoder. The Akai has two operating speeds (SP/LP) for a maximum eight hours uninterrupted use. The timer has an eight programme, one month capacity and there's also a standby timer which, with a few button pushes, starts a programme within a 24 hour period and switches off after a predetermined duration. It even acts as a sleep timer, continuing a manual recording and putting the recorder to sleep when the recording has ended.

Like most modern VCRs, the VS-75EK presents a clean, friendly face to the world with just power and eject controls visible, plus the cassette loading slot and the fluorescent display panel. Almost everything can be operated with the remote control, which handles programming, clock setting etc with assistance from a full on-screen display – a characteristic feature of Akai VCRs for some years. A newer, and very welcome feature that also appears to be here to stay is the remote control design which has some 45 user programmable keys, most of which are accessible only after opening a flap to expose a new set of control legends. Various self-adhesive labels are included in the packing.

The audio system shows signs of having been tackled with special care. Open the wide bottom flap on the VCR and, in addition to the transport controls, you find a 3.5mm headphone socket and volume control, MPX filtering controls, and peak hold record level meters with their associated input level controls. Sound monitoring is controlled remotely – Hi-fi L, R, stereo and linear low grade mono. In common with some others, Akai has its NICAM nomenclature wrong. The detection of a NICAM signal lights an indicator saying 'stereo' which may or may not be correct, however, bilingual transmissions (if and when – don't hold your breath) are correctly described in the display.

The tuner will store up to 100 station frequencies and unwanted stations can be locked out. The range of playback facilities is simply enormous: five noise free (in SP mode) slow motion speeds, 2x play speed

(SP), direct return to counter zero and more. A full VSS tape indexing system is included. Index points are recorded every time the record key is pressed, and in playback the deck will perform intro search or allow direct access of recordings up to 15 index points away in either direction.

Play facilities include five slow motion speeds, double speed, still frame/frame advance and more. It's all thoroughly – what's the word? – excessive. The tape counter reads out in hours and minutes over recorded sections of the tape only. The time readings are arbitrary; the '75 doesn't measure time against tape position as some recorders do.

SOUND AND PICTURE QUALITY

This Akai has four video heads for noise free slow motion, and two heads for the Hi-fi audio system. Setting up is eased by the on-screen displays and a generally logical system of controls and prompts, but this is a complex player and there's a learning process to plough through. It also lacks the usual self-seeek tuning and the manual system is not altogether easy to use.

However, day to day use is a different matter, and owners with children will appreciate the simple electronic childproof lock. All the important controls can be operated remotely, and important displays – elapsed time and real time for example – can be called up on screen at any time. Another factor in the ease of use equation is that it has a quick response system which keeps the tape laced around the heads for a few minutes, ready to respond quickly to commands.

After the complication of trying to describe what the Akai does, it's something of a relief to be able to report that a description of its performance is admirably uncomplicated. It works, and works well. The audio measurements show a slight response unevenness and a modest signal/noise figure. For example close listening with headphones shows some intermittent head switching noise. Nevertheless sound quality is good as is picture quality. There was a trace of dot crawl on vertical edges and a slight, pervad-

ing milkiness, as though the colours had been sapped of a little of their vividness.

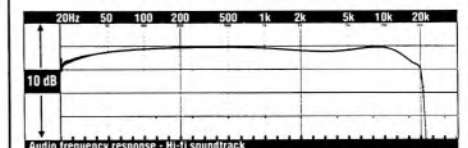
Video noise levels were low and the longer wavelength colours well handled without the blotchiness that still plagues some lesser designs. Resolution of fine detail was good, and the slow motion results noise free as promised. It was also well above average in LP mode, with sound quality almost indistinguishable from SP. But there's no comparison with SP picture quality of course, and trick frame performance suffers too.

CONCLUSIONS

So choice and selective is our bunch of VCRs for this test, the VS-75EK actually fulfils the unlikely role of a near-budget price model. In reality, of course £550 is still a great deal of filthy lucre for a VCR, and it remains so, despite the relentless way the increasing level of features is pushing prices ever higher. But in the end this is a fine, modern player. It is realistically priced and it has a comprehensive array of features. Best Buy.

GENERAL DATA

Heads (video/audio)	4/2
S-VHS	no
Hi-Fi	yes
Manual/auto level recording	manual
Digital effects	no
NICAM	yes
Long Play	yes
Simulcast Recording	yes
Timer	8 events/1 month
Tape indexing	yes
SCART connector	yes
Audio rec/replay response – 1dB/1kHz	30Hz – 15kHz
Audio signal/noise CCIR/ARM wtd	73dB
THD at 0VU 400Hz	0.18%
Dimensions (w x h x d)	42.5 x 8.5 x 37.6cm
Typical Retail Price (inc VAT)	£550



AKAI VS-77EK

AKAI (UK) LTD., 12 HASLEMERE HEATHROW ESTATE, SILVER JUBILEE WAY, HOUNSLOW, MIDDLESEX. TEL: (01) 897 6388.



Most of the VS-77's basic features are identical to those of the VS-75, which reflects the fact that this model is a kind of value added version of its cheaper cousin. The VS-75 is also covered in this project, and I've given a fuller description of the shared features there. A shortened version of the salient points follows, but what makes this machine really exciting is that it has a built-in amplifier and Dolby Stereo decoder, whilst taking up no more room than any other VCR.

There are two main modes of use, apart from the usual method which ignores the added sound related features altogether. The first and simplest involves using the recorder to feed a pair of loudspeakers which typically will be placed a few feet each side of the television. The TV's own speaker(s) can then be bypassed, and any NICAM stereo signal will be reproduced in stereo. Of course NICAM isn't available if you tune the TV to a frequency other than the one the recorder is tuned to – for example when recording one channel and watching another.

With the other method, the Dolby Surround circuit is used for enjoying films with Dolby Stereo soundtracks. As Dolby surround hardware goes, the 77 is a relatively simple implementation. It produces four loud-speaker feeds for a classic square speaker layout, two at the front positioned as a normal stereo pair each side of the television, and two further speakers at the rear. In this case the Akai's speaker outputs feed the rear speakers (remember the 77EK has a restricted power output, and rear speakers in Dolby Surround don't use much power), and a line level output feeds your hi-fi system which is used for the front channels.

There is no provision for a central speech channel in this quite rudimentary set-up. All four outputs are controlled together by a rotary electronic volume control. Secondary switching includes an option designed to synthesise a stereo soundstage from a mono signal, and a 'hall' mode which adds warmth and reverberation, much as you'd expect from a large nearly empty hall.

You also have an eight event, one month timer, a stand-off one event 'quick timer'

which can make a recording of a specified duration within 24 hours and two speed operation (SP/LP). The well designed remote control includes front-rear and side to side sound balance controls and 45 programmable function keys. Tape indexing, intro search, the ability to find index recordings up to 15 recordings away, and return to zero – all find a place here. The audio circuits are graced with good quality peak hold meters (no auto-record levels here!) and MPX filter switching – a nice touch. Status displays appear on screen as well as on the recorder, and are both comprehensive and comprehensible. The tape counter reads in units of time, but the VS-77 can't determine tape lengths or detect how far the tape has wound.

SOUND AND PICTURE QUALITY

Picture and sound quality are more or less indistinguishable from the VS-75. In fact there was a very slight gain in colour saturation in this dearer design, which could easily be due to sample variation. The added features appear not to have detracted from the video or normal audio performance of the recorder.

The Dolby Surround circuit worked well within the constraints discussed above, except that noise (hiss) in the rear channel was a little more prominent than expected. The Hall mode was dramatic and might prove attractive to some, but I doubt its usefulness after the novelty has worn off since there's no musical integrity to it. Ditto with the synthesised stereo circuit, with bells on. But these circuits are very much secondary to those concerned with Dolby Surround.

Measured audio performance ranks as satisfactory, though the numbers are not quite as good as achieved elsewhere. Any shortfall, however, hardly bears on perceived performance, and both hi-fi sound and picture quality rate as good. The Hi-fi sound system gives clean, clear reproduction with a real suggestion of subtlety and finesse, and with better treble openness and clarity than many other Hi-fi video installations. Picture quality is in the top rung of non-S-VHS

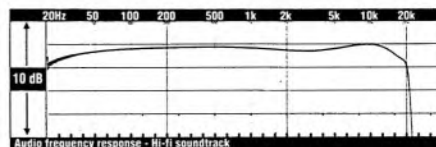
models, and on many receivers will pass as an off air signal. Video noise was low and geometry good with well lit colours and good colour registration. On a good monitor, a subtle loss of fine detail and minor localised losses of stability could just be seen. Noise bars during fast scan were inconspicuous and slow motion was noise free.

CONCLUSIONS

This is an excellent recorder with very few snags and with high standards of usability and watchability. The Dolby circuit is welcome and effective (which is more than can be said of the added hall and spatial mono effects). However, the 77 is open to the criticism that it over simplifies Dolby processing in an otherwise entirely laudable attempt to make the system attractive to a largely indifferent public, but that's the extent of the criticisms. Recommended.

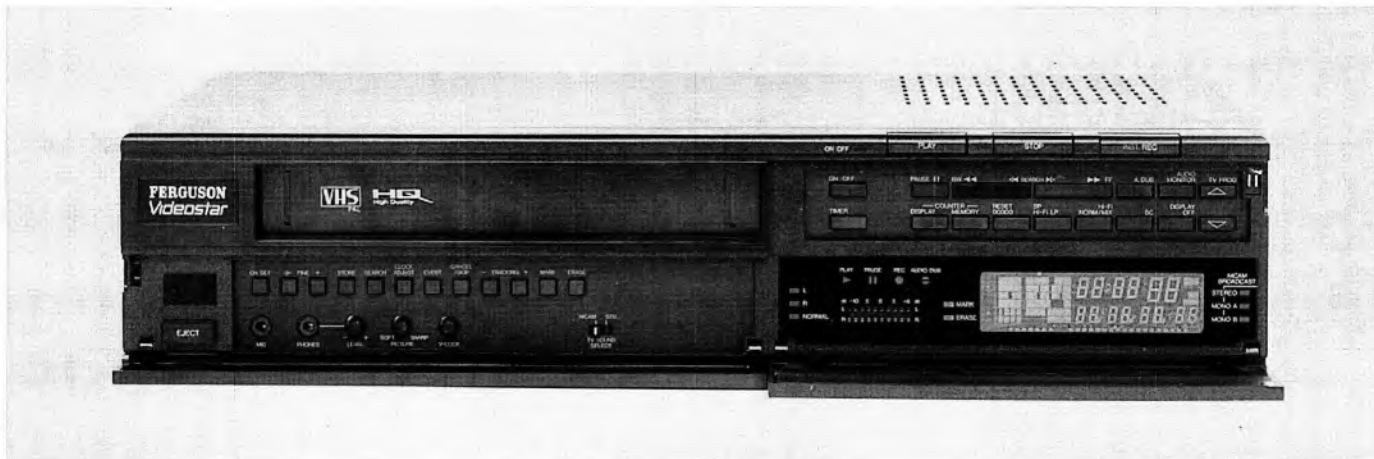
GENERAL DATA

Heads (video/audio)	4/2
S-VHS	no
Hi-Fi	yes
Manual/auto level recording	both
Digital effects	no
NICAM	yes
Long Play	yes
Simulcast Recording	yes
Timer	8 events/1 month
Tape indexing	yes
SCART connector	yes
Audio rec/replay response – 1dB/1kHz	30Hz – 16kHz
Audio signal/noise CCI/R/ARM wtd	75dB
THD at DVU 400Hz	0.15%
Dimensions (w x h x d)	42.5 x 8.5 x 37.6cm
Typical Retail Price (inc VAT)	£700



FERGUSON FV33H

FERGUSON LTD., 270 GREAT CAMBRIDGE ROAD, ENFIELD MIDDLESEX EN1 1ND. TEL: (01) 363 5353.



Most hi-fi recorders are expensive, and NICAM ones tend to be even more so, which limits the size of the market they address. This one, however, is relatively cheap, but this doesn't mean that it's Spartan. Apart from the NICAM decoder and the Hi-fi recording circuit (without which NICAM stereo can't be laid down on tape) the Ferguson *FV33H* has a long play (LP) facility, but for sound recording purposes only – not video. The logic behind this half way house provision may be that half speed working entails no important compromises to sound quality whereas LP video almost invariably suffers badly.

The timer can make as many as eight recordings over a one year period. Timer programming can be accomplished using a neat interactive transmitter remote control on which up to four programmes can be assembled and transmitted at a time.

Recording options are relatively simple, but they do include assemble editing, a microphone input (the output of which can be mixed with another source), and for monitoring purposes a headphone socket and level control. There's no manual record level facility, which means recordings are strictly at the mercy of the auto record level circuit.

On playback it's possible to separately select either channel of the stereo soundtrack, the mono linear track or even to mix the linear and hi-fi tracks, though the recorder automatically defaults to stereo/Hi-fi. Ferguson lays particular stress on finding your way around the tape. Of course there's the usual fast (9x normal speed) cueing, but the deck also has a full indexing feature supported by intro search which plays the first few seconds of each separate recording. The tape counter measures elapsed time, and the electronics allow specific time points to be located directly. The counter can't determine tape lengths, but if prompted to find a place when the tape hasn't been rewound, it rewinds and zeros itself before doing so.

Ergonomics are disappointing. The remote control is a high point and is no real cause for concern, but the recorder is a mess of poorly differentiated controls, in some

cases disposed with little sense of rhyme or reason. With the two large front flaps closed and most of the controls under cover, the display is badly obscured even from quite shallow angles above the normal.

SOUND AND PICTURE QUALITY

Picture quality is workmanlike but hardly exceptional. Chroma performance is good – colour reproduction is a little unsubtle but there's no shortage of depth and saturation, even with reds and oranges which are traditional problem colours. Luminance – the monochrome section of the signal – is; however, poorly handled. The level of detail is relatively low and any attempt to boost it by tweaking the 'picture' control results in clear overshoot. It also betrays some differences in clarity in areas of different colour. Pinks and blues seem particularly badly affected.

Video signal/noise performance is a little below average, leaving a vaguely grainy screen appearance despite the lack of resolution. Dropout is often apparent, though there was some indication of improvement towards the end of the test period. The special play modes also suffer to an extent. Still frame results were jittery, and often subject to a noise bar which could only be eliminated by inching the tape along frame by frame. The cueing gave much more disturbing noise bars than is usual these days.

Whilst the normal linear soundtrack works entirely satisfactorily, the Hi-fi soundtrack is less than wonderful. Reproduction has a slightly grainy, gritty quality, a kind of auditory analogue of the jittery picture, and perhaps caused by the same mechanism.

CONCLUSIONS

Up until now, NICAM stereo has been associated with the unaffordably expensive end of the market. This new model from Ferguson, along with a similarly priced model called the *HR-D750* from JVC, reviewed separately, (they're probably made on the same production line) are setting new low price points for NICAM equipped recorders. You need to look hard to find the evidence of cost cutting because the *FV33H* is so well equipped. But

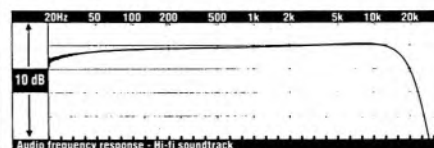
evidence there is, for example in the rather flaky appearance of the fascia moulding and the cramped though informative display. There's some suggestion of price cutting in performance related areas too.

There are no technical novelties here; the *FV33H* is what Ferguson describes as 'consumer driven'. It aims to bring NICAM to the masses, or as near to them as technology and marketing factors allow. Although sound quality is good, the standard of video performance achieved is typical of what was common, say, three or four years ago. In a more expensive model this would have been a matter of censure.

Finally, the lack of sensible control organisation is incomprehensible to me, especially from a company with such a good record in this area. The lack of manual record level adjustment is a severe impediment to using the recorder as a surrogate cassette deck.

GENERAL DATA

Heads (video/audio)	2/2
S-VHS	no
Hi-Fi	yes
Manual/auto level recording	auto
Digital effects	no
NICAM	yes
Long Play	sound only
Simulcast Recording	yes
Timer	8 events/1 year
Tape indexing	yes
SCART connector	yes
Audio rec/replay response – 1dB/1kHz	20Hz – 18kHz
Audio signal/noise CCR/ARM wtd	81dB
THD at DVU 400Hz	1.4%
Dimensions (w x h x d)	43.5 x 9.5 x 33cm
Typical Retail Price (inc VAT)	£500



JVC HR-D750EK

JVC (UK) LTD., ELDONWALL TRADING ESTATE, 12 PRIESTLEY WAY, STAPLES CORNER, LONDON NW2. TEL: (01) 450 3282.



The JVC HR-D750 and its opposite number in the Ferguson stable, the *FV33H*, (reviewed separately) could almost have been shelled from a pod. There are only minor differences between them. However, there's one way in which this JVC is indisputably in the lead. Where the Ferguson bears little sign of being designed in any meaningful aesthetic way, the JVC is sharp and modern.

Even though many of the JVC's controls are exposed they scarcely detract from the modern, clipped lines. Furthermore, they're laid out in an unusually comprehensible way. Those controls not used for normal day to day use are squirrelled away behind a central flap, but even here JVC has gone to some lengths to make the layout practical, for example by using large, clear description labels. Other manufacturers could learn something useful from this recorder.

Somehow, JVC's inventive copywriters have produced a surprisingly realistic features list that stretches over a complete page of the instruction manual in closely spaced type. Of course the main features are the Hi-fi sound system (auto record level setting only, so this is not a serious high fidelity only recorder) and NICAM decoder, with all the usual related benefits including simulcast recording. The *D750* also has a half speed (LP) option which can be used to record up to eight uninterrupted hours of audio only. Video recording is limited to normal SP speed. Given most recorders' performance on LP mode when recording video, this restriction is no real loss.

The tuner has 48 presets with random or sequential selection on the recorder as well as the TV. The timer has a full eight programme capacity within an almost academically long 12 month time scale. The remote control assists in the programming task with an interactive setting up technique featuring an LCD display panel. Four programmes at a time can be assembled in this way, the compiled instructions then being transmitted to the recorder in one operation. The handset will also control a JVC brand TV receiver. A so-called one touch or instant record timer is also fitted.

A special strength of the package, and one area where users of older designs will notice a particular improvement, is the ease with which tapes can be searched, for example using the tape indexing feature. Index points are automatically laid down whenever a recording is started, but they can be freely added or removed later. Using these codes, individual recordings can be found quickly and easily. Up to nine index points can be skipped over if so specified, but intro search (a few seconds from the top of each recording) is also available. Other extras include a counter memory, a couple of 'go-to' functions and a real time counter. This last is not the super intelligent type that detects tape length and position unaided. The final important feature is an adjustable level headphone socket.

SOUND AND PICTURE QUALITY

By rights, on-screen performance should be as near as 'dammit' the same as the Ferguson *FV33H*. It isn't. Although in the same general ballpark, the *D750* is obviously better aligned, which leads to significant gains both to sound and to picture quality.

Both are good. The audio frequency response is almost entirely flat bar a very gentle roll-off in the extreme bass. Signal/noise is a little poorer than average, measured at a fairly substantial 1.7 per cent distortion which with the Hi-fi FM system amounts to incipient mistracking. There are occasional traces of very low level switching noise when using headphones, but sound quality is never less than smooth, clear and well controlled. Assessed as a cassette deck surrogate the only shortcomings are a slightly cold, mechanical feel. Picture quality rates a straight 'pretty good' which is more than fair enough at the price. Video noise levels are low and colour saturation and registration are of a high standard. But the picture is a little soft, almost as though it has been defocused. Resolution of fine detail is slightly but unmistakably limited.

CONCLUSIONS

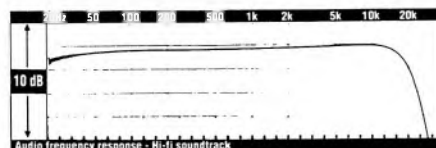
Although the number of names you see on

the front of video recorders is wide, the amount of manufacturers responsible for making them is surprisingly small. JVC is one of the few, and is responsible for more than one of the non-JVC models also covered in this test, for example the Ferguson *FV33H*, which just happens to share the JVC's key distinguishing feature – the price. At the time of writing the £500 retail price quoted for both recorders is about as cheap as they come with Hi-fi sound and NICAM. This, within the present limits of the possible, is where affordable off air stereo is at.

To most eyes the JVC will probably prove the more attractive product. More important than mere aesthetics, the *D750* wins hands down for ergonomics and usability – uncharacteristic as this outcome may seem. Finally, it is rather better set up, though aspiring buyers may not find the same differences with production samples purchased off the shelf. This then is an attractive and well equipped design with good tape search facilities and evident good build quality. Best Buy.

GENERAL DATA

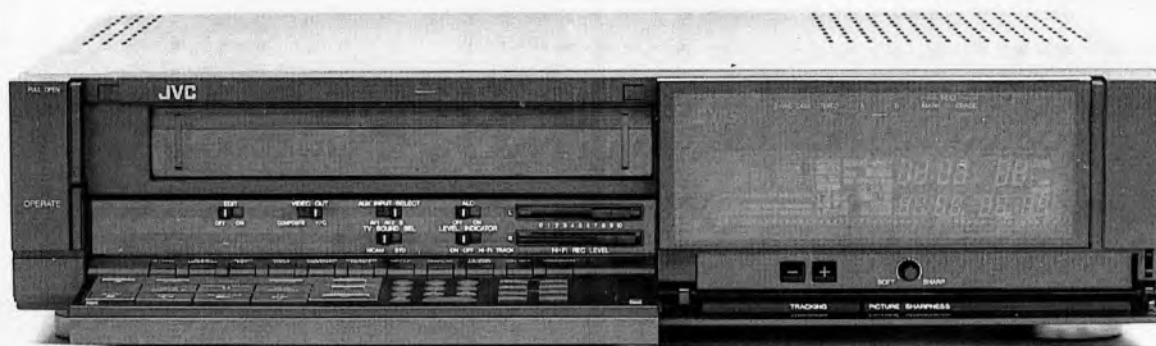
Heads (video/audio)	2/4
S-VHS	no
Hi-Fi	yes
Manual/auto level recording	auto
Digital effects	no
NICAM	yes
Long Play	sound only
Simulcast Recording	yes
Timer	8 events/1 year
Tape indexing	yes
SCART connector	yes
Audio rec/replay response – 1dB/1kHz	20Hz – 17kHz
Audio signal/noise CCIR/ARM wtd	77dB
THD at 0VU 400Hz	1.7%
Dimensions (w x h x d)	43.5 x 9.5 x 33.2cm
Typical Retail Price (inc VAT)	£500



JVC HR-S5000EK

JVC (UK) LTD., ELDONWALL TRADING ESTATE, 12 PRIESTLEY WAY, STAPLES CORNER, LONDON NW2. TEL: (01) 450 3282.

RECOMMENDED



JVC invented S-VHS, and at the time of writing the *HR-S5000* has a right to be regarded as the authentic, seminal S-VHS recorder, the one against which others are to be measured. It's not hard to see it in that role. It's a sophisticated, expensive looking design.

The main function keys are fitted on the inside of the main flap, which is horizontal when open. Minor or less used controls, most of which set defaults (in and output settings, meter display etc) are also more or less hidden, just below the loading slot. There's also a remote control, a fairly traditional but complete implementation of an LCD transmitter design which is closely related to the handset that for some time has been supplied with better JVC and Ferguson recorders.

Both modes of operation – VHS and S-VHS – can be used at normal speed or in Long Play, which means a maximum recording time per tape of eight hours in VHS and six hours in S-VHS (there are no *SE-240* tapes).

The back of the *5000* is going to look unfamiliar. In addition to all the usual socketry, there are two Euroconnectors, one for record/playback use, the other just an input, basically for dubbing. The sockets can be switched to carry composite video, for which the Euroconnector was originally standardised, or separate chrominance and luminance signals for improved video quality. However, this breaks the standard and doesn't always work with third party equipment. In addition, the recorder has an S-Video input terminal for signals from another recorder, player or camcorder, and an S-Video output to another recorder or TV with similar socketry.

Four video heads provide a range of mainly noise-bar free speeds ranging from about one frame a second to 9x playing speed, all selected using just one pair of keys. Three faster than normal search speeds are available in both directions, and normal play speed is available in reverse – no, I don't know why.

The tuner can store 48 channels and of course has a NICAM stereo decoder. Tape search aids include the whole range of features from a remaining time counter, a

counter memory, VISS indexing, a fast acting intro search, direct selection of recordings numbered up to nine away in either direction, and a facility to find any place on the tape by specifying its location by time. Head-phone and microphone sockets are also fitted, the former with a volume control as usual.

SOUND AND PICTURE QUALITY

Highlights include a flying erase head which helps produce clean inserts and edits, a promise that is sustained in practice. On the whole though it's fair to say that non-standard play speeds, the so called 'trick frame' ones, deliver a little less of true excellence. Compared to the Mitsubishi *B70*, the strongest member of our group, either noise bars are a little more prominent or screen shake is more apparent, though not always over the entire picture area.

However, crosscolour interference is remarkably low and colour registration also extremely fine. Large areas of deep red, a colour that over-saturates readily with most recorders, causes no problems in S-VHS mode. S-VHS is also incredibly crisp and lively on screen. It gives a scale of improvement broadly comparable to the gains in clarity and resolution when moving from linear to Hi-fi sound. Both S-VHS and NICAM/Hi-fi may mean relatively little with an ordinary mono TV installation, but with a high grade compatible monitor and a decent hi-fi system to handle the audio, results can be quite astonishing. One test recording I made recently was of the Derek Jarman's film based on Britten's *War Requiem*. Ostensibly broadcast in mono only, it was available in my area in NICAM stereo. Well reproduced, the recording, which is over a quarter of a century old, sounds as alive and as fresh as anything short of the original recording reproduced on a top class system. The recording is, simply, spellbinding.

The *5000* is an exceptional recorder, but is pipped by the Mitsubishi, which crucially has a superior video signal/noise performance. Blacks are not quite as dense or as even, and dark tones are relatively poorly

differentiated, confirmed using test card data. In addition, poorly lit areas show evidence of granularity, albeit at low level. LP performance is good, but noisier and coarser on screen than standard speed VHS, claims to the contrary notwithstanding.

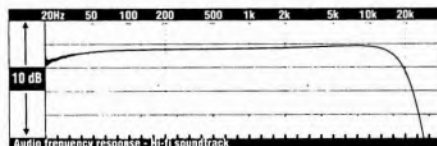
The linear sound track is surprisingly wonky and unsurprisingly lacking in treble in LP mode. The Hi-fi mode sounded good, but at times it did seem a little coarse and edgy, though it opened out nicely, offering good stereo depth and precision at high levels.

CONCLUSIONS

This is an impressive and largely snag free recorder, and a more than adequate exemplar of a new video technology. It performs more or less to broadcast standards as received, and more than matches the standards of some professional U-matic recorders I've seen. It also boasts a most attractive appearance and civilised user interface. It's obviously to be Recommended, though it's just a few percentage points short of the Mitsubishi for picture and sound quality alike.

GENERAL DATA

Heads (video/audio)	4/2
S-VHS	yes
Hi-Fi	yes
Manual/auto level recording	both
Digital effects	no
NICAM	yes
Long Play	yes
Simulcast Recording	yes
Timer	8 events/1 month
Tape indexing	yes
SCART connector	yes
Audio rec/replay response – 1dB/1kHz	30Hz – 16kHz
Audio signal/noise CCIR/ARM wtd	79.5dB
THD at DVU 400Hz	3.2%
Dimensions (w x h x d)	43 x 11 x 35.7cm
Typical Retail Price (inc VAT)	£1000



MITSUBISHI HS-B70

MITSUBISHI ELECTRIC (UK) LTD., TRAVELLERS LANE, HATFIELD, HERTS AL10 8XB. TEL: (07072) 76100.



The basics of this Mitsubishi are similar to the other S-VHS models. S-VHS and NICAM are the most important features of course. The usual full backwards compatibility is retained with standard VHS, and S-VHS tapes can be recorded using the old VHS standard for compatibility purposes.

The so-called user interface is not the most inspiring around, but it is practical. Controls are adequately spaced and labelled, a litmus test that is often failed, and indeed was failed by one arch rival, the Panasonic *NV-FS1*. There are minor niggles though. Example: the otherwise excellent display uses a highly ambiguous visual device that looks like a 110 size photographic film viewed edge-on to show transport modes. Why not use arrows like the good guys?

The remote control makes up for this and other such minor misdemeanours. It is a large but well laid out device with an LCD display to assist when programming, and an ability to mimic at least some of the commands of other handsets. As learning remotes go, it's a rudimentary design with a capacity to store the codes for just 15 commands. But that might well be enough for a TV, say.

Programming is possible for eight programmes (max) within a one month period, and can be performed on screen or using the handset. There's also an instant timer with a delayed start option. The *B70* is particularly well kitted out for tape search. Three basic methods are available: using index points (VISS), which are automatically recorded every time a recording is made, address points (VASS), which are similar to index points but with unique address numbers, and by specifying a time difference (forward or back) from the current position. There's also a straight counter memory. You can specify an index point up to 19 indices away, or run an intro search of the whole tape. Index points can be post-edited at will. But if all this still isn't enough, there's even a tape remain display which automatically works out what length of tape is inserted and just how much of it has elapsed, though *E240s* have to be explicitly identified. Even a com-

monplace feature like cueing has had more than the usual care lavished on it. Cueing works without the need to keep the finger on the button, and at normal or high speed.

On the video side, your £1000 buys a 100 channel tuner and a wide range of slow motion, speeded up and reverse speeds. With four video heads on the head drum, all but the fastest speeds are free of noise bars. A so-called 'twin digital' servo automatically detects and corrects tracking errors whenever they arise. The tracking adjustment is performed for slow option and stop frame too, which is a real novelty.

SOUND AND PICTURE QUALITY

Easily the best of the S-VHS recorders, and therefore of our group, the Mitsubishi lived up to the promises when used with the S-VHS compatible JVC monitor. In SP mode picture quality is sharp and vivid, but so are the JVC and Panasonic models. No, where the Mitsubishi really scores is in its extraordinary picture stability and lack of grain.

There is very little sign of the over-etched borders between areas of contrasting colour, or of the extra picture granularity that betrays image sharpening circuits. Au contraire, on-screen results are remarkably natural. The range of colours is wide with subtle gradation, colour purity is excellent with good whites and excellent shadow detail. Colour registration is good, but not perfect; fine checks are reproduced without flashes of colour and fringing. Equally impressive, the subtle instability on vertical edges, that usually betrays video if nothing else does, is almost entirely absent in here. This last probably has nothing to do with S-VHS itself, but suggests that the transport is unusually jitter free.

From the Hi-fi track, results were much as you'd expect, with rather lower noise than some of a less obtrusive character. However, the dbx-like noise reduction system could be heard more clearly than on some installations, often as a little puff or hiss behind explosive transients. Of the remaining facilities, don't believe what they tell you about LP recording. It isn't as good as normal VHS. It's

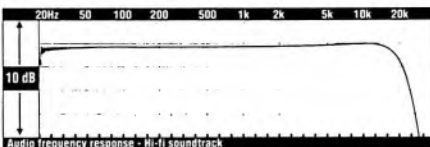
true that an S-VHS LP recording will capture most of the sheer detail of S-VHS SP, and that fine detail is clearer than with VHS SP. But picture stability suffers badly, noise levels are greatly increased and picture shake tends to dominate. SP can pass as broadcast TV, even on a good TV. Half speed certainly can't. Ditto with the trick frame results which are clean at normal speed, almost to the standard of a professional recorder, but which are much cruder in LP.

CONCLUSIONS

Those who prefer something simple to operate might be better off looking elsewhere, but those who hanker for state of the art performance combined with the most sophisticated range of facilities – many extremely useful let it be said – should look no further. The *B70* is a clear first choice and comes highly recommended (also with a capital 'R'). The control system of the test sample proved intermittently troublesome, otherwise I have nothing but praise. It's a real coup for Mitsubishi.

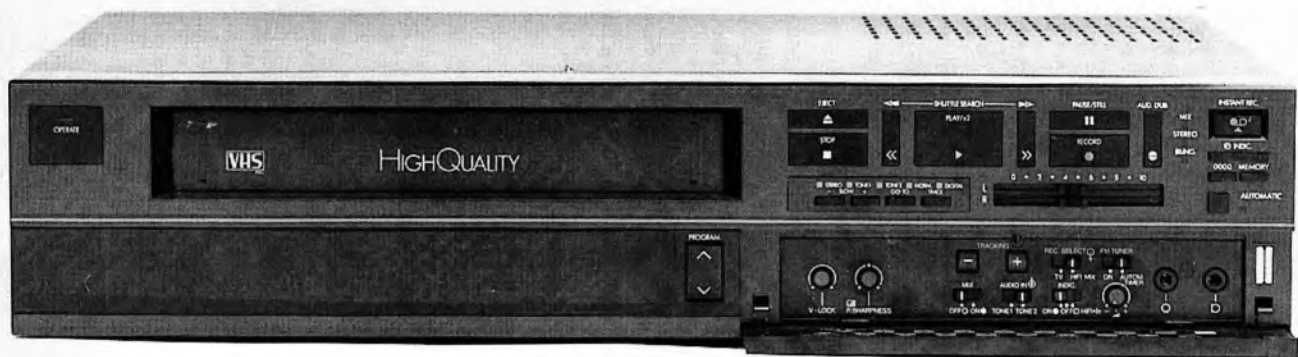
GENERAL DATA

Heads (video/audio)	4/2
S-VHS	yes
Hi-Fi	yes
Manual/auto level recording	manual
Digital effects	no
NICAM	yes
Long Play	yes
Simulcast Recording	yes
Timer	8 events/1 month
Tape indexing	yes
SCART connector	yes
Audio rec/replay response – 1dB/1kHz	<20Hz – 19kHz
Audio signal/noise CCIR/ARM wtd	82dB
THD at DVU 400Hz	3.3%
Dimensions (w x h x d)	42.4 x 11.2 x 40.9cm
Typical Retail Price (inc VAT)	£1000



NORDMENDE V4405K

NORDMENDE, PO BOX 1140, ENFIELD, MIDDLESEX EN1 1ND. TEL: (01) 366 4442.



This Japanese made, German badged recorder has the low key styling that Nordmende has made its own. The *V4405* is well kitted out, although there are significant omissions, the key one being NICAM for off-air stereo. Whilst the Nordmende is stereo capable and can take advantage of stereo prerecorded cassettes or record stereo simulcasts by virtue of being equipped with the Hi-fi sound system, it does not have a NICAM decoder and can only pick up mono FM off air. As national NICAM broadcasting is now but a hop and a skip away, at least as far as ITV and Channel 4 are concerned, this omission must be regarded as serious. Especially on a deck that's this expensive.

We move on . . . The timer has an eight event/one year capacity with daily and weekly repeat options. The instant timer is a simple type without a delayed start feature. Tape search aids are extensive and include a counter memory, index scan (index points are laid down when recordings are initiated), index search up to nine selections away and can 'go-to' a random counter reading. Best of all the Nordmende has a display which can give a continuous, accurate reading of tape remaining after a few seconds delay during which it determines the length of tape inserted and the current position.

Video play facilities are typical of up-market recorders. There's a range of slow motion speeds, still frame, frame advance and 2x play. Picture sharpness is adjustable, and clean assemble edits can be made. Extra facilities include a camera pause connection. Sound related facilities include manual and auto record level setting (the auto option has a fairly brutal gain riding characteristic, and should be avoided with music), a simulcast switch, a microphone input and a variable level headphone outlet. The remote control is a transmitter type which allows instructions for up to four programmes to be assembled locally and transmitted as a group. It can also control Nordmende TVs.

Last and not least, the Nordmende is equipped with a range of digital effects including digital still frame, stepped playback, and – prettiest of all – solarisation. However, what is

lacking is PIP – Picture in Picture, probably the only digital effect worth having.

SOUND AND PICTURE QUALITY

Performance is basically very good, but with some caveats. Assessed using the SCART connector and in SP (standard speed) mode it's clear that the basic JVC made mechanism is of a very high standard, with the result that picture stability is extremely fine. There's a notable absence of dot crawl on vertical edges or of video noise, and the registration of colour with luminance information is good. Generally speaking, although there's some loss of data as is inevitable with the VHS system, the lack of noise and instability means that the Nordmende can successfully pass as a live broadcast on many receivers.

For some reason however, the test recorder had a duff RF convertor. When it was used via the traditional 75ohms aerial cable, the on screen picture was significantly darkened. Apart from this there was nothing much wrong with the picture but attempting to lighten the picture on the monitor (which of course would need doing every time video was selected) gave rather pastel tones on the test (Philips) monitor, and some loss of contrast and lightening of dark areas. Nordmende suggests that this was a fault and was not typical. Sadly, tight schedules didn't allow a second sample to be checked.

Naturally there's some blurring and spreading of colour in LP mode, along with a reduction of detail, signal/noise and stability. In fact LP mode on screen performance is not amongst the best of this group, but it's serviceable for emergency use – to take advantage of the timer facility whilst on holiday, say. Sound quality appears to be identical at the two speeds. It is remarkably clean, with the character of low level noise quite innocuous under most conditions, though not always when replaying recordings made elsewhere.

Trick frame results were excellent on SP. There was an almost complete absence of noise except, inevitably, when cueing. Even here the limited extent of the disturbance will come as a revelation to some – in SP mode. Slow motion speeds and still frame are

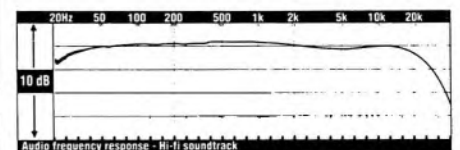
free of noise on both playing speeds, whilst the digital effects did what they were supposed to, with the usual significant loss of detail and distortion of colour tonal spectra. Double speed play at either speed caused picture roll in my installation.

CONCLUSIONS

There are facilities on this recorder that are not intended for the UK and which don't do anything here (eg VPS – Video Programme System), and some of the control legends are distinctly obscure. Functionally this is an excellent recorder if the RF convertor is left to one side, and that is probably a sample fault. But the *4405* is a story of lost opportunity. The price is high, yet there's no NICAM decoder and the digital effects, which might have done much to make the price look more palatable, crucially lack PIP.

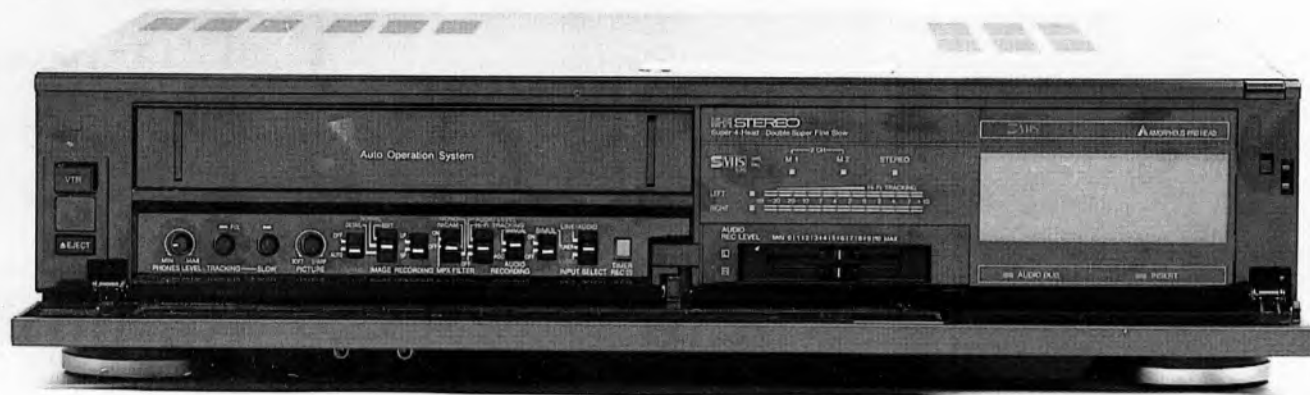
GENERAL DATA

Heads (video/audio)	4/3
S-VHS	no
Hi-Fi	yes
Manual/auto level recording	both
Digital effects	yes
NICAM	no
Long Play	yes
Simulcast Recording	yes
Timer	8 events/1 year
Tape indexing	yes
SCART connector	yes
Audio rec/replay response – 1dB/1kHz	25Hz – 22kHz
Audio signal/noise CCIR/ARM wtd	80.5dB
THD at DVU 400Hz	0.55%
Dimensions (w x h x d)	44 x 9.5 x 38cm
Typical Retail Price (inc VAT)	£799



PANASONIC NV-FS1

PANASONIC UK LTD., 300-318 BATH ROAD, SLOUGH, BERKS SL1 6JB. TEL: (0753) 34522.



The Panasonic is an S-VHS recorder with a NICAM stereo decoder and a half speed (LP) capability for pictures and sound. In common with the equivalent JVC *HR-S5000EK*, the *FS1* is an ultra clean looking design. The fascia is almost completely bare apart from a power switch and the main display. The controls are only revealed by folding down a full width and (almost) full height front cover. The major transport, tuner and timer keys are fitted to the inside of this flap, and are disposed horizontally when open.

So far, it's just like the JVC. However, the difference could be a key one for some, and represents this model's most important disadvantage. The controls are very difficult to get to grips with. The various slide switches have variously impenetrable legends, and it's often difficult to determine their status. The actual control labels used are not unambiguous in some cases too. Even the main controls are rather mealy laid out.

Unfortunately, muddled thinking extends into the remote control provision. In fact there are two remotes. The main one is a perfectly standard implementation, a straight non-LCD handset (sounds positively stone age, doesn't it?) which handles the usual functions including programming and the trick frame facilities, most of which cannot be accessed on the recorder itself. Science really comes into its own however with the second remote which is a pen type infra-red bar code reader.

Also supplied is a fold out laminated card covered in bar codes for channel numbers, dates, start and stop time (etc) from which programming instructions can be built up parameter by parameter. Many people will be put off by this because it looks so fearsomely complicated, and they'd be right. Even for those who persevere, the procedure remains tiresome and slow. The bar code reader has an LCD window in which programmed instructions can be checked (by reading a 'check' barcode!), but it demanded careful handling and even so didn't always read right first time. Still, the point is that you're *not* stuck with it.

The rest is good news. With four video

heads, the recorder is equipped for clean noise and jitter free slow motion results (from 1/5th to 1/25th normal speed), and a very high quality still frame/frame advance. The faster speeds (9x cueing and 2x) also look impressive on screen in SP mode. The sound system includes manual and automatic record level setting, a defeatable MPX filter, simulcast switching, a controllable headphone socket and a microphone input – the lot in fact.

On the video side, the Panasonic has a 99 channel tuner, a flying erase head for clean inserts and assemble edits and audio dubbing for the creative user – plus a switch to 'enhance' S-VHS detail. The timer has an eight event/one month capacity plus an excellent instant or delayed start timer. VISS indexing will find tracks up to 20 record starts away, and an intro search feature is also fitted.

