

£2.00

hi fi
for pleasure

systems
digest



Home is where your hi-fi is.

Bang & Olufsen demonstrates a deeper understanding of domestic harmony. As well as enjoying the audible pleasures of your hi-fi system, you are going to have to look at it every day for years. Use it. Dust it. Live with it. And unless the system is in sympathy with the rest of your furnishings, it's going to start looking and feeling uncomfortably like a sore thumb in less than a fortnight.

You wouldn't put your sideboard in the garden shed, so why keep a rack full of hardware in your lounge? There is an alternative technology – a better way of giving hi-fi units house-room. The Bang & Olufsen way. Three variations on a theme. Beosystem SC1700 (illustrated) – a 2 x 30W receiver covering Long, Medium and FM bands, with matching automatic deck. Beosystem SC1900 – a manually-controlled FM receiver producing 2 x 30W, plus automatic record deck. Beosystem SC2400 – a 2 x 30W FM receiver and matching Beogram 2400 record deck, both fully controllable from the comfort of your chair via the ultrasonic remote handset. All come complete with a pair of Beovox S30 Uni-phase speakers and an elegantly accommodating cabinet finished in black lacquer. Prices from around £445.00. See and hear these and other high-technology Beosystems by visiting your nearest authorised Bang & Olufsen dealer (he's usually listed in Yellow Pages) or send for full details to Bang & Olufsen UK Limited, Dept. HFP Eastbrook Road, Gloucester GL4 7DE. Telephone (0452) 21591.



Bang & Olufsen

HI-FI FOR PLEASURE

CONTENTS



by CLEMENT BROWN

FORTY HI-FI SYSTEMS

Forty rack and micro-style systems are presented in this Digest to guide you towards making a wise purchase. Each system has been tested exhaustively by the author, with the results interpreted and presented in a three-tier format especially designed to be understood by anyone — both enthusiast and newcomer alike. Moreover, as it is impossible to classify complete hi-fi systems as simply 'good' or 'bad', a dual rating system has been adopted in order to indicate their worth, at a glance. This means that at the top of each page you will find separate gradings for technical merit and value. But before you go on to scan the forty reports, we recommend some study of the early chapters listed below. They will help you glean just that bit more from the reviews.

EDITOR
Trevor Preece
DESIGN
Yvonne Baraniak
PUBLISHER
Peter Wilkinson
ADVERTISING
Bob Thrusell
Clive Benton

© 1980 Spotlight Publications.
A Morgan-Grampian Company
Published by Hi-Fi for Pleasure,
Spotlight Publications Ltd,
40 Long Acre, London,
WC2E 9JT
Tel: 01-836 1522. Telex: 299485.
Printed by Fansord Press Ltd,
Gwent.

- 6 WHAT IS A HI-FI SYSTEM?
- 10 SYSTEMS STAGE-BY-STAGE
- 13 HOW POWERFUL?
- 15 HEADPHONES
- 16 INSTALLING HI-FI
- 18 ALL UNDER CONTROL?
- 23 UPGRADING HI-FI
- 24 TENDER LOVING CARE
- 26 TECHNICAL TALK
- 31 WHEN YOU CHOOSE
- 33 DIGEST GRADINGS
- 40 AIWA MICRO 50
- 44 AKAI PRO 501
- 48 AKAI PRO 504
- 52 B & O SYSTEM 1700
- 56 DENON SYSTEM 70
- 60 DUAL SYSTEM 1500
- 64 DYNATRON RICHMOND
- 68 FERGUSON SYSTEM 25
- 76 FIDELITY 350
- 80 FISHER RACK SYSTEM
- 84 GEC SYSTEM 1800
- 86 GRUNDIG 700B SYSTEM
- 90 HITACHI SYSTEM 3
- 94 JVC G-X100
- 98 JVC G-X400
- 102 MARANTZ MODULE 310
- 104 MITSUBISHI SYSTEM 4
- 112 ONKYO MIDI-20
- 116 OPTONICA SYSTEM
- 120 PHILIPS BT 305
- 124 PIONEER X300
- 128 PIONEER X900
- 132 ROTEL SYSTEM A550
- 136 ROTEL MICRO 80
- 140 SANSUI SYSTEM 900
- 148 SANSUI SUPER COMPO
- 152 SANYO H880
- 156 SHARP SYSTEM 30
- 160 SONY MODULE 1
- 164 SONY ZR-300
- 168 TECHNICS LA MINI SERIE
- 172 TECHNICS SYSTEM 80'S
- 176 TELETON TC-380
- 178 TOSHIBA SK-01
- 180 TOSHIBA SYSTEM 115
- 184 TRIO V-710
- 188 TRIO V1000R
- 192 UHER RACK SYSTEM
- 196 VIDETONE SYSTEM
- 200 YAMAHA SYSTEM
- 204 SYSTEMS ROUNDUP
- 206 ADDRESSES
- 210 ADVERTISERS' INDEX

Don't let the ele pull the wool

There you are at the hi-fi shop, drooling over the new sound system you've just set your heart on.

You're impressed with the electronic heritage of the company that put it together.

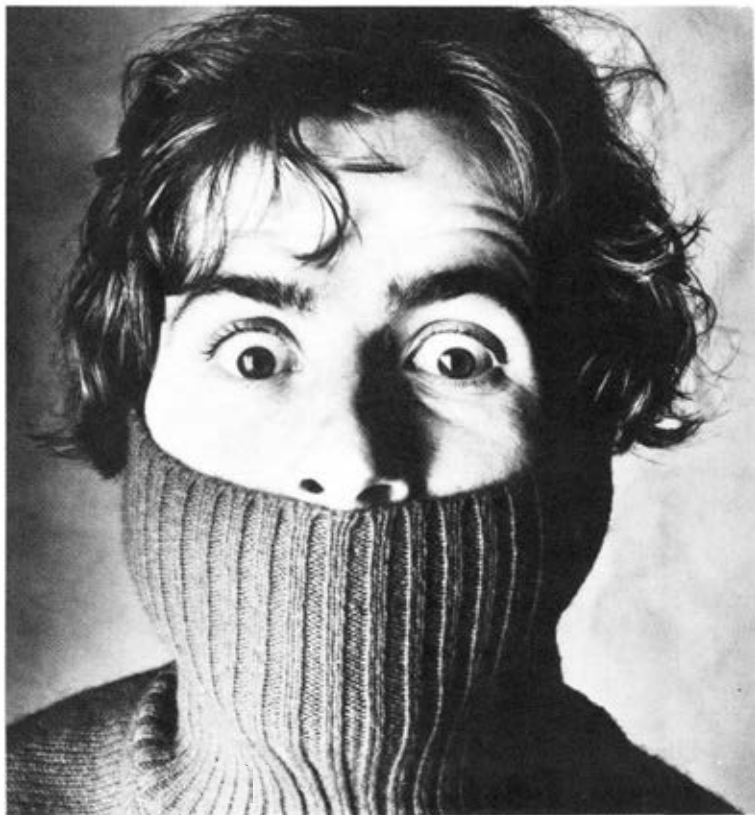
So you figure the speakers that come with the package ought to be just as impressive.

Not so.

Building a great speaker has little to do with electronics.

It's to do with acoustics. A science in itself, which Wharfedale have been researching for 48 years.

Quite often, packaged speakers are where the corners are cut. And the result can be a woolly sound that lets down the quality of the same company's electronics.



So may we suggest you ask your own pair of ears to referee a simple test.

Choose your system. And ask the man in the shop to connect up two

THERE ARE SIX MODELS IN THE WHARFEDALE LASER RANGE. ILLUSTRATED ARE THE LASER 80 AND THE LASER 406. FOR FURTHER INFORMATION, WRITE TO: RANK HI-FI.

ctronic experts over your ears.

pairs of speakers. First, the speakers recommended by the manufacturer of the packaged system.

Second, a pair of Wharfedale Lasers.

(Or, if you prefer, the other way round. We'd hate you to think we're pulling any psychological tricks).

Then stand back, and over to your ears. Ask the dealer to switch backwards and forwards mid-music.

And may the best sound win.

We should admit that the odds are all loaded in our favour.

There's our experience.

Then there's our use of the most sophisticated equipment, like computers and lasers, to isolate every conceivable problem area that stands in the way of absolutely lifelike sound, and then to iron them out.

And our reputation as makers of some of the world's finest speakers is one we don't take lightly.

Once your ears have done their bit, use your eyes. Go over and study the winning pair.

Notice how the Wharfedale craftsmanship extends beyond the coil and cone to the beauty of the box.

Remove the grilles and see

how every part has been crafted with the precision of a Swiss watchmaker.

Admire the sleek modern styling.

Then move along and look over the six models in the range, from the smaller pair of Laser 40's which retail at around about £69, up to the big, bold Laser 400's which you should be able to find for around £229.

Always remember this.

You don't have to take packaged speakers when you buy a packaged system, and you shouldn't let yourself be sweet-talked into making the wrong decision.

Or you might end up taking home less of the quality **LASER RANGE** you're paying for. **WHARFEDALE**
Britain's most famous speakers



WHAT IS A HI-FI SYSTEM?



Since Hi-Fi Systems Digest is so clearly devoted to complete systems it may seem unnecessary for me to pose an obvious question and then offer an equally obvious answer. A quick glance through the many reports should show what is involved. A little more explanation is justified, however, mainly to define a 'system' for the purposes of the Digest. In short, I am concerned here with the groupings of components or units which are supplied complete with a rack, cabinet or other fitting to produce a tidy or reasonably compact installation.

So there is some emphasis on a 'furniture' look. The buyer must go and see for himself whether or not a particular 'look' is to his taste. But the important point is that many first-time buyers do not relish the prospect of an array of separate parts, possibly conflicting in style, and prefer the planning to be done for them.

Manufacturers are responding to a need, and attempting to capture new markets, by making hi-fi appear less intrusive and bitty — even less technical. That is the subject of this Digest.

The systems approach is a matter of bringing suitable components together so that they work correctly and look right in console form. There is no particular hazard in this method, for it has no very direct bearing on sound quality. Of course, systems do vary in merit, according to the expertise of their designers, and that holds good whether or not they are specially housed.

Any newcomer to the subject could, if he wished, study the technical aspects of hi-fi until he felt confident to join the more experienced and inquiring enthusiasts. This leads to a quite different attitude to audio and a closer interest in the technology, without losing sight of such matters as



installation methods and visual appeal.

It is common for the enthusiast to buy individual, specialised units on their own merits and then take a practical part in matching them together. This means that planning has to be done with care. But very many music-lovers simply don't want to get that involved in details or start a hobby. They appreciate hi-fi quality but prefer to secure it without tears.

In general the Digest reports on systems of a type which experience suggests is 'hi-fi'. Quality varies because the price-range is fairly wide. Usually one gets what one pays for (give or take a few quirks) and so we have to take a sensible view. A system that sets you back £1,000 may not be beyond criticism but it will certainly be better than one costing half as much.

By the way, the Digest does not include table-top outfits such as 'music centres'. For the most part such products do not

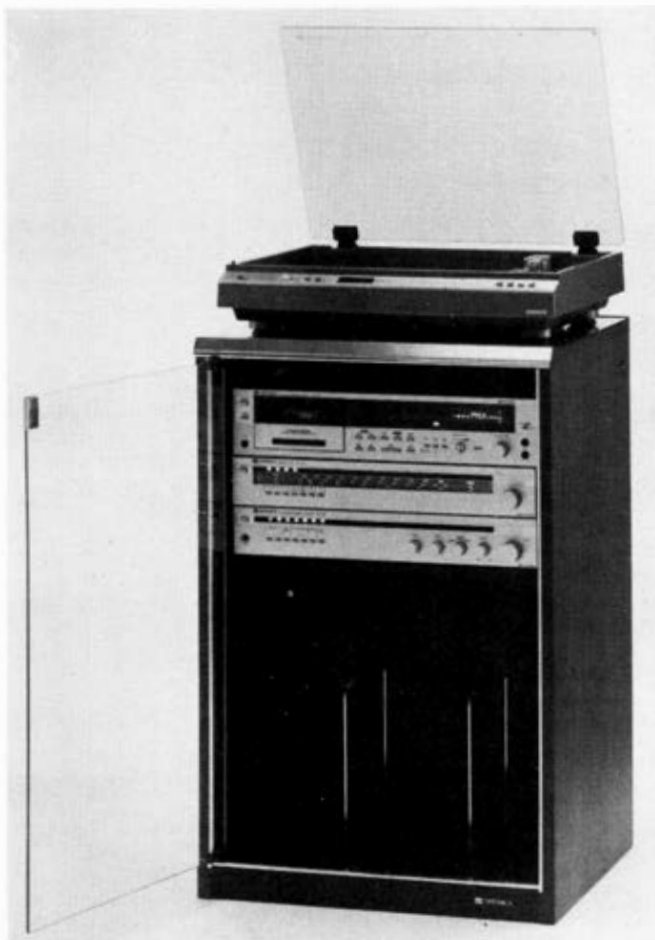
boast hi-fi pretensions. This is not an adverse criticism of that type of product. It is simply that the manufacturers recognise that some people are content with pleasant and undemanding background music from what is really the modern version of the former radiogram or gramophone.

If some kinds of equipment are hi-fi and others are not, it may be as well to consider what this subject is really about. It is hardly possible to launch into the pros and cons of sound systems without knowing what we are trying to achieve by using them. We want something that convinces the ear and soothes the soul — that much is certain.

ABOUT HI-FI

That useful 'hi-fi' tag has been applied — and often misused — for well over 30 years. It is the irresistible and neat contraction of 'high fidelity'. And fidelity

Our System was digested,
and the temptation proved to be great.



OPTONICA

Sharp Electronics (UK) Ltd, Sharp House, Thorp Road, Manchester M10 9BE

WHAT IS A HI-FI SYSTEM?

suggests that we are trying to be faithful to something. It gives us the nearest approach to a definition that we are likely to get.

Surely it is desirable to have widely acceptable standards (of a technical kind, inevitably) that tell us what hi-fi really is? Indeed, some standards in this sense exist, and they cover at least some of the requirements. But the trouble is that, as soon as relevant proposals are put about, they show signs of going out of date, while at the same time attracting the hostility of those who thought they should be differently formulated.

Meanwhile the technology advances and the critical listener is the one who recognises the value of what has been achieved. It does seem very subjective. If it sounds right, then surely it *must* be right? But no, that is not really enough: study, research, technical measurement and the worry about 'standards' have to continue in order to encourage and control the many developments that occur.

Back, then, to fidelity. It is a higher fidelity now than ever before, just as one would expect after a century of development of recording and half a century of broadcasting. During that time the quest for greater realism of sound reproduction has hardly faltered. Is it lifelike, and does it convince you? That is what matters.

Since the whole point of going to some trouble over hi-fi is to create a realistic sound-scene in the home, the proposal that we are being faithful to an original sound seems plausible. But that raises difficulties because most people are not really aware of the true nature of the original, especially when it stemmed from a studio equipped with all the trappings of high audio technology. If they could hear or witness the 'original', the chances are that they would not like it. They might not even recognise it!

All this is complicated further by changes in fashion. It is difficult to concern oneself with an original that is rapidly changing: in fact that is the wrong basis for

criticism. With the more traditional programmes attitudes may well be different, but this still raises complexities of musical balancing and related techniques which are outside the experience of the average listener.

In general we have to accept that the programme producer tries, with varying success, to provide an effect that is right in the scaled-down presentation appropriate to domestic conditions. The job of the hi-fi system is to reproduce the programme with the minimum of impact on it. If a system is very transparent to the programme, then it is probably a very good system.

Part of all this is tonal fidelity, and here we *can* often talk about keeping faith with an original sound. Does that great violinist's tone sound convincing, or does he seem to be playing an inferior instrument on the LP you bought? Does the trumpet sound like a trumpet? Here we are concerned with distortions of several kinds. Then there are frequency range — how evenly this is reproduced — and the unwanted noise that can detract from realism.

These relatively straightforward matters have a lot to do with the quality of sound reproduction. Hi-fi is very much concerned with the improvement of quality, and stereo helps it along. Beginners should note that stereophony is a technique of great influence in sound transmission, but it is of little use unless basic quality is advanced. Hi-fi and stereo are not interchangeable terms, although by now they are firmly linked.

Stereo adds a dimension (compared with the single channel of mono), creating a sound-stage on which is presented a wealth of detail. Good stereo aids clarity and can convey an illusion of depth to the sound as well as impressions of movement. It can also work in favour of a wide dynamic range and bring a sense of 'ambience' — the acoustical character of the place in which the music was played. These qualities become apparent with experience of listening.

SYSTEMS STAGE BY STAGE

For technical and economic reasons the hi-fi business is concerned with separate, functional units. Each can be regarded as a building-block, and several of these are assembled to form a system. Versatility is an obvious advantage, and unit systems can usually be extended or changed in some way. Also, the emphasis on function works in the interest of technical excellence.

The extent and size of a hi-fi stereo system is firmly linked to the sources of programmes you wish to use. Nearly everyone wants to play records, so that accounts for one building-block. Other programmes come in the form of radio and tapes (usually cassettes), so two more units are added. Central in the scheme is the amplifier, and completing it are the loudspeakers. Many systems in this Digest are comprehensive, since the manufacturers have been given the opportunity to show how they plan for buyers who are interested in all the programme media.

An amplifier is the nerve-centre of its system and its main job is to accept the rather feeble outputs of programme units (very small voltages are involved) and amplify them, generating enough power to drive the speakers up to the sound levels required. It also provides the means of control, the adjustment of volume being the most important. This is simply a tap to turn on the sound level. Switching in several programmes is another function.

Closely associated with the amplifier is the radio tuner. This is a fairly inexpensive source of hi-fi because you don't have to go out and buy the programmes (except through the television licence fee). The big attraction is VHF/FM broadcasting from BBC stations, some of it in stereo. Realistic, relatively interference-free sound on FM comes as a pleasant surprise to all who have not sampled radio to hi-fi standards. Most tuners include AM bands as well, although it is only FM that yields high sound quality.

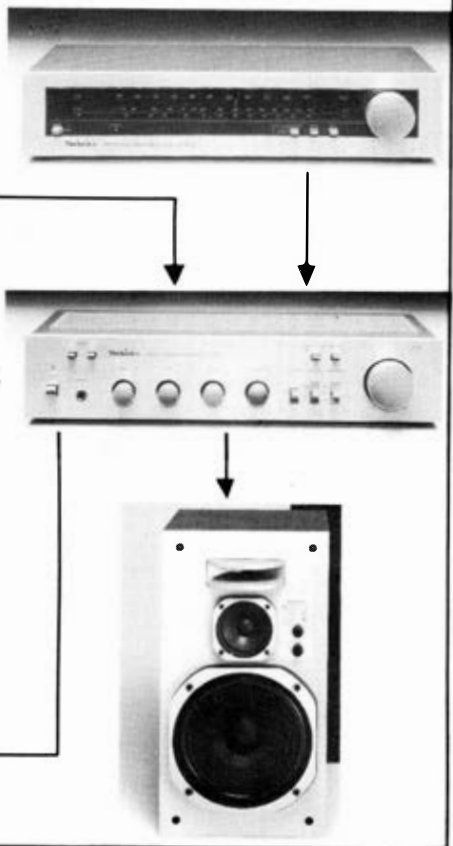
A few systems are based on a receiver, which is an integrated tuner and amplifier



(hence it is sometimes called a tuner-amplifier). In the popular range of products it can be expected that the integrated unit will be as good as equivalent separates. However, amplifiers of very high power are usually separate, since a union with the tuner would cause problems of bulk and introduce some technical difficulties.

A cassette recorder is included in many systems. It can be used simply to play

TOGETHER



commercial music tapes, which are the cassette counterparts of LP discs. But the cassette machine is really only justified if use is made of the recording function. Here is an area where practice makes perfect — to the extent that the medium allows. Rapid progress with both machines and tapes ensure remarkably good results after a little experiment and attention to details. Live recording with microphones is

possible with virtually all cassette units.

A disc player is nearly everyone's choice, of course. LP discs are receiving fresh attention from enthusiasts due to technical advances made by both major organisations and smaller recording companies. Refinements in pickups and turntables are keeping pace and the results achieved are often spectacular. Although some enthusiasts choose their pickups and turntables separately, the popular choice remains the one-piece unit. So in the Digest the word 'turntable' introducing a product can be taken to mean turntable-plus-pickup.

Loudspeakers are last but not least in the chain. Their quality and performance can make or mar the results you achieve. For the moment it is essential to note that the pair of speakers for stereo are separate items, placed in the room where they give the best stereo and the best balanced reproduction. At the same time they should not be too near to the rest of the system because their output may adversely affect the turntable.

There is naturally a lot of discussion about the extent to which particular parts of the system influence audible results. The amplifier should have the least impact: it is more of a channel (or two channels to be exact) through which audio signals pass. If it is suspected of influencing the sound very strongly, then there is probably something wrong with it.

A tuner can impose its influence according to the accuracy of tuning, the distortion produced and other factors. But the links at the end of the chain are the most problematical — they introduce more distortion. Each loudspeaker sounds a little different from the next, for all manner of subtle distortions and 'colourations' of the sound are present and can easily be detected. All the more reason for auditioning speakers carefully before deciding on a purchase! Much the same applies to pickups. Turntables also influence sound quality, especially if speed stability is suspect or 'rumble' noise is imposed on the pickup's output.

Sansui

SYSTEM 111

C-77 Control Centre/Pre-amp.
 B-77 Linear A/ DC Servo
 Power Amp. T-77 Digital
 Quartz PLL Synthesizer
 FM/AM Tuner. FR-04 Com-
 pultered. Fully
 Automatic DD
 Turntable. D-
 100 Metal
 Tape Com-
 patible
 Cassette Deck.
 GX-77 Audio
 Cabinet shown
 with optional
 AT-185 Audio
 Tuner and AX-
 15 Sound
 Console.



**THE RIGHT SYSTEM
 AT THE
 RIGHT PRICE
 WITH THE
 RIGHT GUARANTEE**

JVC

GX 200

A-X2 Super-A Stereo
 Integrated Amplifier
 T-XL Digital
 Synthesizer
 FM/MW/LW
 Tuner
 L-A55 Auto
 Return Direct
 drive Turntable
 KD-A33 Metal
 Cassette Deck
 LK-G342 Audio
 Rack



**THE UNIQUE RUSH
 GUARANTEE...
 MOST HI-FI GUARANTEED
 PARTS & LABOUR
 FOR 3 YEARS!!**

RUSH

Hi-Fi & Video Centres

5 & 6 CORNHILL, CHELMSFORD, ESSEX.
 Telephone: (0245) 57693
 Open 6 Days a Week

38 NORTH STREET, ROMFORD, ESSEX.
 Telephone: (0708) 26840
 Closed all day Thursday

PLEASE TELEPHONE FOR UP TO THE MINUTE PRICES
 AND AVAILABILITY



JVC

SUPER SCOOP

**SUPER 62 WATTS (RMS)
 3-PIECE JVC
 RACK SYSTEM.
 METAL COMPATIBLE**

Comprising:
 JVC AS5 Amplifier
 JVC TV31 FM/MW/LW Tuner Deck with
 JVC KD11 Metal Cassettes
 DOLBY B/C SP75 Electronic Semi-automatic
 Turntable with magnetic cartridge
 SCOTT 166 100 watt 2-way Speakers
 De Luxe Rack with smoked glass door &
 chrome castors.
RUSH PRICE ONLY

£299.90

AKAI



PRO-502 RACK SYSTEM
 Akai's O.K. okay!

Check our deal before buying
 elsewhere

**MANY MANY MORE ITEMS
 AND SYSTEMS ALL ON
 DEMONSTRATION
 MAIL ORDER BY SECURICOR £12
 inc. INSURANCE ON COMPLETE
 SYSTEMS**

Our workshops are available to
 service most makes of equipment
**PART EXCHANGE OR CASH
 PURCHASE WELCOME**
 All prices correct at time of going to
 print



Full details of our
 credit facilities
 available
 on request



SONY

**SONY
 ZR 220
 SUPER
 RACK
 SYSTEM**



QUAD

THE ULTIMATE SUPER OFFERS

- 33 Pre Amp £136.56
- 303 Power Amp. £118.73
- 44 Pre Amp £237.47
- 405 Power Amp. £199.90
- FM-3 FM Tuner £112.70
- Electrostatic Speakers
 (per Pair) £499.90

Some shop soiled items

PIONEER X-500



THE ULTIMATE IN HI-FI INTEGRATION

FREE

ROSS SLIMLINE HEADPHONES AND SCOTT C90 CASSETTES
 VALUE £20.00

WHEN PURCHASING ANY COMPLETE SYSTEM - ON
 PRODUCTION OF THIS ADVERTISEMENT

A HI-FI MARKET

HOW POWERFUL?

How much audio power do you need? In this Digest you will find power ratings in a wide ratio, from the economy class to the medium area, and in hi-fi more widely you will find power figures up to 120 watts per channel or higher. Do not assume from this situation that the most power-hungry fanatic is necessarily intent on making the most shattering din in his lounge, for sound levels are not directly linked to numbers of watts (though planning would be simpler if they were!).

The main requirement is to have some reserve power as insurance against overload and uneasy, fatiguing effects which all too easily result from an underrated system. Generally, your power requirement depends on the size of the listening-room, and high powers can be justified in a spacious lounge, assuming that the speakers can handle substantial peaks of input and reproduce them to good effect.

Give a thought also to conditions of use. For soothing sound against a quiet local background you might run the hi-fi at a watt or so. But what if you felt more exuberant for a while? A mere 3dB increase via the volume control (and it's very little) would have the effect of doubling the power demand, so a couple of watts would become four.

But the increase would almost certainly be much more than 3dB. If it was 6dB the demand would be quadrupled, and that is not much in practice. To put it all another way, one amplifier would have to be about 10 times as powerful as another in order to 'sound' twice as loud.

There is also the question of dynamic range—of which more later. If you want to preserve a realistic range over and above a local noise level (such as traffic or conversation) the effect on power demand may be dramatic. That quiet-listening watt or two soon becomes a peak demand of 40 watts.

Study of such matters, and a realisation that a lot of good speakers need enthusiastic driving, will bring understanding of the popularity of high-

power systems. However, there is scope for ratings offering a peak capability of 20 watts or so where the room is fairly small and the conditions favourable.

One practical point. Expert recommendations about audio power necessarily assume the need to play a wide variety of programmes, including (for example) large-scale orchestral music and organ music. If you happen to play quiet instrumental music *exclusively* you can probably achieve realistic results with low power outputs.

However, it should be clear from the drift of the argument that there is scant point in worrying about small differences of rating between amplifiers of comparable quality (such as 35W as against 42W). By all means settle for the more powerful; but the choice here would be more likely to rest on facilities to meet special needs, for the power difference is of little account.

KRYSTAL

a new name in quality loudspeakers

High performance at a reasonable price is our guiding principle. The emphasis is on quality throughout our speakers, from the smallest component to the wood veneered cabinet. Walnut or teak are the standard finishes, but we can supply any finish of your choice.

EXPLORER (£174 inc. VAT)

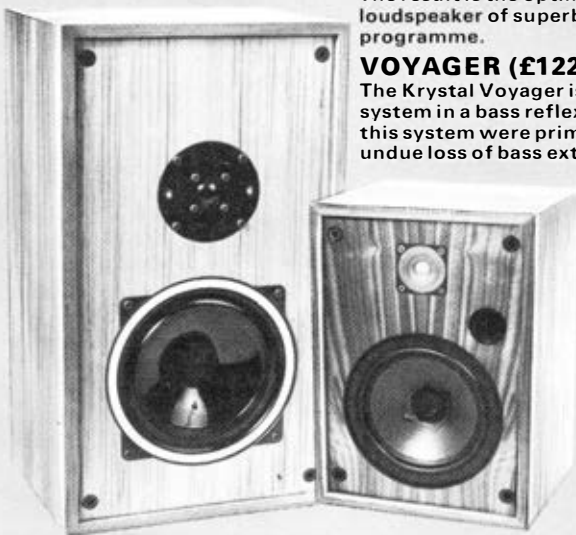
The Krystal Explorer is a high performance sealed-enclosure-type loudspeaker system, employing two acoustic drivers per cabinet. The design parameters were extended bass response, high power handling capability, good transient response and a linear frequency characteristic without compromising the sensitivity of the system or resorting to an enclosure of unmanageable proportions.

The result is the optimisation of all these characteristics and a **loudspeaker** of superb subjective quality on any type of music programme.

VOYAGER (£122 inc. VAT)

The Krystal Voyager is a compact "bookshelf" loudspeaker system in a bass reflex (ported) enclosure. Design parameters for this system were primarily, very small physical size without undue loss of bass extension and overall acoustic linearity.

The use of computer-aided design techniques and careful laboratory work results in a system of the highest subjective and objective quality yet small enough to be placed unobtrusively on a shelf.



Krystal Electronics, Unit 19, Alfric Square, Maxwell Road,
Woodston, Peterborough, Cambs. Tel: 0733 235907

Please send me details of
Krystal Loudspeakers.

Name

Address

.....

.....

.....

HFD1

HEADPHONES



Personal listening with headphones has never been more popular, and many a hi-fi enthusiast keeps a headset on the accessory shelf for occasional use. One obvious attraction is that the audio devotee can still listen while another member of the family watches television in the same room. Another is the facility of listening in the late evening when realistic sound levels from loudspeakers would disturb others. Again, there is sometimes a need to concentrate closely on details in the programmes.

Headphone listening is different from loudspeaker stereo because each channel terminates at one ear of the listener. Also,

the effects of the room's acoustics are excluded. Such a difference will of course be accepted if the general effect is liked. As for choice, it is advisable to audition 'phones with care — exactly as with loudspeakers.

Some headphones give a close and explicit effect, so that the sound image seems to be very 'in the head'. Others produce a more spacious presentation, with greater delicacy in the reproduction of details. When you audition headphones you also have to consider comfort in wear — weight, side-pressure on the ears, and the feel of the pads which either rest on the ears or enclose them.

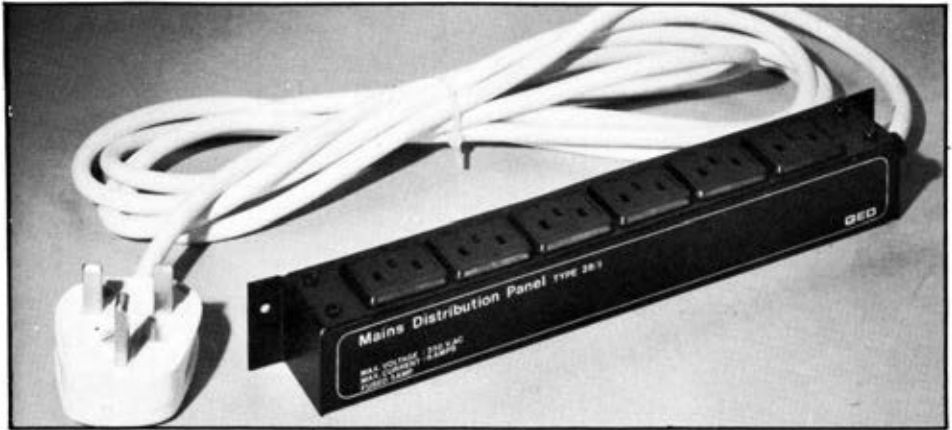
Most headphones are of the dynamic type, with moving-coil inserts which are like tiny loudspeakers, though made in many variants. Then there is the electret type, based on a specially energised diaphragm and capable of very refined sound quality. Most expensive is the electrostatic headset, noted for outstandingly good reproduction.

Use of headphones with hi-fi systems is nearly always very straightforward because most amplifiers and cassette machines (and some tuners) have a socket to accept the jack-plug with which headsets are fitted. The strict matching requirement for loudspeakers does not apply with the same force to headphones, since it is usual for the amplifier to supply ample audio voltage to drive all popular models.

Certain types have to be specially matched to the amplifier but this is not a problem for the user because the technical bits are either built-in or contained in a separate unit. This is true of electret headphones. The electrostatic type requires both matching and a mains supply, but again these matters are anticipated by the manufacturer.

Headphones are connected to the amplifier's two-channel output because they are suitably wired via the jack-plug. This ensures the required 'binaural' effect. Mono sound is obtained by switching the amplifier's control to mono, exactly as with loudspeakers.

INSTALLING HI-FI



Many purchasers of complete systems will be happy to leave installation in the hands of suppliers, co-operating in such essentials as finding a place for the equipment rack — most conveniently near a mains socket. Those who take on the job themselves should follow the makers' instructions, especially with regard to pickup and turntable adjustments, rack or cabinet assembly, and the relative positions of the amplifier, tuner and other items. Ventilation requirements will usually mean that the amplifier is above the tuner.

Surprisingly few manufacturers make really satisfactory arrangements for distribution of the mains supply to units within the system. At worst you may finish up with three or four mains leads, wondering how to connect them to a single wall socket. Accessory firms make small distribution panels: among the neatest are those made in four-way and six-way versions by QED Audio Products. The same firm can supply a tough twin speaker lead with a 42-strand copper conductors.

When finding a place for the rack or cabinet, bear in mind the system's weight. A total of 40kg is common and some weigh much more. All is well if the floor is solid, but it is wise to check for a firm footing if you have a board floor. The sensitivity of turntables to shock and vibration accounts for the importance of this particular point.

Loudspeakers should be positioned by experiment, and it is best to try alternative locations during a period of several days. A spacing of two metres or so is typical in a medium-sized room, but small variations may be necessary because of furniture layout. Small speakers can be shelf-mounted or even fixed on wall brackets if other facilities are restricted.

Medium to large models are usually free-standing and may be placed on stands if this helps to obtain the preferred overall balance. It is best to bring the treble output to about ear-level when you are seated. Corner positions may over-emphasise the bass compared with positions near a wall.

If speakers have not been supplied with the system and you are therefore making your own choice, the manufacturers can be relied upon to give practical advice on installation. British firms are particularly helpful. You will learn many details concerning positioning and whether or not it is advisable to angle the speakers inwards toward the listening area.

Generally the area in which you settle for stereo listening is about as far from the speakers as they are apart, but with the finest speakers it is not vital to be very precise about this. If you feel unduly restricted to one place for acceptable listening, there must be something wrong with the stereo.

If loudspeakers are supplied with your system, you can depend on ready-made connections whereby the phasing or 'polarity' has been fixed for you. If you buy speakers separately it is necessary to take phasing into account unless your supplier checks it on the spot.

What this means, in the simplest terms, is that the stereo pair of speakers must be connected so that the diaphragms move in step — both of them out or in at the same time — and this is the in-phase condition. So they can be either right or wrong: it's a fifty-fifty chance of error. An out-of-phase pair gives a vague stereo image and is likely to give an impression of weak bass output.

To make a positive check, place the speakers side by side and touching, and switch the system to mono while you play a disc. Is the bass as firm and full as expected? If so, place the speakers in their normal positions and check that all is well with the detail in the stereo. There are test discs to aid this little job, but any good programme of familiar music should be sufficient.

If the result of your check is obviously that phasing is wrong, reverse the connections to one of the speakers, leaving the other untouched. This will correct the phasing. Since you will not wish to make an error in the future (if for some reasons the leads are disturbed), mark the insulation so that you know which wire-end goes on which terminal. This is aided by the 'polarity' markings on most speakers and on the output terminals of amplifiers. Leads with coloured inner wires or marks on the insulation are also helpful.

Check that all hi-fi units are set to a mains voltage corresponding as closely as possible to your local supply. Are spare fuses supplied with the system? If not, ask your supplier to order a set. Also, keep one or two mains fuses in your accessory drawer — but that, of course, holds good for any electrical appliances you own. Otherwise you risk a common problem — a lack of mains power some time at the weekend when the shops are closed!

If your efforts to connect up a system

result in unexpected hum or other unusual noise, consult your supplier. A common cause of hum is incorrect connection of earthing wires between the turntable and amplifier. Expert attention will soon sort this out, but it is often found difficult and frustrating by the inexperienced user.

Good FM radio reception depends on care over details, especially using the right aerial to supply adequate signal to the tuner or receiver. This is particularly important for stereo, where the noise hazard is greatest. (If you want a demonstration of this, tune a stereo programme that sounds noisy and weak, and then hear the difference on switching to mono.) If you are not aware of prevailing FM conditions, a local supplier of equipment and aerials should be able to advise, and the BBC Engineering Information Department (BBC, London W1) can offer a wealth of data and advice.

A simple wire dipole is supplied with most systems, and it is tempting to locate this in some concealed place in the room and leave the matter there — especially if you are in a service area and enjoy a nice fat FM signal. But better provision is essential for long-term use. Some listeners report good results with a dipole in the loft of the house, turned toward the local transmitter (that is, broadside on to it).

But it is best to fix the aerial outdoors and as high as possible, and again turned in the direction that gives maximum signal. More elaborate aerials are available for fringe-area reception and special requirements. Some enthusiasts use rotatable aerials which can be remotely controlled from the listening-room.

As for AM radio, your tuner may be fitted with a ferrite-rod which can offer fair results provided its position can be adjusted to pull in a station while discriminating against unwanted noises. If it is a fixed device it is of little use in a system, as it would be necessary to move the entire system around to line up the aerial. In any case of doubt, run an insulated long-wire aerial to the highest convenient point outdoors.

ALL UNDER CONTROL?



There is scope for debate (to say the least of it) about the usefulness of many of the switches and knobs on modern hi-fi equipment. A lot of users like a generous array of controls: we can presume that fewer facilities would be included if there was little demand for them. On the other hand, some controls add significantly to cost yet do not receive much use.

It is maintained in some quarters that controls get in the way of the main business of accurate sound reproduction, and a few manufacturers have reduced such facilities to a bare minimum (thus limiting possible markets for their products). The extreme case would be an amplifier with a means of selecting inputs — plus a volume control. We cannot do without the latter, for it is the 'tap' that lets the signal flow.

A well-endowed control panel is inclined to promote a 'technical' look which many will favour. It is also probable that some potential buyers find this quite daunting and therefore seek something simpler. Such is the variety that it is usually possible to find a compromise, but we may still query the merit of at least a few of the controls.

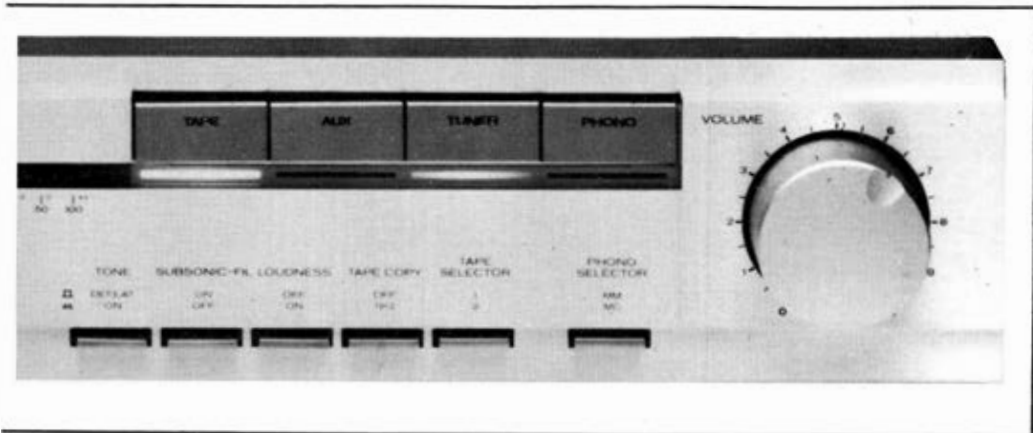
High and low filters are examples. With only a few exceptions, the filter action is not sharp enough (that is, the slope of the cut-off is not steep enough) to be of much

use. A low filter may be intended to mitigate subsonic effects and a high filter to lessen noises or distortion, but with only a mild attenuation one might as well use the bass and treble tone controls instead.