SOUND AND PICTURE QUALITY

Picture quality, whilst excellent, is no match for the other two S-VHS models. The problem (it's not really dramatic enough to be described in such terms, but still...) is not found in picture resolution, which is of a high order and broadly comparable on test cards and normal programme with the other two. Like the JVC but to a rather greater extent, general picture noise, especially in areas painted in a dark colour, is rather high, giving a grainy effect similar to many old films. In addition, there is a certain amount of jitter on sharp vertical edges, especially compared to the Mitsubishi.

The Panasonic has one other shortcoming, in that areas of colour tend to bleed outside their allotted areas. Poor chroma registration is supposed to be a thing of the past with S-VHS, but the evidence here contradicts the proposition. Panasonic could also usefully improve picture geometry which tends to vary with spectral balance. Finally, the Panasonic shows signs of overshoot – falsely emphasised detail and edges – and emphasises granularity with the 'detail' circuit activated.

Long Play S-VHS is comparable to the

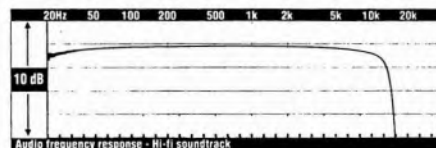
other S-VHS models – plenty of detail, but a generalised increase in noise and loss of colour subtlety and dynamic range amongst other effects. Standard VHS is considerably better, a finding common to all S-VHS machines the author has tested so far. LP mode slow motion and still frame results in severe 'tearing' at the top or bottom edges, and frequently both. Despite the use of audio grade components (eg Cerafin caps) in the audio circuits, sound quality is not as sweet or as pure as usual. Although the higher than usual noise floor wasn't too obvious in practice, the loss of HF energy is apparent as a loss of stereo precision and ainness.

CONCLUSIONS

I'm guessing, but Panasonic probably felt it needed to run to catch JVC. It wouldn't have wanted to lag too far behind with its first S-VHS recorder. This at least is how the *NV-FS1* reads. Sleek and attractive on the outside, the control system is unhelpfully designed and performance is mediocre by S-VHS standards.

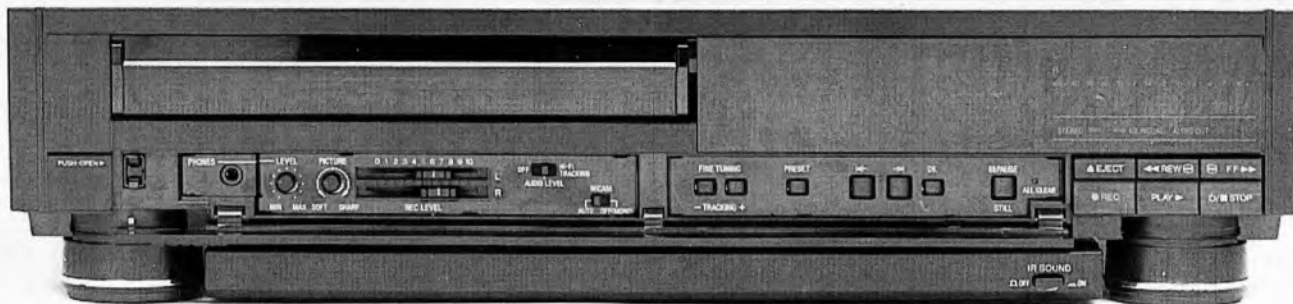
GENERAL DATA

Heads (video/audio)	4/2
S-VHS	yes
Hi-Fi	yes
Manual/auto level recording	both
Digital effects	no
NICAM	yes
Long Play	yes
Simulcast Recording	yes
Timer	8 events/1 month
Tape indexing	yes
SCART connector	yes
Audio rec/replay response – 1dB/1kHz	20Hz – 11kHz
Audio signal/noise CCIR/ARM wtd	77dB
THD at 0VU 400Hz	3.4%
Dimensions (w x h x d)	43 x 11 x 35.7cm
Typical Retail Price (inc VAT)	£1000



SANYO VHR-D4710E

SANYO MARUBENI (UK) LTD., SANYO HOUSE, OTTERSPOOL WAY, WATFORD, HERTS. TEL: (0923) 246363.



Sanyo presently offers a bewildering range of video recorders, including this expensive but not quite range-topping design. Many people will be surprised by its rather striking appearance.

Sanyo is widely known for its contribution to the gentle art of aesthetics, but this model carries more conviction than most. Although close examination betrays quite unremarkable ingredients, the exterior design is aggressively high tech whilst staying just the right side of over the top. Perhaps the false shock-absorbing feet really do go a little far, but the display is clear and attractive, the controls neatly executed and the overall effect is positive. Most of the very low control count is hidden away behind a flap leaving just the transport controls exposed.

And what a remote control! It's a big, chunky item, less of a handful than a pocketful. But with good reason. Not only does it include all the minor controls missing from the main recorder – those for the clock and timer amongst them – it also has an LCD display which is used for building up sequences of timer commands which can then be sent to the recorder in a group using a strategically positioned transmit control. However, the most noteworthy feature of the handset is totally unexpected. It has the wherewithal to run a set of headphones.

It contains an infra red receiver and pre-amplifier for the audio signal which is transmitted from the video on an infra red beam. The sound signal of course is the tape or off-air signal currently being played through the television. The handset has a stereo 3.5mm socket (there's one on the recorder itself, directly connected to the on board electronics) and a volume control (ditto). Both video and handset have switches to enable and disable the battery driven circuitry. By this means, video users in large rooms can listen to TV or video sound on headphones without long trailing wires, which in some circumstances could prove hazardous. A headset is supposed to be included, but wasn't with the test sample.

The rest of the recorder is pretty straightforward, leavened by the odd highlight or

three. Long Play (half speed) operation is a major feature, but is only implemented for the audio. Video can only be recorded at the normal speed. The timer can act on eight sets of programme instructions over a one year period, and is supported by an instant or one touch timer. Search aids include an index search and a 'go-to' facility, and by the counter which acts as a real time tape timer with automatic tape length and position recognition.

The other important feature is a range of digital effects, which have been neatly integrated into the design to provide a near perfect still frame, variable slow motion and automatically controlled tracking. Note there's no PIP (Picture in Picture) or other of the more exotic digital effects, which at this price level, and given that the number crunching chips have already been included, is a matter for regret. The *D4710E* additionally includes a 'memory recall' feature which repeats tape fragments. Remaining points not so far covered include 2x play, automatic play following rewind and a few other minor features in a similar vein. The audio system has bilingual as well as stereo playback switching, and manual record level setting.

SOUND AND PICTURE QUALITY

The headphone feature is a wonderful gimmick but that's more or less all it is – a gimmick. Infra-red reception is fairly reliable within five meters or so, but users with discerning tastes won't be satisfied with the sound for long. In short it is thin and lacks explicit channel separation, but what really makes the infra-red facility hard to live with is that the sound is forever darting around between the two channels. It's a disorientating and tiresome experience. By contrast the recorder's own headphone socket gives a sharper, fuller and more positive sound, with improved stereo differentiation and the missing stability restored. And headphone extension leads are cheap.

Intrinsic sound quality is good. Although not wholly neutral, the added touch of warmth noted during the tests was hardly a

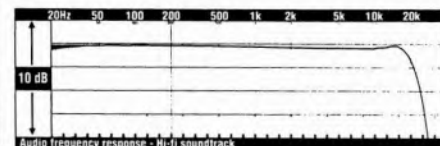
matter for great concern in normal use. Background noise is low and innocuous in character whilst reproduction has a real sense of clarity and poise. The video side is characterised by excellent chroma reproduction, even in the longer wavelength colours which shows barely a trace of oversaturation or break-up in shadow areas. The only slight criticism here is that the lighter colours (yellows etc) lack a little vividness. They appear 'dirty'. Video noise levels are very low. The luminance (detail) signal was a little soft however, which was visible as a bar to the resolution of very fine detail.

CONCLUSIONS

The Sanyo is an attractive model which includes a competent recorder section, a well integrated but limited digital effects package and a clever remote with an infra red headphone facility which unfortunately doesn't work as well as it should. This may be a sample related fault, but even so the model looks a little expensive for what it offers.

GENERAL DATA

Heads (video/audio)	2/2
S-VHS	no
Hi-Fi	yes
Manual/auto level recording	manual
Digital effects	yes
NICAM	yes
Long Play	sound only
Simulcast Recording	yes
Timer	8 events/1 year
Tape indexing	yes
SCART connector	yes
Audio rec/replay response – 1dB/1kHz	<20Hz – 19kHz
Audio signal/noise CCIR/ARM wtd	82dB
THD at 0VU 400Hz	0.50%
Dimensions (w x h x d)	42 x 9.9 x 35cm
Typical Retail Price (inc VAT)	£900



SELECTED DEALER DIRECTORY

Choosing a good hi-fi dealer is the most vital step in acquiring the system that is right for you. This unique directory gives full information on dealers in your area.

AVON

ABSOLUTE SOUND AND VIDEO, 65 Park St, Clifton, Bristol. (0272) 264975. A&R, Apogee, Denon, Dual, Krell, Linn, Magneplanar, Mission, NAD, Quad, Roksan, Rotel, Yamaha, etc. (closed Weds). Customer car park. BADA MEMBER **3124**

PAUL GREEN HI-FI LTD, Kensington Showrooms, London Road, Bath. (0225) 316197. A&R, Creek, Dual, Heybrook, Linn, Musical Fidelity, Rotel, Systemdek, Wharfedale, Magnaplanar, Krell, Apogee. Customer car park. BADA MEMBER **3124**

RICHER SOUNDS, 20 Cotham Hill, Bristol BS6 6LF. (0272) 734397. City-centre budget hi-fi discounts; most popular 'majors' from A to Z and all points in between; monthly 'specials'. Facilities: expert advice, free 48 page Hi-fi Guide and monthly Newsletters; mail order, part exchange. Mon-Fri 10-6, Sats 10-5. Access, Visa, Richer ChargeCard.

BEDFORDSHIRE

ASHTON AUDIO, 6 High Street, Dunstable. (0582) 608003. AR, Cambridge Audio, Denon, Incatech, JVC, Kenwood, Marantz, Monster, NAD, Nakamichi, Proton, Sony, Thorens, etc. Credit to £1,000. Access, Amex, Diners, Visa. Service dept. Dem room facilities. Open 6 days, 9-5.30, 6pm. Friday.

CAMBRIDGE HI-FI, 31 Cuthbert St, Bedford. (0234) 325035. Mission-Cyrus, Rotel, Kenwood, Pioneer, Manticores, Revolver, Ariston, I.T.L., KEF, Monitor Audio. Single speaker dem room. 9.30-5.30 6 days. Free installation. Service Dept. Visa, Access. Credit facilities.

BERKSHIRE

NEWBURY AUDIO, 2 Weavers Walk, Northbrooke Street, Newbury, Berkshire RG13 1A1 (0635) 33929. 6 days 9.30-6.00. Linn, Naim, Roksan, Exposure, A&R Cambridge, Ion Systems, Revolver, Ruark, SD Acoustics, Monitor Audio, Manticores, Nakamichi, Dual, Rotel, Royd. Dem room. Home trial facilities. Free installation. Late appointments. Interest free credit. Access, Visa.

READING HI-FI CENTRE, 4 Queen's Walk, Reading RG1 7QF. (0734) 575736. 'The best equipment, advice and service from Berkshire's premier Hi-Fi emporium'. BADA MEMBER

BUCKINGHAMSHIRE

AUDIO INSIGHT LTD, 53 Wolverton Rd, Stony Stratford, Milton Keynes. (0908) 561551. A&R, Audiolab, Heybrook, KEF, Linn, Mission Cyrus, Musical Fidelity, Nakamichi, Nytech, Rotel. BADA MEMBER **3124**

AYLESBURY HI-FI FIDELITY, 98 Cambridge St, Aylesbury. (0296) 28790. Denon, Dual, Exposure, Heybrook, Marantz, Musical Fidelity, NAD, Roksan, Rotel, Systemdek. 2 Dem rooms, appointment reqd. Mon-Fri 10-6, Sat 9.30-5.30. Home trial, free installation, credit to £1,500. Access, Amex, Diner, Visa. Service dept.

CAMBRIDGESHIRE

CAMBRIDGE HI-FI, 1 Hawthorn Way, Cambridge. (0223) 67773. Ariston, I.T.L., KEF, Mission Cyrus, Monitor Audio, Pioneer, Revolver, Technics, Thorens, Kenwood. All credit cards.

STEVE BOXSHALL AUDIO, 41 Victoria Rd, Cambridge CB4 3BW. (0223) 68305. 10-6 - 6 days. Denon, Rotel, Dual, Monitor Audio, Tannoy, Quad, KEF, Roksan, Nakamichi, Revox, SME, Audio Research, Krell, Magneplanar. 3 dem rooms, home trial, appointment preferred. Free installation and service dept. Access, Visa and credit facilities. BADA MEMBER **3124**

STILTON AUDIO, 489 Lincoln Road, Peterborough. (0733) 558838. A&R, Cyrus, Exposure, Harman Kardon, Linn, Meridian, Mission, Musical Fidelity, Roksan, Yamaha. Home trial, free installation. Credit facilities. Access, Visa, Amex. Mon-Fri 10-6. Sat 10-5.30. Service dept.

CHESHIRE

ASTON AUDIO, 4 West St., Alderley Edge. (0625) 582704. Wide selection of equipment in N.W. 2-year guarantee. 3

dem rooms. Tues-Fri 10-6, Sat 9-5. Closed for lunch 1-2. BADA MEMBER **3124**

DOUG BRADY HI-FI, Kingsway Studios, Kingsway North, Warrington. (Padgate 0925) 828009. 'Largest choice of specialist Hi-Fi in N.W.' All credit cards. 3 Dem rooms. Open 6 days. BADA MEMBER **3124**

NEW DAWN HI-FI, 1-3 Castle St, Lower Bridge St, Chester. (0244) 24179. Linn, Quad, Technics, National Panasonic, Denon, Rotel, Dual, Meridian, Aiwa, Philips. BADA MEMBER **3124**

SWIFT OF WILMSLOW, 4-8 St Annes Parade, Wilmslow. (0625) 526213. A&R, Aiwa, Denon, Marantz, Mission, Monitor-Audio, Pioneer, Trio, Yamaha, NAD. Dem facilities. Tues-Sat. BADA MEMBER **3124**

RICHER SOUNDS, 4 Wellington St, Stockport SK1 3RN. (061) 480 1700. Cheerfully small store by BR station with virtually all major 'budget' names, many on special offer. Facilities: expert advice; free 48 page Hi-fi Guide and monthly Newsletters; part exchange. Mon-Fri 10-6, Sats 10-5. Access, Visa, Richer ChargeCard. Mail Order for all Richer Sounds stores from this branch.

CHRIS BROOKS HI-FI, 29 Gaskell St, Stockton Heath, Warrington. 0925 61212/3. Tues-Sat 10-6. 2 dem rooms. Credit facilities. All credit cards. Total absence of bull****. BADA MEMBER **3124**

CORNWALL

N.C.E. HI-FI, The Bridge, Boscastle, N. Cornwall (08405) 248. Ariston, Arcam, Creek, Denon, Dual, Gale, Heybrook, Incatech, Marantz, QED, etc. Dem room. Full credit facilities including interest free. Access, Visa.

DERBYSHIRE

ACTIVE AUDIO, 12 Osmaston Rd, The Spot, Derby. (0332) 380385. Meridian, Mission, Denon, Yamaha, Rotel, A&R Cambridge, Monitor Audio, Trio, Marantz. Dem and home trial facilities. Open 9.30-6 - early closing Wed. Credit to £1,000. Access, Visa, Diners, American Express. Service dept.

ESSEX

A.T. LABS, 442/4 Cranbrook Rd, Gants Hill, Ilford. (01) 518 0915. Mon-Sat, 10-6. Two single speaker dem rooms. Access, Amex, Visa. BADA MEMBER **3124**

RAYLEIGH HI-FI, 44a High Street, Rayleigh, Essex. (0268) 779762/747571. 216 Moulsham St, On-the-Parkway, Chelmsford, Essex. (0245) 265242. A&R, Audiolab, Beyer, BLQ, Cyrus, Celestion, Denon, DNM, Epos, Gale. Access, Visa. 3 years parts and labour guarantee on hi-fi systems. BADA MEMBER **3124**

BRENTWOOD MUSIC & HI-FI CENTRE, 2 Ingrave Rd, Brentwood. (0277) 221210. Alphason, B&W, Cambridge Audio, Denon, Harman Kardon, Marantz, QED, Quad, Yamaha. Dem and home trial facilities. Mon-Sat 9.30-5.30 (Thurs from 10am, Sat from 9am). Free installation, credit facilities. Access, Visa, Hi-Fi Markets. Service dept.

LYON AUDIO, 16 Peartree Business Centre, Peartree Road, Stanway, Essex CO3 5JN. (0206) 560259. Audiolab, Beard, Celestion, Oracle, Rogers, Denon, NAD, Rotel, J.A. Michell, Roksan, Marantz, Quad. Dem facilities. Mon-Sat 9-6. Installations. Credit facilities up to £1000. Access, Visa, Hi-Fi Markets, Eurocheque. Service dept available.

GLOUCESTERSHIRE

ABSOLUTE SOUND AND VIDEO, 40/42 Albion St, Cheltenham. (0242) 583960. A-R, Denon, Dual, Linn, Meridian, Mission, NAD, Rotel, Technics, Yamaha, etc. (Closed Wed). BADA MEMBER **3124**

AUDIO EXCELLENCE, 58 Bristol Road, Gloucester. (0452) 30046. Audio Research, Dual, Krell, Linn, Magneplanar, Naim, NAD, Yamaha and lots more. Closed Mon. BADA MEMBER **3124**

HAMPSHIRE

ABSOLUTE SOUND AND VIDEO, 4 Feathers Lane, Basingstoke, Hants RG21 1AS. (0256) 24311. A&R, Audiolab, Denon, Dual, Linn, Mission, NAD, Rotel, Technics, Yamaha. Dem and home trial facilities. Mon, Tues, Thurs, Fri 9.30-6, Sat 9.30-5.30. Closed Wed. Free instal-

lation. Credit facilities. Access, Visa, Connect, Amex, Diners. Service dept. BADA MEMBER **3124**

HAMPSHIRE AUDIO LTD, 2-12 Hursley Rd, Chandlers Ford. (0703) 252827/265232. Quality CD and analogue agencies. 5 dem studios. Large free car park. BADA MEMBER **3124**

HOPKINS HI-FI, 38/40 Fratton Rd, Portsmouth PO1 5BX. (822155) 830753. Technics, Quad, Monitor Audio, Tannoy, Denon, NAD, Heybrook, Ariston, Onkyo, plus others. Dem facilities, appointments necessary. Access, Visa. 9-5.30. Open to 6 Thurs. Closed Wed. Service dept.

HERTFORDSHIRE

ACOUSTIC ARTS Ltd, 101 St Albans Rd, Watford, Herts. (0923) 45250. A&R, Audiolab, Denon, Magneplanar, Quad, Rogers, Meridian, TDL, Jadis, Krell. Mon-Sat 9.30-5.30. BADA MEMBER **3124**

THE AUDIO FILE, 40 Hockerill St, Bishops Stortford, Herts CM23 2DW. (0279) 506576. 9.30-5.30 6 days. Linn, Roksan, Rega, Naim, Denon, Mission, Cyrus, Marantz, Quad, Tannoy, Sony. 2 dem rooms. Home trial, free installation service dept. Interest free. Bada Charge Card. BADA MEMBER **3124**

ISLE OF MAN

ISLAND COMPACT DISC CENTRE, Parliament Square, Ramsey. (0624) 815521. Musical Fidelity, Sugden, Celestion, Harman Kardon, Teac, Castle Acoustics, Philips, A&R, JBL, Luxman, Bose, Sansui. Mon-Sat 9-5.00. Dem and home trial facilities. Free installation. Full credit, no limit. Access, Elite. Service dept.

KENT

JOHN MARLEY HI-FI CENTRES, 2 Station Rd West, Canterbury (Canterbury) 69329. Also at Dover - (0304) 207562. B&W, Heybrook, Magnum, M.Y.S.T., Nakamichi, Pink Triangle, Rotel, Sansui, Technics, Quad. Dem and home trial facilities. Mon-Sat 9-5.30 closed Thurs. Free installation. Credit to £1,000. Access, Visa, Creditcharge. Service dept.

VJ HI-FI, 29 Guildhall St, Folkestone. (0303) 56860. Mon-Sat 9-6. NAD, Yamaha, Marantz, Cambridge Audio, Denon, Kenwood, Tannoy, Rogers, Mordaunt Short, Dual. Dem and home trial facilities, free installation, credit to £1000. Amex, Diners, Visa, Access. Service dept.

PHOTOCRAFT HI-FI, 40 High St, Ashford. (0233) 624441. No. 1 in Kent for Linn, Naim, Rega, Roksan, Exposure, Onix, Epos, Royd, Creek. But before you choose equipment choose where to buy it. Dem room, appts. necessary. Home trial and free installation. Visa, Access, Bada Chargecard. 9-5.30 Mon-Fri (Wed & Sat to 5 only). Service Dept.

LEICESTERSHIRE

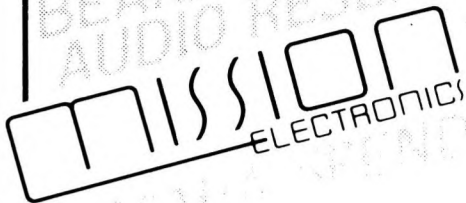
SOUND ADVICE, The Sound Factory, Duke St, Loughborough LE11 1ED. (0509) 218254. A&R, Creek, Linn, Epos, Mission, Cyrus, Naim, Rega, Roksan, Rotel, Yamaha. Dem facilities, appointment reqd. Mon-Sat 9.30-6. Free installation. Credit facilities. Access, Visa, Amex. Service dept. BADA MEMBER **3124**

ALPHA AUDIO, 1-3 Guildhall Lane, Leicester, LE1 5FQ. (0533) 518597 or 530330. Aiwa, Akai, Ariston, Bose, Cambridge, Celestion, Denon, Harman Kardon, Musical Fidelity, Rotel, etc. Mon-Sat 9.30-5.30. Free installation. Credit to £1,000. Dem facilities. Access, Visa.

MJS HI-FI, 80 Stapleton Lane, Barwell, Leicester LE9 8HE. (0455) 46977. The Rock, Audio Innovations, Kelvin Labs, Snell, Helius, Sugden, Ruark, Concordant, Valdi, JPW. Our main aim is for our customers to enjoy music. Dem and home trial facilities. Mon-Sat 9.30-7.00. Free installation and service dept. Visa, Access.

THE LEICESTER HI-FI CO, 6 Silver Walk, St. Martins Square, Leicester LE1 5EW. (0533) 539753. 6 days 9.30-5.30. A&R Cambridge, Heybrook, Marantz, Mission, Musical Fidelity, Nakamichi, QED Hi-Fi, Quad, Revox, Roksan "and oodles more". Largest selection in Leicestershire. 2 dem rooms. Home trial arranged + free installation. Credit facilities. Hi-Fi Markets, Access, Visa, Am. Exp. Service dept.

FOR
25 YEARS
WE'VE BEEN
MIXING
WITH THE
RIGHT
COMPANY



Without doubt — we require the same standards of service you have come to expect from us over the years. But don't just take our word for it, come in and experience the confidence we have in recommending and demonstrating **Mission Cyrus** only the very best in High Fidelity Equipment will do.

Spaldings
ESTABLISHED IN SOUND
01 654 1231/2040 - 352/4 LOWER ADDISCOMBE ROAD, CROYDON, SURREY.



BACK ISSUES & BINDERS

TO ORDER BACK ISSUES:

Please tick issues you require

CD Midi Systems (Special Ed.)	Nov 86 <input type="checkbox"/>
Turntables, Arms, Cartridges (48)	Dec 86 <input type="checkbox"/>
The Best Buy Guide (Special Ed.)	Oct 87 <input type="checkbox"/>
Amplifiers & Tuners (50)	April 87 <input type="checkbox"/>
Compact Disc Players (51)	June 87 <input type="checkbox"/>
Cassette Decks & Tapes (52)	Aug 87 <input type="checkbox"/>
Loudspeakers (53)	Dec 87 <input type="checkbox"/>
CD Based Midi Systems (54)	Jan 88 <input type="checkbox"/>
Turntables & Arms (55)	Feb 88 <input type="checkbox"/>
Amplifiers (56)	March 88 <input type="checkbox"/>
Cassette Decks (57)	April 88 <input type="checkbox"/>
CD Players (58)	May 88 <input type="checkbox"/>
Loudspeakers (59)	June 88 <input type="checkbox"/>
The Collection (60)	July 88 <input type="checkbox"/>
One-Name Systems (61)	Aug 88 <input type="checkbox"/>
Amplifiers (62)	Sept 88 <input type="checkbox"/>
Cassette Decks (63)	Oct 88 <input type="checkbox"/>
Compact Disc Players (64) (inc. free CD)	Nov 88 <input type="checkbox"/>
CD Midi Systems (65)	Dec 88 <input type="checkbox"/>
Loudspeakers (66)	Jan 89 <input type="checkbox"/>
Turntables & Arms (67) (inc. free Elite Gauge)	Feb 89 <input type="checkbox"/>
Amplifiers (68)	March 89 <input type="checkbox"/>
Cassette Decks (69)	April 89 <input type="checkbox"/>
CD Players (70)	May 89 <input type="checkbox"/>

Individual issues including postage and packing: UK £3.50, rest of the world \$4.25 (air service)

TO ORDER BINDERS:

Keep your copies of *Hi-Fi Choice* in prime condition with our 8-issue binder finished in black and gold. £5.95 (UK), £7.95 (air service) inc. postage and packing

PAYMENT

I enclose my cheque/Post Order made payable to *Dennis Publishing Ltd.*

Please charge my Access/Visa (delete as appropriate)

Credit card number _____

Expiry date _____

Signature _____

Name _____

Address _____

Postcode _____
(71)

Please send order form and payment to:


Hi-Fi Choice, Mail Order, P.O. Box 320, London N21 2NB.

SELECTED DEALER DIRECTORY


LONDON


A.T.LABS, 159 Chase Side, Enfield, Middlesex. (01) 367 3132. Mon-Sat 10-6. Two single speaker dem rooms. Service dept, car park. Amex, Visa, Access.


BADA MEMBER 

AUDIO T, 190 West End Lane, London NW6. (01) 794 7848. Mon-Sat, 10-6. Two single speaker dem rooms. Access, Amex, Visa BADA MEMBER 

CORNFLAKE SHOP, 37 Windmill Street (just off Tottenham Court Road), London W1. (01) 631 0472. Mon-Sat 10-7. DNM, Epos, Koetsu, Marantz, Naim, PS Audio, Rega, Roksan, SME, Yamaha. 2 dem rooms, full delivery and installation. Credit facilities. Access, Visa.

COVENT GARDEN RECORDS, 84 Charing Cross Road. (01) 379 7635/7427. Quad, B&W, Meridian, Mission, Yamaha, Sony, A&R Cambridge, Nakamichi, Rotel, etc. Dem facilities - no appointment reqd. Mon-Sat 10-7.30. Home trial facilities, free installation. Access, Visa, American Express, Diners Club. Service dept. BADA MEMBER 

DOUG BRADY HI-FI, 14-18 Monmouth St, London WC2H 9HB. (01) 379 4010. Wide range of top specialist hi-fi from Britain, America and Japan. 3 Dem rooms. BADA MEMBER 

GRAHAMS HI-FI, Canonbury Yard, 190a New North Rd, London N1 7BS. (01) 226 5500. FBA Dealer of the year 1985. Linn, Naim, Rega etc. £300-£3,000-£13,000. BADA MEMBER 


H.L. SMITH & Co Ltd, 287-289 Edgware Rd, London W2 1BE. (01) 723 5891. Aiwa, B&W, Denon, Dual, KEF, Ortofon, Panasonic, Sony, Technics, Yamaha. Dem facilities. Mon-Sat 9-5.30, Thurs 9-1. Credit to £1,000. Access, Visa, Diners. Service dept.


KJ WEST ONE, 26 New Cavendish St, London W1M 7LH. (01) 486 8262/63. Fax (01) 487 3452. Dem's by ap't, installations arranged, open mon-sat 10-6. Design, plan and install of multi-room systems. Arcam, Apogee, Audio Research, Audiolab, Audion, Cambridge, Croft, DNM, Epos, Ear, Harbeth, Heybrook, Krell, Linn, Linx, Magnaplanar, Manticore, Martin Logan, Marantz, Meridian, Mus. Fidelity, Naim, Pink, PS Audio, Quad, QED, Revox, Rotel, Rogers, Stax, Sonus, SME, Systemdek, Tannoy, Voyd, Zeta. Major Credit Cards.


RICHER SOUNDS 2, 6 London Bridge Walk, London SE1. (01) 403 1988. Major names in esoteric hi-fi, unusually matched to discount offers and special end-of-line purchases. Dem facilities, expert advice, free local delivery & installation (£500+), plus 2 Yr G'tee. Hi-fi Guide and monthly Newsletters; part exchange. Mon-Fri 10-7, Sat 10-5. Access, Visa, Richer ChargeCard. Service Department.

RICHER SOUNDS, 2 London Bridge Walk, London SE1 2SX. (01) 403 1201/4710. The original bargain hi-fi store, now refitted; 100s of regular and special discounts on most budget/mid price major names. By London Bridge. Facilities: expert advice; free 48 page Hi-fi Guide and monthly Newsletters; mail order; part exchange. Open Mon-Fri 10-7, Sat 10-5. Access, Visa, Richer ChargeCard. Service Department.

MIDDLESEX

A.T.LABS, 173-175 Station Rd, Edgware, Middx. (01) 952 5535. Mon-Sat 10-6. 2 single speaker dem rooms. Access, Visa, Amex. BADA MEMBER 

UXBRIDGE AUDIO LTD, 278 High St, Uxbridge, Middx UB8 1LZ. (0895) 30404 (Multi-line). A&R, AR, Ariston, Creek, Cyrus, Denon, Dual, JPW, KEF, Manticore, Meridian, NAD, Nakamichi, Quad, Rotel, Wharfedale, Yamaha, etc. 2 dem rooms. Mon-Sat 10-6. BADA MEMBER 

HARROW AUDIO, 27 Springfield Rd, Harrow. (01) 863 0938. Mon-Sat 9.30-5.30. A&R, Audiolab, Cyrus, Denon, Dual, Heybrook, Linn, Monitor Audio, Musical Fidelity, Quad, Rotel, Tannoy etc. BADA MEMBER 

MERSEYSIDE

W.A. BRADY & SON, 401 Smithdown Rd, Liverpool L15 3JJ. (051) 733 6859. Largest choice of specialist Hi-Fi in N.W. £100-£20K. All credit cards. 3 dem rooms. Closed

Monday. BADA MEMBER 

PURE SOUND - Birkenhead 051 645 6690 24hrs. Acoustic Energy, Aragon, Audio Technica, Beard, Celestion, Deltec, Denon, Michel, Cyrodec, Ortofon, SME. Home demonstration a pleasure, plus evenings and weekends (Sundays by appointment).

RICHER SOUNDS, 69B Church St, Liverpool L1 1DN. (051) 708 7484. Virtually every major 'budget' name - small store with big discounts and special offers. Facilities: expert advice; free 48 page Hi-fi Guide and monthly Newsletters; mail order; part exchange. Mon-Fri 10-6, Sat 10-5. Access, Visa, Richer ChargeCard.


NORFOLK


SOUND APPROACH, 161 Unithank Road, Norwich. (0603) 622833. Kuzma, Ariston, Castle, Denon, Exposure, Ion, Royd, NVA, QED, Roksan, Ruark, Revolver, etc. etc. Dem and home trial facilities. Mon-Sat 9-6.30. Free installation. Credit to £1,500. Visa, Access, Diners Club. Service dept.

NORTHAMPTONSHIRE

CLASSIC HI-FI + VIDEO, School Lane, Kettering, Northants. (0536) 515766. ADC, Marantz, Onkyo, Sansui, Teac, Harman Kardon, Pioneer, Proton, Ariston, Thorens, Mantra, Goodmans, Castle, JPL, Mordaunt Short, Seleco TV, Monitor Cable + others.


THE AUDIO SHOP, Coffee Tavern Court, High St, Rushden. (0933) 56651. Audio Technica, Denons, Goodmans, Rotel, Tannoy, Ion Systems, Thorens, Gale, BLQ, Royd. Dem room. Home trial and free installation. Mon-Sat 9.30-5.30 (Thurs 9.30-2). Service dept.


AUDIO INSIGHT, 53 Wolverton Road, Stony Stratford, Milton Keynes. (0908) 561551. A&R, Audiolab, Beard, Heybrook, Ion Systems, Linn, Meridian, Musical Fidelity, Nakamichi, Nytech, QED, Revolver, Rotel, Ruark. BADA MEMBER 

TECHNOSOUND, 7 Granville Square, Willen Local Centre, Milton Keynes. (0908) 604949. Bang & Olufson, Denon, Rotel, Technics, Yamaha. Selection of enthusiasts products. Multi-room hi-fi installations. Branches at Luton and Dunstable. BADA MEMBER 

WEST MIDLANDS

ALTERNATIVE AUDIO Ltd, 93-95 Hobs Moat Rd, Solihull. (021) 742 0254 (sales), 0248 (service). A&R, Audiolab, Denon, KEF, Marantz, Meridian, Mission, M.A., The Source, Philips. Tues-Sat 10-6, closed Mon. Home trial facilities, 3 dem rooms, free installation, instant credit. Access, Visa, Amex. Service dept. BADA MEMBER 

GRIFFIN AUDIO LTD, 94 Bristol St, Birmingham. (021) 692 1359. Linn, Naim Audio, Rega, Creek, Denon, Nakamichi, Quad, Mission, Monitor Audio, Rotel. BADA MEMBER 

FRANK HARVEY HI-FI EXCELLENCE, 163 Medieval Spon St, Coventry. (0203) 525200. Linn, Musical Fidelity, Quad, Mission, Cyrus, Denon, A&R Cambridge, Rotel, Nad, Nakamichi etc. Three floors of carefully selected hi-fi amidst the eloquence of our 14th century showroom. Dem, home trial and credit facilities. Access, Visa, Diners, Am. Exp. Mon-Sat 9.30-5.30. Closed Thurs. BADA MEMBER 

HORTON ELECTRONICS (1987) LTD, 8-9 Lower Temple St, Birmingham B2 4JD. (021) 643 0972. Aiwa, Dual, Marantz, Goodmans, JVC, Mission, Sony, Technics, Wharfedale, Sennheisser. Dem facilities. Credit to £1000. Access, Visa. 9-5.30 Mon-Sat. Service dept.


RICHER SOUNDS 2, 12 Smallbrook Queensway, Birmingham B5 4EN. (021) 643 6664. Popular esoteric hi-fi for upgrades, monthly special offers. Dem facilities, expert advice, free local delivery/installation (£500+), 2 Yr G'tee. Hi-fi Guide and monthly Newsletters; part exchange. Mon-Fri 10-6, Sat 10-5. Access, Visa, Richer ChargeCard. Service Dept.

RICHER SOUNDS, 10 Smallbrook Queensway, Birmingham B5 4EN. (021) 643 1516. An A-Z of affordable, popular hi-fi; no-frills environment. Facilities: expert advice; free 48 page Hi-fi Guide and monthly Newsletters; part exchange. Mon-Fri 10-6, Sat 10-5. Access, Visa, Richer


ChargeCard. Service Dept.

FIVEWAYS HI-FIDELITY LTD, 12 Islington Row, Edgbaston, Birmingham. (021) 4550667. Alphason, A&R, Denon, Meridian, Musical Fidelity, Nakamichi, Quad, Revox, TDL, Thorens, etc. Dem and home trial facilities. Tues-Sat 9.30-6. Free installation. Access, Visa. Service Dept. BRIDGE HI-FI, 3 Tudor House, Bridge St, Walsall. (0922) 640456. NAD, Dual, Yamaha, Kenwood, Technics, Pioneer, Mission, Celestion, Denon, Mordaunt Short. Appts required. Home trial and free installations. Access, Visa, Diners, Amex. Credit to £1,000. 9.15-5.30 Mon-Sat. Service dept.

OXFORDSHIRE


ABSOLUTE SOUND AND VIDEO, 19 Old High St, Headington, Oxford. (0865) 65961. A&R, Denon, Linn, Mission, NAD, Rotel, Yamaha. Also 256, Banbury Rd, Summertown. BADA MEMBER 

ASTLEY AUDIO LTD, 3 Marketplace, Wallingford. (0491) 39305/34349. AR, Dual, Kenwood, Mordaunt-Short, Mission, Monitor Audio, Philips, Technics, Tannoy, Yamaha. Tues-Fri 9-5.30, Sat 9-5. Records, tapes, 1000+ CD's. Service Dept. Access, Visa, Diners.

WESTWOOD AND MASON, 46 George St, Oxford. (0865) 247783. Linn, Naim, Rega, A&R, Heybrook, Dual, Mordaunt-Short, Mission, Tannoy, Quad, etc. BADA MEMBER 

WITNEY AUDIO & VIDEO, 28 High St, Witney, Oxford. (0993) 2414. A&R, Aiwa, Akai, Bose, Denon, Dual, Goldstar, JBL, Mordaunt-Short, NAD, Pioneer, Sony, Yamaha. Dem facilities. Mon-Sat 9-5.30. Free installation, credit to £1,000. Access, Visa. Service dept.

OXFORD AUDIO CONSULTANTS LTD, Cantay Hse, Park End Place, Oxford OX1 1JE. (0865) 790879. Oxford Acoustics, Audio Research, Krell, Magneplanar, Apogee, Aragon, Stax, Marantz, Wharfedale, Cambridge Audio. Home trial and free installation. Instant Credit. Access, Amex, Visa. 10-6 Tues-Sat. Service dept.

HORNS OF OXFORD LTD, 6 South Parade, Summertown, Oxford. (0865) 511241. Alphason, Ariston, B&W, Celestion, Marantz, Nakamichi, Pink Triangle, Quad, Sony, Technics. Free installation. Service dept. Access, Visa. 9-5.30. Closed Thurs. BADA MEMBER 

SHROPSHIRE

AVON HI-FI Ltd, 12 Barker St, Shrewsbury. (0743) 55166. A&R, B&W, JBL, Dual, NAD, Nakamichi, Revolver, Trio, Quad, Yamaha. Dem and home trial facilities. Mon-Sat 9-5.30, closed Thur. Free installation, credit to £1,000. Access, Visa. Service dept.

MID SHROPSHIRE AUDIO, 24 Peverill Bank, Dawley, Telford. (0952) 502828. Agencies include Alphason, Apollo, Ariston, Audio Innovations, Goldring, Ion Systems (full range), Marantz, Michell, Ortofon, QED, Royd, Ruark, Sansui, Sennheisser, SD Acoustics, SME, Target. Guaranteed used equipment also available. Free delivery nationwide. Mail Order. Access/Visa. Credit facilities. Part exchange.

CREATIVE AUDIO, 9 Dogpole, Shrewsbury. (0743) 241924. Marantz, Meridian, Linn, Naim, A&R, Mission, Nakamichi, Revolver, Castle, Audio Technica. Dem room. Home trial and free installation. Credit to £1000. Access, Visa. Tues-Sat 9.30-5.30. Service dept.

SOMERSET


WATTS RADIO - THE ENGINEERS, Jim Badman, 1 West Street, Somerton. (0458) 72440. Castle, Dual, Denon, KEF, Mordaunt-Short, Ortofon, Quad, Rogers, Thorens, Yamaha. Dem and home trial facilities. Mon-Sat 9-1, 2-5.30, Wed 9-1. Free installation. Credit to £1,000. Access, Visa. Service dept.

STAFFORDSHIRE


GRANGE HI-FI LTD, 153 Branston Road, Burton-on-Trent. (0283) 33655. Pink Triangle, Voyd Valdi, Marantz, Audio File, PH, Systemdek, Audio Innovations, A&R Cambridge, Quad, Rotel, Snell, Manticore, etc. 2 dem rooms. Mon, Tues, Thurs, Fri, Sat. 9-6. Closed Wed. Free installation. Credit facilities. Visa, Access. Service dept.

SELECTED DEALER DIRECTORY

SUFFOLK

EASTERN AUDIO, 41 Bramford Rd, Ipswich. (0473) 217217. Quad, Audio Lab, Denon, Dual, Marantz, Mission, NAD, Nakamichi, Technics, Arcam. Mon-Sat 9.30-6. BADA MEMBER 


SURREY

AERCO AUDIO Ltd, 11 The Broadway, Woking, Surrey GU21 5AP. (04862) 4667. Roksan, Exposure, Ion, Royd, Systemdek, Thorens, Acoustic Research, Nakamichi, Monitor Audio and many more. 2 dem rooms. Appt's advisable. Home trial and free installation, part exchange. Access, Visa, Amex, Diners. Credit facilities. Mon-Fri 9.30-6.00. Sat 9.00-5.30. Service dept. BADA MEMBER 

ROGERS HI-FI, 13 Bridge Street, Guildford (0483) 61049. Ariston, Acoustic Research, Akai, Denon, JPW, Mordaunt-Short, Marantz, Onkyo, QED, Tannoy etc. Mon-Sat 9.30-6. Dem. facilities. Instant Credit. Access, Visa. Service dept.

SURBITON PARK RADIO, 48 Surbiton Rd, Kingston-Upon-Thames, Surrey. (01) 546 5549. Quad, Dual, Denon, Kenwood, Nakamichi, Rotel, Pioneer, QED, B&W, Tannoy, Mordaunt Short, Castle, KBL. Dem and home trial facilities. Access, Visa. 9.30-5.00 Tues-Sat. Service dept. TRU-FI SOUND AND VISION, 2 Central Parade, Redhill, Surrey. (0737) 767400/766128. Akai, Aiwa, B&W, Nakamichi, JPW, Mission, Mordaunt-Short, Nagaoka, Sony, Technics. Dem. facilities. Mon-Sat 9.30-6. Free installation, credit to £1,200. Access, Visa. Service dept.


UNILET PRODUCTS Ltd, 35 High St, New Malden, Surrey KT3 4BY. (01) 942 9567. Mon-Sat 9-6. Thurs 9-7. Dem facilities. Large stock Amex, Access, Diners, Visa.


SPALDINGS HI-FI, 352.4 Lower Addiscombe Rd, Croydon, Surrey. (01) 654 1231. A&R Cambridge, Audiolab, Denon, Linn, Marantz, Mission, Musical Fidelity, Meridian, Naim, Quad. 3 dem rooms and home dem. Free installation, credit facilities. Twice nominated Sony E.S. Hi-Fi Dealer of the Year. Mon-Sat 9-6. Tues to 8. Closed Wed. Service dept. BADA MEMBER 

TRU-FI SOUND & VISION, 10 Church St, Leatherhead, Surrey. (0372) 378780. Sony, Technics, Panasonic, Mitsubishi, Ferguson, Aiwa, Pioneer, Sanyo, B&W, Mission, Wharfedale. Free installation. Credit facilities. Access, Visa. 9.15-5.30 Mon-Sat. Closed Wed. Service dept.

SUSSEX (EAST)

DEFINITIVE AUDIO, 30 Islingwood Street, Brighton, East Sussex BN2 2UR. (0273) 672796. Voyd, Systemdek, Helius, Audio Note, JPW, Snell, Pirate Stands, etc. Wed-Sat 11-7. Home dems throughout Sussex. Credit facilities. Visa.


JEFFRIES HI-FI, 69 London Rd, Brighton, East Sussex. (0273) 609 431. 2 dem rooms, closed Mon, late night Wed. Parking, bus route. Credit facilities. BADA MEMBER 

JEFFRIES HI-FI, 4 Albert Parade, Green St, Eastbourne, East Sussex. (0323) 31336. 2 dem rooms, closed Mon. Late night Wed. Parking, bus route. Credit facilities. BADA MEMBER 

HASTINGS HI-FI, 31-32 Western Rd, St Leonards On Sea. (0424) 442975. A&R, B&W, Mission/Cyrus, NAD, Nakamichi, Quad, Rotel, Systemdek, Tannoy, Yamaha. 2 dem rooms. Mon-Sat 9-6. Home trial facilities. Free installation. Credit facilities. Access, Amex, Visa. Service dept.

SUSSEX (WEST)


BOWERS AND WILKINS Ltd, 1 Becket Buildings, Littlehampton Rd, Worthing. (0903) 64141. B&W, Cambridge, Dual, JVC, Mordaunt-Short, Nakamichi, Philips, Shure, Quad, Sony, Technics. 2 dem rooms. Mon-Sat 9.5-3.0, Weds 9-1. Home trial facilities, free installation, credit to £1,000. Access, Visa. Service dept.

CHICHESTER HI-FI, 40 Little London, Chichester PO19 1PL. Tel: (0243) 776402. Linn, Naim, Rega, Creek, Nakamichi, A&R, Denon, Roksan etc. Tues-Sat, 10-1, 2-5.15 (closed Mon). BADA MEMBER 


TYNE & WEAR

RED RADIO SHOP AND HI-FI CENTRE, 11 Olive St, (Off

Park Lane) Sunderland. (Sunderland) 5672087. Bose, Castle, Denon, JVC (Hi-Fi and Portable TV), Luxman, Michell, Mordaunt-Short, Pickering, Tannoy Dem facilities. Mon-Sat 9.5-3.0. Free installation, interest free credit. Visa. Service dept.

LINTONE AUDIO LTD, 7-11 Park Lane, Gateshead. (091) 477 4167. Linn, Naim, Rega, Musical Fidelity, Audio Lab, Quad, Cyrus, Denon, NAD, plus all leading Japanese manufacturers. Dem and home trial facilities. Free installation. Access, Visa, Amex, Diners. Credit to £1000. 9-6 Mon-Sat. Service dept. BADA MEMBER 

WILTSHIRE

ABSOLUTE SOUND AND VIDEO, 60 Fleet Street, Swindon. (0793) 38222. A&R, Denon, Dual, Linn, Meridian, NAD, Rotel, Technics, Yamaha. (Closed Wed). BADA MEMBER 

YORKSHIRE (NORTH)


ELITE HI-FI, 178 Kings Road, Harrogate HG1 5JG (0423) 521 831. Voyd, Valdi, Avalon, Systemdek, Helius, Audionote, Goldring, Audio Innovations, Sugden, Marantz, Mordaunt-Short, JPW, Infinity, Snell. Mon-Sat 9-5.30. Free installation. Service dept.

THE AUDIO CLINIC, 2A Brunswick St, Bishopthorpe Rd, York YO2 1ED. (0904) 646309. ADC, Allison, Hafler, JPW, Luxman, Proton, Quart, Studio Power, Systemdek, Thorens and more. Second hand hi-fi available. Appt's req'd, home trial and dem facilities. Free installation. Access and Visa. 10-5 Mon-Sat. Service dept.


SCARBOROUGH HI-FI CENTRE, 53 Dean Road, Scarborough YO12 7SN. (0723) 374547. A&R, Bose, QED, Denon, NAD (incl. Monitor series), Thorens, Onkyo, Tannoy, Marantz, Quark. Dem Room. Appts preferred. Home trial facilities. Mail order and part exchange. Visa, Access, Diners. Hi-Fi Markets, 6 months interest free credit. 10-6 Tues-Sat.

RICHER SOUNDS, 6 Feasegate, York YO1 2SQ. (0904) 645535. Probably the smallest hi-fi store in York; but stocks the A-Z of popular budget hi-fi in special discount prices. Facilities: expert advice; free 48 page Hi-fi Guide and monthly Newsletters; mail order; part exchange. Mon-Fri 10-6, Sat 10-5. Access, Visa, Richer ChargeCard.

YORKSHIRE (SOUTH)


MOORGATE ACOUSTICS Ltd, 2 Westgate, Rotherham S60 1AP. (0709) 370666. South Yorkshire's leading specialist hi-fi dealer. Roksan, Meridian, Mission, Quad, Musical Fidelity, Rogers, Beard, Bryston etc. Single speaker dem facilities. BADA MEMBER 

YORKSHIRE (WEST)

AUDIO PROJECTS, 45 Headingley Lane, Leeds. (0532) 304565. A&R, Audiolab, Creek, Heybrook, Linn, Musical Fidelity, Naim, Quad, Rega, etc. Tues-Fri 9.30-6, Sat 2.30-5.30. BADA MEMBER 

ERRICKS, Hi-Fi Experience, Fotosonic House, Rawson Square, Bradford (0274) 309266. Dem facilities. Sales/service agents for A&R, Linn, Quad, Naim, Nakamichi, Mission etc. BADA MEMBER 

Huddersfield HI-FI CENTRE, 4 Cross Church St, Huddersfield. (0484) 544668. B&W Loudspeakers, Kenwood, Denon, Dual, A&R Cambridge, Musical Fidelity, Quad, NVA, Audio Lab, Philips, etc. Dem facilities - appointment req'd. Mon-Sat 9.5-3.0; Thurs 9-8. Closed Wed. Free installation, credit facilities. Access, Visa.

IMAGE HI-FI Ltd, 8-10 St Annes Rd, Headingley, Leeds. (0532) 789374. AR, Audio Lab, Denon, Linn, Marantz, Meridian, Mission, Monitor Audio, NAD, Quad. BADA MEMBER 

RICHER SOUNDS, 55 The Headrow, Leeds LS1 6LR. (0532) 455717. Affordable special deals on every big budget line from Akai to Yamaha; separates & systems. City centre store opposite Lewis's. Facilities: expert advice, free 48 page Hi-Fi Guide and monthly Newsletters; mail order; part exchange. Mon-Fri 10-6, Sat 10-5. Access, Visa, Richer ChargeCard.

SELECTIVE AUDIO, The Forge Cottage, 19 Crossgate, Otley. (0943) 467689. Exclusively handles Alphason, Roksan, NVA, ProAc in the area and other minimal

British designer products for the discerning listener. Dem facility. Member of the Cognoscenti. Mon-Sat 10-6.

IRELAND

CLONEY AUDIO, 34 Main St, Blackrock, Co. Dublin. 0001 889449. Linn, Naim, Roksan, Rega, Rogers, Spendor, Musical Fidelity, Cambridge Audio, Accoustat. Tues-Sat 10-6, Thurs & Fri til 9. Free installation. Visa, Access. Service dept.

SCOTLAND


EDINBURGH

RICHER SOUNDS, 1B Chambers St, Edinburgh EH1 1HR. (031) 226 3544. Discount hi-fi near the Royal Scottish Museum; affordable culture with monthly special offers on major names. Facilities: expert advice; free 48 page Hi-fi Guide and monthly Newsletters; mail order; part exchange. Mon-Fri 10-6, Sat 10-5. Access, Visa, Richer ChargeCard.

BILL HUTCHINSON Ltd, 43 Clarke St, Edinburgh. (031) 667 2877. AR, Aiwa, Denon, Dual, JVC, Mission, Mordaunt-Short, Omar, Technics, Yamaha. Dem facilities. Mon-Sat 10-6. Free installation. Instant credit. Credit cards: Access, Visa. Service dept.


GLASGOW

RICHER SOUNDS, 24 Gordon St, Glasgow G1 3PU. (041) 221 9147. The affordable hi-fi alphabet in an unpretentious atmosphere; regular special offers. Facilities: expert advice; free 48 page Hi-fi Guide and monthly Newsletters; mail order; part exchange. Mon-Fri 10-6, Sat 10-5. Access, Visa, Richer ChargeCard.

STEREO STEREO, 278 St. Vincent St, Glasgow G2 5RL. (041) 248 4079. Linn, Naim, Rega, A&R Arcam, Aiwa, Creek, Denon, Dual, Epos, Exposure, Heybrook, Mission, Revox, Rotel, Royd, etc. Mon-Sat 10-6. Interest free credit. BADA MEMBER 

BILL HUTCHINSON Ltd, 43 Hope Street, Glasgow. (041) 248 2857. A.R., Aiwa, Denon, Dual, JVC, Mission, Mordaunt-Short, Omar, Technics, Yamaha etc. Dem facilities. Mon-Sat 10-6. Free installation, instant credit. Access, Visa. Service dept.


GRAMPIAN

HOLBURN HI-FI Ltd, 441 Holburn St, Aberdeen (0224) 585713. Linn, Rega, Quad, Audiolab, Mission Cyrus, Rotel, QED, NAD, Krell, Nakamichi, Denon, Sony, KEF, Wharfedale, Monitor Audio, Kenwood, etc. 9.30-5.30 Mon-Sat. BADA MEMBER 


WALES

GLAMORGAN

AUDIO EXCELLENCE, 134 Crwys Road, Cardiff. (0222) 28565. Audio Research, Dual, Krell, Linn, Magneplanar, Naim, NAD, Yamaha, etc. Closed Mon.

BADA MEMBER 

AUDIO EXCELLENCE, 9 High St, Swansea. (0792) 474608. Audio Research, Dual, Krell, Linn, Magneplanar, Naim, NAD, Yamaha, etc. Closed Mon.

BADA MEMBER 

RICHER SOUNDS, 5 Central Square, Cardiff CF1 1EP. (0222) 383311. From Akai to Yamaha on a budget - regular end of line special offers. Facilities: expert advice; free 48 page Hi-Fi Guide and monthly Newsletters; mail order; part exchange. Mon-Fri 10-6, Sat 10-5. Access, Visa, Richer ChargeCard.

GWENT

A. E. HUGHES & SONS LTD, 28 Clarence Place, Newport. (10633) 58851. Bang & Olufsen, Kenwood, Mordaunt-Short, Roberts Radio, Dynatron, Mitsubishi, Sheraton. Cabinets plus audio accessories. Dem and home facilities. Free installation. Access and Visa. 9-12.45. 2-15-5.30 Mon-Sat. Service dept.



SEVENOAKS HI-FI & VIDEO

This advertisement is valid until at least 31st May 1989. Please note: Beckenham, Chatham and Woolwich close all day Wednesday.

SUGGESTED SYSTEMS

The suggested systems priced below all include the popular Dual CS503/1 turntable but an alternative turntable or CD player is available at extra cost. Please see 'OPTIONS' list below for further details.

SPEAKERS
All systems priced above include Dual CS503/1

AMPS

AUDITION THE SUPERB RANGE AT SEVENOAKS HI-FI

MISSION 761 £119.95
INC. FREE TAPES, STRAPS AND CABLE

MISSION 762 £179.95
INC. FREE TAPES, STRAPS AND CABLE

MISSION 763 £279.95
INC. FREE TAPES, STRAPS AND CABLE

MISSION 764 £399.95
INC. FREE TAPES, STRAPS AND CABLE

MISSION 765 £599.95
INC. FREE TAPES, STRAPS AND CABLE

MISSION 766

MISSION 767

MISSION 768

MISSION 769

MISSION 770

MISSION 771

MISSION 772

MISSION 773

MISSION 774

MISSION 775

MISSION 776

MISSION 777

MISSION 778

MISSION 779

MISSION 780

MISSION 781

MISSION 782

MISSION 783

MISSION 784

MISSION 785

MISSION 786

MISSION 787

MISSION 788

MISSION 789

MISSION 790

MISSION 791

MISSION 792

MISSION 793

MISSION 794

MISSION 795

MISSION 796

MISSION 797

MISSION 798

MISSION 799

MISSION 800

MISSION 801

MISSION 802

MISSION 803

MISSION 804

MISSION 805

MISSION 806

MISSION 807

MISSION 808

MISSION 809

MISSION 810

MISSION 811

MISSION 812

MISSION 813

MISSION 814

MISSION 815

MISSION 816

MISSION 817

MISSION 818

MISSION 819

MISSION 820

MISSION 821

MISSION 822

MISSION 823

MISSION 824

MISSION 825

MISSION 826

MISSION 827

MISSION 828

MISSION 829

MISSION 830

MISSION 831

MISSION 832

MISSION 833

MISSION 834

MISSION 835

MISSION 836

MISSION 837

MISSION 838

MISSION 839

MISSION 840

MISSION 841

MISSION 842

MISSION 843

MISSION 844

MISSION 845

MISSION 846

MISSION 847

MISSION 848

MISSION 849

MISSION 850

MISSION 851

MISSION 852

MISSION 853

MISSION 854

MISSION 855

MISSION 856

MISSION 857

MISSION 858

MISSION 859

MISSION 860

MISSION 861

MISSION 862

MISSION 863

MISSION 864

MISSION 865

MISSION 866

MISSION 867

MISSION 868

MISSION 869

MISSION 870

MISSION 871

MISSION 872

MISSION 873

MISSION 874

MISSION 875

MISSION 876

MISSION 877

MISSION 878

MISSION 879

MISSION 880

MISSION 881

MISSION 882

MISSION 883

MISSION 884

MISSION 885

MISSION 886

MISSION 887

MISSION 888

MISSION 889

MISSION 890

MISSION 891

MISSION 892

MISSION 893

MISSION 894

MISSION 895

MISSION 896

MISSION 897

MISSION 898

MISSION 899

MISSION 900

MISSION 901

MISSION 902

MISSION 903

MISSION 904

MISSION 905

MISSION 906

MISSION 907

MISSION 908

MISSION 909

MISSION 910

MISSION 911

MISSION 912

MISSION 913

MISSION 914

MISSION 915

MISSION 916

MISSION 917

MISSION 918

MISSION 919

MISSION 920

MISSION 921

MISSION 922

MISSION 923

MISSION 924

MISSION 925

MISSION 926

MISSION 927

MISSION 928

MISSION 929

MISSION 930

MISSION 931

MISSION 932

MISSION 933

MISSION 934

MISSION 935

MISSION 936

MISSION 937

MISSION 938

MISSION 939

MISSION 940

MISSION 941

MISSION 942

MISSION 943

MISSION 944

MISSION 945

MISSION 946

MISSION 947

MISSION 948

MISSION 949

MISSION 950

MISSION 951

MISSION 952

MISSION 953

MISSION 954

MISSION 955

MISSION 956

MISSION 957

MISSION 958

MISSION 959

MISSION 960

MISSION 961

MISSION 962

MISSION 963

MISSION 964

MISSION 965

MISSION 966

MISSION 967

MISSION 968

MISSION 969

MISSION 970

MISSION 971

MISSION 972

MISSION 973

MISSION 974

MISSION 975

MISSION 976

MISSION 977

MISSION 978

MISSION 979

MISSION 980

MISSION 981

MISSION 982

MISSION 983

MISSION 984

MISSION 985

MISSION 986

MISSION 987

MISSION 988

MISSION 989

MISSION 990

MISSION 991

MISSION 992

MISSION 993

MISSION 994

MISSION 995

MISSION 996

MISSION 997

MISSION 998

MISSION 999

MISSION 1000

MISSION 1001

MISSION 1002

MISSION 1003

MISSION 1004

MISSION 1005

MISSION 1006

SAVE £100

SYSTEM OF THE MONTH

£299.95 INC VAT
Including cartridge and all leads.
FREE carriage UK mainland.

Rotel RA820A

Celestion DL4 II
What Hi Fi Loudspeaker
AWARD WINNER (Stands not included)

or (Ariston Q deck add £30)
or (Dual CS505/3 add £25)

- Amplifiers**
- A Research 403 £159.95
 - A Research AD2 £129.95
 - Acorn 100 £129.95
 - Acorn 100a £99.95
 - Acorn 100b £99.95
 - Acorn 100c £99.95
 - Acorn 100d £99.95
 - Acorn 100e £99.95
 - Acorn 100f £99.95
 - Acorn 100g £99.95
 - Acorn 100h £99.95
 - Acorn 100i £99.95
 - Acorn 100j £99.95
 - Acorn 100k £99.95
 - Acorn 100l £99.95
 - Acorn 100m £99.95
 - Acorn 100n £99.95
 - Acorn 100o £99.95
 - Acorn 100p £99.95
 - Acorn 100q £99.95
 - Acorn 100r £99.95
 - Acorn 100s £99.95
 - Acorn 100t £99.95
 - Acorn 100u £99.95
 - Acorn 100v £99.95
 - Acorn 100w £99.95
 - Acorn 100x £99.95
 - Acorn 100y £99.95
 - Acorn 100z £99.95
- Cassette Decks**
- A Research 706 £159.95
 - A Research 707 £129.95
 - A Research 708 £129.95
 - A Research 709 £129.95
 - A Research 710 £129.95
 - A Research 711 £129.95
 - A Research 712 £129.95
 - A Research 713 £129.95
 - A Research 714 £129.95
 - A Research 715 £129.95
 - A Research 716 £129.95
 - A Research 717 £129.95
 - A Research 718 £129.95
 - A Research 719 £129.95
 - A Research 720 £129.95
 - A Research 721 £129.95
 - A Research 722 £129.95
 - A Research 723 £129.95
 - A Research 724 £129.95
 - A Research 725 £129.95
 - A Research 726 £129.95
 - A Research 727 £129.95
 - A Research 728 £129.95
 - A Research 729 £129.95
 - A Research 730 £129.95
 - A Research 731 £129.95
 - A Research 732 £129.95
 - A Research 733 £129.95
 - A Research 734 £129.95
 - A Research 735 £129.95
 - A Research 736 £129.95
 - A Research 737 £129.95
 - A Research 738 £129.95
 - A Research 739 £129.95
 - A Research 740 £129.95
 - A Research 741 £129.95
 - A Research 742 £129.95
 - A Research 743 £129.95
 - A Research 744 £129.95
 - A Research 745 £129.95
 - A Research 746 £129.95
 - A Research 747 £129.95
 - A Research 748 £129.95
 - A Research 749 £129.95
 - A Research 750 £129.95
- Speakers**
- A Research 101 £129.95
 - A Research 102 £129.95
 - A Research 103 £129.95
 - A Research 104 £129.95
 - A Research 105 £129.95
 - A Research 106 £129.95
 - A Research 107 £129.95
 - A Research 108 £129.95
 - A Research 109 £129.95
 - A Research 110 £129.95
 - A Research 111 £129.95
 - A Research 112 £129.95
 - A Research 113 £129.95
 - A Research 114 £129.95
 - A Research 115 £129.95
 - A Research 116 £129.95
 - A Research 117 £129.95
 - A Research 118 £129.95
 - A Research 119 £129.95
 - A Research 120 £129.95
 - A Research 121 £129.95
 - A Research 122 £129.95
 - A Research 123 £129.95
 - A Research 124 £129.95
 - A Research 125 £129.95
 - A Research 126 £129.95
 - A Research 127 £129.95
 - A Research 128 £129.95
 - A Research 129 £129.95
 - A Research 130 £129.95
 - A Research 131 £129.95
 - A Research 132 £129.95
 - A Research 133 £129.95
 - A Research 134 £129.95
 - A Research 135 £129.95
 - A Research 136 £129.95
 - A Research 137 £129.95
 - A Research 138 £129.95
 - A Research 139 £129.95
 - A Research 140 £129.95
 - A Research 141 £129.95
 - A Research 142 £129.95
 - A Research 143 £129.95
 - A Research 144 £129.95
 - A Research 145 £129.95
 - A Research 146 £129.95
 - A Research 147 £129.95
 - A Research 148 £129.95
 - A Research 149 £129.95
 - A Research 150 £129.95
- Midi Systems**
- Acorn 100 £129.95
 - Acorn 100a £99.95
 - Acorn 100b £99.95
 - Acorn 100c £99.95
 - Acorn 100d £99.95
 - Acorn 100e £99.95
 - Acorn 100f £99.95
 - Acorn 100g £99.95
 - Acorn 100h £99.95
 - Acorn 100i £99.95
 - Acorn 100j £99.95
 - Acorn 100k £99.95
 - Acorn 100l £99.95
 - Acorn 100m £99.95
 - Acorn 100n £99.95
 - Acorn 100o £99.95
 - Acorn 100p £99.95
 - Acorn 100q £99.95
 - Acorn 100r £99.95
 - Acorn 100s £99.95
 - Acorn 100t £99.95
 - Acorn 100u £99.95
 - Acorn 100v £99.95
 - Acorn 100w £99.95
 - Acorn 100x £99.95
 - Acorn 100y £99.95
 - Acorn 100z £99.95
- Compact Disc**
- Acorn 100 £129.95
 - Acorn 100a £99.95
 - Acorn 100b £99.95
 - Acorn 100c £99.95
 - Acorn 100d £99.95
 - Acorn 100e £99.95
 - Acorn 100f £99.95
 - Acorn 100g £99.95
 - Acorn 100h £99.95
 - Acorn 100i £99.95
 - Acorn 100j £99.95
 - Acorn 100k £99.95
 - Acorn 100l £99.95
 - Acorn 100m £99.95
 - Acorn 100n £99.95
 - Acorn 100o £99.95
 - Acorn 100p £99.95
 - Acorn 100q £99.95
 - Acorn 100r £99.95
 - Acorn 100s £99.95
 - Acorn 100t £99.95
 - Acorn 100u £99.95
 - Acorn 100v £99.95
 - Acorn 100w £99.95
 - Acorn 100x £99.95
 - Acorn 100y £99.95
 - Acorn 100z £99.95
- Tuners**
- Acorn 100 £129.95
 - Acorn 100a £99.95
 - Acorn 100b £99.95
 - Acorn 100c £99.95
 - Acorn 100d £99.95
 - Acorn 100e £99.95
 - Acorn 100f £99.95
 - Acorn 100g £99.95
 - Acorn 100h £99.95
 - Acorn 100i £99.95
 - Acorn 100j £99.95
 - Acorn 100k £99.95
 - Acorn 100l £99.95
 - Acorn 100m £99.95
 - Acorn 100n £99.95
 - Acorn 100o £99.95
 - Acorn 100p £99.95
 - Acorn 100q £99.95
 - Acorn 100r £99.95
 - Acorn 100s £99.95
 - Acorn 100t £99.95
 - Acorn 100u £99.95
 - Acorn 100v £99.95
 - Acorn 100w £99.95
 - Acorn 100x £99.95
 - Acorn 100y £99.95
 - Acorn 100z £99.95
- Turntables**
- Acorn 100 £129.95
 - Acorn 100a £99.95
 - Acorn 100b £99.95
 - Acorn 100c £99.95
 - Acorn 100d £99.95
 - Acorn 100e £99.95
 - Acorn 100f £99.95
 - Acorn 100g £99.95
 - Acorn 100h £99.95
 - Acorn 100i £99.95
 - Acorn 100j £99.95
 - Acorn 100k £99.95
 - Acorn 100l £99.95
 - Acorn 100m £99.95
 - Acorn 100n £99.95
 - Acorn 100o £99.95
 - Acorn 100p £99.95
 - Acorn 100q £99.95
 - Acorn 100r £99.95
 - Acorn 100s £99.95
 - Acorn 100t £99.95
 - Acorn 100u £99.95
 - Acorn 100v £99.95
 - Acorn 100w £99.95
 - Acorn 100x £99.95
 - Acorn 100y £99.95
 - Acorn 100z £99.95
- Speakers**
- Acorn 100 £129.95
 - Acorn 100a £99.95
 - Acorn 100b £99.95
 - Acorn 100c £99.95
 - Acorn 100d £99.95
 - Acorn 100e £99.95
 - Acorn 100f £99.95
 - Acorn 100g £99.95
 - Acorn 100h £99.95
 - Acorn 100i £99.95
 - Acorn 100j £99.95
 - Acorn 100k £99.95
 - Acorn 100l £99.95
 - Acorn 100m £99.95
 - Acorn 100n £99.95
 - Acorn 100o £99.95
 - Acorn 100p £99.95
 - Acorn 100q £99.95
 - Acorn 100r £99.95
 - Acorn 100s £99.95
 - Acorn 100t £99.95
 - Acorn 100u £99.95
 - Acorn 100v £99.95
 - Acorn 100w £99.95
 - Acorn 100x £99.95
 - Acorn 100y £99.95
 - Acorn 100z £99.95
- Tuner Amps**
- Acorn 100 £129.95
 - Acorn 100a £99.95
 - Acorn 100b £99.95
 - Acorn 100c £99.95
 - Acorn 100d £99.95
 - Acorn 100e £99.95
 - Acorn 100f £99.95
 - Acorn 100g £99.95
 - Acorn 100h £99.95
 - Acorn 100i £99.95
 - Acorn 100j £99.95
 - Acorn 100k £99.95
 - Acorn 100l £99.95
 - Acorn 100m £99.95
 - Acorn 100n £99.95
 - Acorn 100o £99.95
 - Acorn 100p £99.95
 - Acorn 100q £99.95
 - Acorn 100r £99.95
 - Acorn 100s £99.95
 - Acorn 100t £99.95
 - Acorn 100u £99.95
 - Acorn 100v £99.95
 - Acorn 100w £99.95
 - Acorn 100x £99.95
 - Acorn 100y £99.95
 - Acorn 100z £99.95

SPRING SALE

10% OFF ALL PRODUCTS DISPLAYING THIS SIGN

FREE
Present this sign to claim free signs and 6 metres 75 strand cable with all Loudspeakers (Suggested Systems - Speakers under £100 and Spokes excluded)

SPECIAL OFFER
Nakamichi OMSIE Compact Disc player
NORMALLY £395.95
OUR PRICE
£249.95
EX DISPLAY - FULLY GUARANTEED

CALL US NOW

SEVENOAKS Kent
109-113 London Road
Sevenoaks Branch Only
MAIL ORDER
73b North Street (World Wide Export)
Surrey

GUILDFORD Surrey
34 Mount Ephraim
TUN. WELLS

BECKENHAM Kent
51 Beckenham Road
BECKENHAM

CHATHAM Kent
4 Railway Street
CHATHAM

LONDON SE18
162 Powis Street, Woolwich
LONDON

BRIGHTON Sussex
55 Preston Street
BRIGHTON

459555 (0732)
458985 (0732)
36666 (0483)
31543 (0892)
658 3450 (01)
46859 (0634)
855 8016 (01)
733338 (0273)

BUY WITH CONFIDENCE
You can buy with confidence from Sevenoaks Hi-Fi & Video. We have been in business for nearly 17 years and have lots of experience with personal callers and Mail Order customers. All goods are BRAND NEW, FULLY GUARANTEED and maintained by our own SERVICE DEPARTMENT. For personal attention and demonstration call into any of our branches. If you live too far away simply post or phone your order through and our efficient Mail Order department will take care of you. All goods are insured against loss or damage in transit. Payment may be made by cash, cheque, Access or Visa (Barcode card). Please note that enquiries from outside the UK only £6 per order and generally FREE if total exceeds £250 (UK mainland only). Please note that enquiries from outside the UK Mainland are treated as exports and are processed by our Guildford branch. Worldwide export is our speciality.

MAIL ORDER TO SEVENOAKS HI-FI 109/113 LONDON RD. SEVENOAKS, KENT
TEL (0732) 458985

EXPORT TEL. GUILDFORD (0483) 36666
HFC 31/05/89

Please send me _____
I enclose a cheque/cash/card No. + Expiry Date
Name _____
Address _____
Daytime Telephone No. _____

VERY RARE SPECIAL OFFERS
ONLY BY THIS SIGN
ELECTRONIC

Prices include VAT and we come at time of preparation (approximately 5 weeks) before publication) but are subject to change without notice.

THE DIRECTORY

The *Hi-Fi Choice Directory* was conceived as a reference guide to all the audio products reviewed by *Choice* that are currently available. At present this runs to some 700 plus products split into suitable categories, each with its own introduction containing information about the product type and its applications. They are particularly relevant to the uninitiated first time buyer and help sort out the order of priorities when buying a piece of equipment.

Each product along with its retail price is placed in its respective category in alphabetical order. For instance the Acoustic Research *EB101* is presently at the beginning of the Turntables and Tonearms section; however, the Ariston *RD90 Superior* heads the Motor Units section as it is sold and was reviewed as a separate component – requiring a separate arm. Where there are several products with the same name but different model numbers these are in price ascending order.

Then come the ratings for the standard achieved in laboratory and listening tests, with the exception of certain product groups where lab tests were not carried out. One important point to remember is that they cannot be used to compare products from different categories – ie a cassette deck rated 'excellent' in sound quality will not usually offer

the same standard of fidelity as a similarly rated turntable or CD player (unless you can get hold of first generation copies of the master tape!).

The Comments column contains a potted summary based on the original review, emphasising the salient points of a product's character and sonic performance. The space available doesn't allow for great detail but in the 20 or so words we have attempted to put across the essence of the review, in some cases using quotes from the review itself. Obviously, important information on compatibility or auxiliary equipment used in the test cannot be included, and it is best to refer to the original review for this, of which more later.

The next column(s) varies from category to category but is usually either features or specifications, the former being facilities available on a cassette deck or amplifier or the type of drive system on a turntable.

Specifications vary with product type but usually relate to suitability or capability, for instance arm matching figures are given with the cartridges which tie in with the mass figures for the tonearms themselves, making it easier to avoid compliance/mass mismatches.

Perhaps the most influential letters in the Directory are those found in the Value column, the *Rs* and *Bs* denoting the Recommended and Best Buy ratings that are appended to products we consider meritorious. The Best Buy tag means that a product not only offers good sound quality but is reasonably priced as well. With source components a price

limit of approximately £300 is usually used as a guide. Recommended means that either the performance of a product is particularly good irrespective of price or, alternatively that a good value standard is achieved but overall attainment falls short of Best Buy classification. An ideal situation would be to choose suitably priced Best Buy or Recommended products from relevant categories and create a Best Buy system, but due to the variety in tonal balance that exists in much audio equipment (especially the electromechanical elements – ie cartridge and speaker) system building is not quite that simple. These ratings make a useful guideline for shortlisting components, but only experiencing the actual combination will tell you whether it works for you.

The final column contains a reference to the issue of *Hi-Fi Choice* which featured the complete review. If you wish to get a better idea of a product by reading the complete review it is possible to order a copy (if still in print) through our back issues department. Every *Choice* issue contains a Back Issues page for this purpose.

The Directory is constantly updated with the latest reviews and price changes as well as having discontinued products removed. If a listed product is updated to a 'mark two' form and the alterations are purely cosmetic or not too extensive we sometimes leave the product in with its current model number and an asterisk to denote that it has changed since our original review was published.

SYSTEM BUILDING

Pre-packaged one-make systems have been commercially very successful, with advantages like cosmetic consistency, competitive pricing, and (assumed) technical compatibility. However, despite the mass market clout of the consumer electronics giants, the hi-fi tradition of specialised separate components seems as strong as ever, and certainly represents the route taken by those who place sound quality ahead of other criteria.

Yet those who choose the separates route still have lingering doubts – usually completely unjustified – over the compatibility of components from different manufacturers. Gross incompatibilities are very rare nowadays, only likely to rear their heads amongst the most exotic components. Here the delicate art of 'supercompatibility' really takes over the major role and might be regarded as the key to 'real' hi-fi.

There are now three different pre-recorded music media competing for the attention of the hi-fi user, and to go for all three will either cost a lot of money or involve substantial compromises in the sound quality of each. For this reason many separates purchasers may start with just one source, adding others or a tuner when funds permit.

There will always be controversy over the relative qualities of LP, CD and cassette. LP is still the choice for ultimate sound quality – particularly for those prepared to spend a substantial sum on a good quality turntable system. Furthermore the vinyl repertoire is still the cheapest, largest and most varied.

Cassette has never really challenged vinyl's superior quality, but it is a multiple role format, offering 'go anywhere' flexibility, a uniquely useful recording capability, plus a broad catalogue of pre-recorded music cassette material. As a hi-fi medium cassette suffers from pre-recorded material which has been improving but is still patchy in quality, and can usually be bettered by a home recording. There is also the worry that a tape made on a specific machine usually replays best on that machine, which may cause aggravation when upgrading a few years hence. It is worth remembering that though such opportunities are rarely possible or practical, a live recording onto cassette using good quality microphones can be the hi-fi equal of any other source.

CD is the latest challenger to these two established media, using a digital instead of analogue storage format. The sound quality remains controversial, hailed as near perfect by its fans but derided by vinyl freaks, so it is probably fairest to say that CD is fine for most listeners, but may not suit everyone; certainly the lack of background noise, defects and deterioration over time are major strengths.

While there will always be arguments about the different music storage and transmission formats available to the hi-fi listener, there is also controversy over the relative importance of the different components which make up the system chain – by which is meant the source, the amplification, and the loudspeakers (and for the pedantic the room itself, though there's often little that can be done here).

For many years the 'weakest link' theory proposed that the loudspeakers needed the most attention, that amplifiers merely had to have sufficient power, and that turntables were pretty well perfect. However, this perspective has become steadily discredited by an alternative 'theory of precedence', which stresses that no subsequent component can make up for the inadequacies of its predecessors – all it can do is supply its own additional degradations. In such a context it is not uncommon to find more than half the system budget allocated to the record player, with scrimping and saving made on amplifiers and loudspeakers, even though these are used all the time whatever the source.

Choosing the components of a system is only part of the task of getting the system as a whole working as well as possible. Good turntables and loudspeakers both benefit to a surprising degree from proper support – from stands that enable them to give their best performance, whether floor-standing or wall mounted.

Siting of components within a room can play a significant role, as can the room itself. Some people may prefer an acoustically more 'live' room than others, but most will agree that the larger it is the better, because this tends to provide smoother and better extended bass reproduction. All rooms create reflections and standing waves, and the effects of these are more severe if all opposing walls are parallel, similar distances apart, and with hard reflective surfaces. Provided that the loudspeakers can be placed fairly symmetrically, slight asymmetry elsewhere in the room is usually helpful.

The loudspeakers are most critical of placement, because it is their job to create the stereo image, and it will be impossible to do this if the sound from each is not roughly similar at the listening position. Each loudspeaker should operate in a similar immediate acoustic environment, unencumbered by other furnishings and structure, and a similar distance from listener, nearby walls, and corners. Some loudspeakers are designed to operate close to a rear wall, others a metre or so out into the room, but all loudspeakers benefit from being closely mechanically coupled via proper stands to the floor.

There is some debate about the best form of fixing, however, adjustable spikes through to the

floor proper or seated into the tops of cross-head screws are generally regarded as the best solution in most circumstances. There is no need for paranoia about using spikes through normal pile carpets because the holes will be almost impossible to find when the stands are removed.

Most decent quality turntables are fairly immune to feedback from loudspeakers, so it should not matter too much if these items are sited fairly close to each other. Indeed it is debatable whether any advantages gained from keeping the turntable well away are not lost through the need to use longer connecting cables.

Mixing and matching the components of a record player to get optimum results can be something of a black art, over and beyond the fairly simple business of choosing a cartridge of roughly the right compliance to suit the arm effective mass. Certainly the combining of turntables and tonearms is not a simple matter, and this is where a good specialist dealer will come into his own, both in terms of recommending good combinations from the models he holds in stock, and then in correctly carrying out the sometimes tricky set up procedures which are often required to get the best results.

The key to getting the best results from a separates system lies in finding an experienced and skilled dealer in the first place, one who takes the trouble to find out what you really want and then demonstrate some likely alternatives, without trying to cram his own particular prejudices down your throat. To some extent the customer's task must be to discover for himself whether the dealer in question is competent or not. Membership of trade organisations like BADA can be a worthwhile pointer to a degree of professionalism, but the bottom line is whether the dealer in question can create a good sound in his own shop. If he can't, there is precious little chance of him doing so in your home. The best dealers should lay on demonstrations so you can hear the differences between components for yourself, and hear the sort of improvements which can be had at different price strata. You can then establish the sort of performance you are prepared to accept within whatever budgetary constraints you have set.

The Directory has been compiled so that it can be used by *Choice* readers as a buying guide. A guide in the sense that you should use the information in it to make a shortlist of equipment suited to your needs and budget, and then audition it at a dealer before taking the plunge. Because tastes inevitably differ it would be unwise to buy purely on the basis of our recommendation and dealers are the most experienced people around when it comes to making systems work as a whole.

THE DIRECTORY

TURNTABLES & TONEARMS

The schizophrenic split between consumer electronics and 'real hi-fi' is most obvious amongst turntables. The former are supplied simply as a means of playing vinyl in a system context. Cheaply manufactured in the Far East, these are complete players with a variety of automatic facilities, sometimes tied into system remote control. But engineering compromises severely limit sound quality, cartridge choice may be P-mount restricted, and such machines are rarely stocked by specialist hi-fi dealers these days.

Specialist turntables offer big sound quality

improvements, but lack so-called convenience features (that practised users often find irksome). Such turntables at the cheaper end of the market (sub-£350) tend to be supplied with matching tonearm, and often include a 'starter' cartridge. Still better quality is found at higher prices amongst the separate motor units and tonearms. Careful partnering and set-up is essential for these individual components, but 'naturally sympathetic' combinations do exist, and the good dealer can help.