Further, it can be argued that no filter action should be necessary if the programmes and components used are worthy of the name hi-fi. It does seem rather odd to buy equipment capable of smoothly reproducing a wide frequency range, and then spend a lot of one's time cutting off the treble or bass.

Another oddity is the 'loudness' control. Due to a characteristic of human hearing, programmes played at very low volume seem deficient in the bass and also slightly lacking in high treble. A loudness control is a special kind of tone control applying boosts to restore tonal balance during low-volume listening. Most such devices are of simple design; but even if they are more complex they cannot meet all practical needs. It would be as acceptable to use the tone controls to give a desired effect, and it is doubtful whether the average user would tell the difference between one method and another.

A few systems offer a midrange (or 'presence') tone control as well as bass and treble controls. It is difficult to see any merit in this: any good programme is likely to sound best with a flat midrange



characteristic, especially if the loudspeakers were competently designed. A more complex device is the equaliser — a set of adjustable filters each centred on a particular frequency. It may be a separate unit or it can be incorporated in the amplifier.

Usually the device is presented as a 'graphic equaliser': the settings of the controls convey an impression of how the frequency response has been modified. The equaliser is intended to compensate for programme deficiencies or effects of room acoustics, but making all the adjustments to good effect is time-consuming and there is strong evidence to support current belief that an equaliser doesn't rise much above the level of gimmickry.

Uses of other controls are mostly evident. One example is the muting control, which cuts the signal level by a specified amount (such as 20dB) at the touch of a button. This saves turning back the volume control if the telephone has to be answered. Clearly this is at its best with remote control, since one can subdue the hi-fi without going over to the control panel.

A tone-control 'defeat' is popular. Ideally it returns the frequency response to a truly 'flat' condition and causes the programme signal to bypass the relevant circuits. It

seems that many users welcome the assurance that the signal path in the amplifier can be simplified to some extent by such bypassing. Often it can be observed that a listener will leave the defeat switch on for much of the time. So we have further evidence that good programmes played on high-grade systems do not require elaborate adjustments.

All this is complemented, in many current units, by illuminated displays which indicate particular functions or depict working conditions (frequency response trend, for instance). Particularly common is an indication of output level, using either meters or, more often, a series of light-emitting diode (LED) devices. Such arrangements offer both a visual attraction and some indication of relative levels. However, a true display of power delivered to the complex load formed by a pair of speakers would demand something more elaborate and costly.

As for the connection of tape machines, the minimum provision will be a control for tape replay, augmented by an amplifier output for use when recording. Keen tape enthusiasts will demand more, and many amplifiers and receivers have provision for monitoring programmes and dubbing. Thus two machines can be connected and it is possible to copy from one tape to another, using the amplifier as control



centre.

Controls on tape machines are divided between those for the mechanism (known as the tape transport) and others which are mostly concerned with electrical circuits. On the least expensive units the tape controls usually have a purely mechanical action and are in the form of press-keys or tabs for play, wind, rewind, pause and so forth. These are acceptable enough if they have a positive action and lock downwards quickly, although great rapidity of action is not possible.

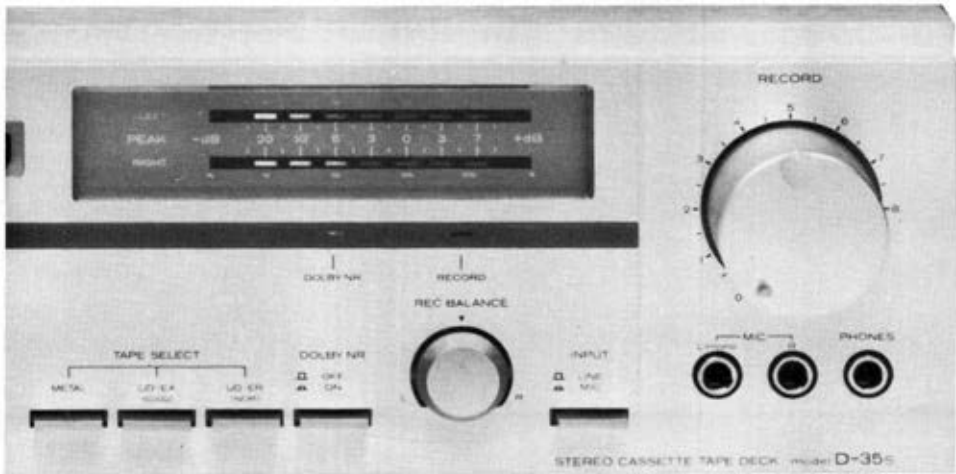
A major advantage of more advanced machines is the line-up of button controls which need only a light touch for all functions. It is usual for these to be associated with 'logic' electronics. Instead of thinking out the control operations deliberately, with regard to any adverse consequences such as tape-stretching, the user can pass rapidly from one control to another (from fast rewind to play, for example), leaving the machine to change safely from one condition to another. The

machines does the thinking — so far as a machine can!

Other items include memory controls and systems which, by running through a tape and detecting signal gaps, enable starts of programmes to be picked up quickly. Then there are the response equalisation and bias controls to prepare the machine for different types of tape (ferro-chrome, metal-particle and the rest). The facility is reduced to a simple level on the cheaper units but is likely to be more complex, to meet the needs of critical and adventurous users, on comparatively advanced machines.

Controls on turntables warrant a mention. At one time a turntable, regarded as a very simple device, was presented accordingly, and the better its quality the simpler it appeared to be. In fact there has been a limited return to simplicity, especially by British makers. But many models are more complex, and a good cross-section features in this Digest's reports.

ALL UNDER CONTROL?



Pickup controls on a manual or semi-auto turntable are evident enough: apart from the control to lift and lower the pickup, there are settings for tracking pressure and bias correction (often confusingly called anti-skating). This latter item concerns the natural inward bias, or sidethrust, of a conventional pivoted pickup. It tends to pull slightly toward the disc centre to an extent which depends on several factors including the nature of the modulations in the groove and the contour of the stylus tip.

Correcting devices are designed to exert a compensating outward pull. Although the arrangement can only be a compromise, it is well worth the trouble. Any sidethrust must demand increased downward pressure to overcome its influence, so it is sensible to attempt correction in order to bring the tracking pressure to an optimum for the particular pickup.

Development of 'servo' systems has been a feature of turntable technology. In

brief, the system removes the motor drive from direct dependence on the mains and introduces a speed-monitoring element whereby information about errors is used to give instantaneous control of speed. Lack of stability is a charge levelled against some such arrangements. Further, it is usual to provide user-adjustment of speed.

However, further refinement has produced more advanced speed-monitoring techniques (at least in the more costly units) and we now have the addition of quartz-lock systems for precise control. The quartz crystal is of course the very symbol of stability in many fields — from wrist-watches to radio-communications.

In the face of all this there is a strong appreciation of well-engineered but very simple turntables — and with some justification. But high technology continues to yield luxury designs and it is easy to see why they sprout so many controls when the user's demand is really very basic — namely the quiet and consistent rotation of discs.

LOST IN THE HI-FI DESERT ?



If so then direct your weary footsteps here, before the Bandits seize your gold, (Access or Barclaycard). Audio refreshment can be had by appointment at this Oasis, where our friendly experts will demonstrate the widest range of specialist Hi-Fi in the U.K.

high fidelity
equipment

W. A.
BRADY
& SON

401 Smithdown Road Liverpool L15 3JJ
Telephone 051-733 6859

for excellence in sound

Only 2¼ miles from M62 and not in city centre

UPGRADING YOUR HI-FI?

If you are thinking of spending a substantial sum on an audio system you will want to get it right first time, and you may not take kindly to any suggestion that it could be improved. Indeed, a well planned outfit should give pleasure for many years. But much depends on your initial ambitions and budget. Extensions and adaptations are usually possible.

For example, you may have excluded cassettes initially, but you can add them later if your cabinet or other housing will accept the recorder in a way that suits you. Again, you may favour FM radio to the exclusion of all else when planning the system, but in all cases it is easy enough to add a turntable at any time.

Judging by trade statistics, the sales of additional loudspeakers are considerable. There are more pairs of speakers in homes than there are stereo systems, according to one large manufacturer! If nothing else, the liking for hi-fi extensions to second rooms can account for this.

This second pair of speakers should be chosen to meet the conditions of use, but often the extension pair will be run at a relatively low volume level and does not necessarily have to be power-rated to match the main speakers.

In that event the secondary speakers must not be exposed to the amplifier's full drive as this may result in damage. Check your power figures. However, amplifier switching for two pairs of speakers makes this two-room arrangement very straightforward. If it is not possible, inquire about a switch-box which can be inserted in the leads between the amplifier and speakers.

Remember to use adequate low-resistance leads for long runs between the installation and another room; otherwise the loss of available power may not be acceptable. Also, consult the amplifier instruction manual to check whether there are any restrictions on the use of extensions. In certain cases it is not advisable to use two pairs of speakers at the same time. But you can always wire up extensions if you intend to use them with

the mains speakers switched off.

Nearly all systems have jack-sockets for connection of headphones. Without such an outlet it is still possible to use 'phones if you buy a connecting box. This is fed from the amplifier's speaker terminals and is so arranged that you can switch between headphones and speakers.

Improvement of pickup performance may be possible to a limited extent. It is tempting to put in a new cartridge, but the pickup arm imposes the limitation, as will be clear from study of the Digest reports, and expert advice should be sought on changes. Where popular ranges of cartridges are concerned, it is possible to secure a change of characteristics by changing the stylus, but again this is permissible only if it suits the pickup.

Almost every system makes provision for the use of tapes, and this means cassettes, for they are high in popular esteem. The larger open-spool tape machine is primarily the province of the creative enthusiast whose interests are semi-professional but may be of interest to any music-lover seeking reproduction of the highest quality.

Recording and replay at this level is relatively expensive, in terms of both initial and running costs, and the machines fit less readily into compact installations. In fact a good open-spool machine tends to dominate the whole system. But this medium is technically compatible with almost all reputable hi-fi systems.

Minor accessories in profusion extend the enthusiast's interests and promote the most effective use of hi-fi. Tape editing and the salvage of damaged tapes are both made easy by specialised kits and tools. Then we have stylus-cleaning, disc maintenance, extra connecting leads for new additions to the system, sensible turntable mats to replace inadequate ones . . . the scope is wide. As your disc and cassette collection grows you will need more storage space, and the supplier of the system may be able to suggest a matching cabinet. Otherwise there are plenty of storage cabinets to take your expanded music library.

TENDER LOVING CARE



Elis cassette care kit

Hi-fi house-keeping jobs are few and simple. A necessary task is the cleaning of vulnerable parts which could be affected by dust. The turntable should be reasonably well protected by its cover but will still need occasional attention around the pickup and the rest of the deck.

Very little lubrication of mechanisms is necessary, and it should not be attempted without prior reference to the equipment instruction manual. Many mechanisms are not intended to be oiled at all by owners but in certain cases there is an instruction concerning very sparing lubrication of bearings in turntables. Belt-driven turntables may need simple attention to guard against the risk of slip in the transmission.

Check occasionally that all signal and mains connections are secure. Also examine the runs of speaker leads, especially where there is a risk they can be damaged by kicking or stretching. In short, such routine tasks arise so infrequently that

they may be neglected unless a special note is kept as a reminder.

Cassette users should do what they can to keep dirt away from tape-heads and nearby parts. Regular cleaning is still necessary, however, and proprietary aids are designed for use after every few hours of recording and replay.

A cleaning kit, with fluid and applicators, can be used if the heads and capstan are sufficiently accessible. The alternative is a cleaning tape in cassette format, which takes only a minute to run through. Aids of this kind, and many more designed for convenience or to extend interest in recording, are offered by tape manufacturers and the many accessory specialists.

An essential feature of disc playing is the precise relationship of stylus and groove. The diamond stylus tip should be cleaned regularly using a proprietary kit (fluid and brush) or, if necessary, pure alcohol. Any accumulation of fluff should be removed



Bib Groov-Kleen

from the stylus before it can cause distortion and mistracking. Neglect here can lead to more audible distortion than that caused anywhere else in the system.

Since the stylus is small and vulnerable, special care and a delicate touch are vital. A miniature brush is satisfactory for cleaning, but it should be wielded very gently, stroking from rear to front of the tip. Consult suppliers if the question of stylus replacement is likely to arise, especially where the stylus has long use (exceeding 500 hours or 1,500 LP sides). The actual life of a diamond tip depends on pickup characteristics and conditions of use.

Store cassettes away from heat or damp conditions. Keep LPs supported vertically strong magnetism, such as the magnetic fields which may extend a short distance from loudspeakers. Never leave a cassette engaged in the machine after you have finished with it.

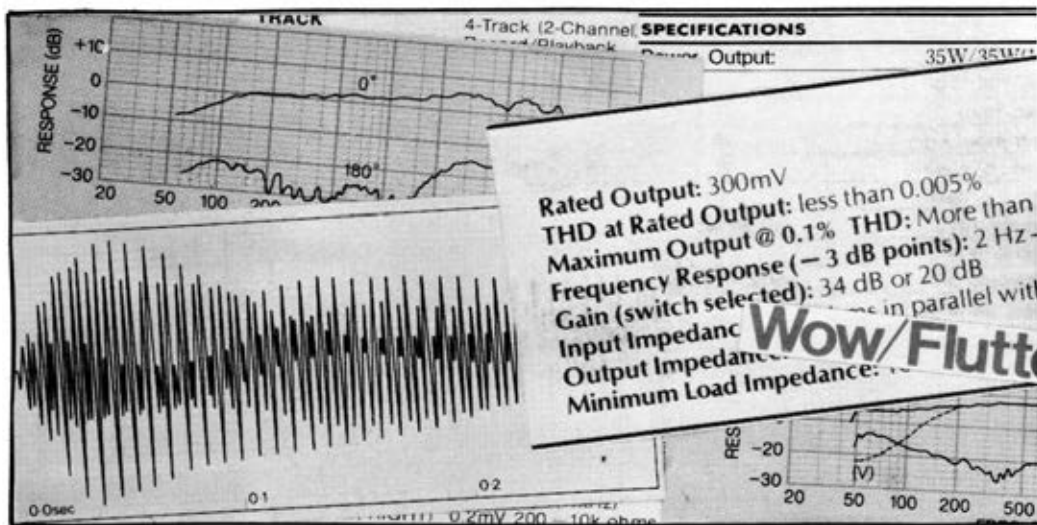
Similarly, store discs at normal room

temperature, avoiding damp and extreme conditions. Keep LPs supported vertically (but not very tightly) and do all you can to protect them from dust. If you have some 7-inch discs store them separately, either vertically or in small piles (in a drawer, for example).

If you start with new discs, very gentle cleaning is all they are likely to need. Avoid methods that could cause abrasion or leave deposits in the grooves, as either will tend to increase the noise levels. A useful pre-play routine is the collection of dust particles, using a cleaning aid designed to ensure a gentle action.

It is safest to avoid cleaning if you are in doubt about the need for it or about the consequences it may have. On the other hand it will be best to seek expert advice — about professional cleaning, in particular — if you have some badly contaminated discs and suspect they could be restored and made playable. Do not play scratched or badly fouled discs on hi-fi equipment.

TECHNICAL TALK



If you feel uneasy at the prospect of a 'technical talk', by all means leave it and turn a page or two. Your impressions of the hi-fi systems will be little affected if you do not grasp many of the technical terms. After all, this *is* a publication for the beginner.

Some study of terminology can however increase your appreciation of a fascinating subject and will take you into a few byways of electronics, physics, precision engineering and materials technology. Don't dismiss it all as jargon, though, for properly used technical expressions are part of clear communication and certainly not jargon. This little round-up of technicalities is included instead of an extensive glossary (an obvious solution, but rejected for once) and confines itself to quite basic matters.

Descriptions of hi-fi are generously laced with something called a dB. This is the very useful decibel — the most beautiful word in audio. It sounds very musical and gentle, though it has a lot to do with noise and loud sounds. The original term was a Bel, but that was too big, so long ago it was decided to use one-tenth and settle for the decibel.

The dB is not a unit like a volt or watt: it

is always a ratio, enabling one thing to be compared with another. One advantage is that it enables us to compress an enormous range of sound intensities into a compact scale. We actually sense sounds that are in ratios of millions-to-one (our ears and brains really are that receptive), but they can be represented on a scale ranging up to about 120dB.

Similarly the dB is used to compare voltages, and there is also the basic need to compare audio powers, relating them to changes of sound. The smallest change that means much (when you notch up the volume control) is about 3dB, but it represents a doubling of power demand. Possibly the most obvious everyday use of the dB is found in signal-to-noise (S/N) ratios, which are so important in all stages of sound recording and reproduction.

Everyone who becomes interested in hi-fi will soon realise the nature of a S/N ratio. A 'signal' is wanted information (music, speech and details of all kinds) and 'noise' is the enemy. The farther they are apart, the better the results, and this implies the biggest possible dB figure. You can view it two ways: the signal should ride well above the noise, or the noise should be controlled so that it does not interfere with the signal.

SPECIFICATIONS


Slew Rate: 40 V/ μ s
 Rise Time (10% -90%): 300 ns
 Typical Equivalent Input Noise, shorted input,
 20 — 20 KHz: 115 nV
 A weighted: 85 nV
 Power Requirements: \pm 18 VDC, 30 ma
 Size: 6.5" x 2.5" x 1.5"
 Net Weight: 30 ounces (0.9 kg.)

V rms
 1 MHz
 01 μ F

-10dB at 1kHz

Crosstalk at 1kHz: -70dB(aux, monitor)
 Stand Voltage: 150mV
 Dimensions: (17 1/4" x 11 1/2" x 11 1/2" at full power)
 Weight: Net 7.5kgs(16.5lbs.)
 Gross 8.5kgs(18.7lbs.)

er & Better Than 67dB S/N with Dolby.



Signals are obvious enough, for they stem from programmes in the form of small voltages and powers. Noise arises in electronic circuits (hiss and hum), in the discs and tapes, and everywhere along the chain of communication from the place of music-making to your listening-room. So there can be no hi-fi without working hard on the S/N.

Attention to electronic and mechanical engineering helps to combat noise, but there are also special devices to make specific cuts in such noises as the hiss inseparable from tape recording. Best known is the Dolby noise-reduction system. Others include dbx and the dynamic noise limiter (DNL).

Of course, buying enough audio output power to meet your needs has some bearing on all this, and it is so important that it has a spot to itself elsewhere in this introduction. This power is the amplifier output available, as a maximum, to drive the loudspeakers. As everyone knows, power is something one uses and pays for, and it is not too difficult to work out the cost of using a 60-watt lamp or a 1kW heater. An amplifier consumes power too, but in its turn it yields a certain output rated in watts.

There is only one kind of watt, and it is the result of multiplying the voltage (V) by the current (I). You may conclude there are several kinds after reading descriptions of hi-fi, but do not despair. We are only interested in the power which the amplifier can deliver up to a point short of causing gross distortion, and we are no less concerned with ensuring that we have enough in reserve to prevent such an undesirable approach to the brink.