Listed separately as integrated players and as turntable motor units and tonearms, our sound

quality rating is based on results achieved using a high quality system – but in point of fact the turntable is usually the limiting factor soundwise in any system. Lab performance summarises the speed stability, vibration generation and environmental isolation of turntables, along with the friction, alignment and adjustment of tonearms. The tonearm's physical characteristics also define a range of mechanically compatible cartridges (see cartridge listings)

INTEGRATED TURNTABLES

NAME PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	BACK ISSUE FULL REVIEW
Acoustic Research EB101 £230	Good Good	This genuine high fidelity product offers an impressive package at a competitive price	Subchassis, manual, 13.5g	BB	48
Alphason Solo/Xenon MCS £365/£262	Average+ Good	The deck is warm and euphonious with high levels of clarity. Wow artefacts occasionally just audible.	3 point suspended motor unit, optional quartz PSU/speed change 13g		67
Alphason Sonata/HR-100S-MCS £695/£412	Excellent Very Good	Highly capable audiophile system with real resolution and control. Bass is powerful and dynamic ability unbridled	Manual, subchassis, belt drive, 10g	R	60
Ariston Q-Deck £150	Good Average+	Well engineered and good sounding low cost package which is both easy to set up and to use	Semi-auto, belt drive, solid	BB	67
Ariston RD60 £219	Good Good	With the Enigma arm, this balanced and communicative turntable falls only slightly short of the RD90 on sound quality	Manual, belt drive, subchassis, 11.5g	BB	48
Ariston Forte £350	Below Average Average	Heavy on engineering, short of soul? The Forte almost makes it, losing out only because of some residual pitch variations and a lack of bass power. The arm is modestly good	Manual 2-speed belt drive player and detachable arm, 10g		67
Dual CS430 £89	Average Below Average	Ragged, sometimes unpleasant cartridge mixes with a modest pleasing player in a very sharply priced package.	Belt drive, with cartridge, auto return, 5g	R	67
Dual CS503-1 £114	Poor Average	Stated as a replacement for the CS505, the 503-1 needs careful system matching to mask rumble and microphony, but is good enough to benefit from a better cartridge	Semi auto, belt drive, low mass arm	R	55
Dual CS505-3 £139	Very Good Good	Continuous steady improvements have kept this model at the forefront of the budget market. Practically is excellent and the deck has excellent timing bass/mid and stereo imaging	Semi-auto belt-drive, 8g	BB	67
Dual CS5000 £200	Average Average+	The rare 78 facility may give grandma's collection a new lease of life but the player did not merit recommendation on price vs sound	Electronic, belt drive, subchassis, 10g		48
Goldmund ST4 £4,000	Very Good Excellent	The Studio turntable takes on a cheaper tonearm than the T3F, yet provides a similar reference standard objective and subjective performance at £2,000 less, in a neatly integrated though bulky package.	Solid subchassis, direct drive, parallel arm, detachable headshell	R	60
Heybrook TT2 turntable & arm £349/£249	Average Good+	A gradual process of informed evolution and a sensibly designed arm combine to make this a good sounding middle of the road package. Well supported by dealers	Manual subchassis motor with arm, belt drive, 14g	R	67
JVC AL-FQ555 £170	Below Average Poor	Clear midband sound but woolly bass and crude treble. Ease of use however ranks highly, and there's little to be out of adjustment	Auto, direct drive, 5.5g		67
Kenwood DP-990 £300	Average Average	Smart, slick and massive player suitable for low compliance cartridges only. A good but not inspired performer.	Semi-auto 2 speed direct drive, 16g		67
Kuzma Stabi/Stogi £575/£349	Average+ Stabi: Good; Stogi: Excellent	Stabi is powerful, spacious but not sufficiently subtle. Stogi is an excellent all rounder with even spread of abilities.	Manual, belt drive, subchassis, 12.5g	Stogi: R	60
Linn Axis £379	Good+ Good+	Setting new performance-for-price standards this cleverly engineered and competent deck has many of the qualities of the Sondek LP12	Electronic, belt drive, semi subchassis, 13g	BB	48/Coll
Linn Sondek/Ittok (Troika) £509/£429 (£669)	Excellent Excellent	Superb sound – the best LP12 combination yet. The Troika gives the system real solidity and strength, stretching the deck and arm qualities to the full	Manual subchassis player, belt drive, 13g	R	60
Manticore Mantra £300/£330 (Arm)	Good+ Good+	Fitted with a Rega RB250 arm variant and AT95E cartridge the Mantra fared very well indeed with a fine midrange and good focus	Subchassis, 12g, manual	BB	48/Coll
NAD5120 £89	Average Average	A number of running improvements have given this player a range and tautness denied its lazier sounding antecedents.	Semi-auto belt drive, detachable arm/tube/weight, 11g	BB	67
Omega Point Silver/Black £895/£295	Good Good+	An avowedly stripped down turntable that lacks even an on/off switch, the Omega Point Silver offers fine midrange clarity and good stereo, but some HF compression and a lack of 'wellie'	Manual, solid, belt drive, unipivot, 11g		55
Opus 3/Decca London International (Revised) £399/£99	Poor Good	Heavyweight motor unit with many fine properties, but which needs further development. The idiosyncratic arm is a suitable (though not ideal) platform for the Decca cartridge. For all its faults though, the whole transcends the sum of the parts	Belt-drive manual, damped unipivot arm, 12g		67
Rega Planar 2 £135	Average+ Good	A remarkable product at the price, surprisingly articulate and confident	Integrated turntable, manual, 11.5g	BB	48
Rega Planar 3 £188	Good Good	A long time leader in its price category, the '3' (with its excellent RB300 arm) sounded nicely 'musical' in a balanced and coherent manner	Integrated turntable, manual, 11.5g	BB	48
Revolver Rebel £160	Below Average Below Average	Fat, assured and forward presentation, but ragged and subjective speed stability problems. With a little further development, it will be a winner	Manual, 2-speed belt drive inc cartridge, 13g		67
Revox B291 £660	Average- Average-	Sound quality ranks as below average. Subjective bandwidth is narrow and the music lacks grace and energy. Ease of use however is unrivalled	Automatic, remote controllable, direct drive parallel arm, prefitted cartridge		55
Sansui SR-222 Mk V £159	Average- Average	More than acceptable in most areas, the Sansui is detailed and positive, though a little muddled when stressed. Best suited to low compliance cartridges	Manual 2-speed belt drive, 16g		67
Source/Odyssey RP1 £849/£695	Very Good	Mixed. The turntable has tremendous power and authority, but as tested suffered pitch imprecision. The arm is rather ill controlled and lacks resolution and focus	Manual, belt drive, subchassis, motor, outboard PSU, 15g		55
Systemdek IIX £248	Good Average+	Poised, clean sounding deck, forward and explicit in character. A good value deck under £250, and a relatively cheap and satisfactory suspended model	2 speed belt drive manual turntable and arm, 11g	R	67
Technics SLBD-22 £90	Average- Average-	Not bad for the price and a great improvement on the L20, it performs reasonably when not stretched	Semi automatic, solid plinth, electronic, 6g P-mount	R	48
Technics SL-DD33 £110	Average Average	As with the DD33 though better value	Automatic, direct drive, solid plinth, 7.5g, P-mount	BB	48

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 109

THE DIRECTORY

NAME PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	BACK ISSUE FULL REVIEW
Technics SL-L20 £115	Poor Average-	A rather lightweight parallel tracker achieving a poor overall rating, with little to recommend it unless you dig facilities	Electronic, solid plinth, 5g, P-mount		48
Technics SL-QD33 £140	Average Average	The quartz speed controlled version of the DD is short on sound quality but not features. But it did have fair focus and some depth	Automatic, Quartz, direct drive, solid plinth, 7.5g, P-mount	R	48
Thorens TD280 £150	Average Average	Extremely competitively priced package with a trace of lower-mid overhang, but it's very well behaved elsewhere	Semi-auto belt-drive 2-speed, 13g	BB	67
Thorens TD166 Mk II £179	Average Average+	A polished and professional design consisting of a first rate budget suspended subchassis turntable and a mildly disappointing arm	Manual 2-speed, 13g	BB	67
Thorens 160S Mk IV £249	Average+ Average+	Fine, familiar suspended player and arm. Faults are few, but include poor arm bearing adjustment. The arm can sound a little messy	Manual 2-speed, 7g	R	67
Thorens TD320 Mk II £349	Good Good	Good, consistent sounding deck with much improved (but not ideal) arm. A little expensive for performance offered	Semi-auto two speed belt drive, 14g		67
Well Tempered Turntable & Arm £1690	Average Very Good	Intriguing and challenging design. Musically it is not ideal, but it has a limpid quality and a lack of artificiality that sets standards as well as turning the ear, though it's not completely uncoloured. A charmer yet mainstream enough in its virtues to be viable	Manual 2-speed, damped, suspended arm, 7.5g	R	67

MOTOR UNITS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Ariston RD90 Superior £900	Good+ Good	Good but slightly damped sound quality, with powerful and stable bass. The pro quo is a certain lack of pace, energy and resolution	Belt drive, subchassis, electronic		55
Audio Labor Konstant £2,560	Good+ Very Good	The space-station-like solid alloy frame needs a substantial shelf, but absolute stability renders a confident, neutral sound	Belt drive, subchassis	R	48/Coll
Goldmund Studio £2,350	Very Good Excellent	A reference point for high end audio, only exceeded by the even more extravagant Reference. Currently being reworked into a more competitive (!) package	Electronic, direct drive, solid subchassis	R	60
Michell Synchro £265	Good Good	A particularly happy blend of qualities endows the Synchro with a blend of subtlety and force – the maled fist in the velvet glove. Easy on the ear in the best sense	Manual, belt drive, suspended motor unit	R	67
Michell Gyrodec £595	Good Good	Sweet and natural sounding player, well exploited by the Rega RB300 arm. Aesthetics, and the acres of acrylic, are unique	Manual, belt drive, suspended motor unit		55
NVA Turntable £499	Average Good	A surprisingly fast and assured performer, but with lightweight bass and a little aggressive. Easy to set up, the price (necessarily) includes stand	Manual, belt drive subchassis, stand, 33 $\frac{1}{3}$ rpm		60
Oracle Alexandria Mk III £825 – £995	Very Good Very Good	One of the most beautifully presented players made, and fully supported by superb separation, dynamics and a euphonious style of delivery	Manual 2-speed belt drive	R	67
Oracle Delphi III £1450	Very Good Very Good	Stable imaging, good bass and refined detail, it's well made and consistent in service – but very expensive	Manual, belt drive, subchassis	R	60
Oxford Acoustics Crystal Reference £1955	Very Good Excellent	This big, open and powerful sounding turntable works beautifully with Airtangent arm to give superb 3-D imagery	Manual, belt drive, subchassis, stand	R	60
Pink Triangle PT 100 £650	Good Excellent	A state of the art player, easy to set up but extremely fussy about partnering equipment and state of tune. The test sample suffered flutter derived roughness (presumed not typical)	Manual 2-speed, outboard PSU	R	67
Rega Split Slab Modification Kit £74	Good Good	Clever and cheap upgrade kit that protects the initial investment and which adds clarity and environmental isolation to a fine but microphonic original	Conversion suspended chassis kit for Rega 2/3		67
Roksan Xerxes £655	Excellent Excellent	This unique design cuts a swathe through the conventions of turntable design, providing superb resolution and stereo. Setting up is critical, and for experts only	Manual, belt drive, solid/decoupled	R	67
SEE Revolver £135	Average Average	Nicely balanced, but unimpressive timing and lightweight bass made this deck rather average for the price. Manufacturer has since made several changes, but not re-submitted for review	Manual, belt drive, solid plinth		48
Source So £675	Good Good+	Now an extremely tidy sounding deck, the So has a grip and range at low frequencies that knows few peers, and is at least sufficiently good elsewhere. A successfully refined version of a promising original that didn't quite deliver	Manual belt-drive 2-speed, outboard PSU	R	67
Systemdek IIXE £248	Good Good	Fine, honestly specified and well built player which easily betters its closest stablemate, the IIX	Manual 2-speed, external PSU	R	67
Systemdek IV £495	Good Very Good	The level of wow is a theoretical concern at least, but elsewhere this player shines, combining euphony, information and imaging in a polished, untemperamental package	Two-speed manual belt drive	R	67
Thorens TD521 £629	Average Average+	Nice product. Unexciting, rather undynamic and insubstantial sound quality, but facilities such as ability to accommodate 12 inch arm compensate	Manual, belt, suspended motor unit, 78rpm, pitch control,		55
Townshend Avalon £299	Good Good	Some smear and coloration, probably due to structural shortcomings of the plinth, take the edge off this otherwise well turned out and well priced machine. Worth trying if you can't afford the full-blown Rock	Manual 2-speed belt drive	R	67
Townshend Rock £450	Good Good+ +	Tight, tidy sounding player which works with a wide variety of (non-tangential) arms, giving almost CD like precision and clarity. Good bass depth, dry balance – our Editor's favourite deck, in fact	Manual, belt drive, solid, arm damping, various optional extras	R	55

TONEARMS

NAME PRICE	LAB SOUND	COMMENTS	ARM EFF. MAS	VALUE	BACK ISSUE FULL REVIEW
Airtangent II £1998	n/a Excellent	A complex but superbly built arm for high quality systems, giving excellent stereo and resolution	7.5g (vertical)	R	60
Alphason Opal £110	Good Average	This is a straightforward adequate sounding low cost arm, priced just above where it rightly belongs	10g		55
Alphason Delta £165	Good Average+	A highly competent design from Alphason gives good sound quality but with slight blurring and treble fizz	16g	R	48
Alphason Xenon £210	Good Good+	A trimmed down HR100S, the Xenon has inferior bearings and a simpler finish, but sounds crisp and coherent. Fits any Linn cutout	12.75g	R	55
Alphason HR100S £395	Good+ + Very Good	This S-shaped arm sounds smooth, but nevertheless reproduces transients with fine attack	10g	R	48/Coll
Ariston Enigma £99	Average Average+	Good but not the best in its class: mid-band sounds a little uneven; treble a trifle "brash"	11.5g		48
Audio Technica AT1130 £186	Good Good	Well suited to most cartridges including high compliance ones, the AT is smooth and tonally neutral, if slightly lacking in 'balls'	8.5g	R	67
Decca International £49	Average+ Average+	This uni-pivot design gives a rather rich tonal balance and some bass muddling. Could be good with Decca cartridges, but not well built	12g		48/Summary
Eminent Technology £960	Good+ Good+ +	One of the best sounding tonearms around, the linear tracking Eminent delivers impressive stereo imagery, focus and transparent sound	9g (vertical)	R	48/Coll

THE DIRECTORY

TONEARMS

NAME PRICE	LAB SOUND	COMMENTS	ARM EFF. MAS	VALUE	BACK ISSUE FULL REVIEW
Goldmund T3F arm £3950	Excellent Excellent	This complex parallel tracker created an "ear-opening" experience when tested with a (since updated) Goldmund Studio turntable	16.5g	R	Coll 2
Grace G707 £299	Good Good+	This venerable is still capable, if not competitive with modern alternatives	7g		48
Helius Orion 2 £490	Very Good Very Good	Very expensive but with a performance that merits recommendation	12g	R	48
Linn LV Plus £129	Good+ Good	The fixed headshell provides an improvement over the LVX resulting in better clarity, detail and punch	13g	BB	48
Linn Ittok LVII £429	Very Good Very Good	Suitable for many turntables this top-quality arm performs best with the LP12, the combination exceeding the sum of both parts	13.5g	R	48/Coll
Linn Ekos £895	Very Good Very Good	Superb, state of the art design which builds significantly on Ittok's strengths	9g	R	67
Manticore (Logic) Datum 2 £140	Very Good Good++	Rated sonically very good with fine depth focus and transparency, good air and life, albeit slightly 'untidy'	15g	R*	48/Coll
Mission Mechanic £900	Good Good+	Nearly right, but inconsistency with level and vague imagery spoil what is otherwise a firm, powerful advocate for black vinyl	11g		55
Moth Arm £65	Good Good+	The ultimate budget arm? Refined, detailed, sweet and natural – performance improves in line with the rest of the system	12g	BB	60
Rega RB300 £90	Good++ Good++	Despite its modest price this sets exceptional performance standards and could be used on a number of high-quality turntables	10-11g	BB	60
Roksan Artemiz £350	Average Good	Excellent but flawed arm which needs some development and refinement before it can be wholeheartedly endorsed. Watch this space. Fits Rega cutout	8g		67
SME 3009 Series IIIS £165	Good Average+	A simplified less flexible (as regards adjustment) Series III with a similarly 'soft' sonic character	5g		48
SME 3009 Series III £229	Good Average+	Comprehensively adjustable and very well made, suited to MM and high compliance MC cartridges	5g		48
SME 3009R £291	Average+ Average+	A higher mass version of the Series III designed for low compliance MC cartridges	12g		48
SME Series IV £810	Excellent Very Good	Superb engineering and finish with a finely balanced sound giving impressive stereo focus and low coloration	10.5g	R	60
SME Series V £1206	Excellent Very Good	Excellent in terms of design engineering and sound quality, this arm arguably sets a new reference standard regardless of price	10.5g	R	60
Souther Tri-Quartz £895	Average Good	A unique parallel tracking arm that makes up for what it lacks sonically in its unusual appearance	3-4g		48

CARTRIDGES

Very much the 'slave' of turntable and tonearm and to some extent undermined by the supply of free 'starter' cartridges on many turntable systems, the cartridge is still worth taking seriously. The quality of both the stylus itself and the cartridge's tracking performance are important in preserving that most important part of the hi-fi system – the record collection – and the cartridge also plays a significant role in determining the overall balance of a system.

Cartridges fall into two groups: high output models, capable of working directly into any amplifier, and more expensive low output models. Stereotypically, low output cartridges use the moving coil principle of operation, have better mechanical integrity and tighter tolerances, and give better performance but at much higher cost. Most under-£150 amplifiers and many valve designs need either an extra head amp or transformer to cope with the low output. **Cartridge/amplifier**

interfacing can be very subtle, but even basic high output moving magnet designs benefit in overall balance from optimised amplifier capacitance loading. Still more important, the mechanical cartridge characteristic of cantilever compliance ('springiness') needs to be considered in the light of the effective mass of the tonearm which will be used (see Turntable & Tonearm entries).

NAME PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/T TYPE	VALUE	BACK ISSUE FULL REVIEW
A&R C77 £20	Average+ Average+	A sensible moving magnet package with good bounce at a competitive price	6-16g Normal, MM	BB	48
A&R C77Mg £30	Average— Average	Punchy sound quality with plenty of extra energy to liven things up. The solid body seems well worth the extra £10	4-8g Normal, MM	BB	67
A&R E77Mg £47.50	Average Average	Our sample had a disappointing stylus, but gave a coherent, rich and laid back sound, with good 'scale'	3-8g Normal, MM	R	48
A&R P77Mg £60	Average+ Average+	Cautiously recommended, the P77Mg was preferred to its cheaper partner by virtue of a better tip. Channel balance could have been better	4-9g Normal, MM	R	48
Audionote ID2VDH £795	Good Very Good	One of the best, giving 'an extraordinarily relaxing midrange clarity'. But it picked up a bit of surface noise and dust and needs a transformer	8-18g Very low (transformer), MC		43
Audioquest MC5 £200	Average Average	Offers high-output benefits but the drooping frequency response and severe VTA error preclude recommendation	10-20g Normal, MC		54
Audio Technica AT95E £17	Average— Average	Clear, dynamic if richly balanced, the magnetic '95E is a definite Best Buy	8-14g Normal, MM	BB	48
Audio Technica AT-420E OCC £30	Average Average	Better suited to pop recordings this MM bears some of the sonic hallmarks of the Linn K5	7-14g (damp) Normal, MM	R	67
Audio Technica AT-430E OCC £42	Average+ Average	A rising high frequency response yields something of a treble sting, not a good all-rounder	3-7g Normal, MM		67
Audio Technica AT-F3/OCC LE £70	Average+ Good	Though the 'limited edition' badge is a trifle tongue-in-cheek the 'F3 still offers excellent value	8-15g Low, MC	BB	67
Audio Technica AT-F5OCC £100	Average+ Good	Decent output, good channel balance and a thoroughly refined sound sets the standard at £100	9-20g Low, MC	BB	54
Audio Technica AT-F5/OCC LE £100	Average Good+	This latest sample demonstrated some technical weaknesses but its spacious, fluid sound quality still represents a benchmark at this price	4-10g Low, MC	BB	67
Audio Technica ATDC7 £250	Good+ Good+	Technically and subjectively this cartridge represents a new dawn for AT, in the twilight of analogue audio	6-13g Low, MC	R	54
Audio Technica ATOC9 £400	Average+ Very Good	Tonal colours were reproduced faithfully while stereo images were clearly isolated and focused despite contributing to a thoroughly integrated whole. Slightly less transparent than more costly MCs	6-14g Low, MC	R	60
Azden YM10VE £12.50	Average Average—	A good tracker. Sounds rather bunched-up but not totally incoherent – for very basic systems only	5-15g Normal, MM		54
Azden GM1E £30	Average— Average—	Of academic interest only, this high o/p MC is seriously flawed in sonic terms	8-18g Low/normal, MC		54

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 108

THE DIRECTORY

NAME PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	BACK ISSUE FULL REVIEW
Azden GMP5L £108	Average + Average +	Although no P-mount system will do this cartridge justice, it can still be enjoyed in its universal mode. The subtle balance may prove irresistible to some	4-10g Low, MC	R	54
B&O MMC5 £24	Average + Average	Cheapest in the family – smooth treble and good focus, but the bass was left in the wings	5-15g Normal, MM		38 (Summary)
B&O MMC4 £43	Good Average +	Solid and well balanced in the midrange, the '4 lacks bass impact	5-15g Normal, MM		48
B&O MMC3 £57	Good Average	Slightly "laid back" sound quality but a good performer for the price. Best suited to B&O equipment	5-15g Normal, MM		48
B&O MMC2 £87	Good Average +	Only a modest improvement on its cheaper brothers (and sisters)	5-15g Normal, MM		48
B&O MMC1 £112	Very Good Good	Great clarity and detail at high frequencies but a slightly plodding bass. It may appeal more to the classical enthusiast	5-13g Normal, MM		48
Cello Chorale £799	Good Very Good	Looking like a piece of NASA gadgetry the Chorale's transparent treble delicacy was without equal. A serious audiophile choice	4-10g Low, MC	R	48/Coll
Clear Audio Gamma £295	Average Average +	Brimming over with enthusiasm, the unusual-looking Gamma is more than an audio oddity, but it lacks a little subtlety at times	4-11g Low, MC		54
Clear Audio Delta £450	Average + Good	Midway between the Gamma and exotic Pradikat, the Delta sounds like neither! Nevertheless, it delivers the goods	6-17g Low, MC	R	54
Clear Audio Pradikat £1225	Average + Very Good	Sounded absolutely glorious, creating a full sense of scale and a large well-focused soundstage – but watch for record wear	8-18g MC		Coll
Clear Audio Accurate £2,000	Good Excellent	A remarkable cartridge, not only by virtue of its effortless and highly neutral sound quality but also because this has been achieved with the same basic design as Clearaudio's cheapest MCs	4-11g Low, MC	R	60
Denon DL110 £69	Good Good	Firmly recommended as a fine all-rounder, this high-output moving coil model is likely to perform well in nearly all circumstances	6-16g Normal, MC	BB	48
Denon DL160 £89	Average + Good	Although listeners just preferred the 110 its brother here proved a twin in lab tests and is still "thoroughly competent"	6-16g Normal, MC		43
Denon DL 103 £99	Average Good	This classic spherical stylus model gives a lively sound with powerful bass, and is popular in broadcast studios	6-16g Low, MC	R	48
Dynavector DV-50X £60	Good Average	A high-output MC model with impressive lab performance, but whose tip and sound quality both disappointed	6-14g Normal, MC		48
Dynavector DV10X IV £60	Average Average +	Fine sounding and realistically priced, damping is recommended to ensure successful tracking ability	8-18g Normal, MC	R	48
Dynavector DV23RS £150	Average + Good	Sound quality was described as "shut-in", lacking energy and sparkle but with some "edginess" in high frequencies	10-22g Low, MC		28
Dynavector DV XX-1 £360	Good Good +	The XX-1 embodies a power and solidity rarely encountered amongst the breed, nevertheless it did exhibit a peculiarly suppressed character that will suit lively rather than wholly neutral systems	7-17g Normal, MC		60
Empire 800 Mk II £33	Good Average	This very high output MM appears to be based on the classic Ortofon VMS series. A trifle uninspiring overall	7-17g Normal, MM		67
Empire MC-5M £110	Average + Good	A very low compliance renders this MC best suited to heavy tonearms while its sweet, non-aggressive sound quality earns it a recommendation	13-20g Low, MC	R	67
Glanz MFG 110EX £24	Average Average	A little bright but giving detailed bass and clear treble this was competitive at the price	6-16g Normal, MM	R	Systems
Glanz GMC-10EH £49	Good Good	The rising HF trend of this high o/p MC may cause problems in certain systems but with a favourable wind its seductive qualities will win out	8-14g Normal, MC	R	67
Glanz GMC-10LX £79	Average + Average +	Bearing some of the hallmarks of the '10EH, the '10LX is still less competitive in the sonic stakes	7-15g Low, MC		67
Glanz GMC20E £129	Average Average	You could try haggling but we thought the makers of this number were demanding too much lucre for their product	3-6g Low, MC		48
Goldmund Clearaudio £1500	Average +	Something of a mixed bag overall, its sonic character bears a strong resemblance to the Pradikat though it shares some of the hallmarks of the more expensive Accurate	5-12g Low, MC		60
Goldring Elan £15	Average + Average	A lightweight and frisky-sounding MM that appears to be based upon the same body as the Nagaoka mm4	7-15g Normal, MM	R	67
Goldring Epic II £23	Average Average +	An excellent budget choice though the limitations of the stylus are rather obvious at higher frequencies	5-12g Normal, MM	R	67
Goldring G1010 £36	Average Average	A bit fiddly to set-up but rewarding once accomplished. The big and bouncy sound belies its price. Sensitive to amp loading	10-20g Normal, MM	BB	54
Goldring G1020 £53	Average + Average –	This one strutted finely onto stage but couldn't project to the "gods"	8-16g Normal, MM		43
Goldring G1040 £79	Average + Average –	High frequency extension was improved by the van den Hul tip, nice looking model – no great actress	8-16g Normal, MM		48
Goldring Eroica L £95	Average Average +	Open and relaxed sounding, the L version is just that bit more refined than its high output brother	7-18g Low, MC	R	54
Goldring Electro II £149 complete	Average Average +	A pretty decent allrounder that did not excel sufficiently to warrant recommendation	8-16g Normal, MC		43
Grace F9E II £240	Good Good	For lively presentation, excellent separation and generally satisfactory sonic delivery – consider this model	5-10g Normal, MM		48
Grado XTE + 1 £20	Average – Average	Bass and treble are a trifle coloured but the midband proved highly enjoyable. Ideal for budget systems	6-13g (damping) Normal, MM	R	54
Grado XF3E + £43	Average – Average	Downtilting balance disguises the brightness of this cartridge; bit of a mixed bag at this price	9-20g (damping) Normal, MM		54
Highphonic MCA3 £360	Very Good Good +	Exquisitely crafted by a group of ex-Denon engineers, this superb tracker had a sweet and seductive (if rather bright) treble	5-12g Low, MC		43
Kiseki Blue Silver Spot £395	Average + Good	Solid performance from a very solid cartridge but lacks some of the magic of other Kisekis. Compliance too high	5-12g Low, MC		54
Kiseki Purpleheart Sapphire £695	Good + Good +	Rare, beautiful to look at and sweet to listen to, our review of this high-flyer conjured up images of Japanese art	5-14g Low, MC		Collection
Kiseki Blackheart £1595	Good Good	This cartridge demonstrated refined poise and a delicate but at once potent security, however, the price did seem a little on the high side compared to other Kisekis	6-16g Low, MC		60
Kiseki Lapis Lazuli £3500	Good Very Good	Combining very sensible design concepts at a silly price, the Lapis Lazuli is best thought of as combining the detail of the MC3000 and the fluidity of the Clearaudios	4-12g Low, MC		60
Koetsu Black K £577	Good + Good +	Impressive in scale and dynamics but with some criticism of bass muddling and high treble fizz. Listen before deciding	6-18g Low, MC	R	48/Coll

THE WORLD'S NO. 1 GUIDE TO BUYING HI-FI

THE DIRECTORY

CARTRIDGES

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Koetsu Red £896	Good + Very Good	Named like a rare, and perhaps dangerous, little oriental fish this famous cartridge sounded "almost larger than life"	10-25g Low, MC	R	48/Coil
Koetsu Red Signature £1298	Good Excellent	Technically this cartridge suffers no faults whilst on a subjective level it offers rare musical insight	10-21g Low, MC	R	60
Linn K5 £30	Average Average +	Not as crisply focused as the costlier Linn magnetics, the K5 offers a smoother presentation	7-16g Normal, MM	R	67
Linn K9 £75	Average Good	Linn threw this model into the leading pack by beefing up the Basik's bodywork, adding a super stylus, and keeping the price fair	6-15g Normal, MM	BB	48/Coil
Linn Asaka £299	Good + Good +	Disciples of Linn who are trying to realise their true "Karma" may find that saving money is not a short cut to heaven	9-18g Low, MC	R	48/Coil
Linn Karma £435	Very Good Very Good	A specialist which is strongly recommended for Linn-based systems; results may be less predictable in more general application	9-18g Low, MC	R	48/Coil
Linn Troika £669	N/A Very Good	Ex-Karma users have been seen with glazed expressions indicating smug self-indulgence the morning after fitting a Troika	8-18g Low, MC		Coil
London Maroon £109	Average Average +	Now manufactured under the London brandname this Decca cartridge is as iconoclastic as ever	9-20g (damp) Normal, MM		67
London Super Gold £248	Average - Good +	Sometimes a bit fierce in emphasising record surface faults, it is perhaps best at revealing the excitement and tension in music	8-20g + damping Normal, MM	R	48/Coil
Madrigal Carnegie One £685	Average + Good	Looks like a duck but sounds much better, certainly worth auditioning. Compliance too high	5-11g Low, MC		54
Milltek Aurora £198	Good + Good +	An overall feeling of relaxed ease characterised this clear and atmospheric Kiseki-built cartridge	8-16g Normal, MC	R	48/Coil
Milltek Olympia £298	Average + Good +	Warm and detailed sound - packs the punch of the best MCs with high output as a bonus	12-20g (damping) Normal, MC	R	54
Mission 773HC £150	Good Good	A sufficiently well-balanced and competitively priced "old-timer" which still warrants recommendation	6-16g Low, MC	R	38
Monster Alpha 2 £479	Good Good +	In the final analysis this fine allrounder is insufficiently exceptional in any specific respect to justify fully its high price	6-14g Low, MC		Collection
Nagaoka MM4 £8	Average - Average -	Clear punchy sound that delivers the rudiments of a good performance	6-16g Normal, MM	R	54
Nagaoka MP10 £17	Average Average	High frequencies sounded "shut-in" with this spherical-stylus model, but mid and mass were energetic, bouncy and punchy	5-13g Normal, MM	R	48
Nagaoka MP11 Boron £38	Average Average +	Responding well overall in PM's equipment and listening room, this model was mildly criticised for low level and dynamic limitations	5-13g Normal, MM	BB	48
Nagaoka MP10SB £40	Average Average +	Stilton's mods have improved the fine detail resolution of this popular budget model	5-15g Normal, MM	R	54
Nagaoka MP11 Gold £45	Average - Average +	There were mild criticisms directed at most areas, but in general the sound was clear, open and even	3-8g Normal, MM	R	48
Nagaoka MP11 Gold SB £70	Average - Average	Excessive price loading for a blob of aluminium	2-6g Normal, MM		54
Ortofon OM5E £15	Average - Average -	The OM10 is a hi-fi cartridge - the OM5E is not	5-16g Normal, MM		43
Ortofon VMS5E II £14	Average Average	Sound quality was thought fair for the price, though a little 'untidy'	8-18g Normal, MM		38 (Summary)
Ortofon OM10 £20	Average Average	One of the leading "cheapies", this gives a fine level of sound quality for the price, with good matching compatibility	5-15g Normal, MM	BB	48
Ortofon VMS 10E II £21	Average - Average -	Some of its stablemates fared rather better, and showed less evidence of tracking problems to boot	Normal, MM		38
Ortofon VMS20E II £35	Average Average	One of the most popular cartridges ever, sound quality was a bit laid-back and tracking could have been better	3-10g Normal, MM		48
Ortofon OM20 £40	Average Average +	This turned out to be the listening panel's favourite among Ortofon's moving magnet models	5-16g Normal, MM	R	48
Ortofon 520 £50	Average Average +	Very sensitive to load capacitance this new Ortofon maintains the company tradition for a lively, effervescent SQ	7-16g Normal, MM	R	67
Ortofon X1 £50	Average Average	The cheaper X1 scored higher marks with our listening panel than the X3, but both were a disappointment	6-15g Normal, MC		48
Ortofon VMS30E II £52	Average + Average	Rather an old soldier in relation to turntable technology, it will perform undemandingly in demanding circumstances	5-13g Normal, MM		38
Ortofon MC10 Super £70	Average Good	"What a delightfully sweet-sounding cartridge this is..." we said	5-15g Low, MC	BB	48
Ortofon X3 £70	Average Average	A lack of bass power, definition and a "zitty" top end makes this competent but uninviting	5-15g Normal, MC		48
Ortofon OM40 £80	Average Average +	Highly competent engineering, secure tracking and decent sound quality are major strengths. But it's a little cold, a little polite	3-8g Normal, MM		48
Ortofon 540 £100	Average - Average	Graced with an advanced FCI stylus our sample possessed too high a compliance for broad arm matching. It could also sound a little unloving	3-8g Normal, MM		67
Ortofon MC20 Super £170	Average + Good +	An "inviting" sound quality; polite rather than exciting it approaches much more expensive models, but does not better them	6-15g Low, MC	R	48/Coil
Ortofon MC30 Super £250	Very Good Good +	Beautifully engineered and well-balanced, it was slightly criticised as bland, though some may appreciate the lack of rough edges	5-14g Low, MC		Coil
Ortofon MC3000 £800	Good Excellent	Quite simply, the most accurate transcription device yet created - not one for the faint hearted	6-16g V. Low, MC	R	60
RATA RP20 £22	Average - Average	Good integration, a clear dynamic midrange and the beginnings of fine stereo imagery merits clear recommendation	6-14g Normal, MM	R	48
RATA RP40 £44	Average Average +	The '40 did a good job of sorting out the layers and complexity of the mix, with good focus, excellent stereo spread and fine scale	6-15g Normal, MM	R	48
RATA RP70 £77	Average Average +	Clearer and sweeter than the '40 this also seemed heavier and less lively. For £99 you can have a van den Hul stylus	6-14g Normal, MM		43
RATA RP70vdH £99	Average + Good	Able to retrieve bags of musical detail (thanks to the vdH stylus), RATA's top cartridge ranks as one of the most articulate MM's available	11-18g Normal, MM	R	67
Rega Bias £34	Average Average +	Difficult to mount in some arms due to its shallow build, the bias offers a gentile, refined SQ that certainly makes it worthy of audition	4-10g Normal, MM		67

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 109

THE DIRECTORY

CARTRIDGES

NAME PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	BACK ISSUE FULL REVIEW
Rega RB100 £38	Average Average+	Remarkable mechanical performance in the right system context, but "try before you buy"	5-12g Normal, MM	R	48
Rega Elys £74	Good Good	Clearly superior to the Bias, despite their common heritage, the Elys is both more detailed, accurate and musically convincing	8-15g Normal, MM	R	67
Revolver £20	Average+ Average	This modified AT-95E enjoys a very lively mid and treble even if the bass is somewhat 'slower' in protection. A firm budget buy	8-16g Normal, MM	BB	67
Shure M92E £15	Average- Average	Though lacking depth, the overall sound quality was competent, but treble was not its forte	10-15g Normal, MM		43
Shure M99E £26	Average- Average-	Sister to the 92E this is a solid but not particularly exciting cartridge	5-10g Normal, MM		38 (Summary)
Shure ME75ED £24	Average Average-	Rather bright and splashy in the high frequencies but nevertheless a competent model	5-10g Normal, MM		38
Shure M104E £32	Average- Average	Capable in many ways, but giving no substantial improvement over the 92E in our view	5-15g Normal, MM		38
Shure ME97HE £44	Average Average+	It won't turn a sow's ear of a turntable into a silk purse, but will at least keep going and produce an acceptable result	8-20g Normal, MM	R	48
Shure M105E £45	Average Average-	A slightly 'spitty' sound lacking deep bass and dynamic contrast, but can be used in virtually every system where it will perform "unobtrusively"	5-12g Normal, MM		38 (Summary)
Shure M110HE £55	Average Average	Sound quality was thought eminently presentable, but not exciting; smooth clear high frequencies, but a loss of bass definition	5-10g Normal, MM		38 (Summary)
Shure M111HE £67	Average Average	Early reviews of this cartridge complained principally of the price - which has since come down	5-10g Normal, MM		38 (Summary)
Shure ML120HE £95	Average+ Average+	Quite decent sound quality and a generally fine balanced performance	6-18g Normal, MM		48
Shure ML140HE £120	Average+ Good	Qualitatively the treble of this well-balanced moving magnet model was a match for many moving coil cartridges	6-16g Normal, MM		43
Shure V15 VMR £195	Good Average+	Initial listening gave promising results, but extended familiarity gave the feeling of a lack of energy and a "shut-in" sound	5-12g Normal, MM		38
Shure Ultra 500 £452	Good Good	There was no doubting the accomplishments of what could well be the finest moving magnet cartridge around	6-14g Normal, MM		48
Stilton/AT-F3 £110	Good+ Good+	At a premium of some £40 this modified AT-F3 offers a startlingly refined performance and is strongly recommended	8-18g Low, MC	R	67
Supex SM100E £115	Average Average+	Delivers as much musical information as many moving coils - the bass in particular having an attractive bounce	6-15g Normal, MM		38
Supex SD900IV £350	Average+ Good+	The 900 is an inherently fine cartridge, but despite a recent update it is beginning to show its age	10-18g Low, MC		48/Coil
Supex SD901IV £375	Average+ Good+	This high output model delivered sufficient subjective and objective performance, plus good compatibility, to justify its price	8-18g Normal, MC	R	48
Supex SDX2000 £651 L £721 H	Good Good+	The high-o/p 2000 was preferred on listening tests to the low-o/p model, which even so has a unique place among the top designs	6-16g Either, MC		48
Van den Hul MC10 £699	Good Good+	A neutral balanced performer giving transparent midrange, fine depth and focus with firm extended bass. Gosh!	5-10g Low, MC	R	60
Van den Hul MC One £799	Good Very Good	This extended all the positive qualities of the '10 but added greater authority and scale - worth it for the extra money	6-12g Low, MC	R	60

AMPLIFIERS

The amplifier sits at the heart of the system, processing the outputs from all the various music sources as necessary and then driving the loudspeakers. These two (quite separate) functions are integrated into a single box at the low-to-middle price points; separated pre- and power amplifiers become increasingly common as one moves upmarket. At the upper end of the specialist market, valve amplifiers provide a popular alternative to the transistor types amongst enthusiasts.

There is a substantial difference between specialist (sound quality oriented) amplifiers and the consumer electronics style models. The former

are bleakly simple, avoiding all unnecessary features to provide the most direct signal path in the interests of best sound quality. The latter range from models with just basic tone controls and tape recorder switching, to those with elaborate facilities such as graphic equalisers, remote control (including volume), surround sound options etc. etc.

Lab measurement provides some useful data, particularly in regard to an amplifier's ability to drive a wide range of different types of loudspeakers, but this is only obliquely related to sound quality. We also include our measured power output (RMS, 8ohm load, 1 channel driven) - but

again, paradoxically, this doesn't necessarily correspond to the loudness capability of the amplifier, which has as much to do with the elegance of the overload characteristics within a given system (valve amplifiers invariably sound more powerful than their rating would suggest). The listing of features provides some indication to the complexity of an amplifier: many users prefer to retain the option of tone controls to 'shape' the overall sound according to taste; many others have found living without tone controls surprisingly easy, with additional benefits in terms of transparency.

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Acoustic Research A07 £280	Very Good Average+	Relatively smooth but ineffectual sound quality that lacks some weight and impetus at very low frequencies	75W, 4 line, 2AV and MM/MC inputs		68
ADC A-2080E £400	Good+ Average+	Clean and neutral sound but one that lacked depth and spaciousness; MM input favoured above MC or CD	108W, logic sw. for 5 line and MM/MC inputs		68
Akai AM-93 £550	Average Average-	Unfortunately Akai's on-board D/A converters were less successful than its conventional analogue CD input	112W, coax and optical dig inputs. MM/MC		68
A&R Arcam Alpha II £160	Good Good+	Very confident, convincingly musical and punchy sound that sets the standard for other budget amps	41W, 4 line and MM inputs	BB	68
A&R Arcam Delta 60 £250	Good Good+	Very refined and highly detailed sound via MM and CD without any of the hardness noted via the MC stage	59W, 4 line, MM/MC inputs, no tone controls	R	68
A&R Arcam Delta 90 £350	Good Fair	Well balanced and sweet-natured in any given system with MC capability, but pricey	70W MM/MC 5 inputs tone controls		50
Albarray M408 II £649 pr.	Good+ Good+	Unusually styled transistor monoblok power amplifiers reintroduced with improved performance and sound quality. Needs good warm-up for best sweetness and clarity	40W Power amp only	R	56
Albarray M1008 II £899	Very Good Good	A larger version of the similarly styled M408II, fairly good all round but only of average quality for the price	80W, monoblok		62
Aria Acoustics Aria 12 £299	Poor Very Good	A plain looking valve power amp that's something of a wolf in sheep's clothing giving many dearer amps a run for their money	12W	BB	63

THE WORLD'S NO 1 GUIDE TO BUYING HI-FI

THE DIRECTORY

AMPLIFIERS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Ariston Amp £180-200	Average Average+	Slightly veiled and thin sound but proved suitably attractive in the listening tests	32W, full logic control, MM and 4 line inputs	R	68
Audio Innovations Series 300 £389	Poor Good + +	Something of an anomaly the 300 is an integrated valve amp that looks awful in the lab but sounds remarkable in a system	10W, MM, 6 inputs	BB	63
Audio Innovations Series 1000/2nd Audio Amplifier £1199/1999	Poor Excellent	This valve combination offered awesome dynamic range with superb transparency and power to match. Compatibility with other brands is unpredictable	15W, MM, 6 inputs, monoblocks	R	63
Audio Research SP9 £1700	Very Good Very Good	This new high performance valve FET hybrid preamplifier sets a high standard for versatility, build quality and sound	5 inputs, MM/MC	R	60
Audio Research SP11 II £5250	Very Good Excellent	Current state of the valve preamp art, A reference point	Straight line MM/MC Disc + phase invert	R	60
Audiolab 8000C £325	Excellent Good	A well established preamp with a highly controlled sound, though it could do with more life and depth	MM/MC, 5 inputs, hdph, tone controls	R	62
Audiolab 8000A £350	Very Good Good	A long running and high dependable classic, versatile and consistent via all inputs	50W, MM/MC, 5 inputs, hdph, tone controls	R	62
Audiolab 8000P £495	Excellent Very Good	A dynamic powerhouse, load tolerant and sonically reliable	100W	R	62
Beard Audio CA35/P35mkII £595/£795	Fair + Very Good	Good build quality and a very smart finish combine with a characteristic valve sound to make a first class amplifier capable of giving hours of musical enjoyment	35W, MM/MC, 4 inputs	R	63
Beard 506 £1195	Good + Good +	A versatile valve preamp - the bass sounded lively if a touch softened while the treble was detailed but lacked a little sparkle and air.	4 inputs MM/MC		50
Beard M70 £1995 pair	Good Good +	A substantial British monoblok power amplifier, but not a great deal more impressive than the P35 at half the price	70W		50
Bryston 12B/4B Pre/Power £995/£1395	Good + Good	Bryston's massive 4B power amp stood out as the backbone of this combo, the preamp sounding a trifle unbalanced between MM and MC inputs	272W, bridgeable to 800W. 6 line, 2 disc inputs, subsonic filter		68
Burmester 838 £1490	Very Good Good	A disc-only minimalist preamp, strong points include excellent build, extreme neutrality, dry clean bass and notably sharp stereo focusing	MC only, MM option		Collection
Burmester 846 £1599	Very Good Good +	Usually coupled with the 838 this high-level preamp provides many and versatile input facilities	6 inputs		Collection
Burmester 850 £3995	Good + Good	Each of these mono power amplifiers contains separate high current 25W amps giving a refined coherent sound over most of the frequency range	100W		Collection
Cambridge Audio P40 £200	Good Good +	A very fine sounding integrated amplifier with simple facilities and MC cartridge capability	5 inputs 40W MM/MC straight line	BB	50
Cambridge Audio C75 £279	Good + Good +	Whilst not quite on par with its A75 companion this preamp provided excellent stereo imagery but was a touch "heavy" in character	MM/MC disc	R	50
Cambridge Audio P55 £290	Very Good Very Good	A grown up P40, the P55 suffers slight noise on the moving coil input but offers great sound for the money	55W, MM/MC, 5 inputs, hdph	BB	62
Cambridge Audio A75 £299	Very Good Very Good	This strong power amplifier sounded open and effortless, with fine bass drive and dynamics, albeit a touch grainy and harsh at high frequencies	100W	R	50
Cello Audio Suite £5280	Excellent V Good/Excellent	Cello's preamp represents a whole new ball game in flexibility and sound quality (or war of attrition on your wallet)	Optional inputs MC etc	R	50
Conrad Johnson MV50 £1699	Good + Good +	Coupled with the PV5, this CJ power amp performed well on audition	50W		Collection
Conrad Johnson Motif MC-8 £1995	Very Good Very Good	A cheaper alternative to the '7, this preamp is an undoubted success in maintaining the Motif sound but does not compare on sound quality	MM/MC	R	50
Copland Pre and power amps £649 each	Good + Fair	At £649 each this simple Danish valve pre/power combination is expensive, though the power amplifier sounds very easy on the ear	3 inputs MM, 12W		50
Counterpoint SA7 £747	Average + Good	Simple valve Californian preamp offering inspiring transparency for the price	4 inputs straight line MM/MC		Collection
Counterpoint SA12 £1250	Good + Good +	A real power-house power amp, beefy and load-tolerant although like the SA7 a trifle untidy at frequency extremes	100W		Collection
Creek CAS 4040 II £179	Good Good	The Mk II has no problems and is a fine all rounder	30W, MM, 4 inputs, tone controls	BB	62
Creek CAS 4140 S2 £219	Good + Good	Redesigned for '88, this is a fine allrounder with good moving coil input, plain presentation	40W MM/MC 3 line inputs	BB	62
Croft Micro £150	Average + Good	A real upsetter, this excellent valve preamp put the cat among the pigeons proving good sounds can be made at budget price levels	4 inputs MM straight line	R	Collection
Croft Super Micro A £500	Average + Very Good	The looks are somewhat improved, while this "hot rod" version with tuned components performed very well indeed. There is still no gain on the line inputs	4 inputs, MM, straight line	R	57
Croft Series IV(S) £730	Good Good	The original IV is still available now supplemented by the higher price and power (S); both are fine performers	40(60)W channel	R	57
Croft Series IVSA £1000	Good Very Good	Featuring tuned components chosen for their sound quality, the 'A' variant is an impressive example of Croft's technique in valve design	60W special supply regulation	R	57
Deltec DSP-50S DPA-50S Pre/Power £675/£825	Excellent Excellent	Remarkable pre/power combo based around the highly linear DH-0A32 hybrid op-amp. Unmatched detail resolution, control and transparency	63W, external feedback wiring, 3 line, MM/MC no tone controls	R	68
Deltec DPA 100S £2200	Very Good Very Good	A top-quality transistor power amp, sounding fast, articulate and well controlled, though maybe a touch clinical for some tastes	80W	R	50
Denon PMA 250 II £125	Good Fair	Despite a claimed increase in power this competent model now slips behind the competition on sound quality grounds	30W, MM, hdph, tone controls		62
Denon DAP-2500 PDA-4400A Pre/Power £549/£599 pr.	Very Good Good	Denon's fully-fledged preamp also incorporates D/A converters that did not improve the sound of our £299 CD player. The power amps are brilliant!	172W, monoblocks Opt/Coax dig + 2 tape, 4 line and MM/MC inputs		68
Denon PDA-6600 £1,000/pair	Excellent Excellent	Delivers abundant high quality sound, solid engineering expertise and content clearly compensating for any compromising of purist audiophile principles	250W monoblok, remote power	R	60
DNM 3A From £1000	Good + Very Good	The DNM3 in its acrylic case is a remarkably revealing and neutral state of the art preamp	5 inputs MM/MC twin vol controls	R*	44
E.A.R. 802/509mkII £920/£1550	Average Very Good	Extremely well made and combining the sonic strengths of both transistors and valves this EAR combo warrants attention	100W, MM, 6 inputs, monoblocks	R	63
E.A.R. 549 £3,000/pair	Very Good Very Good	A valve monoblok that measures like a solid state amp is itself an achievement, but exceptional power delivery and bass 'slam' is not fully matched by delicacy and transparency elsewhere	200W monoblok, bias setting		60
Exposure VII/VIII £360/£340	Very Good Good	Supplied as a combination without the separate preamp power supply, this pre power combination performed satisfactorily especially on the moving coil input	50W, MM/MC, 3 inputs, straight line		62