Manufacturers are inclined to confuse matters by referring to watts 'rms' (it stands for root-mean-square, the text-book says) and, although inexperienced folk will hardly be well placed to argue, it must be said that 'rms' is not at all appropriate to the AC audio signals which are fed to the complex loads presented by loudspeakers.

The only specification of any real use is the 'continuous' power, implying consistent delivery, and this will be seen in most specifications — often perversely accompanied by 'rms'. So look for the continuous rating and ask about it if it is not specified. Disregard other descriptions, especially the disreputable 'music power', which unless carefully qualified merely enables the maker to quote higher figures without being able to justify them.

Study of specifications of all the equipment included in this Digest indicates that the majority of manufacturers list continuous ratings even if they sometimes confuse the issue with other terms, so maybe things are not so bad after all.

Distortions of various kinds are a hazard to the signal wherever it passes along its route from studio to hi-fi system. These cannot all be covered in a brief introduction, and would-be students will find what they need on the subject in books and in the critical reports appearing every month in Hi-Fi for Pleasure magazine.

Most familiar is harmonic distortion, which affects the hopefully clean waveforms representing the audio signals. We see this quoted as total harmonic distortion (THD) related to the maximum output of an amplifier. The less (as a percentage) the better: that is the rule.

Generally, electronic units introduce less distortion than 'transducers', which are the devices taking one form of signal and turning it into another, as is true of pickups and loudspeakers. As for other kinds of distortion, the equipment's impact on frequency response is usually obvious enough, and here again the designers of electronic circuits are at an advantage compared with those responsible for the transducers.

Distortion of transients affects clarity of detail in the sound. As the term suggests, a 'transient' is a fleeting fragment of detail which should get through the system without loss of integrity, though it does come under attack at several stages. Another hazard is tracing distortion, arising as the pickup stylus traces the groove of the disc.

The onomatopoeic 'wow and flutter' (w&f) refer to pitch variations in the sound, which in turn are due to inconsistencies of speed in mechanisms such as turntables and tape machines. Flutter is quicker fluctuation than wow. Designers have been getting these well under control, although some of the cheaper machines may be suspect.

Disc reproduction's old enemy 'rumble'

is another matter. An indifferent LP may actually have some rumble noise recorded on it! Usually, however, we are concerned with noise of low frequency generated by the turntable. As long as it has moving parts of some kind the turntable is bound to cause noise, be it ever so slight. So the aim is to reduce the noise level far below the level of musical signals. It is a prime example of the S/N requirement.

Rumble suggests a very low-pitched noise, and in practice there may be some element of this in the overall noise. But rumble may extend to the upper-bass area (or even higher, especially if a fault exists). All these noises can be analysed, or they can be lumped together. The overall S/N of turntables in the Digest was studied in order to determine how the products stood in relation to cost and applicability to the systems for which they were supplied. For the user the vital need — here as elsewhere — is to listen and decide, remembering that intrusive noise always masks detail in the sound.

Where clear, fully detailed reproduction is the aim we are much concerned with 'dynamic range'. Think of this as a range of loudness, from the extremely quiet to the loudest practicable sound. We are well equipped physically to accept and enjoy (or be annoyed by) an enormous range of dynamics in everyday life. Music-lovers are thrilled by the range experienced when they hear live sound in the concert-hall or theatre. With hi-fi we have to accept a somewhat scaled-down version, although strong reminders of the original scene may still get through in the best recordings and broadcasts.

Leaving aside any problems of the media used, the dynamic range made possible in hi-fi is confined at one extreme by noise levels and what we can actually perceive under domestic conditions, and on the other hand by the ability (necessarily limited) of the system to produce high sound levels. Every system 'runs out of steam' at some point.

A combination of programme and reproducer able to cover a range of more

than 60dB would be regarded as quite remarkable by most listeners. It has interesting implications in regard to power demand. However, a lot of programmes require consistently loud effects with few quiet ones, and then the dynamic range is small, though the availability of enough audio power may be important.

The novice may be mystified by the random appearance of 'DIN' in equipment descriptions. These are the initials of the German standards organisation which has dealt with radio and audio in some depth, specifying various minimum requirements for 'very high frequency' and refers to a specialised hi-fi products exceed such standards in important respects — often by a large margin. DIN-pattern plugs and sockets, though by no means finding universal favour, are often used for hi-fi connections.

Many readers will know that VHF stands for very high frequency and refers to a frequency-band used for broadcasting FM, which in turn is 'frequency modulation'. Although of quite limited range (hence references to service-area reception), FM transmissions offer relative freedom from noise and interference. An extensive network of transmitters is necessary to provide something approaching national coverage. AM is 'amplitude modulation', used for long, medium and short wavebands. Sound quality is much less good and there is intrusive interference of several kinds.

The word 'channel' is much used in hi-fi, as elsewhere in communications, and can be thought of as a route or path followed by the signal. For stereo there are two such channels, maintained through the many stages of recording and replay. Some interference occurs between the channels: hence the references to 'separation' or 'crosstalk'. For mono reproduction we require only one channel.

Beware of confusing the number of channels with the number of loudspeakers used. There is no relationship between the two. But it is obvious that two channels will terminate in at least two speakers, and a

mono channel in at least one (although it may well sound better with several).

SMALL QUANTITIES

V is the abbreviation of volts, and W stands for watts. Very small voltages and powers are common in hi-fi.

Examples: a thousandth is represented by m (milli), so that five-thousandths of a watt becomes 5mW. A millionth is represented by μ (micro), so that five-millionths of a volt becomes 5 μ V.

The symbol μ also indicates a micron. Pickup stylus tip dimensions may be given in microns or thousandths of an inch.

LARGE QUANTITIES

Unit of frequency is Hertz, abbreviated to Hz.

This is the same as the old-style cycles per second. A thousand is denoted by k.

Examples: a frequency of 1,000Hz becomes 1kHz.

A resistance of 47,000 ohms becomes 47kohms.

A million is mega, or M, so that 100 million Hertz becomes 100MHz.

Velocities are expressed in centimetres per second. Thus the velocity involved in tracing a disc groove may be 5cm/sec. One of the standard tape speeds is 19cm/sec. Another, for cassettes, is 4.75cm/sec.

Masses are expressed in grams (g), milligrams (mg) and kilograms (kg).

LED	Light-emitting diode. Used as indicator or beacon.
OCL	Output capacitor-less, as in amplifiers.
DC	Direct-coupled circuits in amplifiers. Also means direct current.
MC	Moving-coil pickup or cartridge.
MM	Moving-magnet pickup or cartridge.
VHF	Very high frequency.
FM	Frequency modulation.
AM	Amplitude modulation.
AC	Alternating current.
PLL	Phase lock loop.

SATISFIED WITH YOUR HI-FI SYSTEM?

In England there are many small companies producing quality Hi Fi products which can more than compete with the massed produced equipment from the Eastern Countries; and although this English equipment is scarce by comparison it is well worth while (if you know what you are listening for) to evaluate these products and realise that these small manufacturers are really into Hi Fi.

At Diesis we believe in using only the highest quality components in the finest cabinets, assembled by hand in strictly limited quantities, with listening tests at every stage during design resulting in a product which satisfies the ear rather than a meter.

Far too many manufacturers place design emphasis on measurements with the result that there are an abundance of boring loudspeakers. The Diesis is designed to sound right, and the extra information that you hear will put pleasure back into listening.

Sensitivity and efficiency in a loudspeaker is desirable for the reproduction of low level and subtle detail. With the Diesis every last scrap of information is extracted by using high quality crossover networks, containing the minimum of components to keep distortion low, make the speaker easy to drive by even the lowest powered amplifiers, and so to avoid information loss at low volume levels.

We believe you will agree that the Diesis Loudspeaker is a GREAT British product.



IMPROVE YOUR SYSTEM WITH A PAIR OF † **DIESIS LOUDSPEAKERS** AND BRING ALL THE MUSIC TO YOUR EARS

DF1: The ideal speaker for all lower to mid-price range systems.

RRP £234.12 inc. VAT.

DF2: An excellent "bookshelf" design for when space is at a premium.

RRP £148.80 inc. VAT.

DF3 & DF4: Larger speakers catering for those of you with more expensive systems.

For further details and stockists:—

† **DIESIS LOUDSPEAKERS**

**5 Glebe Close,
Rayleigh, Essex.**

Tel: (0268) 774035



WHEN YOU CHOOSE...

With the willing help of famous hi-fi companies, typical systems have been selected for this Digest in an attempt to show the great variety available. But only in a few instances are you obliged to take the system exactly as it comes. You may wish to ask the distributor or manufacturer about variants.

That may be so if from reading a report or from your own observation you feel that a particular part of a system is unlikely to meet your needs. In that event inquire about a substitute that will fit the scheme technically and visually.

Or you may wish to omit part of the system, if for example you consider you can do without a cassette machine or other item. Ask for a suggested price that takes this into account.

Then there is the question of loudspeakers. In some cases a system can be supplied with or without the speakers recommended by the manufacturer. If selecting speakers of other makes remember that you will have to check that their power rating and nominal impedance are appropriate. You will then be concerned with their size, finish and special design as well as their sound quality, an appreciation of which will be gained by listening carefully and comparing a limited selection.

For the purposes of reporting on systems which have been supplied without speakers, and for checking systems whose speakers have been found wanting, it has been necessary to select test pairs. It was considered sensible to effect a compromise by choosing samples of British-made speakers (regarding them as audio guinea-pigs, really) which would be suitably revealing, and the choices were Monitor Audio MA-84 for the more potent systems and Krystal Explorer (felicitously named) for the others.

It is not implied that these are ideal choices, though they are typical. The 'ideal' is the one that you really like, given that it is a technical match. However, the critical limelight had to fall somewhere, and the guinea-pigs proved their worth. In the

background were Reference Standard Professional Monitors by IMF Electronics, also proving their worth when it came to study of the finer points of sound reproduction. A pair of RSPM will set you back more than you may be prepared to pay for a complete hi-fi system, but that does not lessen their merits as working tools for the evaluation of programmes and hi-fi systems.

It must be said that, with a few honourable exceptions, the industry's planners do not make a very good job of pickup cartridge selection. Some clearly go for cheapness, and others regard the cartridge as an uninteresting but necessary little item that has to be fixed in the pickup arm. A few leave choice to the buyer, and that is better than including an inferior product.

Although the cartridge supplied may be basically compatible with the arm and player with which it is supplied it is possible that more refined and better-sounding examples, equally compatible, can be found. So it is advisable to consult your supplier about this, especially if disc reproduction is important to you.

Since FM radio is so very attractive as a source of hi-fi, take the trouble to study the capabilities of the equipment. Simple examples often give adequate reception if you live in a service area, and the AM bands (not very hi-fi) offer extra entertainment. Look for something more advanced if you place the emphasis on radio and intend to explore the broadcast bands with a more critical ear. Cassette replay and recording is regarded by many as a useful auxiliary. Again, advanced features affecting recording quality and precision of control are necessary if you have a taste for experiment.

Cavendish lead the way in Hi-Fi Rack Systems

There has never been a better time to buy Hi-Fi and Audio than now – and Cavendish are offering these four superb systems at tremendous savings. It's the way to buy Hi-Fi – so come along and test them in our modern showrooms today. Phone Hotline 01-247 9791 for details of our range of over 50 different systems.



System CTRS 190

This is an extremely impressive Stereo System at an impressive price. Consisting of Sharp SA-10E 3 band Stereo Receiver with LED meter giving 20W per channel output. Sharp RP-10E semi-automatic belt-drive turntable. Sharp RT-10E Dolby Cassette Deck with metal tape facility and 2-colour 10-LED peak level display. Complete with attractive glass fronted rack, speakers and all leads.

Only
£259.95

System CTRS 164

New for 1981 – the very latest Super Hi-Fi from JVC at a tremendous price. Consisting of JVC AX1 30W per channel Amplifier. JVC TX1 3 band Tuner. JVC KDA11 Metal Tape Cassette Deck. JVC LA55 Direct Drive Turntable. Marantz 4G/C Speakers and all leads. Complete with double fronted glass door Hi-Fi cabinet available in teak, ash black, rosewood or walnut finish.

Only
£379.95



System CTRS 138

What better value around than this Sansui based system. Consisting of Sansui R30L Receiver. Sansui D90 Dolby Cassette Deck. Sansui P50 Turntable with cartridge, stereo speakers and superb double fronted glass door cabinet. Complete with all leads.

Only
£279.95



System CTRS 176

Cavendish are proud to have brought together the very latest Sony Hi-Fi units in an attractive double door rack. This system consists of a Sony 30W per channel Amplifier Model No. TA343, a 3 band FM tuner ST242, metal tape cassette deck TCK22, a PST122 direct drive turntable and Hi-Fi speakers.

Only
£369.95

BE WISE – BUY AT CAVENDISH!
BEST PRODUCTS AT HARD TO BEAT PRICES



FREE DELIVERY & INSTALLATION OF THESE SYSTEMS WITHIN 20 MILES OF E. LONDON. INSTANT CREDIT AVAILABLE (subject to status)

Prices Finalized on 296.88 Please check prices and availability at purchase.



Cavendish Sales

CASSETTE CENTRE

Hi-Fi Centre 317 Whitechapel Rd., London, E1

just 2 mins. Whitechapel Underground Stn.

Cassette Centre 279/283 Whitechapel Rd., London E1

Next to Whitechapel Underground Stn.

Tel 01-247 3453/4/5 – 2157 24 hour Answer Service

Open 9 a.m. – 6 p.m. Mon. – Sat.

Access, Barclaycard & Diners Card accepted with pleasure.

DIGEST GRADINGS

In any large-scale review or survey it is expected that the reader will at an early stage turn to the conclusions to check the status or rating of a product that is of interest. Is it outstanding in some way, and is it good value? What has the critic had to say about an already familiar product? Is it worth returning to a particular item for further study and audition?

Accordingly each system report starts with a grading that is chosen on a scale of three. Merit is indicated as an A, B or C, and value as 1, 2 or 3. A and 1 are tops.

Obviously this can only be a rough guide, and it is intended that the reader should take a close look at the pros and cons once a grading has claimed attention.

MERIT

Merit covers technical aspects as well as sound quality, bearing in mind that one weak link in the chain may undermine audible results from a system that otherwise has much to commend it. So it reflects failures and triumphs of planning. If it is clear that a favourably priced system is let down by a planning snag, it may be worth while to ask the supplier whether some alteration could achieve a better result. So please understand that a poorly graded system is not damned for good. You may be able to do something about it.

VALUE

As for value, this grading conveys an idea of value for money, based on suggested prices quoted when the reports were prepared. With regard to the performance and extent of the system, is it a good buy?

There is an evident link between value and merit gradings, but it is not just a matter of whether the buyer seems to be offered a lot of hardware for his money. If the sound is poor, it matters little if the system is generous. It might be that he would get a more satisfying sound — or a better example of planning — if he spent a little more.

At the end of this publication, after the equipment reports, a chart summarises some aspects of performance. Such conclusions complement the critical reports but have been kept as simple as possible, in accordance with the straightforward approach of the Digest.

PRICE

All suggested prices are for a system as described, including a rack, cabinet or other fitting specified by the manufacturer. Loudspeakers are included if confirmed in the report. Some distributors and manufacturers list recommended prices and these are quoted if possible. Others give only guide-prices. If a spread of prices has been offered, the mean of these is quoted.

Therefore buyers may find that dealers' prices differ from those mentioned. VAT at the rate applicable when the reports were compiled is included in all cases.

Merit	Value
A	1
B	2
C	3



**AMPLIFIERS • TUNERS
RECEIVERS • RECORD
DECKS • MUSIC CENTRES
CASSETTE + REEL to REEL
TV • VIDEO • SPEAKERS**

STOCKISTS OF

ACOUSTIC RESEARCH • AIWA • AUDIOMASTER • B & O • BOSE • CASTLE • CELEF • CELESTION • DUAL • FOCUS • GRADO • HITACHI • JR • JVC • KEF • MARANTZ • MAXELL • MICRO • MISSION • MONITOR AUDIO • MORDAUNT • SHORT • NAKAMICHI • PANASONIC • PHILIPS • PIONEER • QUAD • RAM • REFERENCE PRODUCTS • SANSUI • SMC • SONY • TANNOY • TDK • TECHNICS • THORENS • TOSHIBA • TRIO • WHARFEDALE • YAMAHA

When you buy from Sevenoaks Hi-Fi you get:—

- * A WIDE SELECTION OF EQUIPMENT ***
- * KNOWLEDGEABLE STAFF ***
- * EFFECTIVE AFTER-SALES SERVICE ***
- * VERY COMPETITIVE PRICES ***

SEVENOAKS, KENT

118 LONDON ROAD, SEVENOAKS, KENT
(0732) 59555

Mon-Sat 9.30 to 1, 2 to 5.30 late night Thurs
until 7.00. Closed all day Wednesday

LONDON, SE18

162 POWIS STREET, WOOLWICH,
LONDON, SE18 01-855 8016

Mon-Sat 9.30 to 1, 2 to 5.30 late night Thurs
until 7.00. Closed all day Wednesday

TUNBRIDGE WELLS KENT

34 MOUNT EPHRAIM,
TUNBRIDGE WELLS, KENT (0892) 31543

Mon-Sat 10 to 5 Closed all day Wednesday

CHATHAM, KENT

4 RAILWAY STREET,
CHATHAM, KENT (0634) 46859

Mon-Sat 10 to 5 Closed all day Wednesday

Sansui High Rise Hi-Fi

**Music lovers
can't miss it.**

If you want the performance of separate hi-fi without the tiring wiring, raise your sights. To Sansui High Rise Hi-Fi.

It's as neat as a music centre, but it's pure hi-fi from top to bottom. With Sansui High Rise, you can enjoy records, radio, or tapes — and we do mean enjoy.

A pulsing light indicates radio signal strength. Two large meters tell you when your recording levels are spot-on. There's even a cunning little 'traffic light' which first monitors peak reception, then locks in the station for you.

The cassette deck is Dolby* of course — and there's a press-button selector to get the best performance from different types of tape. Now the best feature: prices for the range of Sansui High Rise systems start from around £300 complete with speakers.

Get the lowdown on High Rise Hi-Fi. Post the coupon.



**Even the name
makes music**

*Dolby is a trade mark of Dolby Labs Inc.



Sansui Information Centre PO Box 26C Esher Surrey KT10 9P
Please send me your High Rise colour brochure and list of stockists.
NAME
ADDRESS
Postcode



Solution to the housin

It's all very well creating some of the world's most advanced hi-fi equipment. And performance second to none throughout the entire range.

But that's not the only reason people choose Akai.

You see, it looks as good as it sounds.

Take the PRO-504, for example.

It features a selection of the most superb Akai components, each carefully chosen for its complete compatibility.

There's the 50-watt AM-U04 amplifier with its exclusive peak clipping indicator, heat pipe cooling system and FLD power meters with peak hold.

And the matching AT-V04L tuner, boasting auto-scan tuning, 14 pre-settable stations and patented servo-lock.

Plus the Quartz Lock Direct Drive turntable, AP-Q50C, with controls conveniently placed in front of the dust cover.

And the GX-M10 tape deck featuring the Twinfield Super GX tape head using unique crystal ferrite materials especially designed to cope with the extra bias current demands of the latest metal tapes.

The smooth hard surface of the tape head means that the tapes last longer, and the head itself lasts longer. (So long, in fact, that we guarantee the Twinfield Super GX head for the



g problem.

life of the machine.)