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 109

THE DIRECTORY

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Exposure VI/VII Dual/VIII Pre/Power £449/£219/£379	Good Very Good	An established company like Exposure could do more to improve the 'look' of these amps which, nevertheless, sounded confident, dry and musical	63W, Super mod. 4 line and 2 disc inputs with full rec-out switching	R	68
Goldmund Mimesis 6 £2,500	Very Good Very Good	Small and discrete for those who'd rather not flaunt it, this is no powerhouse but sounds subtle, delicate and refined	80W stereo power amp		60
Grant 660AMS £948 pr.	Good Very Good	This neat and compact 60W valve monoblok gave good sound on the 8ohm tap, better still on 4ohms. The midrange was particularly natural	60W monobloks 41 8ohms	R	57
Haffler DH120 kit form £295	Fair	We didn't build one; see below	60W		44
Haffler DH120 assembled £360	Very Good Fair	Sound quality results were decent enough, but this power amp won't set the world on fire at this price	60W		44
Harman Kardon PM635i £159	Good Good	An improved version of the classic PM635 amp which sounds typically dry and articulate. Price is frozen	49W, 4 line and MM inputs A/B speaker o/p	R	68
Harman Kardon 640 Vxi £225	Good + + Good	Moderately priced but built to HK's high standards; good value and good load tolerance	50W MM, 5 line inputs tone controls		56
Harman Kardon PM645VXi £300	Very Good Good	Fits in well with the Harman Kardon series, giving a competent all round performance at a fair price	75W, MM/MC, 5 inputs, hdph, tone controls		62
Harman Kardon PM650Vxi £369	Average + Good	A tight and slightly over-damped sound lacks any essential warmth or richness. Reduced headroom on MC	71W, 6 line, MM/MC and true A/V inputs		68
Harman Kardon 655 Vxi £449	Very Good Good	Plenty of well built integrated amplifier for the money, with lots of power to drive almost anything, plus versatile inputs	100W MM/MC 6 line inputs tone controls		56
Harman Kardon PM665Vxi £699	Good Good	A versatile and meaty amplifier with high current capability, but sound quality lags behind certain home grown alternatives	150W MM/MC tone controls (switchable)		60
Inca Tech Dirk £215	Good + Good +	This tiny, minimalist model is effectively a power amplifier with volume control, providing inputs for CD player and tape recorder but not tuner!	50W, 2 line inputs, straight line		56
Inca Tech Claymore £396	Good + Good +	Limited facilities but a strong, clear, well-focused sound results in auspicious Choice debut for this relatively young company	50W MM/MC 3 line inputs straight line	R	56
Inca Tech Claymore S £415	Fair Very Good	Rich, deep and captivatingly musical this amp prompted a very favourable reaction. Disc sens. too high	60W, CMOS logic controls 7 line and MM/MC inputs	R	68
Inca Tech Claymore 2 £515	Good Average +	Very similar to the well-received 'S' via CD our Claymore 2 had a dodgy disc input which ruined its showing	100W, CMOS logic, as 'S' but with more MosFets!		68
ITL MA-80 £150	Good Good	A promising start for this young company, the MA-80 gave a fine sound with CD but was less wonderful on the moving coil input	30W, MM/MC, 5 inputs	R	62
Jadis JP30/JA30 £6,790	Fair Excellent	Two-box preamp plus monoblok power amps, classic valve design gives stereotype valve sound. Beautiful build, nostalgic styling and delightful sounding midrange transcend limitations at frequency extremes, in lab, and re cartridge matching	30W 2-box pre-, monoblok power, MM-only, 4 line inputs	R	60
JVC AX-222 £110	Good Fair	Not very impressive, JVC need to pull their socks up if their budget amplifiers are to score	35W, MM, 4 inputs, hdph, tone controls		62
Kelvin Labs Junior/J30 £295/£295	Good Good	Their heart is in the right place but the class A Junior combination is a bit expensive for what you get	20W, MM/MC, 5 inputs		62
Kenwood KA-5500 £130	Very Good Fair	Having dropped its moving coil input, this latest version has British style dynamics and rhythm but is not first grade yet	35W, MM, 4 inputs, hdph, tone controls	R	62
Le Tube £585	Good + Good	If moving coil sensitivity is not required then this preamplifier will offer a clean view with very good stereo	3 inputs MM	R	44
LFD £2,995 +	Very Good Excellent	Can set the subjective standards that others merely aspire to, but this outstanding if unconventional multi-box preamp needs careful matching to ancillary components (cartridge, power amp)	MC (with care), passive line extra	R	60
Linn LK1/LK280 Pre/Power £495/£645	Good Good -	A very modern, logic-controlled amp with distinctive and inoffensive sound quality. Its restrained sound could do with extra insight and zip.	84W, compact amp CMOS sw. for 2 tape, 2 line and MM/MC, XLR sockets.		68
Luxman LV100 £205	Good Fair	Nicely finished modern integrated amplifier, generally competent though not exceptional	45W MM 4 line inputs tone controls		56
Luxman LV105u £685	Very Good Good	This very well equipped and beautifully finished Japanese integrated amplifier has two valves in the early section of the power amplifier. Pleasant and musical it sets no value for money record here	9 inputs 80W, MM/MC tone controls		57
Magnum A100 £1995 pair	Good + + Good +	Given their massive power rating a pair of A100's make a fine stereo power amp; ideal for high levels and with a wide dynamic range for digital programme	320W		50
Marantz PM25 £125	Good Fair	Soft and sweet like the rest of the range, the PM25 is inoffensive and undemanding	25W, MM, 5 inputs, hdph, tone controls		62
Marantz PM35 £170	Very Good Good	This new generation Marantz is a good allrounder, and shows that extra care is being taken over sound quality; well equipped and versatile	45W MM/MC 3 line inputs tone controls		56
Marantz PM45 £200	Good + Fair	Generally pleasant and polite with above average clarity; there was some softening in the bass, restricting dynamic output somewhat	40W MM/MC tone controls		50
Marantz PM-75 £400	Good Average	More successful than most amps with on-board DACs but still not as balanced as other Marantz products	136W, opt/coax dig inputs, 6 line + MM/MC		68
Marantz PM94 £1,000	Very Good Good	At 23kg the PM94 is no lightweight in either physical or sonic respects. A very powerful and comprehensively equipped amplifier	140W MM/MC tone controls (switchable)		60
Meridian 201/205 £599/£425 each	Very Good Good +	A fine preamp with additional luxury option of full system remote, plus competent and attractive monoblok power amplifiers with generally good performance	100W MM/MC 6 line inputs remote capable straight line	R/—	62
Mission Cyrus One £180	Very Good Good	A red hot class winner, which caused the whole issue to be re-rated! It's even well built - however, the headphone socket will only take a 3.5mm jack	30W, MM/MC, 5 inputs, hdph, straight line	BB	62
Mission Cyrus PSX £230	Very Good Very Good	The PSX does make the Cyrus Two sound better; and also improves the PCM II CD player giving more wallop and clarity	Auxiliary power supply	R	62
Mission Cyrus Two £300	Very Good Very Good	Also a top performer in its group with fine moving coil and compact disc sound. Again, only 3.5mm headphone socket	50W, MM/MC, 5 inputs, hdph, straight line	R	62
Mordaunt Short MS-A5000 £350	Very Good Good	With a recognisable pedigree, Mordaunt Short engineers have made a good job of this one. A musical all rounder	50W, MM/MC, 6 inputs, hdph, tone controls	R	62
Musical Fidelity A1 £269	Good Good +	Fine-ranking in terms of overall sound quality for money, the excessive heat output could be hazardous to your vinyl if you're careless	20W MM/MC 4 inputs straight line	BB	56
Musical Fidelity B200 £299	Very Good Good +	Running cooler than other MF's, the B200 delivered fine musical and dynamic sounds with plenty of power	80W MM/MC 4 line inputs straight line	BB	62
Musical Fidelity Pre 3/P140 £379/£349	Very Good Very Good	Delivering true audiophile sound quality well ahead of their price, both components shine in their own right	70W MM/MC 4 line inputs straight line	R	56
Musical Fidelity A100 £459	Good + Very Good	This is another one recommended for fine sound with which you could keep your Chinese carry-outs warm	50W MM/MC 5 inputs straight line	R	62

THE WORLD'S NO 1 GUIDE TO BUYING HI-FI

THE DIRECTORY

AMPLIFIERS					
NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Musical Fidelity P170 £599	Very Good Very Good	Acquitted itself well, later samples showing steadily increasing refinements	85W	R	50
Musical Fidelity MA-50 £875 pair	Good Excellent	An audiophile bargain. One of the best sounding power amplifiers made	50W, monoblok	R	62
Musical Fidelity MVT Mk 3 £1199	Very Good Very Good	The MVT preamp was "strong in its class", providing competition for £1500-plus amplifier systems, now rivalled by the MF3B	MM/MC 5 inputs	R	50
Musical Fidelity P270 £1299	Very Good Excellent	If the hot-box aspect is not a deterrent, this is something of a bargain. A big amplifier scale of sound which is just a little rough-edged	135W	R	50
Musical Fidelity MVX £2229	Very Good Excellent	Soundwise this preamp puts Musical Fidelity on terms with much more expensive exotics, with top class transparency, focus and dynamics	MM/MC, phase invert	R	60
Musical Fidelity A370 £2229	Very Good Excellent	Arguably the finest sounding power-amplifier manufactured in the UK	185W	R	50
NAD 3020e £120	Good Fair	A little light in balance and "weight" but superior to run-of-the-mill budget amplifiers	20W MM/MC 4 inputs	R	50
NAD 3220PE £140	Good Fair	Like the 3020E but with more peak power and loudness thanks to the 'power envelope'	20W, MM, 5 inputs, hdph		62
NAD 3225PE £150	Average + Average +	Light and detailed if not as rich or weighty sounding as others. MM input sounds warmer than CD	42W + 70W dyn. headroom, soft-clipping, MM only	R	68
Naim NAIT 2 £322	Average + Fair	Well built with good load tolerance the NAIT delivered a fully competitive sound in spite of its modest measured power output. Recent modifications as yet unchecked	15W pc MM 3 inputs	R*	50
Naim Separates £560-c£8,000	Very Good Good	A consistent and coherent series of 'building blocks' for conventional passive or active operation. Sound quality ignores conventional audiophile standards of presentation, but achieves fine musical communication	40-70W, MM/MC etc	R	60
Nakamichi CA-5E £750	Very Good Good	A fine lab performance and high build quality but rather disappointing sound quality for a preamp of this price	MM/MC, 6 inputs, hdph, tone controls		62
Nakamichi PA-5E £1150	Very Good Good	A strong sound in several respects but one which ultimately failed to satisfy	100W		62
Nakamichi CA7E/PA7E £2500/£1700	Very good Good/Good +	Exceptional build and finish, plus good general performance, remote control and versatility, but expensive	200W MM/MC 6 line inputs, remote, tone controls		56
Nuance £795	Very Good Good	A subtle civilised pre-amp though a little lacking in resolution and detail, suited to some tastes but not top-drawer	4 inputs MC		50
NVA AP30mc £290	Average + Good	Utilitarian in appearance but offers a very refined and beguilingly musical sound quality on MC and line	22W only. MC or MM options, 3 line inputs	R	68
Dakley Image £425	Poor Very Good	An interesting valve preamp from Yugoslavia, the Image on first impression needs a bit of tweaking to warrant <i>Choice</i> commendation but is a nice product nonetheless	MM, 5 inputs straight line		63
Drell SA-040 £359	Good Good +	This promising newcomer from a brand new company sounded pretty good and should improve as production settles	45W MM/MC, 4 line inputs, straight line	R	56
Philips FA86D £249	Very Good Fair	Well balanced model from Philips' Japanese factory, with versatility, good build and finish	70W MM/MC 5 line inputs tone controls		56
Philips FA96D MkII £299	Good + Average	The MkII '96D still failed to grasp our listeners' attention but it remains a competent amp nonetheless	122W, 6 line & 2 disc inputs + tone controls		68
Pink Triangle PIP £2670	Excellent Excellent	This state-of-the-art preamp is one of the few truly high end products to come out of this country this year. It will most certainly worry the competition	MM/MC, 4 inputs, battery supply	R	62
Pioneer A333 £149	Very Good Fair	A rather average but nonetheless competent performer that is pleasant enough	55W, MM, 5 inputs, hdph, tone controls		62
Pioneer A-616 MkII £180	Good + Average	The disc inputs sounded a trifle smoother than the CD stage which was harder and more aggressive	95W, 3 tape, 3 line and 2 disc inputs. Heavy		68
QED A240 CD II £169	Good + Good	Latest 240CD is fine value for CD and has competent MM disc input as well	45W MM 5 line inputs straight line	BB	62
QED A240 SA II £219	Good + + Good +	Redesigned 240SA represents a significant allround improvement over its predecessor, and provides a good moving-coil disc input in a competitive price	45W MM/MC 5 line inputs straight line	BB	62
QED A270 £329	Good - Good +	Building on the strengths of the '240, the '270 sounds weighty, fast and dynamic. A bit 'lumpy' via MC	51W, 5 line and 2 disc inputs, pre-out	R	68
Quad 34 £285	Very Good Fair	This well-built durable preamp has useful filtering and above average tone controls but was found lacking in sound quality (viz. detail/dynamics)	4 inputs MM/MC tone controls		44
Quad 405 £349	Very Good Fair	Not an impressive power amp but easy on the ear if not pushed and very reliable	100W		44
Quicksilver Mono £1495	Good Good +	Moderately improved for '88 the Quicksilver still rates well despite up and coming competition	60W monoblok 4/8ohms		57
Radford SC25 £862	Very Good Very Good	A very fair price for a solid, well built valve preamp, combining good allround performance and a neutral sound	5 inputs, MM, straight line	R	57
Radford MA75 £977	Good Very Good	A fine quality valve monoblok with good load tolerance and a neutral accurate sound, offering significant gains in power and focus over the STA25	75W monobloks	R	57
Radford STA25 Renaissance £1115	Good Good +	Offering superb midrange performance if not quite as good at the extremes, the Renaissance valve power amp is a genuine audiophile product	25W	R	50
Revox B150 £875	Very Good Average +	Beautifully constructed but hampered by Revox's convoluted logic control. Open and smooth sound. Still costly	117W, CMOS sw. for 3 line, 2 tape and MM		68
Revox B250 £1188	Very Good Good	With much improved sound over its predecessors plus amazing remote control facilities, this could form the heart of a round-the-dream-house system	150W MM/MC system/house remote tone controls		56
Robertson Forty Ten £987	Very Good Good	Here is a neat little power amp (60W) you can fit and forget; it proved most satisfying over long listening sessions	60W		Collection
Rose RV-23 £370	Average Very Good	A very attractive little British valve preamp with a sound that was rich, colourful and reasonably sharp via the CD input but was less impressive on disc	MM, 4 inputs, straight line		63
Rotel RA810A £100	Very Good Fair	As a cut price RA820AII this is a very successful little amp that loses little in sound quality to its predecessor. Excellent value	20W, MM, 5 inputs, hdph, tone controls	BB	62
Rotel RA820A £130	Good + + Good	This A version of an established budget favourite delivers the goods sonically and is fine value for money	35W MM 4 line inputs tone controls	BB	56
Rotel RB/RC85D £145/£125	Good + + Good +	Quality separate pre and power amplifiers at near budget integrated amplifier prices. A notable achievement	60W MM/MC 4 line inputs tone controls	BB	62
Rotel RA820BX3 £165	Very Good Good	The latest upgrade is not that impressive, but the BX remains a fine amplifier and now has a moving coil disc input	30W, MM/MC, 5 inputs, hdph, straight line	BB	62
Rotel RC-870BX/RB-870BX Pre/Power £190/£210	Excellent Good +	Reduced price makes the 870 combo better value but, despite mods to the preamp, it is the power amp that must take the lion's share of credit	128W or 208W in bridged mode. CD direct, 4 line, 2 tape and MM/MC	R	68
Rotel RA840BX3 £220	Very Good Good +	Requires a very long warm-up period but rewards with a refined sound that should suit 'lively' systems	59W, 2 tape, 2 line, MM/MC and A/V inputs	R	68



NEW CAVENDISH STREET W1

CITY OF WESTMINSTER

The choice is yours!

Most equipment featured here has received a "Best Buy" or "Recommended" rating when reviewed in this magazine.

EXPORT Worldwide
Send for our Tax FREE price list and general information on how to order.

MULTIROOM SYSTEMS
Stereo in as many rooms as you want. Contact Paul Tam for more information about this service.

HI-FI CHOICE BEST BUYS



MUSICAL FIDELITY

B200

SPEAKERS

Apart from having the best selling range of amplifiers the MF range of speakers is fast establishing itself as a best selling brand.

MODELS/PRICES

Reference 2	£199
Reference 4	£399
MC 2	£299
MC 4	£499



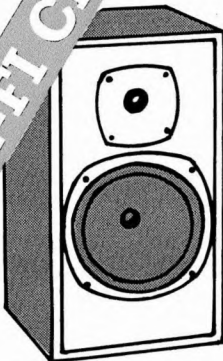
AMPLIFIERS

MODELS/PRICES

A1 (20w)	£269
B200 (80w)	£299
A100 (50w)	£459
PR3A Pre-amp	£379
P140 Power (70w)	£349
P172 Pre-amp	£599
P170 Power (85w)	£599
MVT Pre-amp	£1199
P270 Power (135w)	£1299
MA50 Mono blocks	£875
MXV Pre-amp	£2299
A370 Power (185w)	£2299

ASK ABOUT OUR INTEREST FREE CREDIT

TANNOY

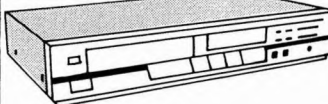


Two models in the Tannoy range have received 'Best Buy' awards in this magazine and it is not difficult to realise why. Their all-round versatility on a wide range of music means they integrate well into most systems. Good dynamics, clarity and firm bass sum up their best characteristics.

MODELS/PRICES

Eclipse	£119.90
Mercury 'S'	£159.90
M20 Gold Mk 2	£199.90

MARANTZ



CD65 Mk 2 Special Edition

The current Marantz range of CD players keeps winning accolades from the press. The 'special edition' versions of the CD65 and CD75 have been 'weaked' for extra refined performance. Indeed the CD65 Mk 2 SE was recently voted CD player of the year by What Hi-Fi magazine and enjoys a 'Best Buy' rating in this magazine. Through the range they are excellent machines and to be fully recommended.

MODELS/PRICES

CD65 Mk 2 SE	£299.90
CD75 Mk 2 SE	£349.90
CD 85	£499.90
CD94	£799.90
CDA94 D to A converter	£799.90

HI-FI CHOICE RECOMMENDED

INTERCONNECTS Stereo pairs terminated gold plated RCA phono plugs

Description	0.5m	0.75m	1.00m	1.5m	2.0m	3.0m	Cable per metre
QED INCON	13.95	—	14.95	16.50	18.00	21.00	1.20
QED INCON (screened)	17.95	—	18.95	19.95	21.95	25.95	1.75
DNM Solid Core	22.90	23.90	25.00	27.25	29.50	34.00	2.30
DNM Solid Core (shielded)	23.50	25.00	26.50	29.50	32.50	38.50	3.00
Deltec Slink	29.00	30.50	32.00	35.50	39.00	46.00	—
Deltec Black Slink	126.00	139.00	152.00	178.00	204.00	256.00	—
Monster Interlink 400	24.00	27.00	30.00	36.00	42.00	54.00	—
Kimber PSB	30.60	33.70	36.80	43.00	49.20	61.60	—
Monster Interlink CD	33.00	39.50	46.00	59.00	72.00	98.00	—
AQ Livewire Ruby	37.00	41.00	45.00	53.00	61.00	77.00	—
Kimber KC1	39.25	46.70	54.20	69.00	83.95	113.75	—
Vecteur 8045	39.00	—	49.00	59.00	69.00	79.00	—
AQ Livewire Quartz	47.00	55.00	63.00	79.00	95.00	127.00	—
Van den Hul D102 Mk2	53.00	59.50	66.00	79.00	92.00	118.00	12.95
Monster Reference	62.00	—	88.00	114.00	140.00	192.00	—
AQ Livewire Emerald	68.00	83.00	98.00	128.00	158.00	218.00	—
Musical Fidelity Lifeline	43.50	46.25	49.00	60.50	72.00	95.00	—
Van den Hul Thunderline	89.00	114.90	139.90	189.90	239.90	339.00	—

SPEAKER CABLES Stereo pairs terminated 4mm plugs (state if other termination required)

Description	2m	3m	4m	5m	7m	10m	Cable per metre
AQ Livewire Type 2	19.80	23.70	27.60	31.50	39.30	51.00	1.95
AQ Livewire BC 4	20.00	24.00	28.00	32.00	40.00	52.00	2.00
AQ Livewire Type 4	26.80	32.70	38.60	44.50	56.30	74.00	2.95
AQ Livewire Brown	27.80	35.70	43.60	51.50	67.30	91.00	3.95
KIMBER 4TC	76.00	108.00	140.00	172.00	236.00	332.00	16.00
QED 79 Strand	12.50	14.30	16.10	17.90	21.50	26.90	0.90
QED 79 Strand (Flat)	13.70	16.10	18.50	20.90	25.70	32.90	1.20
QED 200 Strand (Flat)	18.50	22.50	26.50	30.50	38.50	50.50	1.95
NAIM NACA 4	19.95	24.42	28.90	33.38	42.34	55.78	2.24
LINN LK20	19.90	24.30	28.80	33.30	42.20	55.50	2.20
DNM Solid Core	19.70	24.30	28.90	33.50	42.70	56.50	2.30
MUSICAL FIDELITY Lifeline	56.00	79.00	102.00	125.00	171.00	240.00	11.50
SUPRA 2.5mm	16.95	19.95	22.95	25.95	31.95	49.95	1.49
SUPRA 4.0mm	20.95	25.95	30.95	35.95	45.95	60.95	2.49
SUPRA 10.0mm	41.00	54.00	67.00	80.00	106.00	145.00	6.49
Van den Hul CS422	37.00	48.00	59.00	70.00	92.00	125.00	5.50
Van den Hul CS352	67.00	93.00	119.00	145.00	197.00	275.00	12.95
VECTEUR 9040 (CV30)	35.00	45.00	55.00	65.00	85.00	115.00	4.99
VECTEUR 8120 (CV90)	99.00	—	—	199.00	—	—	389.00

BRANDS STOCKED: Air Tangent, Albarry, Alphason, Arcam, Apogee, Audloplan, Audiolab, Audio Research, Avance, Beard, B & W, Cambridge, Croff, Celestion, DNM, Denon, Dual, Epos, EAR, Foundation, Goldmund, Harbeth, Heybrook, Jadis, KEF, Koetsu, Kiseki, Kinergetics, Krell, Kuzma, Linn, Linx, Magneplanar, Martin Logan, Manticores, Marantz, Me dian, Michell, Milltek, Mod Squad, Musical Fidelity, NAD, Naim, Nakamichi, Nifty Gritty, Oracle, Pink T angle, PS Audio, Quad, QED, Rata, Revox, Revolver, Rotel, Rogers, Stax, SD Acoustics, Sonus Faber, Spica, SME, Sumo, Slate Audio, Systemdek, Tannoy, Voyd, Wharfedale, Yamaha, Zeta.



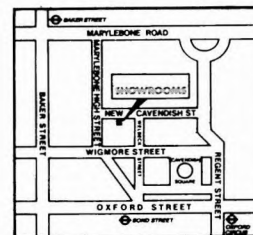
**K.J. WEST ONE Dept HC 6
26 NEW CAVENDISH STREET,
LONDON W1M 7LH**

Telephone: 01-486 8262/8263

Fax: 01-487 3452

**Open: Monday-Saturday 10am-6pm
Thurs until 7pm**

MAIL ORDER — Post/Packing/Carriage £1.65 per order (over £35 Post Free) UK mainland only. Overseas and off-shore by quotation. Telephone orders are welcomed if customers are paying by credit card.



THE DIRECTORY

AMPLIFIERS					
NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Rotel RA870BX £300	Very Good Good+	A powerful blockbuster with solid and well focused sound, good versatility and fine load tolerance	85W MM/MC 7 line inputs tone controls	R	56
Sony TA-F200 £130	Average— Average	Over-ambitious protection circuit is hardly in keeping with modern amp design. Lean but 'dead' sound quality	74W, 2 tape, 3 line and MM/MC inputs		68
Sony TA-F400 £200	Good Average+	Some lack of integration across the frequency range but still offers a more open and detailed sound than the 'F200	76W, 2 tape, 3 line and MM/MC inputs. Rec-out		68
Sony TAF 500ES £349	Good+ Fair	Not too hot at the price, lacking in bass action, rating poorly on vinyl, and only marginally improving on CD	75W hdpb tone controls MM/MC		50
Sony TAF 700ES £500	Good+ + Fair	Scoring higher than the 500 but still not offering the sort of standards set by the competition. But many buttons to push	100W MM/MC tone controls		50
Sumo Nine+ £1200	Very Good Excellent	Macho styling of this class A stereo power amp conceals a sonic subtlety that is exceptional for the price, limited by lots of waste heat and a noisy fan on our sample (being improved)	65W	R	60
Tannoy SR-840 £1713	Very Good Good	A "muscle" power amp, capable of impressive levels into difficult loads while remaining quite subtle and revealing	250W		50
Vacuum State FVP £999	Good Very Good	This well thought out valve preamplifier is designed for optimum musicality and transparency, a goal which is handsomely achieved	5 inputs, MM, straight line	R	57
Yamaha AX-300 £100	Good Fair	A lively and dynamic performer, offering a credible if bright sound at a competitive price	30W hdpb tone controls (MM)		50
Yamaha AX500 £200	Very Good Good	A well built versatile performer with generous power, decent sound	90W MM/MC 5 line inputs tone, var. loudness		56
YBA 2 pre & pwr £1395/£1695	Good+ + V Good/Excellent	Superbly finished French audiophile separates, with very good space and transparency, slightly softened bass. Needs extra transformer (£300) for MC cartridges	70W MM (MC extra) straight line	R	56
YBA 1 preamp £2895	Very Good Excellent	A front line French audiophile product. Great stereo and a fine Krell style finish	MM/MC, 3 inputs, straight line	R	62
YBA 1 power amp £2995	Good Excellent	This equally well finished power amp offers front rank stereo staging and transparency, and is capable of driving the most difficult loads	85W	R	62

LOUDSPEAKERS

Last item in the hi-fi chain, to some extent the loudspeaker is merely the slave of what has gone before, capable only of reproducing a signal as good as it is fed. Nevertheless the distortions (colorations and stereo effects) introduced by loudspeakers (and rooms) tend to be more immediately obvious than those anywhere else in the chain, so careful choosing according to taste is very important.

The average loudspeaker consists of a smallish enclosure, much of which may have begun life as

part of a tree, plus a couple of drive units hidden behind a removable grille. Inside the box lurks a simple electrical circuit known as a crossover, which divides the incoming (full range) signal into the right bits for the drivers to handle. Variations on the above formula are specifically identified in the entries. The designer's primary task is to balance the sensitivity of the loudspeaker (how loud it goes for a given electrical input) against the bass extension (how low does it go) for the given box size. After that such subtleties as coloration and

dispersion come into the equation.

Careful placement of the loudspeakers within the room is as important as the initial choice of model. For good stereo they need to be more or less the same distance from nearby walls, and preferably on similar rigid stands. The listener should be about the same distance from and listening angle to each loudspeaker. The ideal placement depends on the way a particular model has been balanced (not to mention a number of other factors), and our recommendation is given in the entries.

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	BACK ISSUE FULL REVIEW
Acoustic Energy AE1 £696	Good Very Good	To the author's knowledge, the most awesomely dynamic and articulate miniature ever made	29.5 x 18 x 25cm semi-open space	88dB/W 60Hz	R	59
Acoustic Energy AE2 £1138	Good Very Good	Dynamic, solid and lively, a great allrounder if a bit small considering the price. AE proves that metal cone/dome drivers really work.	39 x 23.5 x 29.5cm heavy stands in free space	88.5dB/W 45Hz	R	66
Acoustic Research AR112 £125	Average Average—	Nicely presented and engineered, but sounds a bit small and boxy without true coherence.	36 x 19 x 18.5cm stands near rear wall	87dB/W 75Hz		66
Acoustic Research AR122 £150	Average Average	Despite a promising enough list of ingredients, the 122 failed to excite real enthusiasm amongst the listening panel	38.5 x 19 x 22cm stands near rear wall	87dB/W 68Hz		68
Acoustic Research AR132 £200	Average+ Average—	Good presentation and detail engineering was not sufficient to counter bass heavy balance problems on auditioning	44.5 x 23 x 25.5cm stands 1ft from rear wall	87dB/W 50Hz		66
Alexander Aurora £379	Average Good—	The unusual metal case and slim shape of this grown up miniature provide welcome diversity. It sounds pretty good too	42.5 x 14 x 19cm matching stands in free space	85dB/W 55Hz		66
Apogee Scintilla £4990	Good Very Good	These take-me-to-your-leader speakers gave exceptional transparency and can achieve excellent results in a true audiophile system	145 x 88 x 9cm free space on floor	79dB/W 20Hz	R	46/Coll
A&R Arcam Three £149	Average+ Average—	Arcam's baby speaker did not delight our listeners, but it might do better in less expensive systems	34 x 18 x 23cm close to wall at head height	88.5dB/W 95Hz		53
A&R Arcam Two £270	Good Average	Most things to most men this compact is unlikely to disappoint with its lively "bally" character though lacking weight... a bit	38 x 23 x 28cm near wall shelf or 40cm stands	88dB/W 55Hz		59
A&R Arcam One Plus £359	Good Average	Provides a solid, weighty and rich sound, but is a little raw in the treble and indefinite in the midband	22.3 x 28.1 x 37.8cm open space, on stands	88.5dB/W 60Hz		59
Ariston Image £159	Good Average	Good engineering content at a reasonable price, the Image delivers fine stereo with low coloration, but sounded too bassy under our listening conditions	42 x 22 x 27cm stands in free space	87dB/W 55Hz		66
Audiostatic ES200 £1495	Average Average+	Sounding forward and unbalanced with limited bass power, these excelled in transparency and detail, and might suit some tastes	150 x 53 x 23cm low stands, free space	79dB/W 45Hz		46
Audiostatic ES300 £1995	Average+ Good	Marred by similar problems to its cheaper ES200 stablemate, this fine source electrostatic was superb in the upper-mid and treble but lumpy in the bass	44 x 5 x 93cm free standing	82.5dB/W 30Hz		46
Audio Electronics TC10 II £599	Good— Good+	Oddball appearance is rescued by a respectable technical performance, interesting and impressive engineering and fine sound quality at a realistic price.	70 x 33.5 x 33.5cm low stands in free space	87.5dB/W 40Hz	R	68
Avance 120 £279	Average+ Average+	This unusual "after eighties" looking speaker has the recipe for success, but not quite the right seasoning yet	42 x 30 x 30cm 30cm from wall on 40cm stands	86.5dB/W 60Hz		53
B&W DM560 £200	Average+ Average—	Fine cosmetic presentation and good engineering for the price, overload protection may be handy but listening panel was underwhelmed	49 x 23.5 x 30cm stands in free space	88dB/W 55Hz		66
B&W LMI Mk II £249	Average+ Average	Probably one of the best "micros" ever made, worth considering for special applications (boats or vehicles). Upgraded since our review	24 x 15.5 x 20cm shelf or flush mount	86.5dB/W 80Hz		31
B&W DM1600 £369	Good Good	Crisp, dynamic loudspeaker with tight but not especially deep bass and a tweeter that sometimes sounds overcooked	49 x 23.6 x 30cm free space, open stands	87.5dB/W 60Hz	R	59

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 109

THE DIRECTORY

LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	BACK ISSUE FULL REVIEW
BLQ Q2 £275	Average— Average	Nearly a good loudspeaker, the basic balance is good, but the midband is very uneven and there are severe losses of resolution, 'space' and dynamics	43 x 25.1 x 24.5 semi open on stands	87.5dB/W 70Hz		59
Boston A4011 £120	Average Average—	Competent performance for size and price but below average relative to the UK competition	34 x 21 x 20cm on stands near wall	88.5dB/W 63Hz		41
Canton 60 Karat £630	Average+ Good	Looks a bit of a throwback designwise, but is nicely presented and has a lively, dynamic and generous sound	58 x 31.5 x 31cm stands in open space	90dB/W 48Hz	R	66
Castle Clyde £149	Average+ Average	A tidy little performer packing punch, but beginning to show its age in the light of new competition	37 x 21.5 x 22cm open space on stands	89.5dB/W 64Hz	R	46
Castle Durham £199	Average+ Average	Listening results were encouraging, well engineered and finished, but lean on treble and a bit weak on bass; still recommended	41 x 21.5 x 25cm near rear wall	89dB/W 67Hz	R	46
Castle Pembroke £309	Good Average+	Comfortably recommended, a sweet smooth sound with good overall balance of engineering-based performance	55 x 37.5 x 30.5cm open space on stands	88dB/W 46Hz	R	31
Castle Warwick £169	Good Average—	Excellent presentation and fine engineering with overload protection, but a sonic disappointment in bass and dynamic qualities	46.5 x 25 x 23cm stands 1ft from rear wall	88dB/W 50Hz		66
Celef Cirrus £180	Average Good	It's nice to see Celef back in the UK, with this decent sounding small reflex box that seems unusually tolerant of siting	39 x 20.5 x 23cm stands in free space	84dB/W 60Hz	R	66
Celestion DL6 Series Two £149	Good Average	Good tonal colouring and plenty of bass for the enclosure size; the metal dome tweeter is excellent, but bass and mid lack clarity and 'bite'	45.4 x 24.5 x 26.2cm near wall, on stands	87dB/W 65Hz		59
Celestion DL8 Series Two £199	Very Good Good	A refined middle market speaker has a smooth but slightly dull quality, with good definition and deep, if slightly boxy bass	50 x 27.5 x 27.8cm open, stands	87.5dB/W 60Hz	R	59
Celestion SL12Si £580	Average Average	Careful setting up does reveal elements of fine sound quality, but this 'grown up' SL6 variation has a lumpy response alongside its improved power handling	53 x 20 x 27cm matching stands clear of walls	85dB/W 50Hz		66
Celestion SL600Si £799	Good+ Good	This Aerolam high tech miniature has certain remarkable qualities that some will find irresistible, and which go a long way towards justifying the highish price. Needs careful system and room matching.	27 x 20 x 23cm matching stands in free space	82dB/W 52Hz		68
Celestion SL700 £1349 inc stands	Good Good	Very sophisticated, mostly smooth and accurate transducer, with fast but not very deep bass and a rather bright treble	37.5 x 20 x 23.5cm free air on tall stands	83dB/W 45Hz		60
Celestion 6000 £1470	Very Good Very Good	A genuine fullrange audiophile quality speaker system – with Star Wars styling to suit a high tech environment	Complex, on floor in free space	82.5dB/W	R	60
Chameleon 500 £349	Average— Average—	Sounding badly coloured, dull and compressed, it is also amateurishly constructed, despite using good quality materials	38 x 25.3 x 31.3cm free, stands	89.5dB/W 75Hz		59
Energy 22 Pro Monitor £600	Good Good	Presentation is a bit rough for the price, but this Canadian entrant is an impressive sonic allrounder that will appeal to most listeners	62.5 x 27 x 30cm stands in free space	87dB/W 40Hz	R	66
Gale 301 £300	Average Average+	Of unusual, distinctive appearance this produced a mixed response, being lively but lacking depth	44 x 23.5 x 22cm on stands quite near wall	86.5dB/W 63Hz	*	46
Gale GS402 £700	Average+ Average+	Clean but rich and powerful bass; stereo focus was not a strong point, but it is worth considering. (Recent revisions not yet checked)	61 x 35.5 x 28cm on matching stands near wall	88dB/W 48Hz	*	46
Goodmans Maxim Two £90	Average+ Average	More wham-bam-thankyou-mam sound that imitates much bigger speakers when you let these babies yell. (A well-controlled yell!)	26 x 17 x 19cm near wall on shelf or stand	86dB/W 85Hz	BB	59
Goodmans Point 3 £100	Average+ Average—	Recommended as good value for money, but our listeners' differing opinions mean your ears should judge for themselves	47 x 25 x 20cm shelf/high stand near wall	90dB/W 80Hz	R	53
Goodmans Point 7 £180	Average+ Average	Basically competent performance-mix and a lot of speaker for the money, but a certain lack of refinement nonetheless	69 x 33 x 26cm free space on 35cm stand	89dB/W 47Hz		53
Harbeth LS3/5A £330	Good Average	Still a classic miniature, though not to every taste, and none the better for the recent update under our listening conditions. Limited dynamic range	30.5 x 19 x 16cm stands in free space	81dB/W 60Hz		66
Harbeth HL Compact From £499	Very Good Average	The clean and neutral sound lacks resolution and gives rather unsubtle though well differentiated stereo. Can be bi-wired to advantage	52 x 27.2 x 28.1cm open space, on high stands	87.5dB/W 65Hz		59
Heybrook Point Five £129	Average Average	Disappointingly prosaic performance on listening tests; wooden and hollow, with restricted dynamics and 'space'. Earlier samples sounded better	37.5 x 23 x 23cm near wall, on matching stands	86dB/W 65Hz		59
Heybrook Point 7 £169	Average Average	Physically an attractive package, but not entirely convincing in lab or listening panel test; interesting for all that	40.5 x 23 x 23cm stands against rear wall	85dB/W 60Hz		68
Heybrook HB1 £189	Good Average+	No longer an over-bright character, a strikingly clear sound and fine transient performance now merits recommendation	47 x 29 x 23cm on stands near wall	88dB/W 61Hz	R	46
Heybrook HB100 £249	Average+ Good	Well matched for wall siting, the HB100 is a lively and informative performer in the tradition of the popular HB1	47 x 26 x 28cm stands near rear wall	86dB/W 50Hz	BB	66
Heybrook HB200 £369	Average Average	This luxury successor to the HB2 is lively and informative, but sounded insufficiently balanced to convince our listening panel	46 x 23 x 26cm stands against rear wall	87dB/W 55Hz		66
Infinity RS2000 £130	Good Good+	Fast, detailed and assured miniature with quick but not very deep bass. The top end is detailed but sometimes jangly	36.2 x 22.5 x 20cm near rear wall, high stands	91.5dB/W 70Hz	BB	59
Infinity 6 Kappa £725	Good Good	Interestingly styled US loudspeaker has unusual high tech drivers and good neutrality, but the sound seriously lacks excitement	63 x 38 x 24cm stands, free space	85dB/W 35Hz		66
Jamo Concert 2 £240	Good Average—	A thoroughly respectable 'bookshelf' performer that needs free space siting but includes attractive cabinetwork and a neat grille	41 x 24 x 25cm stands in free space	85dB/W 48Hz		66
JBL L 60T £449	Good+ Good	Well balanced and offering realistic value for money, the fine treble and extended bass make it suitable for larger rooms	78 x 30.5 x 26.5cm low stands or floor	88dB/W 40Hz	R	46
JBL L80T £649	Good Average	Large scale, dynamic if rather unwieldy sounding, this is a performer of integrity, if not much subtlety	85.1 x 35.6 x 30.3cm floorstanding, open space	89.5dB/W 55Hz		59
JBL 18Ti £599	Good+ Good	Beautifully engineered, well finished miniature with many good points, but unexceptional overall. Try the cheaper L20T	34 x 24 x 22.5cm 50cm from wall on rigid stands	85.5dB/W 53Hz		46
JBL 250Ti £3599	Good+ Good+	In general this speaker did not show the required level of dynamic presentation transparency and stereo depth expected of a pricey flagship model	132 x 57 x 36cm free space on floor	89dB/W 53Hz		46
JPW P1 £125	Good Average+	Honest and basically articulate if not very sophisticated, resolution is good but it can sound a little wearing in bright systems or with rough sounding material	44 x 25.9 x 26.1cm free space on stands	89dB/W 60Hz	R	59
JPW AP2 £145	Good Average+	Few grounds for criticism but purchasers should check out the treble qualities to avoid hammering the ear anvils	46 x 26 x 25cm 40cm from wall on 45cm stands	89dB/W 65Hz	R	53
JPW AP3 £210	Good Average+	Pretty good stereo and well balanced overall it had its own character which is well suited to vinyl replay	52 x 25 x 29.5cm near wall on stands	90dB/W 57Hz	R	46
KEF R102 £365	Very Good Very Good	High class near-miniature with expressive, articulate midband and clean, accurate bass and top. The sound quality of the Kube circuitry, however, is suspect; what would an audiophile Kube sound like?	33 x 20.7 x 26.3cm near wall or open on stands	89.5dB/W 60Hz	R	59