To add the final touches – the optional EA-G40 graphic equaliser and DT-200 timer. All matched up to the high-performance SR-H50 speakers.

The PRO-504, just one of our new range of racking systems, is technically superb.

In low-reflective stylish finish, it is slim and subtle in design because we know that some people set enormous store by the appearance of their hi-fi.

Of course, it's what's inside that counts.

But love at first sight is just as important.



PRO-601

Includes Quartz Direct Drive Turntable AP-Q50C with ultra-thin Discolith Coil Motor, GX-M10 Stereo Cassette Deck incorporating our new Twinfield Super GX head, DC Stereo Power Amplifier PA-W04 with its vigorous 50 watts per channel, Stereo Preamplifier PR-A04, FM AM Stereo Digital Synthesiser Tuner AT-V04, Audio Rack RM-H61. Optional Stereo Graphic Equaliser and Audio Timer also available.



PRO-30

FM AM Stereo Receiver AA-R30 giving a healthy 40 watts per channel and with sensitive tuning/signal meter, Direct Drive Turntable AP-D30C with Discolith Coil Motor, Stereo Cassette Deck CS-M02 which accommodates metal tape, Audio Rack RM-50 and three-way Speaker System SR-H40.

AKAI

Akai's Okay. OK.

ROTEL *hi-fi*

‘A competently-engineered,
non-integrated amplifier system
which is capable of
true hi-fi results’

(RB/RC 1000)

HI-FI FOR PLEASURE



SYSTEM 1000 RT 1000 tuner, FM / MW / LW, servo lock, **RC 1000** control amplifier, moving coil head amp, graphic equaliser, **RB 1000** power amplifier, 70 watts RMS, THD 0.03%, **RD 1000M** Dolby cassette deck, two motor operation, metal, CrO2, normal, **RP 1001** direct drive turntable semi automatic, AT 30E MC cartridge, **RL 1000** loudspeakers, 3 way, 130 watt (DIN 45500).

COSMIC

EST 1962

MONDAY – SATURDAY 9 a.m. – 6 p.m.

WE BEAT ALL OTHER PRICES



PIONEER®

X-SERIES



Rack Systems

X-300	£299.00
X-500 short	£385.00
X-500 Tall	£405.00
X-700 short	£480.00
X-700 tall	£499.00
X-900 short	£549.00
X-900 tall	£570.00
Mini System	£385.00
B-3000 rack	£440.00
Rest of Pioneer range	P.O.A.



Stereo Systems

Micro Systems	£249.90
RML 60 (Matching speakers)	£49.90
A 300 system	£329.90
A 500 system	£399.90
A 550 system	£499.90

Stereo Cassette Decks

RD 300M	£74.90
RD 500	£89.00
RD 550	£114.90
RD 1000M	£169.90
RD 1001	£119.90

Stereo Receivers

RX 300	£84.90
RX 500SL	£109.90
RX 1000	£139.90
RX 1010	£224.90

Rest of Rotel Range P.O.A.






All prices correct at time of going to press.

We specialise in mail order. Securicor delivery £4.00 per item. Full after sales service. We probably have the largest range on TV, Hi-Fi Video in the home counties.

WE STOCK OR OBTAIN

A.D.C., A.K.G., AUDIO TECHNICA, AR, AMSTRAD, AUDIO MASTER, AKAI, BEYER, CAMBRIDGE, CELEF, DECCA, DUAL, FERGUSON, FUJI, GRADO, GRUNDIG, GOODMAN'S, HADCOCK, HARMON-KARDON, HITACHI, JR, JVC, ITT, KEF, KOSS, K.L.H., MARANTZ, MICRO-SEIKI, MONITOR-AUDIO, MORDAUNT-SHORT, NATIONAL PANASONIC, OPTONICA. ORTOFON, QED, ROTEL, SANSUI, SENNHEISER, SHARP, STAX, SONY, TANNOY, TEAC, TECHNICS, TRIO, ARISTON, MITSUBISHI, THORENS, TOSHIBA, WAR, WHARFDALE, ETC. ETC.

Please Supply _____

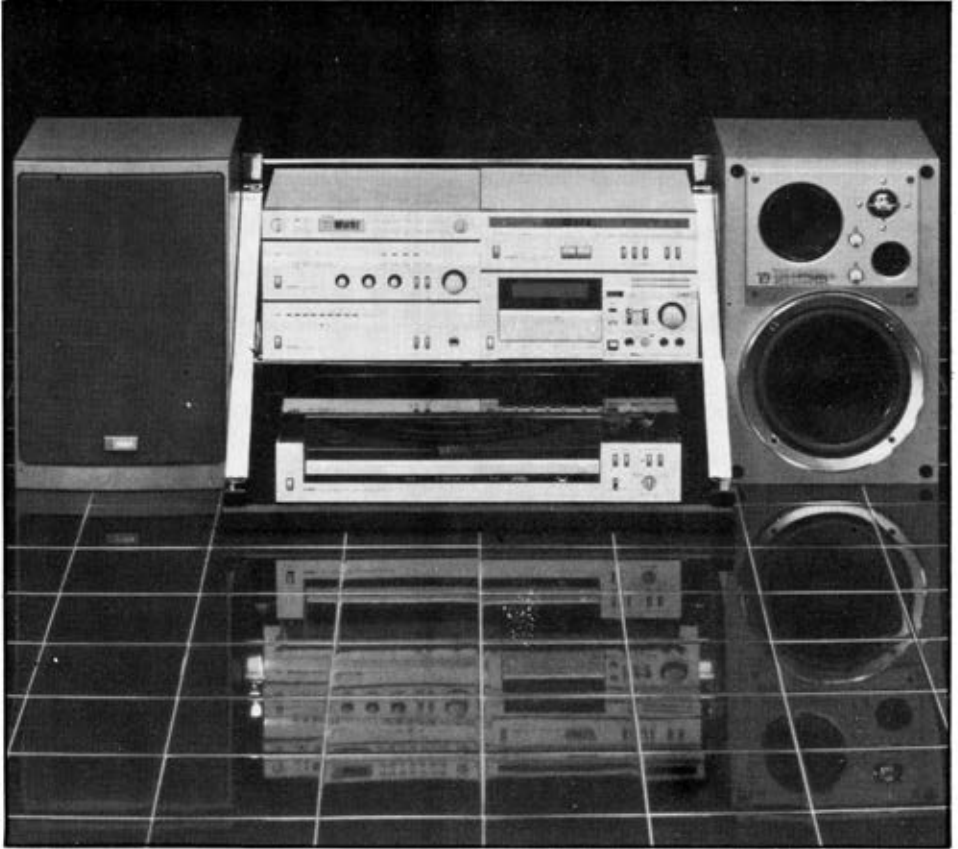
I Enclose £ _____ (Cheque/PO Access or Barclaycard)

Name _____ You may telephone your order quoting Barclaycard or Access number.

Address _____

COSMIC
246-256 STATION RD.
ADDLESTONE,
SURREY.
Telephone:
WEYBRIDGE
54522 (6 lines)

AIWA MICRO 50



A well-designed miniature or 'micro' system demonstrating how, with application of the latest electronic wizardry, a luxury-style installation can be whittled down to proportions well below the norm. Here, the separate power amplifier and preamplifier (control unit) account for less than half a cubic foot when stacked together, and the other units are also engagingly small. There is provision for distribution of the mains within the system.

The basic Micro 50 comprises the amplifier with preamp plus a tuner and cassette unit, and with this can be supplied a pair of small loudspeakers. The system was submitted in that form, so the price quoted at the top of the report refers to the items just mentioned.

It is of course possible to order the system without the speakers, reducing the quoted price by around £120. Then there are some auxiliaries, headed by a turntable and including a remote control unit, a timer and a rack, designed to emphasise tidy presentation and convenient use.

AMPLIFIER & TUNER

A power output rating of around 50 watts per channel seems to be the limit for micros at the present state of the art, although it is possible that further development will bring some change. But such a rating is adequate for many users, and indeed it applies to the Aiwa SA-P50, which delivers this power into 8 ohms (related to 0.03 per cent total harmonic distortion). On this chassis are a headphone socket, switching for two pairs of speakers, and an output level indicator using the familiar row of LEDs.

Preamplifier SA-C50, separately mainspowered, offers the advantage of an input stage to accept moving-coil cartridges. In fact there is only one input connection, but this is used for both moving-coil and other magnetic pickups by virtue of the switching on the panel. Overload threshold for the 2.5mV condition was 210mV, which is commendable. Panel features include muting, loudness, simple controls for tape functions and a low (subsonic) filter — all in a sensible layout, as logical as one is likely to find.

Investigated with suitable auxiliaries this combination made a particularly good impression, for it delivered its full output cleanly and at all times promoted a neutral character of sound with fine detail. Full marks here, then, and the micro approach would appear to be vindicated. On initial testing the noise level on phono did not quite match the specification's promise, but very careful earthing and routing of leads ensured acceptable results.

The ST-R50 tuner is a 'quartz synthesiser' model, with miniature touch-button operation and digital frequency readout, a prime example of high-technology radio as it has ventured so

far. In a synthesiser design, tuning is secured by entirely electronic means, using the most advanced miniature devices, while quartz-crystal stability is another state-of-art feature.

Coverage is FM, MW and LW. Tuning can be done manually, using 'up' and 'down' buttons to scan the bands, or by an auto control. For the latter there is an adjustment so that the user can set the sensitivity at which the auto-scan will respond to (and stop at) weak stations.

Most importantly, up to 10 stations can be preset across the bands. These are set-up simply by choosing the desired frequencies during a band-search and passing them to a data store where they are held for subsequent use.

This 'memory' is cancelled if the system is unplugged from the mains (as it might be if the owner is absent for a time), but a 6-volt battery supply can ensure retention of presets. Alternatively it is an easy and reasonably quick matter to restock the store with presets if cancellation has occurred.

The usual aerial terminals are fitted for FM (twin feeder and coaxial 75 ohm) and there is a ferrite-rod for AM. This latter device does not swivel far and is not wholly satisfactory, so a long-wire aerial is advisable. Stereo FM requirement was about 50 μ V for 50dB S/N. In practice, service-area BBC reception was excellent and the clean, crisp audio, free from objectionable emphases, was admired.

Your reporter, though by no means prejudiced in this regard, finds digital tuners tiresome to use, much preferring normal analogue design plus presets. But a lot of people think otherwise, and Aiwa's very clever alternative is well executed.

CASSETTE RECORDER

Not much bigger than the tuner or preamp, the SD-L50 is of advanced type, with 'logic' control of tape functions to ensure positive and very rapid changes (such as quick and safe switching from fast rewind to play). This is a two-motor machine: one is for spooling, reducing the load on the capstan-drive motor.

Separate bias and equalisation controls cater for common tape varieties plus metal tape in fixed switching positions. A well-contrived LED peak-level display is included and the unit is of

course equipped with Dolby noise-reduction. A particular merit was found to be outstandingly good speed stability. Distortion and dynamic range potential were considered to be very good in relation to price and specification, evidenced by checks with TDK metal and popular LH cassettes. A well-endowed unit in its class.

change up to celestion

Up front is the only place for you.
Take the ultimate option now.
Get ahead of the other rigs. Change up.
Change up to Celestion.



celestion
international 

Rola Celestion Limited, Ditton Works, Foxhall Road, Ipswich, Suffolk, IP3 8JP. Tel: Ipswich (0473) 73131. Telex: 98365. Cables: Voicemail Ipswich.

LOUDSPEAKERS

Matching speakers SC-E50 were provided for test. They really *do* match, for they are finished in grey to look well with the system's silver-grey frontal aspect, and the power rating and impedance are as they should be. They are not quite miniatures, but a height of about 39cm is well in keeping with the system's proportions.

A vented enclosure contains a 20.5cm bass driver, 10cm midrange cone unit and a dome tweeter. Sensitivity was above average and the presentation forward and rather keen, so that the speakers' explicit and brash sound may find favour with those who play a mixed bag of

popular programmes.

There was no impression of depth from the sound, however, and not a lot of real detail. It took more refined speakers of British design to reveal the qualities of the system in good light. The Krystal test pair confirmed this, as did others which were to hand at the time. Additional checks with Keesonic Kolts and JR Metros showed that true minis (they really are tiny) could also match up to Micro 50, and that may be a matter of interest if you are absolutely intent on size-reduction.

VERDICT

This system is quite expensive, for addition of a turntable and other extras (remote control and a timer, neither of them vital) would bring the total near to £1,000. The potential buyer's view must depend on how he responds to miniature designs and the importance attached to the equipment's more advanced features.

But the system is a delight to use (assuming your eyesight can identify the smaller push-buttons) and the standard of performance is high, as revealed by well-chosen speakers of compatible quality. Full marks for merit, therefore. The value grading is somewhat tentative in the circumstances.

Other units available are the AP-D50 turntable, the R300 remote-control unit and the MT-50 timer.

AKAI PRO-501



Power-rated for a small room, this fairly compact outfit may be seen with an 'A' suffix to its model number by the time the Digest is well in circulation. The change is solely concerned with the cassette machine, to which metal-tape compatibility is being added, and all other system features remain the same.

It is Akai's practice to promote this system with its own loudspeakers, so the price quoted above includes these as well as a rack housing. However, it is possible to exclude speakers when ordering, and in that event the price is about £50 less.

AMPLIFIER & TUNER

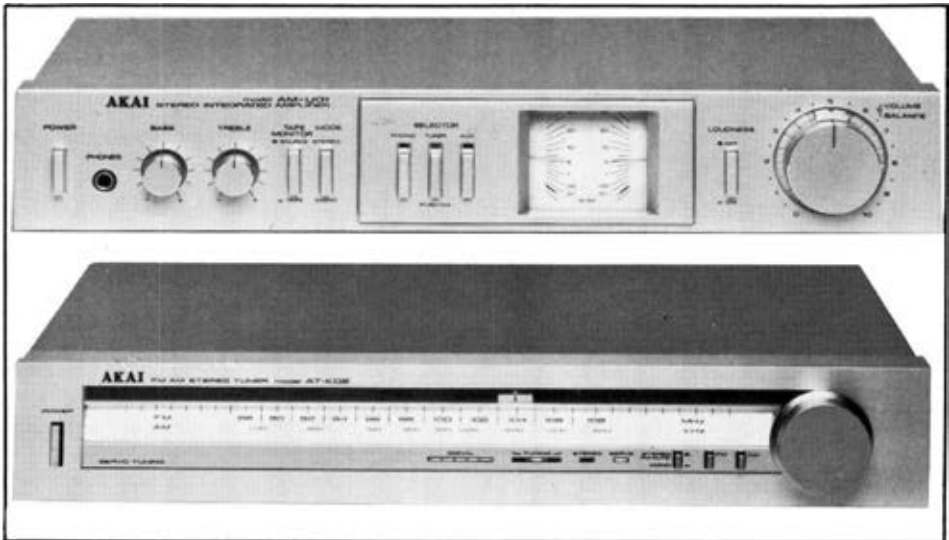
A neat and unobtrusive 'budget' design in the slimline style, model AM-UO1 is rated at 23W per channel (8ohms, 0.3 per cent THD). Restricted power capability becomes evident in audition, with deterioration of quality when the unit is hard-pressed, though this is not unusual and depends to some extent on the speakers actually used.

The single 3mV phono input offers an overload margin a little over 100mV, and the usual auxiliary, tuner and tape inputs are included together with one set of speaker terminals. Other controls include a loudness button and tape-input switching. Lack of centre-stops for the tone controls seems a curious omission. A pair of showy 'power' meters are evidently meant to add visual interest (and they add to cost too), for

they have little to do with what goes on at the interface of transistors and speakers.

Model AT-KO2L is the ideal partner for the amplifier, for it is a neat and simple tuner, one of the most elegant looking seen in the low-cost sector. Generally the characteristics of this manually-tuned unit are average for the price level, though the crisp audio on FM, with something less than ideal bass definition, warrants special praise.

The usual muting is provided, and the coverage is LW and MW as well as FM. Aerial inputs are by screw terminals only. The AM ferrite-rod swings outwards but is not fully adjustable. FM basic sensitivity was $2.5\mu\text{V}$ with a requirement of around $110\mu\text{V}$ for optimum stereo.



TURNTABLE

Companion turntable is the AP-B20C, a manually operated belt-driven unit (synchronous motor) with auto pickup return. Construction generally is good for an economy-class player. The pickup arm looks slender and interestingly like a low-mass design, but the use of a rather massive and elaborate headshell loses much of the possible advantage. In fact the mass is in the upper medium area at 14g effective. Arm frictions were low but the lateral bearing revealed too much play.

The light cast platter sports an unsatisfactory mat, a fancy design of ribs and undulations, and a replacement would be essential. Start-up time was under a second and speed stability was exemplary, but some slight high rumble noise was evident in practical conditions. The magnetic cartridge, a 2g tracker, sounded edgy

and somewhat coarse, and there was no really defined deep bass.

Results in respect of acoustic breakthrough and shock isolation were rather poor. On the whole, this player is typical of inexpensive units for low-budget outfits, offering a fair balance, but really the system could do with something a little better, especially where pickup quality is concerned.



AKAI PRO-501

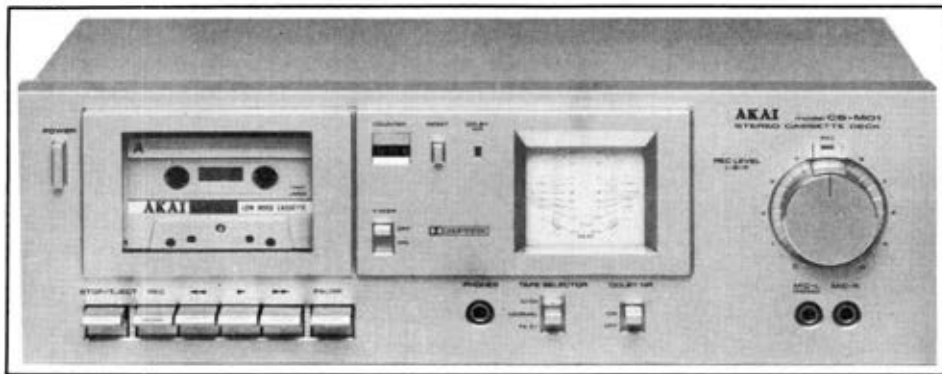
CASSETTE RECORDER

Model CS-M01 is to be modified slightly, as already mentioned. The main change is the addition of a metal position on the tape selector, and a Sendust record/replay head is replacing the existing Permalloy head.

This simple, mechanically-operated machine seems a good choice for the system and offers a nice turn of performance for the first-time buyer. If anything it tends to highlight certain deficiencies on the disc replay side. Distortion

and speed stability were acceptable for the class of product, though some patient trial and error will be needed to exploit the recorder's potential while taking into account the limitations of record-level meters which are not augmented by closer monitoring of peaks.

The damped cassette carrier was satisfactory and access to heads was fair. This machine has expected basic facilities such as Dolby, stereo microphone jacks and a headphone socket.



LOUDSPEAKERS

A pair of SR-H30 compact speakers was submitted. This nicely-made model is of the total-enclosure type, suitably rated for the system. It is presumably intended as an inexpensive product to complete the system, appealing to buyers who have no particular ambitions in this area. Driver complement is a 20cm bass/midrange unit and a 10cm pulp-cone tweeter.

Reproduction was pleasant enough at levels appropriate to background listening — but that has little to do with hi-fi. On high inputs the quality thickened and was much less likeable. There was severe shortage of detail and stereo perspective, and the general effect was tiresome.

VERDICT

Value is very good and the system embodies a lot of technical merit. The grading is awarded with an ear on speaker quality, which is hardly in keeping with the potential of the main units, and the system can be recommended with more enthusiasm if the speakers are omitted. Also, the pickup is disappointing.

AKAI PRO-504



Hi-fi by Akai exemplifies the metallic 'technical' look of much of Japanese equipment, although certain products are obtainable in an optional black finish. System PRO-504 is just one of a series of assemblies brought together from a large variety of units, each of which is available separately.

This particular outfit comes with a castor-mounted rack, robust and attractive, and in its full form embraces a timer and a graphic equaliser. These two items were not supplied for tests, although they are shown in the picture, and the price quoted at the top of the report covers the system as tested. Akai can suggest loudspeakers from their own range, though again these do not feature in the present tests.

AMPLIFIER & TUNER

Model AM-U04 DC amplifier has a nominal rating of 50 watts per channel (0.008 per cent THD) into 8 ohms and will feed successfully into loads down to 4 ohms with some increase of available power. S/N was fairly good — better has been encountered at this price level — and the unit was impeccable in respect of distortion characteristics.

The amplifier would have been made all the more attractive by the inclusion of an input for moving-coil pickups: it would be more useful by far than the complex and gimmicky loudness control. However, the normal pickup input stage

is very well executed, with a generous overload margin (nearly 300mV). There are facilities for connecting two tape machines with monitoring and dubbing.

Volume is adjusted against an illuminated scale showing relative levels and there is also an illuminated bar display to indicate the power at which the system is peaking. There is even an overload warning device for fast drivers! It is all very amusing to see in action, though driving a system to clipping (gross distortion) is hardly of the essence of hi-fi.

Switched filters have a mild effect at low and



AMPLIFIER & TUNER CONTINUED

high ends of the spectrum. Two pairs of speakers can be used separately or together, and the output-circuit protection arrangements are efficient. In addition to the usual tone controls there is a midrange control — of limited use or merit.

The AT-V04 is a typical example of a digital synthesiser tuner, covering both FM and AM. It is unusual, though, in that it has continuous tuning via a knob as well as the customary push-button array for station-seeking. Touching the control knob prepares for continuous tuning, so that one checks progress by watching the digital display instead of the old-style pointer on a scale. For the newcomer, a good example of contrast between digital and analogue.

However, there is the expected auto tuning, for which a tilt switch gives scanning up or down the bands. FM accuracy is shown by LED display, and similarly there is a display to show signal strength on FM or AM. Further, a memory

facility holds seven stations for recall on both FM and AM. Leaving aside the question of whether one would find that many stations to store in the memory, the facility is clearly the one for regular use, and it is difficult to imagine that many listeners would need any other mode except for occasional experiment.

As is often the case with such tuners, there is a fitting to accept miniature cells which keep the station store active when the system is left with the mains disconnected.

The usual aerial inputs are provided and there is an adjustable ferrite-rod for AM. Sensitivity for 50dB S/N on FM is about $3\mu\text{V}$, with a $35\mu\text{V}$ requirement for stereo. Distortion was very low and the sound quality, smooth and free from notable emphases, was much liked.

TURNTABLE

The AP-Q50C is a two-speed direct-drive turntable, in the medium-price bracket and not specially innovative, but there is the attraction of quartz crystal control of speed with phase-lock loop (PLL). This can be switched off, and then it is possible to make fine adjustment of speed. No doubt most users would keep the quartz-lock on, finding little use for the alternative.

This is a semi-automatic unit, providing for reject and the return of the pickup to its rest after play. Starting is by moving the pickup toward the disc, using the lift/lower control for cueing. The plinth is fairly solid and in the form of a loaded moulding (silver finish), with a hinged dust cover.

A platter mass of about 1.1kg includes a poorly designed mat covered with a lot of moulded ridges. A replacement of proper contour to give a snug fit for discs will be worth considering. Start-up time to 33 was 1.3 secs. The unit as a whole could be classed as fair on acoustic breakthrough and isolation from shock, while overall signal-noise performance was acceptable if not outstanding for the class of product.

The curved pickup arm with plug-in headshell

was fitted with a magnetic cartridge as a standard offering. It proved to be an Audio-Technica carrying an Akai type-number: its characteristics indicated it was similar to an AT-105. Although it tracked well enough at marginally under 2g pressure, and the bias (sidethrust) correction could be effectively set in that part of the range, the union of this cartridge with the medium-mass arm brought the main resonance down to about 8Hz, which is somewhat lower than the ideal.

In fact the low-budget pickup was not quite as compatible with the system as might be wished. A more refined quality of replay would be justifiable, bearing in mind the standard set by the amplifier and tuner. As things stand the replay promotes an edgy quality, and revelation of detail is disappointing.

AKAI PRO-504

CASSETTE RECORDER

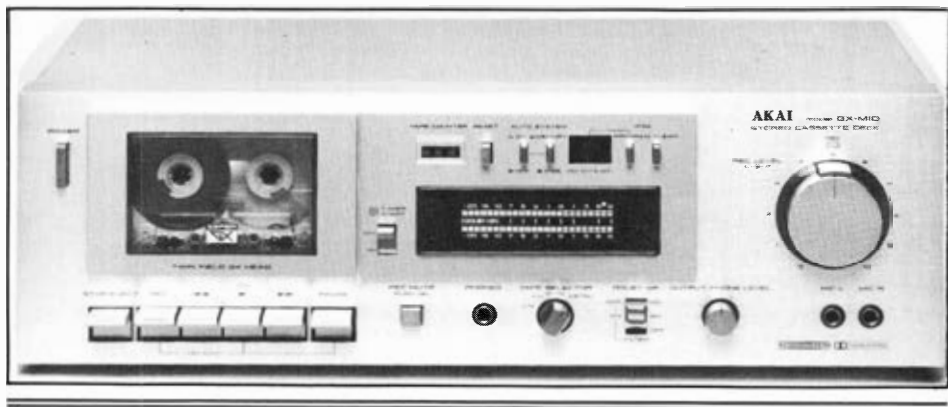
Equipped for metal tapes plus the other, more commonly used varieties, the GX-M10 has a cassette compartment which gives a clearer view than usual of the cassette — a matter of convenience, bettered only by machines using an external frame (direct-loaders) rather than a concealed mechanism. Dolby noise-reduction is incorporated.

Tape controls are mechanical press-keys with a long throw but reasonably smooth action. An illuminated bar display for recording level is like that used for output levels on the amplifier. Levels for microphone and other inputs are set by dual-concentric controls and interconnections are by both phono and DIN fittings.

Another version of the now-familiar

programme search system is incorporated. This detects gaps between recorded items and is arranged to find specific starts to programmes while the tape is fast-spoiled, the indication to the user being in the form of a digital display. A recording-mute button is also included.

This modestly-priced unit is certainly well endowed and capable of results to please the amateur user, as distinct from the more creative enthusiast, as was evidenced by encouraging dynamic range and noise performance using both metal tapes (TDK, Maxell) and popular low-noise tapes. Bass was a bit lumpy, but that is a common failing and in this case not out of tune with the price and specification.



VERDICT

This system, with many obvious attractions, was judged to be a marginal case in regard to overall merit, and the grading gives the benefit of what little doubt there may be. A reservation expressed about the quality of disc replay should not be taken as an indication of glaring discrepancy. Just the same, a higher standard here could complete one's pleasure in the system.

Although the system looks a bit expensive, it has some glamorous extras that contribute to cost, though that is not unusual in Japanese hi-fi. But audition with the Monitor Audio test speakers was well liked, especially with radio and tape programmes.

B & O SYSTEM 1700



Danish stylists Bang & Olufsen have long marketed all the parts of complete systems but have only recently presented them with housings of the kind featured in this Digest. Even then — and characteristically — the presentation is distinctive. The SC17 housing shown here is best described as a two-tier bench, arranged to give some spare space for sundries and record-storage.

The effect is smartly modern: the Danish flair gives clean lines, conceals technical complications and puts the emphasis on essentials. Whatever your preferences in appearance-design you will probably agree that the result is "defyingly different" (B & O's words). The makers call this a Beosystem and, at the price quoted, it includes everything shown in the picture. But it does not include a cassette recorder.

RECEIVER

Exemplifying the B & O design, the Beomaster 1700 looks both elegant and novel with its sloping top panel. It is longer than most receivers but very slim. There are no protrusions: all controls are press-keys, with the exception of the volume and tuning sliders which are continuous-band devices reminding one irresistibly of caterpillar tracks.

Rating is 30 watts per channel into 4 ohms (related to 0.2 per cent total harmonic distortion), so that the system is an obvious candidate for rooms of small to medium size, taking into account the modest proportions of the speakers supplied. The expected facilities include the pickup input (2mV sensitivity) and input/output connections for a tape machine.

Control is exercised by depressing a key and using the slider. Since a 'memory' is involved, the same slider can be used for a number of adjustments without upsetting any other adjustment made previously.

Radio coverage is MW and LW as well as FM. The FM-band scale is repeated five times to

permit the setting of the same number of presets. As with the audio controls, the slider is used to tune all presets, each being stored as soon as it has been chosen. Switched automatic frequency control is provided but the tuning aid is limited to a pair of beacons which are equally illuminated when tuning is spot-on (though it is as convenient to tune by ear). There is no signal-strength indication.

Two pairs of speakers can be connected, and connection of headphones to their socket disconnects speaker pair no. 1. The usual aerial inputs for FM include a 75 ohm coaxial socket, but a long-wire aerial is essential for AM. Performance on FM was excellent, with smooth and flat-sounding performance, a shade light in the bass. Stereo requirement was about 25 μ V for 50dB S/N.

TURNTABLE

Beogram 1700 is a variant of a relatively lightweight design presented in several versions by this manufacturer. It is a pretty piece of work, yet it displays a mixture of merits and demerits which can only be received with mixed feelings. One outstanding attribute is the suspended sub-assembly of platter and pickup. Another is the low-mass integrated pickup, showing an unusual and welcome design approach, especially in this price area.

This is a belt-driven, electronically regulated unit with automatic features such as pickup set-down, pause, and auto-return at the end of play. There is no manual pickup control and handling of the pickup is, in fact, made inconvenient. It all worked in fine style and the two speeds remained within a hairsbreadth of nominal during tests. There is no user-adjustment of speeds. There was no intrusive rumble under practical conditions using the system's speakers.

The results in respect of acoustic breakthrough and shock-isolation were above average. On the other hand the very light aluminium platter was not much liked. It sits uneasily on a small hub and provides disc

support on three concentric rings, leaving voids beneath the disc. It rings like a bell and there is nothing to damp it.

Effective mass of the complete pickup is low at around 6g and, with the plug-in head supplied, the bass resonance is at about 13Hz, which seems ideal for this application. It is, to say the least, unusual in a product of this calibre. The head is an MMC-20, a medium-compliance type in a version with conical stylus (about 0.6 thou. tip radius) tracking at 1.5g.

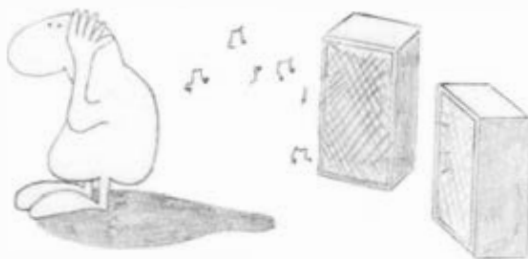
The extreme treble is not very well defined, showing a declining trend, lacking sparkle, though the general smoothness may well be liked. Bias (sidethrust) correction is not adjustable by the user and was somewhat high at the anticipated tracking pressure. Vertical pivot friction was negligible but the lateral was high at 60mg. There seems to be no technical obstacle to improvement of this player: attention to a few details could be influential. An elliptical stylus and a better platter are two possibilities.

HOMESOUND

HI-FI & VIDEO

CONFUSED? DON'T KNOW WHICH SYSTEM IS BEST FOR YOU?

REMEMBER
IT'S A SYSTEM FOR PLEASURE!



NOT FOR HEADACHES!

COME AND LISTEN IN COMFORT TO OUR WIDE SELECTION OF HI-FI SYSTEMS
FULL LOUDSPEAKER COMPARATOR FACILITIES TO ENABLE A CORRECT MATCH FOR YOU

FREE HOME TRIALS AVAILABLE

FOUR YEARS PARTS & LABOUR GUARANTEE

SYSTEMS AND SEPARATES BY

DENON • JVC • MARANTZ • MITSUBISHI • SANSUI • OPTONICA • TEAC
TOSHIBA • TRIO • YAMAHA • MISSION • NAKAMICHI • THORENS • ARISTON
SYSTEMDEK • JBE • DYNAVECTOR • GLANZ • KLIPSCH • AUDIOMASTER • IMF
MONITOR AUDIO • CELEF • HARMAN KARDON • ELITE • GRADO • IAS • AKG

MICRO-COMPONENTS BY

AUREX • MITSUBISHI • JVC

AND MUCH MORE

INSTANT CREDIT FOR CALLERS • MAIL ORDER • ACCESS, BARCLAY, OR CASH!

145, SIDWELL STREET, EXETER. TEL. 72814

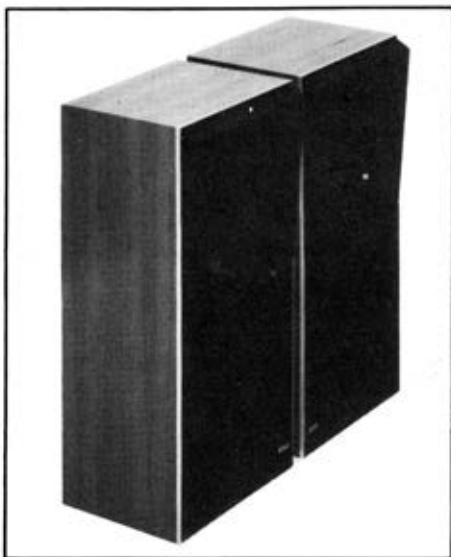
B & O SYSTEM 1700

LOUDSPEAKERS

Recommended speakers, supplied for evaluation, are a pair of S30s. This is a bookshelf model of fairly shallow proportions with dimensions 26 by 48 by 18 cm. Stand-mounting is possible, and the speakers can also be fixed on a wall (a kit of hardware is available) where space is at a premium.

Fixed leads are fitted, carrying DIN plugs to suit the receiver. As ever with such ready-made leads, the result may or may not be convenient, according to room size and layout. It would be better to supply more generous leads which the user could shorten if necessary and fit to spring-loaded terminals on the speakers. A choice of finishes is available for this speaker, which is rated at 30W and of medium sensitivity.

A well-made and simple total-enclosure with two units (bass/midrange driver and dome tweeter), the S30 was found to yield a pleasant overall balance and modest colouration, with somewhat forward projection and good detail. The sound did not exactly sparkle, especially on disc programmes, but the speaker was still preferred to many advocated for packaged systems.



VERDICT

If you are susceptible to B & O's undoubted design flair, which is put to such good effect here, you are hardly likely to find fault with the value offered, even though a cassette machine is not part of the deal. A high value grading cannot be denied.

As for technical merit, the receiver impresses as a brilliant unit while the turntable appeals less on points of detail (it's an odd mixture). So the grading is marginal and the B-1 conclusion is unusual but advisory. As a sidelight on selection, there seems to be no reason why the buyer should not explore the B & O loudspeaker range for alternative, bigger examples if these suit conditions of use.

DENON SYSTEM 70



Products from Nippon Columbia enjoy an enviable reputation among British enthusiasts, and notable among the output of this company (which is firmly based in broadcasting and recording) is a series of domestic hi-fi specialities of refinement and quality, marketed under the Denon tradename.

Doubtless this company would be capable of devising an interesting package deal further 'down market' but perhaps this would be somewhat out of character. UK distributors Eumig seem to think so, as I do. System 70 consists of units which, individually, would claim the attention of many enthusiasts looking for up-to-date designs in the medium-price area. As a whole this array stands out as one of the most attractive in my test group.

Housed in a vertical rack, simple but robust (with dark finish and some bright trim), the system includes an amplifier of generous output, a tuner, a cassette machine, and a direct-drive turntable which stands on top. Surprisingly, the latter comes without cartridge, but some buyers will welcome the freedom of choice. System 70 is supplied without speakers at the price quoted, but Denon can advise anyone who (unlikely though it may be) is short of ideas.

AMPLIFIER & TUNER

Rated at 60 watts per channel into 8 ohms (0.003 per cent harmonic distortion), the PMA-530 is a class A direct-coupled (without coupling capacitors) design, solidly made and easy to use. All controls have a positive feel, giving an impression of quality. A notable feature is the direct-couple control: this is in fact a tone-control defeat, whereby the relevant circuits can be bypassed so that the frequency response is flat from the early stages through to the outputs.

Many buyers will welcome the inclusion of extra preamplifier stages to match moving-coil cartridges of low output. Panel switching is provided for this function. For ordinary magnetic cartridges the sensitivity is 2.5mV and the overload threshold is 200mV at 1kHz, which is satisfactory. Otherwise the facilities are fairly conventional and free from gimmicks, although the familiar loudness control is included.

Among the controls are switches for a subsonic filter and tape functions, which are well thought-out for users who use two machines for copying and experiment. Two sets of speaker outlets are switched so that one pair can be used at a time, but speaker 'off' depends on inserting a headphone plug in the front-panel socket. This amplifier was liked for its low distortion, low noise levels and graceful delivery of power, promoting an impression of unstressed sound at low frequencies and indeed in all areas of high energy.

To a compatible standard, the TU-530 tuner offers the medium-wave band as well as VHF/FM. There are no preset stations on FM but manual tuning on the long scale is very smooth

and precise, while such aids as muting and a simple servo-lock are included. The usual aerial connections are augmented by a ferrite-rod aerial for AM reception. Nominal FM sensitivity is 1.7 μ V and stereo performance is good at about 35 μ V for 50dB signal-noise.

Other features include a hi-blend button to reduce noise on weak reception of stereo. An array of LED beacons serves as a signal-strength indicator and similar devices are used for indication of tuning accuracy. Smooth sound quality was evidence of low distortion and general precision of design. Performance characteristics suggest this unit will interest listeners who venture a little beyond BBC service-area restrictions on FM.

TURNTABLE

For this system Denon supply model DP-30LS, a direct-drive turntable having a lot in common with more expensive units such as the DP-2500. The raised, sloped platter surround, forming a well, reveals right away the source of the product, for it is very distinctive.

In fact, this two-speed model is attractive in its own right. It is more massive than some comparable turntables, largely due to the use of a high-density compound for the plinth. This item is made from a mix of heavy materials which have been moulded and baked, the final finish being silver. The controls can be used with the hinged dust cover closed.

The DP-30LS has the Denon speed-monitoring arrangement in which a magnetic head scans a regular series of magnetised areas on a strip inside the platter rim. This is used in conjunction with a servo system for speed-correction of the AC motor. Fine adjustment of each speed can be made with reference to a strobe. The die-cast platter weighs about 1.5kg including a mat of sensible design, and start-up time to the 33 speed was 1.2 secs.

A clever feature is the end-of-side trip using a light source and sensing cell and actuated when the pickup reaches the run-off groove. At this point the pickup is raised by a separate mechanism and the motor switched off. The black-finished pickup arm is of light alloy and in the medium range of effective mass (13g), with a plug-in headshell which, ideally, would display greater rigidity.

A variety of magnetic and moving-coil cartridges could be used, and tests were completed with Audio-Technica AT-32 and Signet 111E moving-coils. Since the turntable yields commendable results in respect of rumble and speed stability, it can be said that the DP-30LS complements the general standard of System 70. Shock-resistance was classed as fair, isolation from acoustic interference as good.