THE WORLD'S NO 1 GUIDE TO BUYING HI-FI

THE DIRECTORY

LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	BACK ISSUE FULL REVIEW
KEF 103/3 £680	Good+ Good	Technically impressive, excellent bass/power handling for size, but not for the audiophile system. Better among cheaper components, and good in a large room	56 x 27 x 30cm supplied stands free space	90-95dB/W 35Hz		53
KEF 104/2 (inc KUBE equaliser) £895 (€994)	Very Good Good++	A reference point for dynamics, preferred without KUBE, suited to many rooms. Good stereo, high sound levels	90 x 28 x 41.5cm floor standing in free space	92dB/W 50Hz	R	60
KEF 107 £2025	Very Good Good+	A welcome sense of ease and lack of strain at most normal levels. Minor criticisms included a dulling in the extreme treble. Excellent bass extension	116.5 x 33 x 45cm on floor in free space	87.5dB/W 20Hz	R	60
Linn Helix £279	Average+ Good	Attractive presentation is coupled with an attractively lively sound which is more neutral if less committed than earlier Linn loudspeakers	51 x 25.5 x 28cm stands 1ft from rear wall	88dB/W 53Hz	R	66
Linn Nexus £379	Good Average	Good features include a solid, meaty bass plus good imagery and tonal balance. The catch is that Nexus lacks resolution and timing	49 x 23.5 x 30.4cm near rear wall supplied stands	89dB/W 60Hz		59
Linn Sara £795	Good Very Good	The new Sara is now much smoother and sweeter, with much better imaging. Bass power and dynamics are as good as ever, and the system is no longer as fussy as before	43 x 34.4 x 26.5cm stand mounting, near wall	88dB/W 50Hz	R	60
Magneplanar SMGa £675	Average- Average	Tonally 'rich', in the right room it proved a satisfactory musical experience	122 x 48 x 4.5cm on floor clear of wall	85dB/W 56Hz		46
Magneplanar MG2.5R £1897		Offers the low coloration and profound musical insight of better electrostatic loudspeakers but without loss of low frequency extension	183 x 56 x 4.5cm Open space	83-85dB/W 35Hz	R	60
Magneplanar MG11la £2650	Good Very Good	Another excellent true-audiophile loudspeaker this American panel speaker helps to convey much of the original character of the music	180 x 62 x 38cm well clear of walls	84-86dB/W 35Hz	R	46
Marantz LD20 DMS £150	Average Average	Recommended more for CD users than vinyl keepers, soundly engineered and built but should be heard before bought	36 x 23 x 24cm free space on 45cm stands	86.5dB/W 55Hz		53
MB Quart 390 £469	Below Average Poor	An aggressive, messy sounding design whose uncouthness undermines the positive level of detail	52 x 31 x 30.5cm open space, on stands	89.5dB/W 60Hz		59
Meridian M30 £775	Average+ Average	Pricy but easy on the ears and worth considering especially where space is at a premium	38.5 x 18 x 32cm free space on stands	Active 40Hz		46
Mission 761 £120	Average Good	One helluva speaker for the price, if a shade small and short of subtlety and refinement - should prove a worthy successor to the 70 and 700	38 x 21 x 21cm stands near rear wall	87dB/W 60Hz	BB	66
Mission 762 £180	Average Average-	Mission's 'bookshelf middleweight' offers high sensitivity and loudness capability, but at the expense of a somewhat untidy and rather 'heavy' sound	50 x 25 x 27cm stand, experiment advised	91dB/W 55Hz		66
Mission 763 £280	Average+ Average+	A very artful combination of generous volume and good bass extension at a surprisingly modest price that works well in the listening room despite a few rough edges	77 x 25 x 32cm near rear wall	86dB 40Hz	BB	68
Monitor Audio R100 £159	Average+ Average-	Tonally quite neutral, but with small box character, negligible low bass and a rather 'hard' midrange	40.5 x 25 x 21cm free space on stands	87.5dB/W 70Hz		46
Monitor Audio R352/MD £299	Average+ Good	A good value large box that sounds more engaging than subtle, providing a good compromise between bandwidth and sensitivity	64 x 25 x 32cm stands in free space	89dB/W 45Hz	R	66
Monitor Audio R452/MD £399	Average Average	This big, efficient, dynamic sounding loudspeaker has a clean, open treble but a pinched, two-dimensional midband. Can be tiring in the long run	64 x 25 x 31.8cm open space, low stands	89dB/W 55Hz		59
Monitor Audio R852/Gold MD £449	Good Good	Luxury build and 'high tech' tweeter or not, this compact model offers good refinement and detail on an open soundstage	45 x 25 x 26cm stands in free space	86dB/W 50Hz	R	66
Monitor Audio 1200 Gold MD £799	Average Average+	This smooth and civilised slimline floorstanding loudspeaker is well built and nicely presented. But it is also expensive	94 x 20 x 26cm in free space	85dB/W 48Hz		68
Mordaunt Short MS10 II £90	Average Average-	One of the best miniatures around. A borderline Best Buy because of the bass limitations, which may depend on your taste	29 x 20 x 17cm wall bracket	86dB/W 75Hz	R	53
Mordaunt Short MS100 £189	Average+ Average+	A 'mid forward' tonal balance is its main drawback but other aspects such as ambience, transparency and stereo depth compensate	32.5 x 22.5 x 21.5cm stands near wall	85dB/W 80Hz	R	46
Mordaunt Short 45Ti £230	Good Average	A sensitive tandem-bass number that can be driven loud but loses its balance a bit and can be unobtrusive	63 x 26 x 30cm low (20cm) stand near wall	90.5dB/W 52Hz		53
Mordaunt Short MS300 £319	Average+ Average+	Not considered particularly competitive in its class, though it has good power handling and stereo focus	54 x 22.5 x 25cm on stands near wall	89dB/W 65Hz		46
Mordaunt Short 442 £1150	Good+ Good++	A resounding success with the listening panels. Make sure your room can accommodate the bass	95 x 26 x 38cm floor standing in free space	87.5dB/W 40Hz	R	60
Musical Fidelity MC-2 £299	Very Good Very Good	This exceptionally clean and clear design offers real subtlety and finesse. Bass quality is light but exceptionally clear, the treble is smooth if slightly shallow	48.5 x 25.5 x 16.5cm open space and stands	87.5dB/W 65Hz	BB	66
Musical Fidelity MC-4 £499	Very Good+ Very Good	Achieving a very high standard, the MC-4 sounds detailed and coherent like the MC-2, but with more bass depth and solidity, and large image scale	56.5 x 26.9 x 29cm open space on stands	87.5dB/W 60Hz	R	59
Opus 3 Capella £495	Good Good	The sound of this Scandinavian curiosity certainly benefits from the crushed marble enclosure, though presentation is strictly DIY	32 x 40.5 x 26(ave)cm amongst books in bookcase	86.5dB/W 45Hz		66
Quad ESL-63 £1538	Good+ Good++	With its unusual but subtle characteristics this classic electrostatic may not be punchy in the bass, but has strengths that some cannot live without	92 x 66 x 27cm open stand well clear of wall	84dB/W 34Hz	R	60
Richard Allan CD5 £242	Average- Average-	This neatly presented small reflex design can sound engagingly communicative, but is flawed sonically and technically and quite expensive too	38 x 19 x 23cm on rigid stands	88dB/W 80Hz		68
Rogers LS7t £399	Good+ Good+	A fine combination of classic qualities at reasonable price produces the "R" tag, but try to get a pair home on approval to check for bass 'heaviness'	56 x 27 x 28cm free space on 40cm stands	88.5dB/W 48Hz	R	59
Rogers Studio 1a £565	Very Good Good-	The classic BBC monitor style sound sensitively updated - transparent and natural with fine stereo, but a touch 'heavy' in balance	63.5 x 30.5 x 30.5cm stands in free space	87dB/W 36Hz	R	66
Roksan Darius £1265	Average Poor/Very Good	A controversial speaker which when set up right can deliver impressive performance, but with a far from neutral balance	98 x 31 x 51cm integral stands near side walls	88dB/W 50Hz		53
Rotel RL850 II £130	Average+ Average+	Strongly recommended. Well-balanced, clear, with decent focus and fine stereo, but tendency to 'heaviness' needs decent stands and space	44 x 25 x 24cm free space on 40cm stands	86.5dB/W 50Hz	BB	59
Royd A7 Series 11 £99	Average+ Average	Lively clear sound, good upper bass and dynamics, but treble "ramp" made vocals sound shut in. Try before you buy	31 x 20 x 17cm shelf or 50cm stands near wall	86dB/W 75Hz	R	53
Royd Eden £235	Average Average+	Delightful mid/treble speed and transparency but determinedly bass light, this oddball miniature threatens cult status but could use a sweeter tweeter	31 x 20.5 x 18.5cm stands close to rear wall	87dB/W 85Hz	R	66
SD Acoustics SD1 £1150	Average Very Good	A large scale, airy and unusually detailed system with excellent dynamics. Balance is light and bright, and the original model could upset some systems/listeners. Current model has more civilised top-end and warmer overall balance	123.5 x 38.2 x 31.9cm free standing, away from walls	90dB/W 50Hz	R	60
Sony APM 10ES £100	-	An obvious Best Buy at its highly competitive price point, it can do justice to a good hi-fi system of Sony or specialist origins	40 x 25 x 20cm, 40cm stands 40cm from wall	87dB/W 55Hz	BB	59
Sony APM 22ES £249	Good+ Good	Sounding notably clear, the 22ES scored well on listening tests was easy to drive and achieved high sound levels	51.5 x 29 x 30cm free space on 40cm stands	88.5dB/W 46Hz	R	46

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 100

THE DIRECTORY

LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	BACK ISSUE FULL REVIEW
Sony APM 66ES £700	Average + Average +	Powerful heavyweight sound with a brilliant midband – clear articulate and transparent. But the bass is on the boomy side and the treble can sound grainy	66 x 38 x 36.5cm open space, low stands	89dB/W 60Hz		59
Spendor SP2 £470	Very Good Good +	Conceding little to the SP1, this 30 litre model displayed good tonal balance with a highly articulate midrange, only slightly marred at frequency extremes	50 x 25 x 30cm free space, stands	87dB/W 45Hz	R*	59
Spendor SP1 £710	Very Good Good	A very subtle and musical performer that works particularly well with digital material. An exceptional allrounder	63.5 x 29.5 x 30.5cm stands in open space	87dB/W 41Hz	R	60
Spendor SA3 Passive £1500	— Good +	Same as Spendor SA3 active	85 x 38 x 46cm low	89dB/W 32Hz	R	46
Spendor SA3 Active £2900	Good + Very Good	Substantial speakers designed to deliver high sound levels and killer bass. Suited to larger rooms and power hungry ears	85 x 38 x 46cm low rigid stands in free space	89dB/W 32Hz	R	46
Spica Angelus £1195	Good Average	A little bass shy and soft in the bass and lower mid, the Angelus is otherwise tidy, extremely lively and fluid, if uneven overall	116.8 x 53.3 x 26cm free standing away from walls	86.5dB/W 50Hz		60
Studio Power Sapphire £130	Poor Average —	Balance difficulties are improving, though still prevent the potential of this interesting metal-cone new miniature from being fully realised	30 x 20 x 19.5cm stands near rear wall	85dB/W 70Hz		66
Tannoy Eclipse £120	Average + Good	Although a little bright, the essentials are right: hear-through clarity at all frequencies, good dynamics, firm bass	38.8 x 22.6 x 21cm semi open on stands	87dB/W 65Hz	BB	59
Tannoy Mercury S £160	Good Good	A fine budget allrounder in the now established Mercury tradition; good balance and reasonable refinement will ensure wide appeal	49.5 x 25 x 21.5cm stands in free space	87dB/W 50Hz	BB	66
Tannoy M20 Gold £200	Good Average +	Luxury version of Mercury S with real wood and bi-wire frills doesn't necessarily sound any better overall, but still fine value	49.5 x 25 x 21.5cm stands in free space	87dB/W 50Hz	R	68
Tannoy DC2000 £300	Good Good	Remarkably high sensitivity from unique dual concentric driver that has an involving but characteristic sound. Bass could be better	68.5 x 26 x 27cm floor in free space	93dB/W 55Hz	R	66
Tannoy Westminster £3400	n/a Good +	These awesome horn loaded speakers are remarkably controlled and impressive, if only suited to a few pockets and rooms	Huge, flat against rear wall, away from corners	96dB/W (manuf.)	R	Coll
TDL Monitor £1600	Very Good Very Good	Fine solidity and good accuracy, with enough bass extension to satisfy even organ freaks. Needs a big room and can sound a bit lazy and a shade tinkly	118.5 x 30 x 47cm 0.5m from walls	85dB/W 28Hz	R	66
Technics SBC 250 £130	Average + Average —	Despite a fairly even tonal balance, the 250EK sounded muddled in the midrange and dull in character	36.5 x 23.5 x 20.5cm free space, stands	86dB/W 60Hz		46
Technics SB-RX50 £500	Very Good Average +	With its unique coaxial drive unit the RX50 proved a smooth and well balanced loudspeaker, its minor weakness being a mildly excessive low bass	48 x 30 x 26cm free space on 40cm stands	86dB/W 40Hz	R	46
Toshiba S33-M £90	Average Average	Providing a benchmark for budget loudspeakers, this Toshiba-inspired but UK designed and manufactured model is a lot of loudspeaker for the money, if a shade on the cheap	40 x 26 x 21.5cm stands in free space	86dB/W 55Hz	BB	68
Wharfedale Delta 30 £79	Good Average	Very clear and surprisingly neutral for the price, with good dynamics and stereo within limited volume ceiling	37.9 x 20 x 16.9cm near wall on high stands	88.5dB/W 80Hz	BB	59
Wharfedale Delta 50 £99	Average + Average —	"There's nothing obviously wrong, but it seems a bit mundane," is what we said when the Delta 50 was £129. But since then the price has dropped by 30 per cent, making it great value	48 x 27 x 19cm near wall on 40cm stands	88dB/W 55Hz		53
Wharfedale Diamond 111 £99	Below Average Average —	This latest version of the long running Diamond sports a better tweeter, but bass, though deep, is soft, and the midband is indistinct and uneven	24 x 18.5 x 20.5cm near wall, stands	86.5dB/W 75Hz		59
Wharfedale Super Diamond £139	Average Average —	Although there are improvements on the basic "legendary" model, listening panelists did not get airborne about this upgrade	24 x 19 x 19cm close to wall at head height	88dB/W 57Hz		53
Wharfedale 504/2 £139	Average Average	Not strictly accurate, this musically involving miniature sounds unusually coherent and well integrated, if a shade dull in balance	29 x 18.5 x 19cm stands against rear wall	84dB/W 60Hz	R	68
Wharfedale 505/2 £169	Average Good	This lively Wharfedale provides plenty of speaker with unusual refinement for the money, and should be fairly tolerant of room siting	44 x 25.5 x 24cm stands 1ft from wall	86dB/W 55Hz	BB	66
Wharfedale 510.2 £299	Average Average —	Even in its latest guise, this loudspeaker still sounds hard, cluttered and lacking innate clarity. The bass is uneven and midband coloured	61.5 x 28 x 29.6cm near wall, high stands	89dB/W 50Hz		59
Yamaha NS 1000M £900	Good Good +	Living up to its monitor label, and tonally well suited to digital material, the NS 1000M is superbly crafted and capable of high levels	67.5 x 37.5 x 32.5cm 30cm from wall, stands	90dB/W 40Hz	R	46

* rating refers to original, tested model.

To Advertise in
this space ring Miriam Young
on 01-631 1433

THE DIRECTORY

CASSETTE DECKS

The bad odour of copyright theft hangs around the compact cassette, but there is no doubt it is the world's most versatile and ubiquitous music storage medium. Hi-fi buffs may wrinkle their noses pointedly, but are still happy to use cassette decks to make up tapes for the car or personal – at the same time complaining loudly about the quality of pre-recorded material. (In fact the very best decks can do a surprisingly good job with musicassettes.)

There is no problem in connecting a cassette deck to any normal amplifier, but some care needs

to be taken in choosing the best tapes for a specific machine. (Trial and error is one effective technique, but many decks have manual bias adjustment and some match up to the tape automatically.) Lab performance and sound quality often go hand in hand, and are frequently somewhat dependent upon factory alignment. The mechanical integrity of the mechanism itself is another crucial factor, that is often reflected in the asking price.

All modern hi-fi decks have Dolby B and the majority have Dolby C besides, the very worthwhile

HX Pro system is becoming steadily more widespread. Remote control remains rare, though sometimes it is available as a system option. Three-head recorders allow simultaneous checking of the recording being made. Auto-reverse is a useful convenience feature, but usually with some mechanical compromise, while double-mechanism 'dubbing' decks of dubious quality are fashionable at the bottom end of the market. The welter of different 'music search' systems available is some indication of their frequent ineffectiveness.

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Acoustic Research RD-06 £280	Average Average +	Acceptable middle market player with very simple facilities and cramped control section, but unusual good looks	Dolby B/C HX Pro, fine bias, counter memory, repeat		This
Aiwa AD-F370 £130	Average Average	Adequate but uninspiring recorder with detail shortcomings but good control layout and successful sounding with recorded musicassettes	Dolby B, C, HX Pro, bias adjust		63
Aiwa AD-R470 £150	Average Good	For once, an auto-reverse deck with the performance of a decent unidirectional one at a similar price. The Aiwa is modern in concept and execution, and has good, transparent electronics	Dolby B/C/HX Pro, auto reverse, cue & review, bias adjust	BB	69
Aiwa AD-WX707 £180	Poor Average	Not bad value for a twin deck, but marginal from the high fidelity viewpoint. The review sample was poorly set up	Dual deck, auto-reverse, Dolby B & C, bias adjust		57
Aiwa AD-F880 £300	Good Very Good	Modern-sophisticated deck which manages to include some very sound under-the-skin development work in a rather ordinary (if well polished) exterior	Dolby B/C/HX Pro, 3 head, remote, manual tape calibration	R	69
Aiwa XK-007 Excelia £400	Good Good	Downmarket version of XK-009 with simplified bias/equalisation adjustment section and more forgiving but less informative sound. Still good, but less exciting than XK-009	Dolby B, C, dbx, HX Pro, 3 Head, tape alignment		63
Aiwa AD-WX909 £400	Good Good	Convenience meets sound quality, and both win. An essentially clean, positive recorder which works alongside an auto-reverse player of lower standard – a sensible compromise	Dual deck, auto-reverse, track search, Dolby B/C/HX Pro, bias adjust, 3 Head	R	57
Aiwa XK-009 Excelia £550	Very Good Very Good	Excellent detail, stable articulate midband and slightly obvious treble. The most interesting Aiwa for yonks	Dolby B, C, dbx, HX Pro, 3 Head, tape alignment, CD direct	R	63
Akai GX-32 £200	Average Poor	Constrained and smeared sum this deck well. It has poor bass and treble definition alike, though it proved well aligned for prerecorded cassettes	Dolby B/C, variable bias, headphone out, track search		69
Akai GX-52 £249	Very Good Very Good	Well finished and a pleasure to use. This well specified deck sounds clean and defined with all tape groups, with or without Dolby	Dolby B, C, HX Pro, track locate features	BB	57
Akai GX-6 £350	Good Good	There is a strong sense that someone has really thought this one through; it has an indefinable 'specialness'	Real-time counter, track search, Dolby B, C, bias adjust	R	52
Akai GX-95 £400	Good Very Good	Well designed and finished cassette deck with features well judged to please the audiophile – especially switchable Dolby HX Pro and switchable panel display. The calibration system is simple and effective, and the deck sounds great	Dolby B/C/HX Pro, 3 head, manual tape set-up	R	69
Denon DR-M07 £125	Poor + Average	There were several problems with the test player that render it an unsafe purchase. This is a pity since despite the antiquated control system, the deck is capable of refined sound quality	Dolby B/C, fine bias adjust		69
Denon DR-M10HX £180	Good Good	Very well laid out, a sensible range of features and smooth cam-operated transport. Replay-only sound quality suspect, but the deck is successful as a recorder – clean, precise but slightly 'grainy'	Dolby B, C HX Pro, memory counter, bias adjust	R	63
Denon DR-M12HX £220	Good Good +	Well constructed and pleasant to use, a lack of true pitch constancy kept it from sounding superb	Track search, Dolby B, C, HX Pro, bias adjust	R	57
Denon DRW-750 £229	Good Good	Polished and articulate, the only significant shortcoming is poor performance with prerecorded material	Dolby B/C/HX Pro, twin unidirectional, one records	R	69
Denon DR-M24HX £290	Good Good +	This deck will slot into many high grade systems without disgracing itself – or the cassette medium. Very presentable high resolution sound with good stereo with or without Dolby	Dolby B, C, HX Pro, bias adjust, 3 Head	R	60
Denon DR-M34HR £320	Very Good Good +	Prerecorded cassettes sounded grey and dull, but this may have been a sample fault. As a recorder, the DR-M34 is refined and detailed – and good value	Dolby B, C, HX Pro, 3 Head, manual tape calibration, memory counter		63
Denon DR-M44HX £400	Excellent Excellent	A well designed deck that also performed fine sonically, working very well with ferric and metal tapes	Real-time counter, Dolby B, C, HX Pro, tape alignment adjust, remote control, 3 Head	R	60
Dual CC8010 £110	Average Average +	The only limitation worth noting is a slight opaqueness; the Dual otherwise sounds stable and effective. An excellent low-cost design	Dolby B & C, microphone input	BB	63
Goodmans GSW-5200 £90	Poor Poor	Musically unimpressive but at least it's cheap!	Dolby B, twin, one records		69
Grundig Fine Arts CCT-903 n/a (system component)	Good Good -	(Competent part of complete Grundig system). Solid and well engineered deck with small but significant problems preventing it scoring highly. Basic design generally – and transport specifically – are excellent	Dolby B/C, twin auto reverse, one records		69
Harman Kardon CD491 £695	Good Good +	Excellent audio engineering and tremendous flexibility make this an audiophile cassette deck for excellence	Real-time counter, auto reverse, track search, Dolby B, C, HX Pro, bias adjust	R	52
JVC TD-R411 £180	Poor Poor	Transport irregularity, especially flutter, and poor set-up lead to a sound that although sharp is lacking in body and detail. However, the quick auto-reverse mechanism is nice to use.	Dolby B/C, auto reverse		69
JVC TD-W444 £190	Average Average	The 444 offers a satisfying blend of cost and facilities; but musically it is lacklustre, lacking detail, dynamics and grip. Fair value though	Dolby B/C, twin deck, unidirectional play deck, auto-reverse record deck		69
JVC TD-V711 £380	Very Good Excellent	This is a complex recorder which is built on the back of some important ideas with audiophile roots. It has a (mostly) superb technical performance and is very capable, if not always strictly accurate	Dolby B, C, HX Pro, 3 Head, variable bias, track search, 3 line inputs	R	63
JVC TD-W222 £150	Below Average Below Average	Well endowed but somewhat user-hostile twin deck. Sound quality is very tape dependent, but offers tolerable stability with considerable loss of resolution and scrappy musical presentation.	Dual deck, auto reverse, Dolby B/C		63
Kenwood KX-440HX £140	Average + Poor	Uneven, unstable sounding player with limited resolving power, but good control layout and finish	Dolby B, C, HX Pro, intro scan		63
Kenwood KX-660HX £170	Good Good	Well designed control system with useful search aids. Sound quality is positive and detailed	Dolby B, C, HX Pro, track & blank search, intro-scan, bias adjust	R	63
Kenwood KX-5010 £269	Very Good Excellent	This important new middle price deck is a well thought through and thoroughly developed design which eschews gimmicks for the sake of musical excellence	Dolby B/C/HX Pro, auto tape calibration, track/intro search	BB	69
Luxman K-105 £349	Average Average	Rating quite well for an auto reverse deck, and featuring complex track search facilities, it was not sonically competitive on price	Auto reverse, track search, Dolby B & C, remote control		52
Luxman K-112 £349	Average Average	Build quality is not truly consistent with the price. Nor is sound, which veers on the warm, lossy side of neutral	Dolby B, C, HX Pro, bias adjust, 3 Head		57
Marantz SD-35 £150	Good Good +	Rock steady tape transport gives very competitive sound quality for the price, but the slightly bright replay may not appeal to some	Dolby B & C, bias adjust	R	52

THE DIRECTORY

CASSETTE DECKS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Marantz SD-45II £200	Good + Good +	Well built and dynamic sounding player, working better as a recorder than with musicassettes	Dolby B & C, bias adjust Auto selection	R	52
Marantz CP230 £300	Average Average	This is a competitively priced portable recorder though not suited to replay of musicassettes	Dolby B, bias adjust	R	52
Marantz SD585 £300	Average Average—	Sound quality is a little sat upon, and control ergonomics are somewhat opaque, though the twin auto-reverse/recording capability makes this a powerful machine	Dolby B/C, twin auto-reverse & record, parallel recording etc		69
Marantz SD-55 £349	Good Very Good	Slightly tacky feel and restricted signal/noise performance are the main shortcomings of an excellent sounding piece of kit	Real-time counter, track search, Dolby B/C/HX Pro, bias adjust, 3 Head	R	57
Memorex SCT-84 £200	Average + Average +	The playback only transport is a little disappointing, but the record one is a quality item and the deck works well. Ergonomics are good, but styling and control feel are decidedly tacky.	Dolby B/C, fine bias, twin with auto- reverse record, unidirectional play	R	69
NAO 6300 £550	Very Good Very Good	Solid and homogeneous sound quality and very good replay compatibility thanks to 'play trim'. Distinctive, musical – and costly	Dolby B, C, HX Pro, 3 Head, bias adjust	R	63
Nakamichi CR-1E £345	Very Good Good	Modestly equipped by any standards, the CR-1E stands or falls by its build quality, which is high, and sound which is highly competent	Dolby B & C		57
Nakamichi CR-2E £395	Very Good Good +	Ordinary to look at, in some respects rather awkward to use (tape switching especially), the CR-2E sounds very slightly better than the CR-1E, and therefore ranks well. But it doesn't come cheap	Dolby B & C, bias adjust, remote control	R	57
Nakamichi RX-202E £545	Good Very Good +	Fine, clear and articulate sounding player. Excellent with prerecorded material, but idiosyncratic and sometimes obstructive control system	Auto reverse, Dolby B, C, 2 Head	R	63
Nakamichi CR-3E £595	Very Good Very Good	The user interface is a little clumsy, though conceptually straightforward. Sound quality approaches the CR-4E, and is amongst the best at the price.	Dolby B & C, bias adjust, remote control	R	57
Nakamichi CR-4E £745	Very Good + Very Good +	high class deck with a reasonably full range of features and superb sound at a slightly unlikely price	Dolby B & C, bias adjust, remote control, 3 Head	R	57
Nakamichi CR-5E £995	Excellent Excellent	A slightly simplified version of the all-conquering CR-7, the CR-5 has a very similar standard of audio performance – the best	Dolby B/C, fine bias, 3-head	R	69
Nakamichi CR-7E £1500	Excellent Excellent	Remarkably this deck is not only ergonomically but also sonically superior to the Dragon, particularly on record/replay	Real-time counter, track search, Dolby B & C, tape alignment adjust, bias adjust, remote control, 3 Head	R	60
Nakamichi Dragon £1750	Excellent Excellent	Previous to the birth of the CR-7E, this machine stood head and shoulders above the rest. It is still the ultimate for musiccassette replay	Auto reverse, Dolby B & C, tape alignment adjust, bias adjust, remote		60
Onkyo TA-2120 £130	Average + Good	Clear, vivid sound with good timing and resolution when using Type II tapes without Dolby. The controls are less inspiring – the meters in particular are plainly inadequate	Dolby B/C, auto tape sensing, block/ side repeat	R	63
Onkyo TA 2130 £160	Average + Average +	Rating fairly well on both pre-recorded and record/playback, ergonomics were a little poor but overall performance was generally consistent	Track search, Dolby B & C, bias adjust		52
Philips FC566 £179	Average + Average +	Mostly well equipped, though some tape search facilities fail to exploit the auto-reverse capability. Sounds clean and stable – with prerecorded tapes too	Auto reverse, track search, Dolby B & C		57
Philips FC567 £279	Average Poor	Well equipped but ergonomically substandard; sound quality is messy and lacking in clarity and dynamics	Dual deck, auto reverse, track search, Dolby B & C		57
Pioneer CT-443 £180	Average Good	Structurally sound and subtly musical recorder. Sophisticated, mildly damped sound quality	Dolby B & C, fine bias adjust, track search	R	63
Pioneer CT-737 £300	Average— Average—	Interesting design and a pleasure to use with rather too many rough edges to really work properly	Dolby B, C, HX Pro, 3 Head, bias adjust, memory counter		63
Pioneer CT-939 £450	Excellent Excellent	High grade and easy to use cassette deck featuring a state of the art transport. The audio amplifiers are not quite in the same class, but fail to seriously damp enthusiasm for an excellent package.	Dolby B/C/HX Pro, 3 head, real time counter, variable bias	R	69
Proton AD-200 £140	Poor Poor	Sound quality is essentially on a par with many portables, and has nothing to do with high fidelity. The main problems are an unrelenting hardness and an almost total lack of detail	Dolby B & C		57
Proton AD-300 £200	Average— Poor	High levels of flutter give sound a roughness and coarseness that rules it out for high quality work. The record and replay electronics certainly deserve better	Auto reverse, Dolby B & C		57
Revox B215 £1461	Good Average +	Superb engineering and good sound, but lacking the subjective qualities that characterise the very best hi-fi equipment	Real-time counter, Dolby B & C, tape alignment adjust, remote control		52
SAE C102 £549	Average + Good	Looking most unlike a cassette deck designed in the States and proving competitive in its price group. Not sonically that outstanding, however	Real-time counter, track search, Dolby B & C		52
Sansui D-X301i £150	Average + Good	Lively, informative and well equipped basic deck, if rather obscure operationally	Dolby B/C/HX Pro, variable bias, track search	R	69
Sony TC-FX 150 £90	Average + Average +	Recording and playing back on this deck itself gave acceptable results, whereas prerecorded stuff was a joke. But it's a good £90 worth	Dolby B & C		52
Sony TC-W300 £150	Poor Poor	Deeply unimpressive and messy sounding deck with bloated quality and poor pitch integrity. Dubbing performance substandard	Dual deck, Dolby B & C		63
Sony TC-RX50 £180	Average— Poor	Terminal inability to play at a steady pitch, or (on prerecorded material) in tune spoiled this simple but otherwise attractive design	Auto-reverse, Dolby B/C/HX Pro		63
Sony TC-WR500 £200	Poor Poor	In many ways a curiously old-fashioned package which lives up (down?) to stereotypes about twin cassette decks	Twin Dolby B & C, 1 records, both auto-reverse		69
Sony (WMD6C) ProWalkman £249	Good + Excellent	"One of the finest sounding cassette decks on the market today. A mandatory Best Buy, which also fits in your pocket"	Dolby B, & C	BB	60
Sony TC-RX60ES £250	Average Average	For once a stable sounding auto-reverse deck but sound quality is rather 'dirty' and compressed, especially with Dolby C	Auto-reverse, Dolby B/C/HX Pro, auto tape recognition		63
Sony TC-RX80ES £350	Average + Good	Clean, powerful and detailed sound, especially without Dolby C. Stable pitch – but prerecorded cassettes sounded disappointing	Auto reverse, Dolby B/C/HX Pro, bias/ level adjust	R	63
Sony TC-K700ES £499	Excellent Excellent	Firmly in the esoteric league, this is easy both to operate and to listen to. Best points: first class imagery, focus and stability	Auto reverse, track search, Dolby B & C, tape alignment adjust	R	60
Teac V-250 £89	Average Average	Ultra-basic design which works quite well. Lack of pitch integrity is the main shortcoming, but it wasn't always noticeable	Dolby B		63
Teac V-270C £109	Average— Average+	Not quite cheap enough to compete solely on price, the V-270C is a rather messy and unstable sounding deck	Dolby B & C, bias adjust		63
Teac V-570 £199	Average + Good	Metal tapes are not exploited well by this deck, and prerecorded tapes sounded very disappointing. But the underlying sound quality sets a very high standard, assisted by clean electronics and an excellent transport	Dolby B/C/HX Pro, fine bias adjust	R	69
Teac V-670 £249	Average Average	This deck is worth considering, but much has been sacrificed for the third head, both musically and in the range and type of features included. Worth considering	Dolby B/C/HX Pro, fine bias, 3 head/off tape monitoring		69

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 109

THE DIRECTORY

CASSETTE DECKS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Teac R-515 £299	Average+ Average+	Expensive, this deck is basically a competent but pedestrian performer which will not fully satisfy the critical user	Real-time counter, auto reverse, Dolby B & C, bias adjust		57
Teac W-460C £299	Good Average	Musically this deck is a little lacking, given the price and despite a notably fine transport section. Nevertheless well worth considering if the programming options appeal.	Dolby B/C, twin unidirectional, one records. Programme memory		69
Teac V-870 £399	Good+ Good	Cut-down V-970X for the proletariat. Expensive and carefully engineered with mostly very good but slightly cold sound quality	Dolby B, C, HX Pro, 3 Head, manual tape calibration	R	63
Teac V-970X £499	Very Good Very Good	An excellent sounding deck with useful features (tape calibration etc) that fully justifies the price	Real-time counter, track search, Dolby B/C/dbx & Dolby HX Pro, bias adjust, remote control, 3 Head	R	57
Teac W-990RX £499	Good Good	A mess with dbx, but taut and articulate otherwise. The 990, though expensive, has a powerful range of features, making it one of the few really ambitious decks to successfully straddle both sets of requirements	Dolby B/C & dbx, dual auto-reverse/record, parallel & sequential recording, remote	R	69
Technics RS-T230 £160	Average- Average	Satisfactory with prerecorded material but otherwise unexceptional, the main features of this deck are its excellent user interface and value for money	Dual deck, Dolby B/C		63
Technics RS-B355 £140	Good Good	Good sound let down by inadequate meters and poor prerecorded replay only sound quality	Dolby B, C, microphone inputs, cue and review	R	63
Technics RS-B505 £160	Average+ Average+	Neatly made recorder with Dolby HX Pro that sounds precise and stable, though sometimes a little processed and grainy too	Track search, Dolby B/C/HX Pro		57
Technics RS-B605 £180	Good Average+	Mixed but generally good sound. Weakest points are dbx and prerecorded sound, best are Type IV (metal) recordings which sound sharp and precise	Track search, Dolby B/C/HX Pro & dbx		57
Technics RS-T330R £200	Average+ Average+	One of the very few dual cassette decks with any real pretensions to audio quality, the RS-T330 is a considerable success musically as well as being a pleasure to use	Dual deck, Dolby B & C	R	63
Technics RS-B705 £250	Average Average-	3 heads for the price of two, but not the sound quality to go with them	Track search, Dolby B, C, HX Pro, bias adjust, 3 Head		52
Technics RS-B905 £350	Good Good	Good, well set up cassette deck with a clean, accurate sound but some compression. dbx circuit sounds poor	Dolby B, C, HX Pro, dbx, bias adjust, 3 Head		57
Technics RS-T80R £400	Poor Poor	Flexible and pleasant to use but poor transports led to poor sound on our latest sample	Dual deck, auto reverse, track search, Dolby B, C, dbx		52
Yamaha KX-200 £120	Good- Good	Cheap, well-equipped and workmanlike with the sound quality less obviously processed than most - the whole is more than the sum of the parts	Track search, Dolby B & C, remote control	R	52
Yamaha KX-300 £150	Average+ Average-	Uncommonly well equipped and adequately made and presented, this model turned out to be a disappointingly uncertain proposition on audition	Track search, Dolby B, C, HX Pro with 'play trim', bias adjust, remote control		57
Yamaha KX-400 £200	Good Good+	A highly commercial package with every widget under the sun. Happily it sounds good too.	Auto reverse, track search, Dolby B, C, HX Pro, remote control	R	52
Yamaha KX-500 £210	Very Good Very Good	An accomplished performer, strongest in the areas of pitch and spatial stability, but slightly rough around the edges	Real-time counter, track search, Dolby B/C/HX Pro with play trim, bias adjust, remote control	R	57
Yamaha KX-800 £330	Good Average	The present Yamaha range seems oddly inconsistent. This sophisticated model sounds fine (almost) but came a clear second best to the KX-500	Real-time counter, track search, Dolby B, C, HX Pro with play trim, bias adjust, 3 Head		57
Yamaha KX-1200 £500	Excellent Average+	A veritable rats' nest of buttons and dials, albeit well laid-out. This is nearly a great recorder, but lacks simplicity of sound	Real-time counter, track search, Dolby B, C, dbx, HX Pro, bias adjust, remote control		52

DAT RECORDERS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Aiwa Excelia XD-001 £1300	Very Good Very Good	Clear and very listenable recorder roughly comparable to but slightly sweeter sounding than the Sony DCT-1000ES - but with an inferior front panel design	Track ID and search, remote	R	63
Grundig Fine Arts DAT-9000 n/a (system component)	Good Good	Conventional DAT recorder offering standard facilities. The deck is well made and equipped, and is engineered to a satisfactory quality standard. It performs to an acceptable standard, though it is not state of the art	2/4 hour recording, mic inputs, digital in/out		69
Luxman KD-117 £1499	Good Good	Slightly soggy, earth-bound sound quality, this model trails the other DAT decks tested so far	Two analogue inputs, remote twin address		63
Pioneer D-1000 n/a	Excellent Excellent	Fine, clear, colourful and consistent sounding deck. The Pioneer is lavishly (uneconomically?) constructed and equipped. It shows what is possible, but will probably never go on sale	Many search and memory facilities	R	63
Sony DTC-M100 £799	Very Good Very Good	Clean, clear sounding 2nd generation model with most of the features and sound of the DTC-1000ES	Mid-width, alpha-numeric display, remote, optical interfaces	R	63
Sony DTC-1000ES £1299	Very Good Very Good	Fine, consistent performer with accomplished tape handling and good build quality	Standard track ID and search, remote	R	63

CD PLAYERS

This all-digital music source is well established, despite still high disc prices and the opposition of many hi-fi enthusiasts. Compact Disc's strengths over conventional vinyl are complete freedom from surface noise with automatic and programmable play, plus track skip and fast music scan - frequently under full remote control. However, many vinyl enthusiasts find CDs sound less involving than

top quality vinyl replay. Introduced five years ago at around £500, CD players now average less than half that price, and for the main offer improved performance besides. Even cheaper players may have the latest decoding chips and the most useful play features; extra money can buy remote control, remote volume control, audio 'tweaks', plus improved build and component

quality control. Compared with many hi-fi components, CD players give impressive lab performance, though there are differences between players nonetheless. Sound quality variations are even more marked, particularly in a good quality system. As it behaves very like a preamp, there are no problems connecting a player to a normal amplifier.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
ADC CD 2000E £330	Good+ Fair+	One of the slimmest players in the business but nothing special inside. Nice ergonomics but overpriced	Remote, timeshared 16 bit		64
Aiwa OX-M45 £149	Fair Fair	Cutdown Philips technology, but results are quite good for this British made machine	Manual	R	64
Aiwa CD-D01 £300	Good Good	Pretty close to Recommendation, delivering a respectable sound quality and lab performance from an ergonomically attractive package, but ultimately failed to excel in any particular respect	Track entry/volume remote, direct recorder connection etc		58
Aiwa XC-007 £499	Very Good Good	Creditable sound despite inverted output, high tech engineering with very good lab performance. A worthy contender but not cheap	Remote, keypad, timer, digital output, pseudo 20 bit, dual DAC		64
Akai CD-52 £249	Good Good	A nice surprise from Akai, genuinely good sound from this mid-priced model. Better linearity will help further	Remote, digital output, headphone socket	BB	64