CASSETTE RECORDER

Model DR-230 is a well-endowed machine which falls in well with the system's general level of price and performance. It is a two-motor unit, with a servo motor for the capstan and a DC motor for spool drive. Control buttons are linked to quick-acting micro switches and so require only a light touch, and the 'logic' control system (an application of integrated-circuit devices) ensures that rapid changes of function can be made without stressing the tape. For instance, one can go from rewind to play without having to think about the purely mechanical consequences.

A Sendust record/replay head is fitted. There are facilities for the use of metal tape as well as the more commonly encountered varieties, and recording bias is adjustable by about 15 per cent each side of a nominal central setting. In-

structions are given on settings for various tape types but inevitably the advice will go out of date in a while, leading the user to refer back for additions to the data. Compatibility of tape and machine is a difficult subject in a time of development, but at least Denon have made an effort which is in keeping with the price level.

Other features are Dolby noise-reduction and a peak-level indicator comprising 15 beacons on each channel. Removal of the cover of the cassette compartment gives fairly good accessibility to heads for the purpose of cleaning. In all, this machine offers a lot to the general user who values ease of control and wishes to experiment with the latest types of cassette.

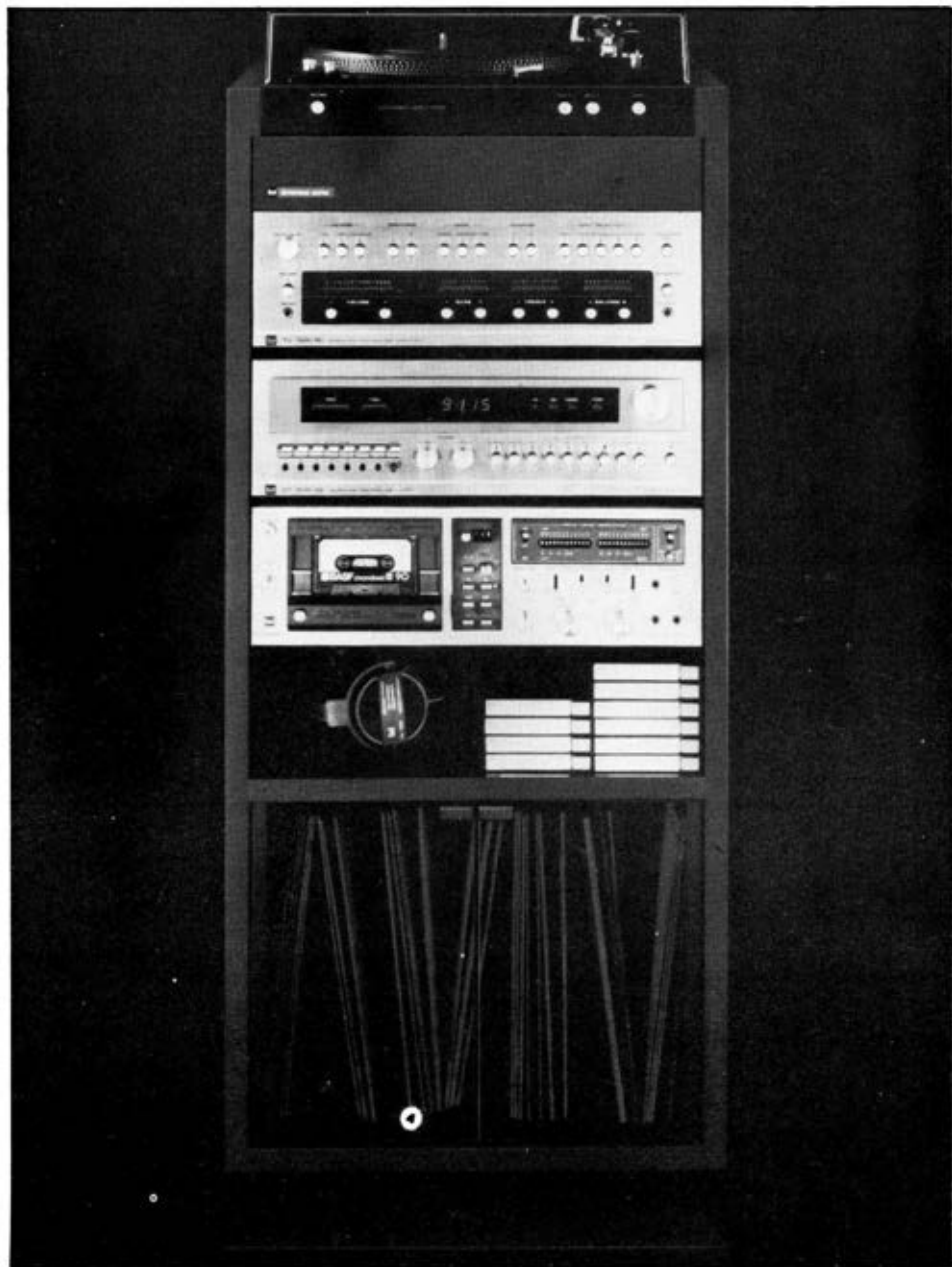
VERDICT

Although System 70 is marketed without speakers, the possibilities are wide open to those who care to listen and compare. For these trials the test pair of MA-84s was used, some reference being made to other high-grade speakers which were available at the time.

It is hardly surprising that Denon, with their long experience (70 years of development), have fostered an almost uniform standard of technical quality throughout the links in the audio chain. The disc replay aspect is particularly well judged, with scope for performance of some refinement (this is not given enough attention in many systems). But there are no really outstanding bugs in the overall planning and execution of this outfit.

Under the test regime the sound quality was distinguished by firm and well-defined bass, smooth and detailed midrange, and extended treble. Low noise and distortion levels were achieved, especially on disc and radio, and a pleasing impression was gained of wide dynamic range where this was conveyed by the programmes. I conclude that this is a well-balanced system, rating highly in the context of total-system hi-fi. It is my own view that a cartridge should be included in the turntable: Denon are qualified to make a wise choice, although I would not say the same of all manufacturers!

DUAL SYSTEM 1500



£1,450

merit **A** value **2**

System 1500 is a comprehensive system in the luxury style with just about every conceivable operational feature together with a few that may not have occurred to most enthusiasts! A particular attraction is the remote-control facility: this is not essential, since all units can be operated in the usual way, but many will regard it as an interesting and convenient extra.

A robust rack houses the considerable weight of the units safely with the turntable placed on top, space being left in the bottom for record storage. The system was supplied for test without loudspeakers, but Dual can advise on that aspect if required. All the equipment mentioned in the report is included in the price quoted — that is, with remote control but excluding speakers.

AMPLIFIER & TUNER

Without doubt the components of this system are as much fun to watch as they are to hear. The entertainment starts with the CV-1500 amplifier, a solidly made unit rated at 60W per channel (DIN), specified as a continuous rating. This unit is of the 'microprocessor' variety, packed with data stores and ingeniously contrived visual displays covering main control operations.

There is even a 'standby' function whereby the power switch can be left on while only the volume and tone control memories are operative. Design is firmly centred on feather-touch button controls, so that the one minor exception stands out oddly (a control knob for microphone input). Intrinsic in such a design is the use of two buttons for 'up' and 'down' (or 'plus' and 'minus') control of bass, treble, balance and volume, with every change indicated on a row of beacons.

Such a scheme displays its own limitations: changes of control are shown in quite large increments and response to command is relatively slow. Conventional rotary controls are quicker in action and response. However, systems based on logic devices are susceptible to development and, where the Dual system is concerned, are inseparable from the remote-control feature.

In any event certain advantages are apparent, examples being the return to flat response (after tone control operation) at the quick touch of a button, the quick selection of tape and monitor functions, muting, and selection of two pairs of speaker outlets. Also included are a loudness control plus high and low filters.

It is surprising with such an ambitious unit to find there is no provision for the connection of moving-coil pickups — a sad omission. But there are two magnetic pickup inputs, one with

switching for three sensitivities. The best overload threshold here was about 170mV, which is hardly generous, and a bit of uplift in the preamp area would not come amiss.

The amplifier runs into detectable distortion a little sooner than some units of comparable potential, bearing in mind the price (it accounts for around £400 of the total), but the reserve power is generous for most domestic conditions and the many facilities, combining the normal with the unexpected in a novel way, make this model something of a masterpiece of luxury hi-fi.

Model CT-1540 tuner is similarly well-endowed to the extent of incorporating a timer — this would be an accessory in some systems — and a variable stereo/mono switching circuit which can be set-up as required for auto changeover to mono, with a S/N advantage, when stereo becomes too weak to be useful. With this goes a variable muting control.

Tuning is continuous and quartz-stabilised, augmented by digital read-out, while coverage is FM plus medium and long wavebands. Rows of LEDs give signal-strength and tuning indications. There are seven presets (adjusting key supplied) in the form of touch controls together with a control for reversion to manual scanning.

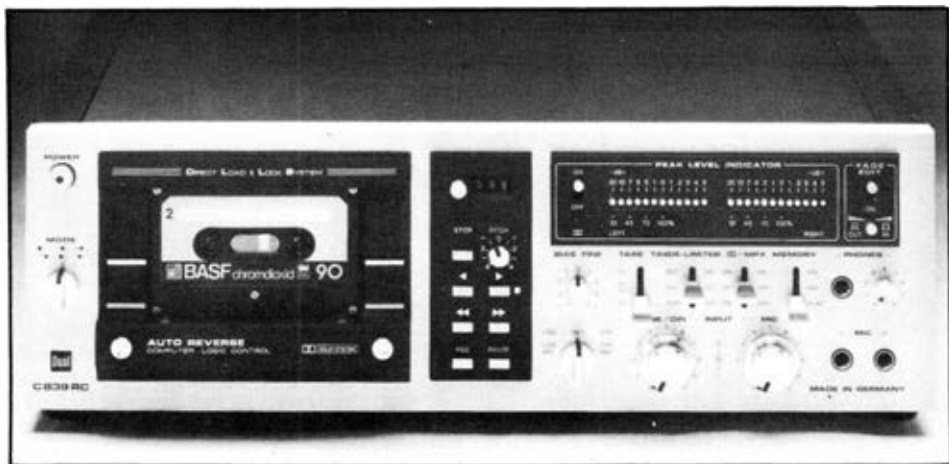
As ever, the preset-station facility is likely to prove the most useful, and the timer/clock system is also commendable. Aerial terminals include a coaxial socket for 75-ohm connection, but the ferrite-rod for AM can only be hinged outward, not swung away for orientation, so it is best to use a long-wire aerial for MW and LW. Basic sensitivity on FM was $2\mu\text{V}$ with a requirement of $32\mu\text{V}$ on stereo, and the tuner gave lively results likely to interest adventurous listeners. Smooth, extended response with some bass emphasis, readily controllable.

CASSETTE DECK

Model C-839 is a direct-loader with an open cassette holder and a hinged cover to protect the heads. Tape functions are under 'logic' supervision, smoothly acting and selected by light-touch buttons, and other features include auto-reverse, a switchable limiter, and selection of all types of tape — but without a separate bias control. Two motors are used for the double-capstan system. An unusual extra of limited applicability is the variable-speed (pitch) facility.

Several other refinements include an adjustable-voltage headphone outlet,

microphone mixing and a fade device for editing purposes. The machine is Dolby-equipped and has the familiar LED array for recording level indication. Offering smooth and extended frequency response, with the facility to make low-distortion recordings by simple and convenient means (as an experiment with TDK metal tape showed), this somewhat expensive machine appeals on grounds of its compatibility with the system as a whole. It would not be a first choice for the enthusiast wishing to control recording characteristics more precisely.



REMOTE CONTROL

A cordless, battery-powered unit RC-154 is supplied. It is a pulsed infra-red transmitter capable of sending no fewer than 32 commands to the system via a receiving point on the amplifier over a distance of about 15 metres, assuming a clear line of sight between user and equipment. It is similar to devices used for television control and the remote opening of garage doors.

Since System 1500 provides for interlinking of all units, command signals arriving at the amplifier are distributed through the system according to the modulation of the beamed signal. In the unlikely event that commands are

to be sent over a tortuous route (from another room, for instance) the suppliers can advise on adaptation. However, remote control is not obligatory: the system functions in a normal way without it.

RC-154 is a hand-held unit, rather like a calculator. It is probably as small as such devices can be made at present. Human fingers do not become smaller to meet the needs of new technology, and the risk of tapping two buttons (or the wrong one) is always present — unless a pencil is used to tap with! Errors do no harm but can prove irritating.

DUAL SYSTEM 1500

TURNTABLE

The CS-680 automatic player is well chosen for the system. It is characteristic of Dual in its styling and the system of spring suspension within a fairly massive plinth. This model is an electronically governed direct-drive turntable with fine-speed adjustment and an illuminated strobe in the form of marks on the platter rim. The fixed mat offers reasonably good disc support. Start-up time to 33 was 2 secs.

Auto operation is inevitable since the unit is part of the remote-control scheme. Its performance was well in accord with the standard of System 1500 in respect of S/N, the

low rumble content being particularly well reduced, and speed stability also was satisfactory. Acoustic breakthrough and shock-resistance were average for this class of unit.

A notable feature is the gimbal-mounted pickup in which a version of Ortofon's lightweight magnetic cartridge — designated ULM-55E — is fitted as standard. This low-mass arm (8g effective as set for the Ortofon), with negligible pivot frictions and a satisfactory bias device, makes a better impression than the average component on integrated players associated with packaged systems.



VERDICT

This is a well planned luxury system of considerable technical merit, confirmed by trials with the MA-84 test speakers. But a judgement on value is difficult: so much depends on how attracted you are to the novelty of the control arrangements which vie with basic performance for your attention. System 1500 is well into the realms of gimmickry — or a clever product of high technology, according to your views on such matters. Excellence of quality can hardly be disputed and overall performance is very good.

DYNATRON RICHMOND



It may not be well appreciated that Dynatron have been at least part-way into the hi-fi business for some considerable time. What is perhaps more apparent is that the company specialises in what it terms 'classical' cabinet styles. As an example of this, the Richmond is a cupboard-on-chest design, the lower cabinet being devoted to disc and cassette storage.

This is a receiver-based system, supplied with its own speakers. Particular care is taken over distribution of mains within the system, for which purpose a ready-wired socket box of safety-approved design is supplied. It fits at the rear of the equipment console. Japanese and Singapore-made units are the mainstays of the system.

A conventional manually-tuned receiver with FM, LW and MW coverage, this unit has a power rating of 40W per channel into 8 ohms (0.08 per cent THD). Control line-up is normal enough, with selection of alternative pairs of speaker outlets, tape interconnections (two machines can be used), loudness, filters and muting — all with miniature push-buttons. The only offbeat feature is provision for driving 'motional feedback' speakers.

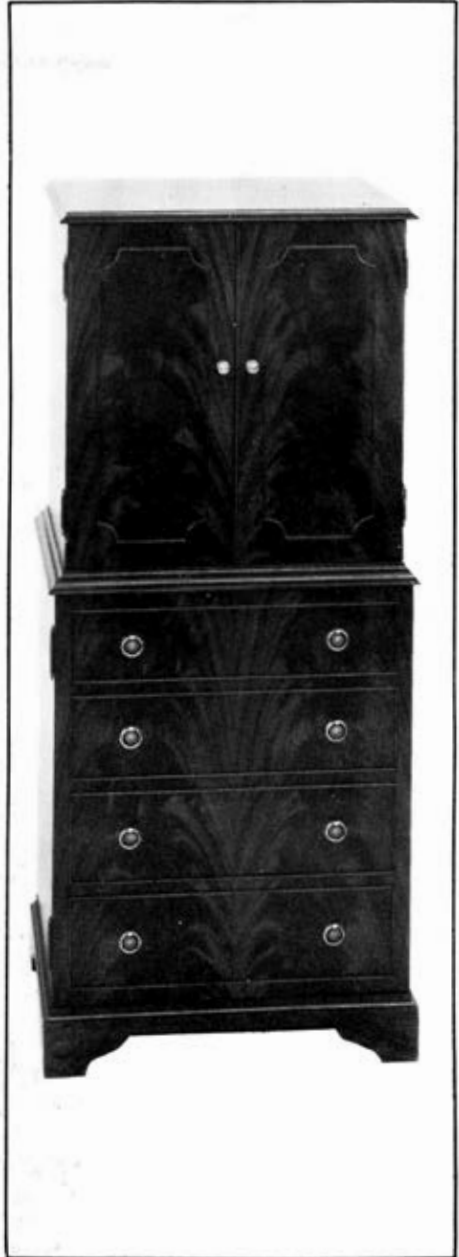
Overload threshold for the single 2.5mV pickup input was a fair 140mV. As for the radio section, it was disappointing to find there were no station presets, bearing in mind the price of the system, but the smooth tuning and excellent audio quality were liked. Sensitivity was a basic 3µV, with 52µV for 50dB S/N on stereo.

Aerial connections include a coaxial 75 ohm FM terminal, while a ferrite-rod is fitted for AM. This can be swung outward but not otherwise orientated, and it is advisable to use a long-wire aerial for MW. In all, a worthy effort if not a very ambitious one. Bass performance lacked a little in firm definition at high levels.

TURNTABLE

This is an electronically governed two-speed unit with belt drive. Of fairly light construction (the plinth is largely of plastics), the turntable offers familiar semi-auto functions and fine-speed adjustment with the aid of an illuminated strobe. Auto-return of the pickup and reject are the principal functions.

The transmission showed a slight tendency towards speed-hunting, affecting stability, but there was no rumble problem as judged with the system's speakers. Acoustic breakthrough results were fair. The S-shaped arm carries an ADC headshell and a QLM-series cartridge by the same maker. It seems a reasonable choice for the high-mass arm. However, disc sound lacked refinement and detail, and it seemed that various details of construction conspired to produce this effect.



OPEN YOUR EARS TO BEYER DYNAMIC

If you demand the best from your hi-fi equipment, Beyer Dynamic have made the DT 440 headphones just for you. This elegantly designed, open high velocity stereophone is a marvel of superb technology and craftsmanship.

The DT 440 brings you beautifully tight bass response, pinpoint accuracy on the mid-range frequencies and the clarity on the high makes them sound heaven sent.

The clean, transparent quality of the overall sound proves that the DT 440 is capable of

faithfully relaying all the nuances of the signal transmitted.

Beyer Dynamic believe that the discerning audiophile can only fully appreciate his music in comfort. So we have designed the DT 440 with just that in mind.

The adjustable headband is fully covered by an extra soft padding and the foam ear cushions provide a good sound seal without crushing your ears.

The DT 440 is just one of a wide range of headphones offered by Beyer Dynamic. Every model gives you the ultimate in innovative technology and provides the ideal finishing touch to your sound system, whatever your needs.



For the complete catalogue of Beyer Dynamic Headphones, send this coupon to the address below



DT 440 headphones

Beyer 
Dynamic

Beyer Dynamic (GB) Ltd, 1 Clair Rd., Haywards Heath, Sussex RH16 3DP. Tel: (0444) 51003

DYNATRON RICHMOND

CASSETTE RECORDER

Well gauged for the standard of the system, the recorder has entirely mechanical controls, including press-keys for tape-transport functions (reasonably positive, with a short throw). Dolby is incorporated and there are separate equalisation and bias settings for commonly-used tapes, excluding metal types.

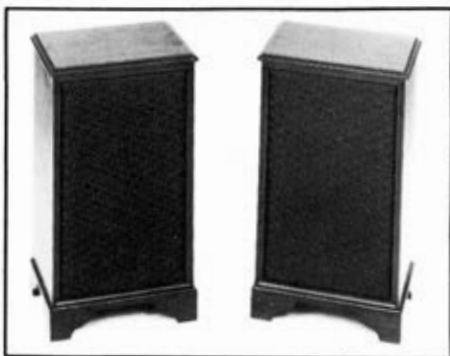
A nicely damped cassette-eject action and a separate line-output control were regarded as

plus-points on this class of machine. Head accessibility was fairly good. The record-level meters would hardly be acceptable to critical users (it is a basic matter of ballistics, as usual), but the addition of a 'peak' warning beacon is useful. No particular criticism could be directed at the essentials of performance of what is an unpretentious unit for occasional use.