THE DIRECTORY

CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Akai CD-62 £330	Fair Very Good	Looks, build quality and the technical specification are right up to date. As it stands it sounds very good but if the indifferent lab performance could be improved, it would probably sound even better.	Remote, programme, hdph, comprehensive display etc	BB	70
Akai CD-73 £450	Good Average	A little uneven musically, the Akai tends to smother fine detail, but has first class dynamics and stereo imagery. Worth auditioning	Track entry keypad remote, menu display (switchable)		62
Akai CD93 £700	Good Very Good	Undoubtedly a CD player of real class in build, presentation, lab performance and sound quality, but also a shade expensive for formal Recommendation – though that's not to dissuade lovers of black lacquer wood finish.	Track entry remote, menu display etc.		58
Arcam Delta Black Box £250	n/a Very Good	This rich, powerful and articulate sounding DAC transforms the majority of medium price CD players	Needs D-out CD players	R	60
Arcam Delta 70 £500	Good Very Good	This solidly built British player has attractively understated presentation with straightforward, simple ergonomics. The very good sound quality shows a steady improvement over earlier samples.	Simple remote, headphone socket etc.	R	58
Cambridge Audio CD2 £650	Fair Very Good	The finest midrange in digital audio is sufficient grounds for Recommendation, though there remains a tinge of disappointment that the CD2 didn't get closer to big brother elsewhere, notably in the bass.	16x oversampling, remote control	R	58
dbx DX5 £640	Good Poor	Sound quality proved a single disappointment, though it's refreshingly unique in providing semi-pro post-production facilities that some users will undoubtedly relish.	Track entry/volume remote, compression, impact recovery, ambience etc.		58
Denon DCD 610 £200	Good + Fair +	Lots of Denon player for the money, well equipped with good all round performance	Remote, versatile programming 2x 0/S	BB	64
Denon DCD 810 £250	Very Good Fair +	A good value allrounder bettered on sheet value by the 610 and 910; power volume could sound better	Remote, 4x oversampling, programming	R	64
Denon DCD 910 £300	Very Good Fair +	A well equipped deck of impressive appearance and solid sonic and lab performance	Remote volume, programming, 8x 0/S digital output	BB	64
Denon DCD-1500II £500	Very Good Very Good	The extra build quality over cheaper Denons is justified in terms of sound quality and lab performance, while the feature list is comprehensive and quite nicely presented.	Track entry/volume remote, menu display etc.	R	60
Denon DCD-1520 £500	Very Good Very Good	High tech, high profile, high gadget content, good sounding player at an almost affordable price.	Programme, hdph socket, remote, track entry, optical digital output	R	70
Denon DCD 1700 £650	Good + Very Good	The overall sound was strong and coherent approaching reference standards. Fine build quality and facilities make this a firm contender	Remote, skip, scan, headphone socket, programmable	R	58
Denon DCD-3300 £1200	Good + + Very Good	Sounding tight and coherent though not significantly better than the cheaper 1700. Very well built and comprehensively equipped	Remote control, with volume, keypad programme, scan, search, headphone		51
Dual CD 1030 RC £170	Fair Fair	An up and down performance on test but it is hard to deny the overall value for a machine that includes remote control at this price	Remote, headphone socket, 2x 0/S, timeshared 16 bit	R	64
Ferguson CD007 £130	Good Fair	The cheapest recommendation in the test group; don't expect the earth but the value is good	Manual, digital output, headphone socket	R	64
Ferguson CD008 £150	Fair Fair	Not as strong as its relatives, sample fault perhaps? Though performance is fair enough overall	Remote, midi digital output, 2x 0/S, timeshare 16 bit		64
Goodmans GCD300 £129	Average Average	It may be adequately made, but with cheap good sounding players available this particular Goodmans isn't quite good enough	Programmable, skip, search, repeat		70
Goodmans GCD550 £199	Average + Fair +	A slow autochanger with a weakish lab performance but the sound is fair enough, the features good and the price is low	Remote, 6 disc autochanger, 2x 0/S	BB	64
Grundig CD9000 £1000	Good Good	Aimed at a market which puts external styling above sound quality. Although this player is of slightly above average competence in most departments it is expensive	Remote, programme, hdph socket, calendar display etc		70
JVC XL333 £170	Good Good	This player provides lavish facilities at a budget price (no remote though) and it produces a good sound and performed well in the lab	Track key entry, 32 track memory, comprehensive display	BB	70
JVC XL-Z444 £255	Good Fair +	An average performer, unremarkable though well equipped and fair value for money	Full feature remote, digital output, headphone socket		64
JVC XL-M400 £300	Good Fair	JVC has produced a competent autochanger which works well. Average sound quality doesn't create any great enthusiasm	Autochanger, key pad remote, hdph socket, multi disc programming		70
JVC XLZ 555 £350	Good Fair	The display is something else, but the rest of the player, although displaying fine build quality is too average everywhere	Keypad track select, comprehensive display, optical digital output etc		70
Kenwood DP-660SG £180	Below Average Below Average	Build quality and ergonomics are good, and the range of features far exceeds the price norm. However, sound quality is messy with a soft bass, recessed mid and sometimes spiky top.	Remote control, calendar/menu display, keypad, 20 track memory		62
Kenwood DP-880SG £250	Very good + Fair +	A fine CD transport for the price, fine sound, very good lab results, good for a decoder?	Remote volume, programming, headphone socket	BB	64
Kenwood DP-990SG £400	Very Good Good	Falling just short of the required subjective standard for Recommendation at this price level, this is a doughty player nonetheless, with a build quality and technical performance that arguably justifies its premium price.	Track entry remote, menu display, sprung feet etc.		58
Kenwood DP-8010 £449	Good Fair	Top build quality and novel technological features seem to achieve little success here. While the technical performance is fine, the sound quality doesn't match its competitors	Track entry remote, memory display, sprung feet, optical digital output etc		70
Kenwood DP-1100SG £450	Very Good Good	Something of a high tech flagship, this model doesn't quite make the grade on sonic grounds but is well built	Full remote, optical and coax digital outputs, headphones		64
Kinergetics KCD-30 £1700	Very Good Very Good	Definitely a technical oddball with its distortion-cancelling circuits, the pricey KCD-30 nevertheless does sound very good, and also noticeably 'different' – not necessarily to our collective tastes, but possibly to yours	Favourite track selection, remote, high output (vol, bal)		60
Luxman D-90 £300	Fair Good	Despite technical ingredients that do not seem particularly inspiring, this is a nicely judged package that is ergonomically neater than most, with decent sound quality for the price and distinctive finish and presentation.	Track entry remote, programming etc.	R	58
Marantz CD583 £150	Very Good Good	Devoid of all but the CD essentials it makes up for in sound quality what it lacks elsewhere	Memory, track skip, search, etc	BB	70
Marantz CD65IIE £300	Very Good Very Good	Scorching sound quality from a competitively priced player, which is the new middle market reference	Remote, programming, digital output	BB	64
Marantz CD75IIE £350	Very Good Very Good	Remote volume version of the 65 SE with an optical digital output as well. A sonic superiority complex in a cheap plastic box	Remote volume, hdph socket, FTS, optical output etc	BB	70
Marantz CD85 £550	Very Good Very Good	This player may just miss a top sonic rating but it's well made and has plenty of features befitting a Marantz heavyweight	FTS, key pad remote, comprehensive display, programming, optical output etc	R	70
Marantz CD94 £800	Good + + Very Good	Clearly the best Marantz CD player, with high build quality and good objective and subjective performance	10 digit keypad, headphone socket, favourite track selection, remote	R	58
Marantz CD94/CDA94 £1600	Very Good Excellent	Taking its logical place at the top of the Marantz CD hierarchy, this two-box combination delivers reference standard lab and listening test results, albeit at a price which seems a little steep. Very refined	Favourite track selection, remote, balanced output etc	R	60

THE WORLD'S NO 1 GUIDE TO BUYING HI-FI

THE DIRECTORY

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Marantz CD12LE £2500	Very Good Very Good	This may be very expensive but it is very well made. Technical performance is very good and the sound is the best from Marantz yet	Two box, digital processor, FTS, optical connection, hdph socket, comprehensive display, balanced output etc	R	70
Meridian 207 £1050	Very Good Excellent	Not only arguably the prettiest model around, but also one of the best sounding and most versatile – on-board preamp now accepts vinyl disc for an extra £100, and Meridian plans round-the-house future-readiness	On-board preamp, remote (inc volume)	R	64
Mission PCM2 £500	Good + Good	A matured design with good features it is the best sounding power volume player available, it even tests well. It accepts the £200 PSX power supply option	Remote volume, display and phase invert	R	64
NAD 5220 £230	Average – Poor	Conforms sonically to a stereotype of the medium that most players have grown out of. Hard, thin and raw sound with poor stereo and resolution	Time/track display, memory		62
Nakamichi OMS-1E £395	Good Good	This neat enough player doesn't really follow the Nakamichi tradition of providing exceptional sound quality while at the same time perpetuates that of selling at an above average price	Simple remote etc		58
Nakamichi CDP-2E £495	Very Good Good	It's ergonomically superior and has above average sound, but it isn't cheap. The standard of build quality and finish is first class which isn't quite matched by the sound quality	Programming, hdph, remote track entry, digital output		70
Nakamichi OMS-3E £995	Good Good	Superbly built and presented this expensive machine was a bit of a "stuffed shirt" when it came to sound quality	Remote control, skip and scan, headphone socket		51
Nakamichi OMS-4E £1200	Very Good Very Good	Solidly controlled and comparatively simple this clearly represents one of the major benchmarks for CD sound quality, though the midrange sounded a touch thin	Skip and scan, headphone socket		51
Nakamichi OMS-5EII £1500	Good + Very Good	"... delivers near state of the art performance and build quality in a deliberately starkly functional package, but at a very high price..."	Skip and scan; simple track programming, manual control		51
Nakamichi OMS-7EII £2000	Good + Good	The only serious criticism here is of the price. And in our not always humble opinion you can get better sound quality for less elsewhere in Nakamichi's range	10 digit track entry keypad programming, headphones		51
Onkyo DX-1500 £170	Average Fair	Ruled out on the grounds of its poor DAC filter, but it's not so bad really given the price	Manual, 2x O/S, timeshared 16 bit		64
Onkyo DX-3500 £250	Very Good Fair	It offers a lot of facilities and fine build quality for the money. Lab performance is very good but the sound quality doesn't inspire	Key pad remote, memory, hdph socket, comprehensive display etc		70
Onkyo DX-7500 £450	Good Very Good	This comes close to the state of the art performance in many areas. It has lots of facilities and is well made too.	Key pad remote, memory, hdph, very comprehensive display, optical digital output etc	R	70
Philips CD582 £200	Very Good Good	Build quality and finish are only adequate but in every other respect it's more than competitive	Simple remote, programming, large display, hdph socket	BB	70
Philips CD473 £229	Good Good	In the forefront as regards sound quality, this is one of the best sounding Philips players yet, we were unable to catch it out on classical through Jazz program	Favourite track selection, remote control with volume, headphones etc	BB	58
Philips CD782 £230	Very Good Good	In the present market this Philips offers an amazing performance in all areas at a most affordable price. The styling is a little bland	Versatile volume remote, FTS, variable headphone socket etc	BB	70
Philips CD880 £500	Very Good Very Good	The '880 is an impressive blend of luxury build quality and features at a far from extravagant price, and also delivers the subjective goods.	Volume remote, FTS, menu display etc.	R	60
Pioneer PD4100 £170	Fair Good	It's not perfect in the lab, the facilities are few, but the sound quality sets it apart	Programmable, skip, search, repeat	BB	70
Pioneer PD5100 £220	Fair Fair	It's well made and has good facilities. The lab performance is generally fine, but it's only average for sound quality	Remote, volume, programming, hdph socket, etc		70
Pioneer PD-6100 £249	Good Good	A budget audiophile player, fine sound even if its lab performance seems a little uneven	Full feature remote, digital output, variable hdph	BB	64
Pioneer PD-M500 £269	Good Good	A high performance autochanger for the money, good value all round and generously featured specification	Full remote, digital output, variable hdph	BB	64
Pioneer PD7100 £300	Good Good	External build quality is fine, the level of facilities are lavish, but the sound it produces only just takes it into the good category	Remote, volume headphone socket, versatile programming, faders etc		70
Pioneer PD-M700 £400	Very Good Fair +	Top class autochanger, surprisingly fast, high specification and a good allrounder	Remote, optical digital output, headphone socket		64
Pioneer PD-91 £800	Excellent Excellent	Close to state of the art in nearly all areas – soundstaging, clarity and simple lack of artificiality. A well made and sophisticated player	Track entry remote, calendar display, index search, etc.	R	64
Revox B126 £649	Very Good Good	Made in Switzerland so the build quality and technical performance is high but then so is the price and the sound quality is only good	Programming, Revox remote system compatible		70
Revox B226 £756	Good + Good	The traditional Revox house style is combined with the fine Philips 16 bit chip set, but this player doesn't really offer sound quality to match the price	Infra-red remote control, full search, scan, programming		51/Coll
Rotel RCD820B £210	Good + Fair +	A budget Philips based player of dependable sound quality and offering very good value. Build is a touch lightweight	Remote, basic facilities	BB	64
Rotel RCD820BX2 £250	Good Very Good	Start with a good base and then make it sound better, the '820BX2 CD player maintains the reputation established by its namesakes, and comfortably deserves Recommendation.	Direct track entry remote etc.	R	58
SAE D102 £700	Good Good	Considering the high price of this player, most of the innards seem fairly prosaic. Sound quality and lab performance are both respectable enough, but hardly justify the price premium involved, though styling is unusual.	Remote (inc volume), skip, scan etc.		58
Sansui CD-XM510M £299	Average Fair	Not designed to appeal to the audiophile, but with its 12 disc facility it's ideal for background music or as a second player for the kids	12 Disc, 2 magazine autochanger, comprehensive remote, programming etc		70
Sansui CD-X501i £300	Fair Fair	Weak dynamic range for an upmarket player which shows in both lab and listening tests	Remote, programmable, digital output, headphones		64
Sansui CD X701i £449	Good Good	A stylish attractive player which sets itself apart from mainstream mediocrity by means of its external appearance. It works well too, has plenty of facilities and good sound quality.	Remote, key pad track access, digital output, variable headphone socket etc	R	70
Sharp DX150 £129	Fair Fair	This is a none oversampled player which is rather outclassed for technical and sonic merit by the vast majority of the competition. Pretty enough but would you want to put discs in it?	Programmable, skip, search, repeat		70
Sharp DX750 £179	Fair Fair	It has a remote control but it's too like the 150 which is rather outclassed for technical and sonic merit by the vast majority of the competition	Remote, programmable, skip, search, repeat		70
Sharp DX-620 £200	Good Good	A surprising achievement but it shows what can be done. Another high value budget package	Remote, headphone output, 2x O/S, timeshare 16 bit	BB	64
Sharp DX-R700H £225	Average – Poor	A workmanlike player that does not offer exemplary lab or sound quality but which is well-built with good facilities and should perform well in use	Remote control, track selection keypad, skip, scan repeat programming		53
Shure Ultra D6000 £495	Average + Fair	Ergonomically well thought out with full function remote control, but not really scoring sonically considering its price	Remote control (full function inc volume)		51
Sonographe SD1 (by CJ) £799	Good Very Good	Distinctive with oak end-cheeks, using Philips based 14 bit x 4 oversampling. Conrad Johnson electronics make this a musically rewarding player	Full search programme and timing	R	51/Coll
Sony CDP-M35 £170	Fair Fair	There is no disguising the lightweight plastic construction of this player, but the technical performance, sound quality, aesthetics and ergonomics all deliver more than one has the right to expect for £170	Skip, scan, programming etc.	R	58
Sony CDP-350 £180	Fair Fair	A fairly basic machine. The lab test showed up some faults and it didn't do particularly well sonically	Programming, skip, search, repeat, hdph socket		70

THE DIRECTORY

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Sony CDP-M55 £190	Fair Fair	£20 buys a remote control handset to operate your M35. Sony call it an M55 (see CDP-M35 review)	Simple remote, skip, scan, programming etc.	R	58
Sony CDP-550 £200	Good+ Fair+	Another dependable Sony, it doesn't have a digital output but at the price who's complaining? Fit and forget	Full remote headphone output, 4x 0/S	BB	64
Sony CDP-M75 £230	Good Good	This midi version of the '750 saves £20 on the price (see CDP-750 review).	Track entry remote, menu display ect.	BB	58
Sony CDP-750 £250	Good Good	A seductive blend of fine presentation and solid performance, all at a very realistic price that should ensure its success.	Track entry remote, menu display etc.	BB	58
Sony CDP-C50M £250	Fair Fair	The Sony concept of an autochanger is interesting and executed with characteristic thoroughness. The lab and sound test results reveal it to be of only average quality	Carousel autochanger, remote, multi disc programming, variable hdph socket		70
Sony CDP-M95 £280	Very Good Fair+	Very well equipped mid sized player fine build and finish, incorporating Sony's custom file disc labelling	Remote, programmable, variable hdph output	R	64
Sony CDP227ESD £400	Good Good	The cheapest of the ESD range offers plenty of ergonomically arranged facilities. It performed well in both the lab and on the listening tests, and its reasonable price makes it hard to miss	Remote, keypad track access, volume, hdph, comprehensive display, FTS, custom index, etc	R	70
Sony CDP-337ESD £550	Good Very Good+	Well built, high grade player with excellent if undemonstrative sound. Excellent resolution, dynamics and bass weight, though arguably not control	Random access remote, calendar display, FTS, memory	R	61
Sony 557ESD £1000	Excellent Good+	Superbly built flagship model that produced excellent lab results and very good sound. Many luxury features though not that good value	Full remote, disc directory, digital output, power volume, 8x 0/S, 18 bit		64
Teac PD135 £180	Fair Fair	Particularly easy to use, this lags a little behind the pack when it comes to sound quality, but it still represents a valid alternative for those who find the presentation attractive.	Skip, scan, programming, repeat.		58
Teac PD470 £250	Fair Good	Pleasant sounding though unexciting, ergonomically functional though predominantly plastic. It doesn't achieve the sonic status required in a hotly contested market segment	Remote, track key pad, autospace, comprehensive display, hdph socket		70
Teac ZD880 £450	Good Fair	Decent enough in most respects with a very good build and finish. Its sound isn't competitive enough to inspire any real enthusiasm	Remote, track key access, auto space, comprehensive display, hdph socket etc		70
Technics SL-P350 £250	Very Good+ Good	Nicely built, good features and fine sound, what more do you want for £250?	Remote, digital output, variable hdph output	BB	64
Technics SL-P770 £350	Excellent Good	Sophisticated, high resolution player, but inconsistent with level with some coarseness and compression during loud passages	Remote, 18 bit, rotary cue wheel, comprehensive display	R	61
Technics SL-P990 £450	Excellent Good	An obvious technical tour de force, with ample engineering and build quality to justify the price, but some subjective reservations nonetheless.	Track entry remote, menu display, search dial etc.		58
Technics SL-P1200 £800	Good+ Good	Looking more like a desk workstation than a stackable component, this will appeal to the creative recordist and semi pro user. Sounded pretty good	Headphones, remote control, search dial cueing, etc		51
Toshiba XR-9318 £150	Good Fair+	A basic Philips based player perhaps but just look at the price/performance equation	Remote via system, manual, non oversampled, 16 bit	BB	64
Toshiba XR-9128 £190	Very Good Good	A well equipped Philips clone with a very good performance for the price	Remote, programmable, digital output, hdph	BB	64

CD MIDI SYSTEMS

So you want a hi-fi, but you don't want to make a fuss about it. A pre-packaged system with everything matching up and no aggravation may not rank with carefully chosen separates on **sound quality**, but there's no denying the attractiveness or popularity of this approach - the market for pre-packaged component hi-fi systems is at least as big as that for separate items, even ignoring the vast numbers of low-cost single unit stacker systems. The arrival of compact disc led to a new fashion for shelf-standing compact systems, or 'midis' as

they are known in the trade, as a replacement for earlier floor-standing rack systems (themselves the upmarket development from music centres). Only some 330mm wide, midis can more or less match full-size (430mm) rack components for performance, and are certainly cheaper to make, ship, sell and buy. Whereas specialist hi-fi is moving steadily towards ultra-simple 'no frills' components, midi systems tend to be sold on a feature count at a price point, usually with little opportunity for

demonstration and comparison. Our test programme includes extensive auditioning and lab testing, while making allowance for the different aspirations of designers and expectations of users. Key features valued highly by customers include system remote control, automatic switching, double 'dubbing' cassette decks, and elaborate equaliser tone controls. And the top end of the market is developing with surround sound audio/video-ready packages.

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Aiwa X-55 £380	Average Average-	The turntable was slightly better than usual, the cassette deck highly limited, but the dreadful loudspeakers are the clincher	Combined cassette tuner-timer/amp, dedicated T/T speakers, & optional CD		65
Aiwa X-78 £550	Average+ Good	Good. The loudspeakers are disappointing and the turntable is excessively microphonic, but the rest of the system works well.	Auto reverse cassette/tuner/amp & timer, T/T and CD	R	65
Aiwa V1500DX £999	Good Good	Remarkable features level even includes independent record feeds to each cassette. High class build, satisfying sound, but best without loudspeakers	Separates system, twin auto-reverse cassette, full remote, timer	R	54
Akai M.50CD £550	Poor Poor	Cassette lacks Type II compatibility, general sonics mediocre or less	Devolved from M.80 but simplified, part remote		65
Akai M.80CD £800	Good Good	Good all rounder with minor ergonomic shortcomings but generally practical layout	Separates based, twin auto-reverse cassette	R	65
Goodmans 5300CDM £400	Average- Average+	Crisply styled system with gutsy amplifier and sophisticated speakers. CD player works well, other sources are variously mediocre	Combined cassette/tuner/amp, plus T/T and CD with remote	R	65
Goodmans Maxim-Midi System £520	Average Average+	De-luxe version of 5200 system - very good value for money and readily upgradeable. Sonics rough but OK and speakers good; CD crude	All separates with twin cassette	R	54
JVC Midi-W900CD £1000	Good Good+	A competent allrounder, with important convenience related features, and powerful linked recording facilities. Less strident speakers would be appreciated	Separates system, equaliser, auto-reverse cassette	R	65
Marantz MX583 £750	Below Average Poor	The system has potential in an A/V context, but is patently lacking in a purely audio one. Only the CD excels	Component system with A/V amp, no speakers		65
Marantz MX673CD System £900	Average+ Average	Tremendously flexible audio/visual system. Sound quality is satisfactory at best and ergonomics a mess	Various A/V inputs, remote, speakers optional		54
Philips F777 £850	Good Good	Excellent CD player, tuner and amplifier, offset partly by poor cassette deck and turntable	Separates system, optional remote, no speakers		65
Pioneer System 300 £1000	Very Good Very Good	Sharp, articulate and powerful system that works. The turntable is a weakness as usual, but the only real weakness in an uncommonly sophisticated package	Remote separates system, optional multi-disc CD	R	65
Proton AI-3000 £550	Good Good	There are a host of minor problems, including no LW, but the unit is attractively packaged and can be made to sound very good despite a woolly sounding amplifier	One piece CD, cassette, tuner and amp, remote	R	65

THE WORLD'S NO 1 GUIDE TO BUYING HI-FI

THE DIRECTORY

CD MIDI SYSTEMS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Sanyo System 22 £350	Average Average+	Some careful detail design has given this system sound quality out of keeping with ordinary appearance. More than the sum of its parts	Single piece, plus speakers	BB	65
Sanyo W40CD £380	Average Average	Low cost, no options package with attractive displays, cassette had high wow and flutter, but the rest worked OK	Semi auto T/T, auto record start, twin cassette	R	54
Sanyo System 33 £400	Average Average+	Similar to the 22, and better when extended, but the price (and value) advantage is dissipated.	As 22, separate T/T, remote	R	65
Sharp SA-CD800H £700	Average Average-	A superficially high grade, high spec system, the SA-CD800H actually sounds clean but a little 'synthetic'	One-piece, 6-disc CD, no T/T		54
Sony Compact 350CD £480	Average- Average-	Visually stunning appearance hides very basic audio attributes, the turntable and cassette deck suffering severe pitch related shortcomings. CD is too expensive in this company.	Integrated one piece, (ex CD), 5 disc non-cartridge player		65
Sony Compact 500CD £550	Average+ Average+	Impressive visuals are matched to electronics which in audio terms lack inspiration. The speakers are particularly poor	Combined amp/cassette, 36 preset tuner, T/T component CD		65
Sony Compact 700CD £700	Average+ Good	Loudspeakers and (to a lesser extent) turntable spoil a fine sounding and stylish - if rather costly - package	Separates system, auto reverse cassette, 36 preset tuner		65
Sony Series 1000CD £1500	Very Good Excellent	Very sharp, articulate sounding system from CD and FM. Cassette deck good and flexible, turntable as usual is not in keeping	Separates system, twin auto-reverse cassette, amp with DAC	R	65
Technics X900CD £470	Average Average-	Good build and mostly good sound is offset by mediocre amplifier and loudspeaker and some operational oddities	Main cassette/tuner/amp, separate T/T and CD		65
Technics X950 System £850	Good Good	Fine sound from CD, FM and AM radio and cassette. The record deck is a little better than normal too, but the loudspeakers are disappointing	Component based, CD, twin auto-reverse cassette, tuner, auto T/T, amp and speakers	R	65
Technics X990D System £1250	Good Very Good	Powerful, flexible and well built system - loudspeakers apart. Even the turntable is on the rough side and the loudspeakers should be changed if possible. The rest of the system is AI	Twin deck, programmable T/T, amp, CD, speakers	R	65
Toshiba V17CD £370	Average Average+	Loudspeakers are the weak link, with cassette and turntable also indifferent. Tuner and CD worked well though, so reasonable value for money	Twin cassette, semi-auto T/T	R	54
Toshiba V18CD £400	Poor Poor	Neat and simple to use basic system with good CD but poor elsewhere and abysmal loudspeakers	Integrated amp/cassette deck, other components separate but dedicated		65

TUNERS

The radio medium operates at a much lower profile than TV, but in areas outside pop music the BBC service is the envy of the world. Live Prom concerts can rival all other sources from a hi-fi perspective. Only the FM (VHF) bands give stereo hi-fi sound, though AM (MW & LW) are useful for receiving certain transmissions in the UK.

Something of a hi-fi afterthought, tuners are often selected merely to match a chosen amplifier

cosmetically. However, the task they carry out is far from simple (or cheap), combining the skills of RF (reception) and audio (signal processing) engineering. The importance of the former will depend on local reception conditions, but money invested in a high quality outside aerial system is well spent.

Tuners come in two basic types. Analogue models tune gradually (and usually manually) across

the bands, and can have analogue or digital displays; they are often preferred for sound quality, and are certainly best for AM bands. Digital tuners offer convenient automatic tune facilities and hold many station positions in pre-set memories.

(The Lab and Sound results for models tested in issue No. 65 refer to FM only. For AM results see under Comments.)

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Akai AT-52L £150	Very Good Very Good	Holds its own on FM against many much more expensive tuners, but AM is very poor	All bands	BB	65
Akai AT-93L £250	Good+ Good+	By AM standards presentable (good) while FM delivers the goods	All bands, aerial switch	R	65
A&R Arcam Alpha £149	Good Average+ +	Attractively classic British analogue tuner with sound quality comfortably better than most	FM/AM Analogue	BB*	50
A&R Arcam Delta £270	Very Good Very Good	Hi-fi sound on FM, good on AM, a dependable British all-rounder	6AM, 6FM presets. FM/MW. LW display manual tune	BB	55
Denon TU 450L £130	Average+ Average+	Poor AM sound quality may be a deterrent but the FM performance fully merits recommendation	FM/AM Digital MW/LW	R	50
Harman Kardon TU920 £299	Good Average	Rather weak sound quality for the price despite good lab test results	16 presets, AM/FM, digital auto scan, active tracking		55
Harman Kardon Citation 23 £559	Good Very Good	Fine performance, interesting features and ease of use are this tuner's forte, and the sound quality is top notch	FM/AM seek/manual adjustment muting 16 presets remote control	R	60
Hitachi FT-MD 5500 £200	Excellent Good+ +	A powerful, good sounding tuner with versatile facilities	16 presets, FM, AM, MW auto scan digital, signal meter	BB	55
Hitachi FT5500 II £200	Very Good Good+	Soundwise highly rated on FM, and on AM basically satisfactory - a versatile all-rounder	Auto and manual tuning. 16 presets	R	44
Kenwood KT-660L £130	Fairly Good Fairly Good	You get your money's worth of gadgets and the radio's basically sound although programming is complicated. AM - fairly good	Timer, clock, all bands	R	65
Kenwood KT-1100D £300	Good+ Good+	Behind a gaudy and rather useless display the radio is much better than you might first think. AM - good	Firework display. FM/MW bands only	R	65
Marantz ST35L £125	Good+ Average-	It works well enough but the sound could be better for the money	16 presets, AM/FM, digital auto scan, active tracking		55
Meridian 204 £525	Good+ Good	Pleasant sounding with a fine finish but does not make the grade at this price	FM only, auto scan, digital, remote, clock timer		55
Musical Fidelity TI £300	Good+ Very Good	Top class FM stereo sound on good signal strengths from this audiophile model. Watch out for local CB!	FM only, analogue box dial, manual tune, signal meter	R	55
NAD 4020B £139	Good Average+	Not the quietest or most sensitive tuner tested, it still provided good sound for the money, being "musical and ambient"	Analogue FM/AM	BB	50
Naim NAT 01 £1098	Very Good Very Good	There may be better sounding tuners in the world, but we have yet to hear one	No presets. Two box, flywheel tuning FM only. Analogue	R	50
Nakamichi ST-7E £750	Good+ + Good+	Exceptionally good for weak-signal areas, and good all round	16 AM/FM presets, Schotz enhanced sensitivity, auto time digital		55
Pioneer F551L £100	Good+ Good+	High value budget tuner, very little to argue about (includes long wave)	12 FM, 12 AM presets, auto scan, digital and signal strength meter	BB	55
Pioneer FT 443L £130	Poor Poor	The pretentious 'computer controlled' features don't amount to much. AM - very poor	All bands		65
Pioneer F-737 £230	Good+ Good+	Terrific separation and selectivity on FM, but AM still lacking. AM - fair	FM/MW only	R	65
Pioneer F91 £350	Excellent Good+ +	Easy to use, this model has excellent RF performance and scored very high ratings on the listening tests	FM/AM 24 presets	R	60

THE DIRECTORY

TUNERS					
NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Proton AT-300 £199	Good Good	The AT-300 is pretty on the outside, orthodox on the inside and rather dear. AM – poor	FM/MW only	R	65
Quad FM4 £289	Very Good Good+	Fine sound, excellent ease of use, good build and finish and a more than satisfactory technical performance	7 presets Digital	R	50
Revox B260 £918	Excellent Very Good	Sophisticated and expensive, the B260 is ideally suited to the rest of the Revox range and should also work well in other systems	FM – virtually everything	R	60
Rotel RT-830AL £110	Good+ Good	Fine sounding budget audiophile material, no frills, no fuss	Manual dial analogue, FM, MW, LW	BB	55
Rotel RT-850AL £160	Good+ Good+	Scoring well on listening tests and one of the best sounding tuners at its price level, it was a bit let down on AM but RF performance was good	FM/AM, digital	BB	50
SAE T-102 £449	Good+ Good+	Expensive for all the radio you get, but sounds interesting. AM – Poor	FM/MW only	R	65
Sansui TU-D99XL £249	Very Good Good+	This slimline compact model gave good FM sound quality and strong RF performance. But the AM sounded unpleasant	FM/AM, 16 presets	R	50
Sony ST-S300L/ ST-S100L £140/£100	Good Good	A reasonable entry point, not for difficult areas. AM – Poor	All bands	R	65
Sony ST 500ES £200	Good+ + Average –	Disappointing sound quality but good lab performance (Includes long wave)	10 AM/FM presets, auto scan digital		55
Sony ST-S 700ES £299	Very Good Very Good	First class in every respect including FM sound quality. Even AM was well above average	FM/AM, 10 presets, digital scan	BB	60
Yamaha TX-L400 £130	Good+ + Good+	Good FM sound, let down by poor AM but otherwise good value	16 presets, auto scan, digital, FM, MW, LW	BB	55
Yamaha TX-500 £150	Average+ Average	Under a gaudy coat, this sensitive tuner gave reasonable stereo results. However, the AM had again been thrown down a well	20 presets (10 buttons) digital		50

HEADPHONES

There are a variety of different approaches to headphone design, and examples of each turn up in this group. Amongst the more expensive esoteric models, electrostatic drivers are used in square open-backed phones such as the Jecklin and Stax models. The majority of these come with some form of transformer which takes the signal initially from the speaker terminals on the amplifier. The actual speaker cables then travel from this unit via a

bypass switch to the loudspeakers.

The more down to earth models feature dynamic drivers in circular open-backed designs. The advantage of open backs seems to be a correspondingly open sound and a less claustrophobic feel to the music. One can also of course hear external noises and irritate people on public transport.

The third category are closed-back designs,

which are useful in situations where it is necessary to block out background noise.

Another means of distinguishing different types is the way they sit on your head or ears. There are three styles: circumaural models enclose the ear and rest on the side of the head; supra-aural designs press on the outer ear (pinna); and intra-aural types rest inside the ear and are popular amongst users of personal stereos.

NAME PRICE	SOUND COMFORT	COMMENTS	TYPE	VALUE	BACK ISSUE FULL REVIEW
Aiwa HP-X8 £49	Good Very Good	Very slick Walkman oriented phones which are tonally well balanced and go loud without becoming painful	Supra-aural, closed-back, dynamic	R	63
Aiwa HPEX-200 £90	Good Good	Modern looking and well finished the Excelsia, as they are dubbed, had meaty bass and sounded reasonably open for the type	Circumaural, closed-back, dynamic		63
AKG K135 £35	Fair Poor	Despite a very appealing design the K135s don't live up to the usual AKG standards, though they do have the ability to reproduce rhythm well	Supra-aural, semi-open, dynamic		63
AKG K240 Monitor £60	Good Very Good	Something of a classic these AKGs are very user friendly in all respects; sonically on the warm side of neutral	Circumaural, semi-open, dynamic	R	63
AKG K280 Parabolic £110	Very Good Good	A very revealing and unusual twin driver design that uses the same principle as a satellite dish to beam sound into the ear	Circumaural, open-backed, dynamic	R	63
Audio Technica ATH 909 £55	Average Average	Quite impressive in the treble though a bit bass shy, the 909s worked well at highish levels	Circumaural, semi-open, dynamic		55
Audio Technica ATH 910 £65	Good Average	The closed-back 910s are an improvement on the 909s with a nice rhythmic quality rarely found with headphones	Circumaural, closed-back, dynamic	R	55
Audio Technica ATH-911 £75	Very Good Very Good	Nicely finished dynamic headphones with all the trimmings, plus a very clean and subtle sound	Circumaural, open-backed, dynamic	R	63
Beyer DT 325 £30	Fair Very Good	Lightweight in more ways than one, the 325s may be a little bright for some systems and tastes but will suit duller sources	Supra-aural, open-back, dynamic	R	63
Beyer DT330 Mk II £45	Poor Good	Not the most revealing 'phones encountered, the 330s were nevertheless enjoyable and rarely offended	Circumaural, semi-open, dynamic		55
Beyer DT550 £69	Good Good	On their own the 550s sound articulate with a slightly 'gritty' treble and 'keen' midrange, not suitable for headbangers!	Circumaural, semi-open, dynamic		55
Beyer DT880 £90	Good Good	Well made cans with a warmish sound but fairly solid midrange, though they're not that informative for the price	Circumaural, semi-open, dynamic		63
Beyer DT990 £119	Very Good Very Good	The 990s are definitely a significant pair of dynamic headphones; they have a smooth and yet revealing, neutral sound that is hard to criticise	Circumaural, open-back, dynamic	R	55
Jecklin Float Model One £79	Very Good Good	Whilst very unusual in appearance the Floats give remarkable sound quality and openness at a reasonable price	Circumaural-ish, open-back, dynamic	BB	55
Jecklin Float Model Two £99	Very Good Good	Helmet shaped and pretty unflattering but open sounding and comfortable in the long term. Note lack of adjustment means you should try before you buy	Circumaural-ish, open-backed, dynamic	R	63
Jecklin Float Electrostatic £399	Excellent Good	One version of the state-of-the-art, these electrostatics have an openness of sound rarely found in the breed, with good dynamic range to boot	Circumaural-ish, open-back, electrostatic	R	55
Koss K/6X Plus £30	Poor Fair	'Sixties-style' phones from the good ole US of A, their sonic style is unique and can make a system sound quite different	Supra-aural, closed-backed, dynamic		63
Quart Phone 30 £40	Fair Good	Whilst not as seductive as their PMB25 predecessor the 30s are reasonably neutral and do improve on some of the competition – though not stunning	Circumaural, semi-open, dynamic		63
Quart PMB 25II £40	Good Good	Despite a somewhat unconventional suspension system the 25s put in a convincing and enjoyable performance with warm yet lively balance	Circumaural, open-back, dynamic	BB	55
Quart Phone 70 £70	Good Good	Competent performers that were hard to criticise but lacked the life and sparkle of which some of the competition are capable	Circumaural, closed-back, dynamic		63
Quart PMB 65 £70	Good Good	Quite revealing and neutral albeit with the usual closed back sound, this competes well with more established models	Circumaural, closed-back, dynamic	R	55
Quart PMB 85 £90	Very Good Fair	These more expensive Quarts bear a striking resemblance to the Jecklin Float models and use two drivers per ear. Sound is a bit bass heavy but not bad overall	Circumaural, open-backed, dynamic		63
Ross RE-2760 £35	Fair Poor	Stylish white cans from the only British firm in the business. Unfortunately sound quality is not up to par in this price range	Supra-aural, closed-back, dynamic		63

THE DIRECTORY

HEADPHONES

NAME PRICE	SOUND COMFORT	COMMENTS	TYPE	VALUE	BACK ISSUE FULL REVIEW
Sennheiser HD30 £13.50	Poor Good	Built specifically for the personal stereo market these small and light Sennheisers have a slightly synthetic sound, but are an upgrade on the average Walkphones	Supra-aural, semi-open back, dynamic		55
Sennheiser HD450 £27	Fair Good	Modern, simple and lightweight phones that are remarkably robust and which turned in a relaxed if weighty performance that was at worst pleasant	Supra-aural, semi-open, dynamic	R	63
Sennheiser HD480 £37	Fair Good	Using the same shell as the 450s, the 480s were a little softened and unrevealing by comparison with their competitors	Supra-aural, semi-open, dynamic		63
Sennheiser HD420SL £47	Good Good	The 420s gave a full and tangible quality to instruments and voices; whilst not the most revealing headphones around they would suit slightly brash sources	Supra-aural, open-back, dynamic		55
Sennheiser HD540 Ref Gold £160	Very Good Good	The 540 Golds prove that dynamic headphones can be subtle, informative and capable of creating a remarkable sense of space	Circumaural, open-back, dynamic	R	55
Sony MDR V3 £30	Good Fair	Portable stereo oriented phones that are very nicely made and combine clarity with a pleasant lack of distortion	Supra-aural, closed-back, dynamic	BB	63
Sony MDR V6 £70	Good Very Good	A lot more civilised and dynamic than the V4s, these were pretty good for their type and fold up to boot	Circumaural, closed-back, dynamic	R	55
Sony MDR V7 £70	Very Good Very Good	Classy sounding cans that are very slick and work well with all types of music, setting the standard in their price range	Circumaural, closed-back, dynamic	R	63
Stax SR34 £140	Very Good Fair	The least expensive Stax headphones around, the SR34s are lively and rhythmic with good tight bass and a sweet midrange	Supra-aural, open-back, electret		55
Stax SR84 £210	Very Good Very Good	The stepping stone between dynamics and full electrostatics, these electret phones are revealing, open and highly enjoyable	Supra-aural, open-backed, electret	R	63
Stax Gamma pro/SRD-X pro £296/£230	Excellent Very Good	The Gamma pros are like a stethoscope for your hi-fi, revealing subtleties that many loudspeakers fail to resolve	Circumaural, open-backed, electrostatic	R	63
Stax SR Gamma £299 (inc. SRD-6 Adaptor at £100)	Very Good Very Good	The next model down the Stax range from the Lambda, the Gamma is an excellent headphone with little to criticise but the price	Circumaural, open-back, electrostatic	R	55
Stax SR Lambda Pro £545 (inc. SRD-7SB Mk 2 Adaptor at £185)	Excellent Very Good	A bit of an industry reference the Pros are frighteningly revealing, bringing across more information than loudspeakers costing twice as much	Circumaural, open-back, electrostatic	R	55

PERSONAL STEREO

Whilst not exactly hi-fi components, personal stereos probably play more music to more ears than any manner of domestic systems and as such demand some attention. Now that personal CD players have joined the ubiquitous Walkman in the market, the variety and standard of sound quality is huge, with obscurely named cassette players practically falling out of your cornflakes packet and Discmen going for £300.

Despite their diminutive size personals attempt to incorporate as many gimmicks and features as

possible, cassette players often incorporating tuners, graphic equalisers and Dolby noise reduction. CD players are still relatively expensive and don't tend to vary that much on the features front, rather the amount and quality of accessories differs. Most models come with a mains adaptor and some include remote control.

Sound quality on the cassette front seems to have a proportional relationship to price and integrity of construction – wow and flutter being quite obvious on the cheaper models. CD players

become less noisy as they get dearer and also reduce in size; one drawback of the latter seems to be that immunity to shock suffers as a consequence. Cassette players do, on the whole, seem better suited to the outdoor life than their digital counterparts, as does the software. Bear in mind that the sound and lab ratings given below cannot realistically be compared to those in other categories or between cassette and CD personals.

PERSONAL CASSETTES

MODEL NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Aiwa HS-G35 MkII £30	Poor Fair	A reasonable player for the price but not well suited to classical material and let down by the headphones	Autoreverse, graphic EQ, types I & II		56
Aiwa HS-136 £89	Good— Average	Comprehensive facilities and reasonable sound are no mean feat for the price.	Dolby, autoreverse, types I, II & IV, AM/FM, recorder	R	56
Aiwa HS-PX101 £149	Average— Good	A very slick little number with soft touch controls and remote control headphones	Dolby B, C, autoreverse, types I, II & IV	R	56
Ferguson 3T46 £35	Very Poor Poor	Not particularly subtle but having reasonable speed constancy, it's OK with most material but can get painful	Autoreverse, AM/FM		56
Philips D6658 £30	Very Poor Poor	The low price limits sound quality, and this is not a spectacular machine, but it does a reasonable job nonetheless	Graphic EQ, AM/FM		56
Saisho PS90R £40	Poor Poor	A bit of a jumble of features and gadgets, the PS90R has on-board speakers, an extending aerial and even records, but sound quality is dubious	Graphic EQ, types I, II & IV, AM/FM, recorder		56
Sanyo MGR-77 £35	Very Poor Very Poor	Rather a basic machine with a raw edgy sound, not helped by poor speed stability	Graphic EQ, AM/FM		56
Sanyo MGR-87 £50	Very Poor Fair	The 87 came up with a slightly fast but rhythmic sound. Although lacking in finesse, it worked OK with pop material	Autoreverse, graphic EQ, AM/FM		56
Sanyo MGP 6000 £50	Average+ Average—	With styling aimed at the fairer sex the 6000 sounded a little better than the similarly priced MGR-87. Lacking in clarity, it was still quite durable	Dolby, autoreverse, graphic EQ, types I, II & IV		56
Sanyo JJ-P4 £100	Poor Good	Claimed by its makers to be the world's smallest personal stereo the JJ-P4 is a tasty looking object that's capable of good sounds to boot	Dolby, autoreverse, tape types I, II & IV, rechargeable		56
Sony WM-34 £40	Poor Average	This straightforward no frills Walkman makes pretty plausible sounds at a reasonable price and apart from the Walkman Pro was the only model to earn a Best Buy rating	Dolby, types I, II & IV	BB	56
Sony WM-F63 £100	Average— Average—	This attractive Sports Walkman is nicely built but sonically flawed by rather hissy intra-aural headphones	Dolby, autoreverse, types I, II & IV		56
Sony Walkman Pro £249-£289	Good+ Excellent	One of the finest sounding cassette decks on the market today. A mandatory Best Buy, it takes other personals to the cleaners (except on weight and power consumption)	Dolby B, C, types I, II & IV, record, line in/out, varispeed	BB	52/56
Toshiba KT-4027 £35	Very Poor Very Poor	Not a very wonderful machine, the 4027 sounded pretty appalling with all but the most unsubtle music	Graphic EQ, AM/FM		56
Toshiba KT-4047 £60	Average Average	This model proved capable of making the most of better recordings, and sounds reasonably tuneful	Dolby, autoreverse, graphic EQ, types I, & II, AM/FM	R	56

PERSONAL CDS

MODEL NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Goodmans GCD-10 £120	Average— Poor	Cheap, flashy and not short on accessories the GCD-10 is a rather noisy player that left a lot to be desired on the sound quality front	13.5 x 3.7 x 18cm, 478g, mains adaptor		66

THE DIRECTORY

PERSONAL CDs

MODEL NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Kenwood DPC-77 £270	Good+ Very Good	Very chunky and well made, the DPC-77 is the only player to include a digital output and sounds very good through its analogue output – a suitable domestic alternative	12.8 x 3.5 x 14.5cm, 750g, digital output, mains & in-car adaptors	R	66
Philips DG800 £130	Average Average—	A competitively priced and reasonably attractive looking player whose sonic performance is somewhat marred by a rather grainy top end	13 x 4 x 17.5cm, 516g, 3" ready, twin hdph sockets		66
Sanyo CP-12 £260	Fair Good+	Sonically amongst the more enjoyable personal CD players and capable of revealing the musical aspects of a disc in an interesting and entertaining fashion	12.5 x 2 x 12.7cm, 380g, wired remote, mains adaptor	R	66
Sony D-20 £150	Average+ Fair	Not bad for a machine at this price, it's nicely designed and reasonably robust, with reasonable sound quality	13.8 x 3.8 x 15cm, 450g, mains adaptor	R	66
Sony D-40 £200	Fair Good	A 'largish' but attractive player that works well as a Discman being fairly immune to shock and capable of making a good job of reproducing the discs it's given	13.6 x 3.7 x 14.7cm, 480g, mains adaptor, slinky case	R	66
Sony D-88 £300	Average— Fair+	A stylish and 'cultish' object, the D-88 is very small and has an adjustable disc drive for three and five inch discs. Sound quality doesn't quite match appearance	9.4 x 3 x 9.8cm, 300g, 3" ready, mains adaptor, no line out		66
Sony D-150 £300	Fair+ Very Good	One of the most enjoyable machines encountered, sounding informative and sweet and looking very tasty to boot. Comes complete with a tough carrying case	12.6 x 2.1 x 13.5cm, 420g, 3" ready, R mains adaptor	R	66
Toshiba XR-9458 £250	Average+ Good—	Accompanied by a plethora of accessories including a meaty plinth and infra red remote, the Toshiba didn't quite make it on the sound quality front but is worth considering	12.6 x 2.4 x 12.9cm, 460g, 2 remotes, mains adaptor, 3" ready etc		66
Xenon CDP-03 £180	Average— Fair+	A well made and competitively priced machine that is ergonomically spoilt by flat slightly unresponsive buttons. Sound quality ain't too bad but a trifle boring	12.6 x 2.7 x 12.6cm, 560g, high frequency filter, key lock		66

CD PORTABLES

CD Portables or Yuppie Blasters as we classified them are basically portable stereos gone digital, ie a compact disc player is included alongside the usual AM/FM radio and single or double cassette deck. Compact disc is a novelty that seems to add a fairly hefty premium onto the price of the standard ghetto blaster, but the improved sound quality over standard cassettes may justify this for some.

In virtually every case a CD output socket is

fitted which means that it's possible to play silver discs through a domestic amplifier and loudspeakers, thus they are some sort of substitute for standalone mains machines (as are the personal CD players). One drawback with having a CD player on board is that batteries are gobbled up even quicker than usual, up to ten batteries being required in some cases. Neither are the units particularly light, the heaviest weighing eight kilos!

However they do all run off the mains too, and come with an appropriate lead for this purpose. Other useful features common to most are spare input sockets to record from an external line source such as a preamplified vinyl disc signal, and microphone sockets for recording live events (although the usual lack of record level adjustment is a nuisance).

MODEL PRICE	SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Ferguson RCD02 £300	Poor	A large, slightly tinny midi system-esque unit with removable speakers and a slightly brash sounding CD player	Twin cassette, graphic equaliser, spare input (DIN)		53
Fisher PH-D473F £300	Average	The Fisher is quite a neat and compact player which is nice to use but doesn't offer particularly great sound quality	Autoreverse, AFC		53
Hitachi CX-W800 £300	Average+	This meaty Hitachi lives up to Blaster expectations, its super woofer bass speaker giving maximum street credibility	Twin cassette, graphic equaliser, phono input	R	53
Memorex CD-3300 £280	Average	A little bit tacky, the Memorex put in a plausible if unenthralling performance, and will work with external speakers	Spare input		53
Panasonic RX-F080L £300	Average—	Shiny in a glitzy way, this Panasonic features a reasonable cassette deck but a below par CD player with tiny transport controls	Autoreverse, spare input		53
Sharp WQ-C015 £250	Good	A reasonably compact machine with a quite impressive CD player and a novel twin cassette mechanism	Twin cassette, graphic equaliser, spare input	R	53
Sony CFD-66L £350	Good	A very attractive player in the true yuppie mould of white plastic with silver details, it even sounds OK	Spare input, shuffle play, AMS (tape search system)	R	53
Toshiba RT-7096 £250	Poor	Quite a large box for the money, the Toshiba isn't too special when it comes to sound quality but does have partly wooden detachable speakers	Twin cassette, graphic equaliser, spare input		53

STANDS AND SUPPORTS

It's becoming more and more apparent that all the components in a hi-fi system benefit from being placed on the right kind of support. It is already acknowledged that performance of electro-mechanical transducers, such as turntables and loudspeakers, can be greatly improved by using highly rigid supports. This notion has been expanded to include electronics such as amplifiers and compact disc players, and inevitably a broad range of stands and supports have been produced to cater for this requirement.

With loudspeaker stands there seems to be two

broad schools of design. The most common is the open frame type which uses square section steel tubing (usually less than an inch square) made up to form a tripod or quadropod stand usually fitted with spikes top and bottom to ensure good coupling to both floor and cabinet. However, for reasons of domestic harmony this latter option is often not pursued as eagerly as perhaps it should be. The alternative approach is to use mass. Larger section (approximately 3 inch x 2 inch) tubing is welded between square top and bottom plates and filled with sand and/or lead shot. Again, this type uses

spikes at the base but Blu-tack or the like for coupling with the speaker cabinet.

Equipment supports generally place isolation quite high on the list of priorities and usually use a lightweight steel frame to support an MDF platform. Once again spikes are used to minimise contact with the platform and ensure good coupling to the floor. Minimising weight without compromising rigidity seems to be the aim with turntable supports but those designed for electronics often employ some form of damping to kill vibration, sometimes in the form of mass.

LOUDSPEAKER STANDS

MODEL PRICE	TYPE FINISH	COMMENTS	TOP PLATE SIZE HEIGHT	VALUE	BACK ISSUE FULL REVIEW
Appolo A820 £40	4 leg Fair	A light open-framed budget design slightly lacking in rigidity and subjectively superceded by other stands costing £10 more.	19 x 19cm 53cm		58
Appolo A10 £47.25	4 leg Fair	A robust and lightweight model, it would make an ideal upgrade for those still happy with the big boxes of old.	19 x 19cm 44cm	R	58
Foundation Fred £65	2 leg Average	With sand filling the Freds made speakers sound tight and coherent with a more even balance.	19 x 19cm 36/43/59cm		58
Foundation Maggi £159	Pair Very Good	Made for Magneplanar and other similar panel speakers they seem to have a healthy effect on the sound quality thereof.	50 x 2cm 2cm	R	58
Foundation Pi £250	2 leg Very Good	Overpriced in material terms the Pi nevertheless has a very positive effect on the low frequency performance of conventional speakers.	20 x 20cm 25/38/46/53cm	R	58
Heybrook Point 5 £50	3 leg Very Good	An unusual triangulated open frame stand that can help certain speakers sound more transparent and fluent – a good value stand	23 x 21.5cm 47cm	BB	58
Heybrook HBS1 £75	4 leg Very Good	With its new aluminium base frame the HBS1 fared very well in the listening tests. It allowed much of the speakers own 'sound' to remain intact.	23 x 21cm 47cm	R	58
Linn Kan II £79	4 leg Very Good	Built to support Linn's Kan speaker this stand is well suited to the task, but is less successful with other loudspeakers.	19 x 16cm 59cm		58

THE DIRECTORY

LOUDSPEAKER STANDS

MODEL PRICE	TYPE FINISH	COMMENTS	TOP PLATE SIZE HEIGHT	VALUE	BACK ISSUE FULL REVIEW
Linn Sara £85	4 leg Very Good	The Sara exhibits some odd properties so its use other than with the Sara loudspeaker should be viewed with caution.	25 x 21cm 53cm		58
Monotrak Engineering M1 £58	1 leg Good	The M1 gave the mid and treble a commendably smooth and detailed presentation but bass sounded rather lacklustre and muddy.	19 x 18.5cm 48cm		58
Monotrak Engineering M4 £58	4 leg Very Good	Begging comparison with Heybrook's HBS1 the M4 maintained much of the openness and forthright detail of that model.	23 x 21.5cm 53cm	R	58
Monotrak Engineering M4S £58	4 leg Very Good	Its stature and stability would seem to mark it out as most suitable for smaller, lighter cabinets. The M4S possessed an open midband and clear treble.	20 x 17.5cm 53cm		58
Mordaunt-Short IS1 II £45	3 leg Good	Suited to low mass speakers, preferably using spikes to effect coupling, they sounded slightly 'jazzed up' but the overall sound was quite unmodified.	18 x 15cm 56cm	R	58
Origin Live £117	3 leg Good	An unusual tripod stand devoid of top plate and taking up more floor space than normal, subjective and technical performance was exemplary.	(support area) 22 x 17.5cm 52cm	R	58
Partington PP4 £50	1 leg Good	The PP4 offers a rather mixed performance, though when damped with sand infill it was less ready to embellish the overall sound and low frequencies became tauter and quicker.	18 x 16.5cm 48cm		58
Partington Dreadnought II £120 (filled)	1 leg Very Good	Ideal for systems on the light/bright side of neutral, the Dreadnought IIs nevertheless still need some careful re-examination by Partington.	17.5 x 16.5cm 63cm		58
QED TS22 Tristand £50	3 leg Very Good	Most tracks sounded uplifted or buoyant, never thick nor coloured. It worked well with most of the speakers tried and encouraged a fluid and revealing midband.	19 x 17cm 45/50/58cm	BB	58
RATA Torlyte £190	2 panel Excellent	Suited to low mass speakers, these unusual stands are hardly discreet but offer transparent and clean sound – much like the Torlyte table!	25 x 21cm 48cm	R	58
Target HS20 £53	1 leg Excellent	This monopod stand can be used either filled or unfilled and encourages different characteristics in the sound accordingly.	19 x 16.5cm 53cm		58
Target HJ15/3 £83	3 leg Very Good	Sound quality was basically very good though without the sand infill some loudspeakers may sound a little unbalanced as both bass and treble regions are subjectively exaggerated.	28 x 28cm 40cm	R	58

EQUIPMENT SUPPORTS

MODEL PRICE	TYPE FINISH	COMMENTS	SIZE (H x W x D)	VALUE	BACK ISSUE FULL REVIEW
Audioquest Sorbothane Feet £10 each	Feet Good	These large gumdrops are very useful for damping vibrations in amplifiers and especially CD players.	6.5 x 2.5cm (circular)	R	57
Cornflake TCS5 £50	Table Very Good	A little too close to the ground for comfort, perhaps, but this novel and stylish little table is certainly worth seeking out.	29 x 43 x 33cm	R	57
Cornflake TCS6 £50	Shelf Good	A squat and rigid frame supports a Medite top board with four adjustable spikes, better suited to suspended sub-chassis turntables.	43 x 23 x 33cm		57
Deltec Isolation Base £135	Platform Good	Designed for all CD players, amplifiers and separates, but not suspended sub-chassis turntables, the isolation is second to none.	50.5 x 40cm	R	57
RATA Model A £125	Table Very Good	A three-legged Torlyte turntable support that has become something of an industry reference.	46 x 46.5 x 38.5cm	R	57
RATA Amplat £40.25	Platform Very Good	A lightweight and rigid Torlyte slat with spikes for floor or shelf mounting, it works well in conjunction with the Target TT2	4 x 44.5 x 35cm		57
Sound Organisation Table £55	Table Very Good	A deceptively simple structure that just happens to be engineered in a thoughtful, and ultimately successful manner.	37 x 45 x 35cm	BB	57
Sound Organisation Wall Stand £40	Shelf Very Good	The first of its ilk and still amongst the best, this simple framework represents a vast improvement over standard furniture shelves.	27.5 x 43 x 35cm	BB	57
Target TT1 £46.50	Shelf Excellent	This rigidly braced shelf offers both good sound quality and material value for money.	26 x 46.5 x 35.5cm	BB	57
Target TT2 £47.50	Table Very Good	Standing up to the best in most areas, the TT2's only real foible concerns a slight loss of bass 'slam'.	52 x 46.5 x 35.5cm	BB	57
Townshend Suspension Base £145	Platform Fair	Designed to complement the Rock turntable, this platform will bring subjective improvement to a wide range of electronics.	43 x 36cm	R	57

CABLES AND CONNECTIONS

Although cables and connections are sometimes thought to be the least important items in an audio system there has been a growing awareness in recent years that they have a significant effect on sound quality. To this end there is now a vast array of exotic cables and interconnects available to those interested in experimentation. The key observation on cables is that they are much more than mere accessories. Carrying the audio signal, just as any amplifier does, it's really not too surprising that they can influence the quality of that

signal.

The characteristics of any cable are determined by the materials and topologies utilised in its construction. The purity of the conductor, nature of the insulator dielectric, mechanical construction, physical geometry, RF characteristics, efficiency of screening and finally the connectors themselves, all play vital roles in the sonic character. These factors tend to vary more with interconnect cables which are used to carry the signal between active components like pre and power amplifiers. The

interconnects summarised here were tested in 1m terminated lengths and therefore the results and prices relate to that length – some cables may well perform differently when used in longer lengths.

The features column contains information on the material make-up of the different cables with the following abbreviations: OFC – oxygen free copper, OFHC – oxygen free high conductivity (Audionote define the HC as high crystal), PC-OCC – pure copper by ohno continuous casting, LC-OFC – linear crystal oxygen free copper.

INTERCONNECT CABLES

MODEL PRICE (per metre)	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Apature LSD N/A in UK	Poor Fair	Faint resonant boom was audible at very low frequencies, but otherwise this cable sounded remarkably neutral.	Silver plated copper, PTFE dielectric		59
Audioquest Reference 2 £29	Good Fair	Ultimately Reference 2 simply damped much of the atmosphere and emotional charge of a musical performance.	OF copper		59
Audioquest Livewire Topaz £29	Good Fair	Sounding 'bigger' and faintly richer than Reference 2, Topaz was also slightly grainy at the top end.	Gold-plated plugs, OFHC copper		59
Audioquest Livewire Ruby £45	Fair Good	Smoother sounding than the Topaz, the extended crystal Ruby is less grainy and coarse, better able to resolve complex passages.	FCL copper twin axial	R	59
Audioquest Livewire Quartz £65	Good Good	Quartz has an ideal, neutral balance that embodies sparkling clarity without the drawbacks of harshness or compression.	3 piece plugs, PTFE dielectric	R	59
Audio Technica AT6115 £50	Very Good Fair	This cable sounds somewhat 'quieter' than the original LC-OFC interconnect, but is also less transparent and three dimensional.	PC-OCC copper coaxial		59

THE WORLD'S NO 1 GUIDE TO BUYING HI-FI

THE DIRECTORY

INTERCONNECT CABLES

MODEL PRICE (per metre)	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Audionote Copper ANC £35	Fair Good	ANC sounded punchy with a faintly lean but tightly-focused bass character. This crystalline precision waned slightly at higher frequencies.	OFHC copper twin-axial	R	59
Audionote Flexible Silver ANS £85	Fair Good	ANS scored a hit with its transparent midband and revealing but quite unforced treble quality. Bass transients were slightly softened.	Silver signal & Copper screen	R	59
Audionote Silver ANV £140	Poor Fair	Far weightier-sounding than the flexible ANS, ANV interconnect also possesses a fair degree of treble clarity and sparkle.	21 strand silver Litz		59
Aural Symphonics N/A in UK	Poor Good	This cable enjoyed an open and transparent midband and sounded remarkably neutral and faithful to the source.	OF copper PTFE dielectric	R	59
Budget Patch Cords see text	Fair Poor	As thrown in gratis with cassette decks and the like – frequency extremes were restricted and performances were veiled.	Thin coaxial		59
Budget OFC circa £7	Fair Fair	Subjectively, this cable did lift much of the aural fog experienced with scrawny standard hook-up leads.	OFC		59
Deltec Slink £32	Good Very Good	Ideally used in lengths of under 4 metres, it errs on the lean side of neutral but has an uncommon transparency in the midrange.	4 silver plated OFC strands PTFE dielectric	BB	59
Deltec Black Slink £152	Excellent Excellent	Inherently neutral the cable faithfully reproduced broad and deep stereo soundstages with precise focus and a sense of tactility.	8 silver plated OFC strands PTFE dielectric	R	59
Denon LC-OFc N/A separately	Very Good Fair	Supplied with Denon's dearer CD players this cable introduced a peculiar 'twangy' coloration at high frequencies, and a slightly soft bass.	LC-OFc, non-magnetic gold plated plugs		59
DNM Solid-core £15-£25	Fair Good	Transparent in the midband and full of sparkling detail in the treble, low bass was slightly curtailed (unterminated price £4.60 per m)	Single strand nickel-plated copper. Unshielded	R	59
Kimber Kable PSB £32	Very Good Very Good	An exceedingly transparent midband but slightly 'clanky' treble. It always managed to sound remarkably uncluttered and open.	OFC, PTFE dielectric	BB	59
Kimber Kable KC-1 £47	Very Good Fair	Tonally faintly leaner and brighter than the more open-weave PSB, KC-1's treble detail was just too sharp and grainy.	Multi-gauge PTFE dielectric		59
Kimber Kable KC-AG £375	Good Very Good	Treble detail resolution was perceived in a slightly abrupt if wholly controlled fashion. Depth re-creation and lateral separation were excellent.	Multi-gauge silver, PTFE dielectric	R	59
MDM Interconnect £14.95	Good Fair	The subjective performance of MDM did appear a little imprecise at the frequency extremes, but a worthwhile upgrade on budget interconnect.	Coaxial, solid core, gold plated plugs		59
MIT PC-Squared £75	Fair Good	This multi-gauge cable produced a very open and buoyant midband but sounded slightly 'peculiar' at frequency extremes.	OFC, multi-gauge	R	59
MIT Spectral MI330 £193	Poor Fair	MI330 displays a marvellously open and enticing midband quality, bass is warm and rich but this character has a tendency to dominate.	Multi-gauge balanced bandwidth		59
Monitor PC 0100381 £17	Good Fair	There is more than a hint of instrumental muddling and bass is slightly soft, however, the slightly 'shut-in' sound is par for the course at the price.	OFC, coaxial	R	59
Monster Interlink 400 £30	Good Good	Bass is solid and punchy, counterpointed by a slightly overblown midband which tends to make vocalists sound larger-than-life.	Multi-gauge	R	59
Monster Interlink CD £44	Fair Fair	Low frequency is commendably weighty, but the top-end sounds vague and lacking in image focus. Suited to some systems better than others.	Multi-gauge		59
Monster Interlink Reference £88	Good Fair	Protracted listening indicated a lack of dynamic speed – a subjective sluggishness. It may prove well suited to up-front systems.	Multi-gauge Balanced bandwidth Gold plated plugs		59
Myst Tm £15.60	Fair Good	Fairly neutral with a pleasantly open and transparent midband. Some deep bass detail is lost but treble is sharply focused.	Solid-silver PTFE dielectric	BB	59
Origin Live Soli-Core Super £60	Good Fair	Improves over previous Soli-core samples in stereo depth and bass weight, but a 'loud' treble presentation remains.	Solid-core gold-plated AT plugs		59
QED Incon P1-Gold £14.95	Good Good	A lively open presentation that just borders on the lean side of neutral, the quick and lucid delivery affording considerable musical insight.	OFHC, gold plated Deltron plugs	BB	59
QED Incon Graphite GP1 Gold £18.95	Fair Fair	A shielded version of Incon P1, it sounded thicker at the frequency extremes, the top end being coarser and more out of focus. Good for long runs though.	OFHC Graphite shielding	R	59
Sony RK-C310ES £40	Excellent Good	Possessing deep firm bass and a sparkling top end it offers a balanced perspective with negligible coloration.	Coaxial LC-OFc	R	59
Sterling £250	Fair Good	Possessing a neutral if faintly rich overall balance it supplies a pleasantly open and transparent perspective. (Reviewed in pre-production form.)	2 silver strands per conductor		59
Thorens SAC 100 £50	Good Fair	Performance is undermined by a slightly coarse and splashy treble, not necessarily bright, simply rather confused – and fine detail lacks resolution.	Silver-plated OFc, coaxial		59
Van den Hul MC-D300II £59	Poor Good	It tended to highlight some upper mid detail, but a generally open and spacious acoustic proved its saving grace. Slightly soft at LF.	Silver plated single strand VdH plugs	R	59
Van den Hul MC-1021II £69	Good Good	Possessing the same endearing qualities as the D300 it presented open and transparent soundstages and improved timbral resolution.	Twin axial silver plated copper	R	59
Van den Hul MC-D502 £77	Fair Fair	The tonal balance was 'tilted' by a strong and authoritative bass line, which had the knock-on effect of muting treble detail. A bit dear.	Twin axial silver plated copper, teflon dielectric		59
Van den Hul Thunderline £147	Good Fair	Thunderline essentially parallels the sonic performance of the cheaper D102. HF is occasionally tainted by a 'tizzy' coarseness, bass is tight and dry.	Silver plated 'matched copper'		59
Van den Hul MC-Gold £247	Fair Good	It possesses a rich and beguiling treble balance that matches a weighty, slightly warm bass character. Seductive balance may prove worthwhile in some circumstances.	Silver & gold plated copper		59
Van den Hul MC-Silver £747	Good Good	Although remarkably transparent for an asymmetric design this costly cable was not considered to be of 'state-of-the-art' standard, and is bettered by cheaper models.	19 silver plated copper strands		59
Vecteur 8045 £49	Very Good Good	Sounding solid and forthright it might seem slightly cold in some systems but the treble 'edge' is mercifully clean. Very low frequencies were a little lacking in 'slam'.	LC-OFc signal & screen	R	59

LOUDSPEAKER CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Absolute Wire Force 4 £4.50 per metre	Good Fair+	By current standards there was a loss of fine, sharp detail at the frequency extremes, but it has a big and friendly sound.	744 OFc strands, PVC dielectric		64
Audionote DR-200 £16 per metre	Fair+ Fair+	Open and detailed throughout the midband but a grainy coloration tended to corrupt subtle timbral information at very high frequencies.	200 LC strands, polyurethane and cotton dielectric		64
Audionote AN-SP £100 per metre	Average— Good	A clean and open sounding cable that offered a deep and pleasantly detailed perspective. Bass was slightly restricted, but seemed tight and coherent nonetheless.	15 silver strands, polyethylene dielectric		64
Audioquest BC-4 £2 per metre	Average+ Good+	There was a slowing of fast transient edges to contend with but in general BC-4 offered a delightful clarity and sparkle throughout the highest octaves.	4 OFHC strands, PVC dielectric	BB	64

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 109

THE DIRECTORY

LOUDSPEAKER CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Audioquest Livewire Black £15 per metre	Good Good	It proved clear and punchy but with some grain across the treble. Nevertheless Black remains an interesting concept and proved better than Livewire Green	OFHC, surface only – foam core construction	R	64
Audioquest Livewire Green £30 per metre	Good Fair +	Green proved more overtly dynamic and forward than BC-4 with simple music, but complex passages tended towards a mushy and ill-defined perspective. FCL – functionally crystal: less	FCL, surface only – foam core construction		64
Audio Technica AT6120 £95 – 10m	Fair + Fair	Compared to earlier LC-OFCC cables this PC-OCC derivative sounded smoother and less aggressive	PC-OCC, PVC dielectric		64
Bellwire 12p per metre	Poor Average –	Broadly speaking it delivered a bright and tizzy sounding treble with a fairly open and detailed mid with little or no bass resolution	0.5mm single strand, PVC dielectric		64
Deltec 8S £144 – 5m pair	Good Good +	The unerring transparency and detail resolution of 8S throughout the midband makes it a far cleaner and more spacious sounding cable than others at the price	4 silver plated OF copper strands, PTFE	R	64
Deltec Black Sixteen £456 – 4.5m pair	Very Good Excellent	Bass was deep and rhythmically secure, the mid tonally pure and free of additional sibilance while the treble was both relaxed, sweet and highly detailed	16 silver plated OF copper strands, PTFE dielectric	R	64
DNM Solid core £2.30 per metre	Average Fair	DNM cable seems too unbalanced for general consumption but excellent results have been obtained in sympathetic systems	0.54mm single strand, webbed PVC dielectric	R	64
Exposure £2 per metre	Good Good	It could sound a trifle matter of fact but this emotive flattening was also somewhat dependent on the music program. It is also highly suited to long runs	56 OFC strands, webbed PVC dielectric	R	64
Kimber Kable 4PR £49.45 – 5m pair	Fair Fair +	This directionally marked cable benefitted from an open and airy treble quality but seemed notably leaner than 4TC. Bass was well round and satisfyingly taut	4 x 7 copper strands per conductor, PVC dielectric		64
Kimber Kable 4TC £16 per metre	Good Good +	4TC made a great impression in the listening tests with an open midband, a smooth and unfatiguing treble with slightly rich but suitably weighty bass	OF copper, PTFE dielectric	R	64
Linn K20 £2.20 per metre	Good Fair	Subjectively it erred on the forward and bright side of neutral but enjoyed an essentially clear and punchy delivery	56 OFC strands, webbed PVC dielectric		64
Marantz ML-55S £24.90 – 10m	Fair Fair	Subjectively this cable offered a loose and splashy treble which, though not overtly bright, did compromise both tonal and timbral accuracy	30 OFC strands, 3 conductors PVC dielectric		64
Mission Cyrus £2.50 per metre	Average + Good	Because of its impedance characteristic this cable will deliver a smooth and unfatiguing treble balance with loudspeakers offering an easy load	0.8mm single strand, PVC dielectric	BB	64
Monitor PC Silverline PC4 £5.75 per metre	Good Average	Sonically it laboured under a heavy and claustrophobic balance, lacking the see through transparency and lucidity of the better solid core cables	2072 x 0.07mm silver plated copper strands		64
Monster Superflex £2.50 per metre	Fair + Fair +	Treble detail was both reserved and confused though there was little in the way of harshness and grain. Deep bass notes were also found to be lacking	OFC, multistrand, Duraflex dielectric		64
Monster Original £4 per metre	Good Fair +	Original sounded relatively congested and murky at higher frequencies but possessed weight and conviction in the bass	Multistrand		64
Monster Powerline 2 £12 per metre	Good Good –	Powerline stamped its own hallmark on the sound with a strong taut bass and an essentially clear midband giving tactile stereo images	Multistrand, helical construction		64
Musical Fidelity Lifeline £11.50 per metre	Fair Good –	Lifeline did demonstrate a strong directional inclination, affording a laid back but fairly neutral balance when correctly oriented	4 x 0.8mm PC-OCC strands	R	64
Naim NAC-A4 £2.25 per metre	Good Fair +	Tinged with brightness while the deep bass response seemed both over heavy and poorly integrated compared to the immediate competition	Multistrand, webbed PVC dielectric		64
NVA £6 per metre	Average + Good	A light and breezy sounding cable best suited to short lengths, NVA benefitted from a clear and transparent outlook	7 x 0.25mm silver alloy strands, PTFE	R	64
Origin Live Soli-Core Ordinary £1.80 per metre	Good Fair +	Subjectively it bettered the performance of the costlier Super version, affording a pleasantly detailed and spacious soundstage with firm bass but slightly coarse treble	1.8mm and 0.5mm single strands	R	64
QED 79-Strand 90p per metre	Good Fair	For much of the last decade QED 79-Strand has been the first port of call for enthusiasts on the upgrading ladder, a tradition that should still hold true today	79 strand, PVC dielectric	R	64
QED Incon Graphite £1.75 per metre	Fair + Fair +	This graphite version of Incon sounded cruder and generally more heavy handed than the cheaper unshielded type. Overall presentation was mildly restricted and cloaked in a faint aural fog	OFHC, polymeric screen		64
QED Flat 200 £1.95 per metre	Good Good	I detected a degree of confusion at low frequencies but this did not stifle the acoustic atmosphere which remained open and positive	200 strands, flat webbed PVC dielectric	R	64
Rotel Supra 4 £2.49 per metre	Good + Good	Ideal for both long and short runs, it furnishes a big sound that benefits further from a smooth, unfatiguing treble	1.036 OFC strands, webbed PVC dielectric	R	64
Rotel Supra 10 £6.49 per metre	Good + Good	Supra 10 provided a very free and open sound that was unhindered by any excess at low frequencies. Worth its weight in scrap copper!	2.562 OFC strands, webbed PVC dielectric	R	64
Sony RK-SSES £59.95 – 5m	Fair + Fair +	The sound of this cable was also somewhat controlled and over damped. The treble was relatively free and airy but lower octaves, including the midband, were constrained	350 x 0.08mm OFC strands, heat shrink dielectric		64

To Advertise in
this space ring Miriam Young
on 01-631 1433

THE DIRECTORY

LOUDSPEAKER CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Solid core mains cable 36p per metre	Fair + Good	It enjoys much of the smooth treble and articulate midrange usually associated with the better solid core derivatives. Lean but taut and rhythmically coherent	1.5mm square, 3 cores, PVC dielectric	BB	64
Sterling £499 - 5m pair	Fair Fair	This pre-production sample possessed a strangely muddled and reserved sound quality. It suffered from a progressive instrument modulation that totally confused more complex orchestral passages	Pure Silver, PTFE dielectric		64
Townshend Isolda £400 - 5m pair	Fair + Good	Isolda possessed a truly dark background out of which rose a very solid and extended bass together with an excellent sense of transparency through the upper octaves	8 coax cables per conductor - very thick	R	64
van den Hul CS-122 £5.50 per metre	Fair + Good-	Characterised by a driving and powerful bass, CS-122 proved to be a heavy sounding cable. Mid treble detail was refreshingly clear but there was a slightly muted air about the extreme treble	19 x 0.45mm silver plated strands, webbed rubberised dielectric	R	64
van den Hul CS-352 £12.95 per metre	Good Fair +	Subjectively it sounded like CS-122 only more so, the deep rumbling bass tending to overwhelm subtle musical details. It also appeared a trifle peaky in the treble	7 x 0.76mm + 168 x 0.125mm silver plated strands, rubberised dielectric		64
van den Hul SCS-12 £29.95 per linear metre	Good + Good +	SCS-12 set a high standard with a tight and well focused soundstage populated with tactile stereo images. Bass wasn't as extended or resolved as some other cables	19 silver plated strands of 12 different gauges, PTFE dielectric	R	64
van den Hul SCS-2 £99.95 per linear metre	Good + Good +	Overall it was commendably neutral and transparent but nothing less would be acceptable bearing in mind the tremendous cost of a stereo pair	665 silver plated matched crystal copper strands, PTFE dielectric	R	64
Vecteur R-CV30 £4.99 per metre	Fair Good	Subjectively the better of Vecteur's three-strong cable line-up offering a neutral overall perspective but with a slight loss of detail resolution at both frequency extremes	4 x 0.8mm LC-OFC PTFE insulated strands	BB	64
Vecteur S-CV30 £199 - 5m pair	Fair + Fair +	It seemed both less transparent and integrated throughout the midband than R-CV30, though both frequency extremes were spruced up with a tighter sharper delivery	6 x 0.7mm LC-OFC strands		64

IN-CAR ENTERTAINMENT

In-car entertainment is an area not usually associated with the esoteric world of domestic hi-fi. However, it represents a source of musical entertainment that many of us are exposed to every day. The majority of new cars are fitted with some form of radio before they leave the showroom and in many cases this usually very basic player is taken for granted and accepted as representative of in-car audio standards.

For the price of a budget amplifier or more, there is a wide variety of in-car machines to choose from,

including cassette, CD and even DAT players. The majority of sub £300 players are integrated units featuring a cassette player, AM/FM tuner and amplifier, all in one remarkably compact standard sized box. At this price level the cassette players tend to be fairly basic affairs, although autoreverse and noise reduction systems are both fairly common. Tuners are usually of the digital variety with varying degrees of sophistication in signal tuning and presetting, with some machines featuring as many as 18 FM presets. The emphasis is on the frequency

modulated band and AM often suffers as a consequence, but fortunately for radio enthusiasts there are some exceptions.

The amplifier is usually designed to drive two pairs of speakers mounted fore and aft of the vehicle, and a fader is fitted to adjust the balance between the two. The dearer machines feature separate bass and treble controls which can be quite handy given the unusual acoustic of the car environment and the variety in balance and presentation to be had from car speakers.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Alpine 7282L £250	Good Very Good	A very attractive and seductive sounding player. The matt surfaced transparent preset keys are especially sexy	Bass/treble controls, 12 FM 6 AM presets, chrome eq., clock, 8W	R	61
Alpine 7905M/3539 £650/£350	Excellent Excellent	An easy to use and attractive CD/tuner, partnered with a powerful and flexible amplifier to give an effortless source of in-car entertainment	Bass/treble controls, 12 FM, 12 AM presets, slide-out, 150W	R	68
Aiwa CT-Z3500YL £199	Fair Fair	A nicely designed machine with a flip up lid for disguise purposes. Sound quality from cassette is a bit poor but the radio is exemplary especially on AM	Bass/Treble controls, 6 FM, 12 AM presets, Dolby, chrome eq., 8.4W	R	62
Blaupunkt Paris SQM 48 £253	Average Average	A powerful and sensibly designed player but let down by a very dull sounding cassette. The radio is a bit better	Bass/treble controls, 5 FM, 10 AM presets, uni-directional, 11.5W		62
Blaupunkt Windsor SQR 38 £275	Good Average	Not very enthralling sonically, the Windsor is rather low powered but does have a reasonably stable tape transport	5 FM, 10 AM presets, 3.1W		62
Clarion 916HP £160	Good Average	With its rubbery buttons and touches of white this is a modest looking player let down by a weak cassette	Bass/treble controls, 5 FM, 5 AM presets, 9W		61
Clarion 946HP £250	Very Good Very Good	A good FM side let down slightly by AM performance. This Clarion is particularly nice to use with its nifty SAM tuning system	Bass/treble controls, 12 FM/6 AM presets, Slot-in, 15.1W	R	61
Clarion CDC7000/10028HA £650/£250	Very Good Excellent	Despite a slightly off-beat cartridge system the Clarion combo put in a performance that had the sonic edge over other CD/tuners in its test group	Bass/treble controls, 12 FM, 12 AM presets, security code, 80W	R	68
Goodmans GCE229 £150	Fair Average	If knobs, switches and legends are your bag then the GCE229 is the one for you - a lot of gizmos for the price and it even sounds OK	Bass/treble controls, 6 FM/6 AM presets, Chrome eq., clock, MSS, 10.1W	BB	61
Hitachi CSK-402E £250	Good Good	An attractively designed little player that for once doesn't disappoint when it comes to playing music, and it even has a security system	Bass/treble controls, 6 FM, 12 AM presets, Dolby, chrome eq., music search, 7.4W	R	62
JVC RX-318 £200	Average Average	This JVC sounded quite enjoyable and turned in an impressive performance on FM. It even looks quite nice	Bass/treble controls, 5 FM, 10 AM presets, slot-in, 8.8W	R	62

To Advertise in
this space ring Miriam Young
on 01-631 1433

THE DIRECTORY

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
JVC RX-418 £250	Average Fair	An attractively designed machine with a fair selection of features – even an aux socket for a portable CD player	Bass/treble controls, 10 FM, 10 AM presets, Dolby, chrome eq., slot-in, aux socket, 7.7W		62
JVC XL-C30E/KS-A102 £499/£130	Very Good Very Good	Not sonically as impressive as the other CD cartridge players in its group, the C30/A102 combo is, however, a versatile and fast sounding player	Bass/treble controls, 10 FM, 10 AM presets, direct track access, 30W		68
JVC KS-D1 £1000	n/a Excellent	The only in-car DAT player we've tested proved musically quite impressive and if software ever becomes prolific it will be able to offer CD a run for its money	Bass/treble controls, no tuner, direct track access	R	68
Nakamichi TD-400E/PA-300 II £450/£275	Very Good Excellent	If you want your in-car entertainment to compete on sound quality grounds with your domestic system, this combo offers a very strong challenge	Bass/treble controls, 5 FM, 10 AM presets, uni-directional, chrome eq., Dolby B, C, 75W	R	62
Nakamichi TD-700E/PA-300II £795/£299	Very Good Excellent	For those who appreciate the wonders of analogue there are few in-car players to really compete with this superb cassette/radio. You can even adjust azimuth	Bass/treble controls, 6 FM, 6 AM presets, music search, Dolby, 75W	R	68
Panasonic CQ-497 £117	Fair Poor	The CQ-497 has a traditional style analogue tuning system making it easy to use. AM reception was good but the other sources are less encouraging	Bass/treble controls, chrome, NR, 7W		62
Philips 553 £120	Average Average	Not the most ergonomic player on test but sound quality was quite refined for the price. Presets are a bit gauche	4 FM, 4 AM presets uni-direction cassette 3.1W		61
Philips DC680 £180	Average Good	A colourful and musically competent player that despite a gammy volume knob is well worth checking out.	8 FM, 4 AM presets 3.5W	R	61
Pioneer KE-3030 £150	Poor Fair	A tasty looking, if sonically bass heavy, little box well suited to blasting out rock or dub	18 FM, 6 AM presets 4.2W		61
Pioneer KEH-5080B £230	Fair Good	A chunky and neatly styled player with healthy power output and an easy relaxed sound. Just the thing for pumping the volume	Bass/treble controls, 18 FM, 6 AM presets, anti-theft device, slot-in. 9W	R	61
Pioneer DEX-M300/CDX-M100/ GM-3000 £300/£450/£280	n/a Very Good	Separate control unit and boot mounted multi play autochanger make this a bit of a hefty installation but it uses the same magazines as their domestic players and sounds fine	Bass/treble controls, 18 FM, 6 AM presets, 80W, removable fascia		68
Proton 214CD/D275 £300/£175	Very Good Very Good	This Proton cassette/tuner offers good power and a level of fidelity appropriate to its price. Musically it has a Decca-like charm that is very appealing, plus a sensitive radio	Bass/treble controls, 8 FM, 8 AM presets, Dolby B/C/NR, chrome eq., 85W	R	68
Sansui RX-3100L £180	Poor Fair	Quite flash looking with a reasonable feature count but FM sound and cassette replay quality could be a bit stronger at the price	Bass/treble controls, 12 FM, 12 AM presets, chrome eq., 8W		61
Sansui RX-5100L £250	Good Very Good	One of the cleaner machines around the 5100 has an excellent AM section and a reasonable cassette player	Bass/treble controls, 12 FM, 6 AM presets, chrome eq., slot-in, 12.5W	R	61
Sharp RC-FB16E £200	Poor Average	Nothing if not novel the 816, with its unusual anti-theft system is custom built for the furry dice brigade, but is sonically a bit lacklustre	Four band graphic, 8 FM, 16 AM presets, ASP, Dolby, MSS, 10.9W		62
Sharp RG-FB82E £220	Average Average	Again a glitzy full feature machine with a flip out control panel and plenty of lights. However, sound quality is a bit disappointing	Seven band graphic, 5 FM, 10 AM presets, ASP, chrome eq., Dolby, 8.5W		62

RECEIVERS

Purists will look down their noses at the very idea of combining two functions into one box, and indeed they always have done. But unless we're talking about the exotic elite, the creme de la creme of amplifier and tunerdom, intrinsic technical shortcomings simply aren't an issue.

One obvious reason why you should buy a receiver if you were otherwise considering an amplifier and a tuner is that there are savings, ie of

size. Generally you end up with one box in place of two similarly sized boxes, which has got to be a good idea. Receivers are also simpler to operate, in principle anyway. At the very least you save on one power switch, and typically you are presented with an integrated control system that is bound to oil the wheels of ergonomics.

But there is one important point to watch. Because receivers don't sell in vast quantities in

this country, and because this is one of the very few countries to use Long Wave for public service broadcasting, many – no, most – receivers on sale in this country cover FM and MW only. Remember that LW is the home of Radio 4, where it can be heard on the all too frequent occasions it is not on FM.

MODEL NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Harman Kardon HK330Vi £259	Average Average—	No LW, and FM section best suited to strong, local transmissions. The amplifier is quite powerful but favours the treble. Bass is tuneful but lacks weight	5 inputs (inc 2 tape), FM/MW tuner		70
Harman Kardon HK440Vxi £329	Good Good	Clear, dynamic, slightly bright sounding design, a little grainy in extremis. Mono switching and LW missing from tuner, which otherwise performs well	5 inputs (including 2 tape) with FM/MW tuner	R	70
JVC RX-777VL £500	Good Good	Sharp, lively but euphonious sound quality from line and phono source is matched to a high grade tuner. However, many half-baked facilities blunt value for money	A/V capable with 6 inputs, equaliser, digital ambience, FM, MW/LW		70
JVC RX-1001V £770	Average Poor	Power output is well below spec, and sound quality is cluttered and messy on all inputs	Digital ambience processing, Dolby Surround, 2/4 speaker, 40 FM/MW presets		70
Revox B285 £1782	Average Average—	Sophisticated and capable tuner is married to a muddled, compressed sounding amplifier, which also has low sensitivity preventing the amplifier being driven fully in many situations	70 watts/ch, 4 inputs (inc 2 tape), 29 FM/MW/LW presets		70
Rotel RX-850AL £230	Good Good	Well built and sensibly equipped receiver with outstanding sound quality for the price via the tuner, phono and line sources alike. It majors on subtlety however, and may not impress the heavy metal brigade	4 inputs (inc 1 tape), FM/MW/LW tuner BB		70
SAE R102 £599	Average— Average	This is an uneven but mostly good performer. It sounds constrained but musical, but the tuner is weak on both wavebands.	4 inputs (inc 2 tape), FM/MW tuner		70

THE WORLD'S
NO 1 GUIDE
TO BUYING HI-FI

ADVERTISER'S INDEX

A

Akai 10,11
 Audio Precision 90
 Audio Technica 46

B

Brady, W & A 88

C

Cambridge Hi Fi 94
 Chew & Osbourne 82
 Cornflake Shop 34
 Compact Music 94
 Covent Garden Records 26,72

G

Graham's Hi Fi 86

H

Hampshire Audio 64
 Harrow Audio 13
 Heybrook 62
 Hi-Fi Experience 78
 Hutchinson Hi-Fi, Bill 82

J

Jordan, E&J 92
 J.P.W. 88

K

KJ Leisuresound 82, 124

L

Lyon Audio 90

M

Marantz 18
 Mike Manning 92

O

O'Brien Hi Fi 94

P

Progresive Audio 90

R

Richer Sounds 4,5

S

S.M.E. 60
 Sevenoaks Hi Fi 112, 113
 Spaldings 109
 Sound Gallery 90
 Soundtec Marketing 56
 Swifts of Wilmslow 92

T

Target Audio 50

U

Uxbridge Audio 57

V

Victoria Audio 86

W

Wilmslow Audio 94

QUART

*The wraps are off
the Quart sound revolution!*

Times and sounds are
changing

And Quart Loud Speakers
are right behind the sound
revolution — as one of the
biggest names in Germany.

Now, here in the UK, Quart is
set to challenge every opinion
you have ever had about
quality sound reproduction.

Hear the sound, appreciate
the finish, enjoy the value —
starting at only £299.90.

Quart — take the wraps off
soon at your dealer.



Soundtec Marketing Limited,
Unit 9, Belfont Trading Estate,
Mucklow Hill, Halesowen,
West Midlands, B62 8DR
Telephone: 021-550-7387

MAKING GOOD
SOUND BETTER
TAKE TO YOUR
DEALER SOON



MISSION
ELECTRONICS

MISSION ELECTRONICS HILTINGDON PE 19 6ED PHONE (0460) 52777 TELEX 32333 FAX 432777