LOUDSPEAKERS

Matching in cabinet style as well as technically, the speakers are total-enclosure types with three drive units — 20cm bass, 12cm midrange and 6cm paper-cone tweeter — forming a system of 8 ohms nominal impedance, rated at 45W. The enclosures are solidly made and well finished.

These speakers were considered somewhat better than average for packaged systems, but still it was possible to criticise overall balance, for the bass was rather thin, the high treble inclined to be a bit 'tizzly' and forward, and the stereo imaging left a lot to be desired.



VERDICT

Although individual parts display some merit, the system as a whole does seem expensive. There are no technical innovations: the emphasis is on the distinctive Dynatron cabinet style. The grading is put forward with an eye on the general standard reached by a wide variety of systems. You may feel inclined to adjust the verdict if this manufacturer's cabinet presentation is just what you want. Bear in mind, though, that it has been necessary to judge the system exclusively with its own speakers because, on grounds of visual design, it would hardly be practicable to make a substitution.

FERGUSON SYSTEM 25



AMPLIFIER & TUNER

In relation to its rating of 25 watts per channel (8 ohms, 0.1 per cent harmonic distortion) the 3939 amplifier is big, if not very heavy. The same is true of the tuner, but the visual match is good and the styling pleasing. Amplifier facilities are acceptable enough having regard to cost: controls include rumble filter, loudness and muting buttons, and a switched arrangement to permit tape dubbing.

Power meters are fitted, but these are as sluggish in response as is usually the case and therefore augmented by a peak-reading LED overload indicator. As a low-power unit the 3939 has much merit, delivering its output without fuss, though the noise level at outputs near to maximum (especially on pickup) was markedly higher than from more refined units.

Model 3938 tuner covers long-wave and medium-wave bands as well as FM. Good basic properties include stereo/mono switching, automatic frequency control, muting, a stereo beacon, and meters for tuning and signal strength. A useful extra is a 'level' button, replacing the programme by a tone which can be used to adjust recording levels on the cassette machine.

With usable FM sensitivity of $2\mu\text{V}$ (about $300\mu\text{V}$ on stereo), and taking into account performance as a whole, the tuner is of interest mainly to those who restrict themselves to BBC service-area reception plus occasional excursions along the AM bands. Sound was low in distortion but light in the bass, inclined to promote an impression of treble emphasis.

Already familiar, this well established model represents an attempt by Thorn to offer a complete components system at fairly low cost. The appeal is to buyers who are not committed hi-fi enthusiasts, some of whom might favour a table-top 'music centre'. Thorn proffer this alternative, showing how modern audio can take over from the old-style radiogram.

System 25 includes a pair of free-standing loudspeakers. The equipment cabinet, which arrives in a flat pack for self-assembly, is simple and strong, equipped with a glass door, and there is provision for disc and cassette storage.

A practical point concerns the distribution of the mains supply to the units via safety-approved sockets on the rear panels, the turntable being supplied from the nearest unit. This means that a single lead runs from the wall socket to the cabinet. Signal leads are all tailor-made and fitted with DIN-pattern connectors. The instruction booklets are exemplary in their clarity.

TURNTABLE

Semi-automatic record player 3937 is a two-speed unit, belt driven with DC motor, electronic control and a platter-edge strobe for checking speed. Fine adjustment of speed is provided. Construction is light, for the mechanism is built into a moulded plastics base (black and silver finish), but there is the advantage of a sprung sub-frame carrying the pickup and platter.

The pickup, of medium effective mass, exhibited some play in the vertical pivot. It was noticed that the original System 25 specification listed a Shure M75-series cartridge, but an Audio-Technica CN2700 is now fitted. This is an OEM 'special' (a product supplied by one manufacturer for use in another's equipment) and may well have been chosen to raise the resonant frequency of the pickup, which was unduly low with the Shure.

Some rumble was audible at high sound levels through the system's speakers and, although the

pickup tracked well at 2g pressure, the sound quality was inclined toward high-range coarseness (the stylus is spherical-tipped, not elliptical). The pickup headshell is not very substantial — inclined to flex. While the turntable could be classed as fair in respect of acoustic breakthrough and shock-resistance, performance as a whole suggested too strongly that the primary aim has been cheapness. The system warrants a little more attention to detail.

LOUDSPEAKERS

Matching speakers type 3942, completing the system, are of total-enclosure design with 20cm bass drivers and dome tweeters. Cabinet finish is good and a contrasting Declon foam grille is fitted. Alas, the speakers were acceptable only for background music at low levels. On higher inputs they exhibited a congested effect and much colouration through the midrange. Very fatiguing.

Cabinet panel resonance was a factor in the

coloured and unrealistic result. Treble lacked sparkle and the bass was indeterminate. Stereo presentation was very poor. These speakers seriously limit the system's performance.

FERGUSON SYSTEM 25

CASSETTE RECORDER

Basic in its facilities, the 3936 cassette unit is pleasingly simple in use. It has purely mechanical press-key controls, as expected at this price level, and a hinged cassette loading device with damped action. The line-up includes Dolby noise-reduction, a three-digit counter, and bias and equalisation switching for standard ferric, ferric-chrome and chrome dioxide tapes. The fast action of the record-level meters was approved.

Checks for wow and flutter indicated below-average performance and the frequency

response declined more sharply than was desirable below 150Hz, but distortion was moderate and noise levels satisfactorily low. In all, the results were reasonably in tune with expectations from an economy-class unit, unlikely to disappoint those who make occasional and relatively uncritical use of the tape medium.



VERDICT

Although a lot is offered for the price, System 25's good features are mostly set at nought by the dreadful speakers. Substituting the test pair of Krystals brought about a notable improvement, with cleaner sound, better stereo imaging and a dramatic reduction of colouration. Minor deficiencies in the system, such as lightness in the bass, were of course revealed. Radio was considered to be the most pleasing programme source in this outfit, and the amplifier was also liked.

The first hi fi you bought probably seduced you with its good looks.

Maybe it looked and sounded great in the showroom, but once you'd got it home and listened to it a few times, you realised it wasn't the one for you.

The honeymoon was over.

The second time around, chances are you will be a few years older, a little wiser and, hopefully, several pounds richer.

You will pay more attention to technical details:

Does the amplifier have a good dynamic range, 70 wpc output with 0.005% distortion and a Direct ADC servo circuit?

Is the cassette deck metal tape compatible, with separate drive and take up motors and full logic touch controls?

Does the FM/AM tuner have linear phase ceramic filters and servo lock tuning?

Is the record deck direct drive with a special turntable speed monitor and an opto-electronic end of record sensor?

Of course, none of these features are unique to System 70.

But together, coupled with Denon's 70 years experience in professional sound reproduction, they make it the perfect second choice.

Please send me details of Denon System 70.

Name _____


Address _____

To: Eumig (UK) Ltd, 14 Priestley Way,
London NW2 7TN.

DENON[®]
THE PROFESSIONAL
STANDARD IN HI-FI.



Second choice.



40 years after we invented high fidelity, Fisher technology still leads the world.



In 1937 Fisher built the first high fidelity sound system featuring a beam power amplifier. Since then, an impressive list of audio firsts have been researched and engineered by the company.

Today, Fisher is still setting the quality standards for the industry with a superb range of tuners, amplifiers, receivers, cassette decks and turntables.

Illustrated above is the Fisher MT6360 Linear Motor Drive Turntable with infra-red remote control. The micro-processor automatically moves the arm to play the selected track. You can repeat the same track, select another or play the entire record over again all by remote control. And there's LED readout to show the track being played.

The MT6360 has Fisher's exclusive Linear Motor Drive. The only moving part is the platter itself so there's virtually nothing to go wrong. And no inherent turntable noise. Wow and flutter is just 0.03% DIN.

There's a lot more including a servo circuit that continuously monitors and locks in record speed, a strobe light and fine speed control.

Every Fisher unit combines the newest technological developments with over 40 years of high quality production experience.

It's a record you can't ignore when you come to choose hi-fi.

Send off the coupon for full literature on Fisher and the name and address of your nearest stockist.



To: Fisher Sales UK,
Units 1/4, Walter Lawrence Estate,
Otterspool Way, Watford WD2 8HL.
Tel: 0923 31974.

Please send full details on the Fisher range and the name and address of my nearest stockist

Name _____
Address _____

FISHER
The first name in high fidelity



IT'S ALMOST LIKE FALLING IN LOVE

Not to put too fine a point on it, listening to Trio is like falling in love.
With the music.
Because that's all you hear. No noise. No distortion. Just beautiful,
beautiful music.
You could get carried away.



TRIO

HI-FI STEREO

Ask for details of the full range of Trio Hi-Fi Stereo:

Exclusive United Kingdom Distributors:
B. H. Morris & Co. (Radio) Ltd., Precision Centre,
Weather Park Drive, Wembley, Middx. HA0 1SU Phone: 01-902 9422

V-Series COMPONENT SYSTEMS

Fishe is available from these Hi-Fi Markets Specialist Retailers

LONDON
London EC2
 48 London Wall Tel 01 6280537
London E17
 67 Central Parade Hoe Street
 Tel 01 520 7277
London N13
 88 Pentonville Road Tel 01 837 4416
London NW1
 359 Green Lanes Tel 01 882 5888
London NW6
 79-81 Farnley Road
 Tel 01 638 6666
London W1
 17 Tottenham Court Road
 Tel 01 580 7731
 185 Tottenham Court Road
 Tel 01 631 1424
 In Store at Lion House
 227 Tottenham Court Road
 Tel 01 580 7383
 231 Tottenham Court Road
 Tel 01 580 3459
 242 Tottenham Court Road
 Tel 01 638 9979
Marble Arch W2
 38 Edgware Road Tel 01 723 3071
 Tel 01 992 4788 2405
London W3
 86 High Street Acton
 Tel 01 992 4788 2405
London SE1
 23 York Road Tel 01 928 6843
London SE
 38 Windsor Arcade Bromley
 Tel 01 464 2260
London SE13
 66 Lee High Road Lewisham
 Tel 01 318 5755
London SE18
 162 Powis Street Woolwich
 Tel 01 855 9016
London SE25
 79 High Street South Norwood
 Tel 01 653 4224
London SW2
 57 Arlington Arcade Brixton Hill
 Tel 01 735 6708
London SW7
 14 Bute Street Tel 01 589 2586

REST OF BRITAIN

Aldershot
 81 High Street Tel 0252 20728
Amerham
 16 Mill Avenue Tel 02403 21343
Arlebury
 8 South Street Tel 0296894 19
Barking, Essex
 75 Station Parade Tel 01 594 3526
Barnsley
 40-42 Sheldrick Road Tel 02265459
Barnwell
 172 Dalton Road Tel 0229 20473
Bedford
 2351 Peters Street Tel 0234 46058
Beveley (North Humberside)
 91 Hemingale Tel 0482862636
Birmingham
 35 37 Hurst Street Tel 021 622 2323

Blackpool
 4 Deansgate Tel 0253 28357
Bolton
 156-158 Blackburn Road Tel 0204 22636
Bournemouth
 254 Old Christchurch Road
 Tel 0202 291524
Bristol
 15 17 North Parade Tel 0274 3911 66
Brighton & Hove
 136 138 Portland Road Tel 0273 723399
Bristol
 36 Union Street Tel 0272 294 183
Cambridge
 19 20 Market Street Tel 0223 51791
Canterbury
 21 The Burgate Tel 0227 65315
Carlisle
 Victoria Viaduct Tel 022820230
Castleford (Yorks)
 64 & 85 Beancroft Road
 Tel 0977 553666
Chatham (Kent)
 4 Ranway Street Tel 0634 46859
Chelmsford
 5 G Cornhill Tel 0245 57593 64393
Cheltenham
 287 High Street Tel 0242 22317
Chester
 1, 2 Castle Street Tel 0244 241 79
Chichester
 125 Sheldrick Road Tel 024634923
Chichester (Sussex)
 12 South Street Tel 0243 787562
Colchester
 49 55 North Station Road Tel 020649842
Conington (Cheshire)
 64 Launceston Street Tel 02602 5649
Crawley
 106 Victoria Street
 Tel 0270 111091
Croydon
 252 254 Lower Addiscombe Road
 Tel 01 654 1231 2040
Darlington (Durham)
 23 South Street Tel 0306882897
Dunstable
 45 Katherine Drive Tel 0582 67750
Eastbourne
 28 Grove Road Tel 0323 27362
East Grinstead
 2 High Street Tel 0342 27787
Fareham (Hants)
 15 17 West Street Tel 0329 283421
Gillingham (Dorset)
 The Square Tel 07476 2474 2728
Gosport (Hants)
 79-83 Stone Road Tel 0701 834666
Harlow, Essex
 2 Westgate Tel 0279 26155
Harrow, Middle
 10 World Lane, Harrow Weald
 Tel 01 427 1227
Hartlepool
 7 The Shopping Centre Tel 042966347
Hastings
 3 Marine Court, St Leonards on Sea
 Tel 0424 393150
Havant (Hants)
 52 West Street Tel 0705 451425 452025

Haywards Heath (Sussex)
 13 South Road Tel 0444 50333
Hemel Hempstead
 13 The Marlowes Tel 0442 40999
Hitchin
 Hemingfold Road Tel 0462 4537
Ipswich
 87 Norwich Road Tel 0473 217217
Kendal
 185 Highgate Tel 0539 25728
Kettering
 68 Sainsbury Road Tel 0536 515266
Leicester
 27 Churchgate Tel 0533 58662
Lincoln
 271a High Street Tel 0522 20265
Liverpool
 20 22 Whitechapel Tel 051 7099898
Loughton, Essex
 182 High Road Tel 01 5080247
Manchester
 25 29 Station Road Urmoston
 Tel 061 747 5181
Middlesbrough
 235 Linthorpe Road Tel 0642 248793
New Malden
 25 High Street Tel 01 942 9567
Newcastle upon Tyne
 33 Handyside Arcade Tel 0632 27791
Norwich
 161 Unharm Road Tel 0603 22833
Nottingham
 156 Abington Road Tel 0602 784015
Oxford
 296 Banbury Road
 Tel 0865 53072 511767
Plymouth
 392 Cornwall Street
 Tel 0752 60264
Preston
 51 Fishergate Tel 0772 53057
Reading
 49 Woodingham Road
 Tel 07346 1416
 103 Cuckshamwell Road, Woodley
 Tel 0734 691758
 130 131 Friar Street
 Tel 0234 509507
Rochdale
 52 Great Street Tel 0706 524652
Romford
 38 North Street Tel 0708 268403
Salisbury
 17 Bulcher Row Tel 0722 22746
Shaftesbury
 33 High Street Tel 0747 2649
Sheffield (Totter)
 172 Blacklow Road Tel 0742 360295
Slough
 5 Old Crown Buildings Windsor Road
 Tel 0753 21021
Southampton
 37 Bedford Place Tel 070328434
Southern
 149 Leigh Road Leigh on Sea
 Tel 0752 79134
Southport
 6 P Rices Street Tel 0704 36901
Stamford
 9 Red Lion Square Tel 0780 2128

Sunderland
 20 22 Waterloo Place Tel 0783 57578
Swindon
 91 92 Commercial Road
 Tel 0793 28383
Tarboro Wells
 67 Grosvenor Road Tel 0892 21069
Warwick
 Wharf Street Tel 0926 43796
Watford
 131 The Parade Tel 92 34644
Wendbury (West Midlands)
 1 Upper High Street Tel 021 556 0473
Wigan
 12 Woodcock Street Tel 0942 37977
Witley
 29 Elm Street Tel 0993 2414
Woking (Surrey)
 27 Chobham Road Tel 04862 4926
Wolverhampton
 11 Salop Street Tel 0902 23980
York
 7 Daygate Arcade Tel 0904 51712
NORTH WALES
Bangor
 19 Wellfield Arcade
 Wellfield Shopping Centre Gwynedd
 Tel 0248 2951
Colwyn Bay
 38 Station Road Tel 0492 30982
SOUTH WALES
Milford Haven
 25 Robert Street Tel 064624078
Swansea
 31 Onhor Street Tel 0792 54747
SCOTLAND
Aberdeen
 44 445 Holburn Street Tel 0224 25713
Edinburgh
 34 Northumberland Street
 Tel 031 557 1679
Gillingham (Dumfries)
 340 342 Gyle Street Tel 041 221 8958
Kilmarnock
 49 The Foregate Tel 0563348226
Nairn
 76 High Street Tel 0667 52230
NORTHERN IRELAND
Belfast
 85 Royal Avenue Tel 0232 29907 41331
 Fountain Centre College Street
 Tel 028 2851437
ISLE OF MAN
 Glen View Tel 0624 851437
CHANNEL ISLES
Guernsey
 Rue de Marais Vale Tel 0481 55573
Jersey
 69 King Street St Helier
 Tel 0534 21735



Head Office, Colnway Way, Watford
 Herts. Tel 0262 32737
 Prices correct at time of going to press
 All Prices include VAT @ 15%

HI-FI MARKETS

The place where people care about hi-fi

Your best buy . . .

is of most concern to you. Rarely is it also the concern of the hi-fi dealer. Yet, Hampshire Audio is one of those rare Independent Hi-Fi Specialists who put quality and value first and foremost. Volumes abound on the whys and wherefores of this and that . . . black is proved to be white, and white black . . . but you still have to make a choice. Buying hi-fi should not be like betting on a horse, whether you study form in detail or just use a pin. On average the punter does not win because the odds are stacked against him. Test reports never show variability between different samples nor general reliability — good or bad — but these facts a good dealer learns from

experience. In any event your requirement might be best met by a model not included in test reports. The risk is just not worth it, so approach Hampshire Audio if you have not already been recommended to come to us. In fact, recommendation we consider to be our most effective form of advertising (sorry System's Digest and other magazines). Recommendations from those persons who really appreciate the joys of music are valued greatly for enjoyment is the final result of our endeavours. This we are committed to. Hi-Fi equipment is our only speciality and we stock nothing else.

Come and try us . . .

. . .at Hampshire Audio Ltd

8 & 12 HURSLEY ROAD, CHANDLER'S FORD, HANTS. TEL: (04215) 2827 & 65232

Your best buy . . .

We stock selected items from the ranges of:—

ADC Aiwa AKG A & R
AR Arison B & W Beyer
Celef Celestion Chartwell
Decca Denon Dual Dumpa
 Elite Entré Eumig
Ferrograph Fuji Gale Glanz
Grace Grado Hadcock
Harbeth Heybrook IMF
Infinity JPW JVC KEF
Lentek Linn Isobarik Linn-
Sondek Maxell Meridian
Michaelson & Austin Michell
Mission Monitor Audio
Nakamichi Nightingale Optonica
 Ortofon QED QUAD
Radford RAM Reference
Revox Rogers Sansul Satin
 Sennheiser SME Spondor
Stanton Stax STD Sugden
 Supex Swallow Syrinx
Systemdek Tangent TDK
Technics Trio UAD Yamaha

► OPEN THURSDAYS UNTIL 8pm

► OVER-THE-COUNTER AND PERSONAL EXPORT

► TAPE BY FUJI, MAXELL, SONY AND TDK

ALL EQUIPMENT CHECKED BEFORE SALE
NO SEALED BOXES SUPPLIED

► OUR OWN TWO-YEAR LABOUR AND PARTS GUARANTEE

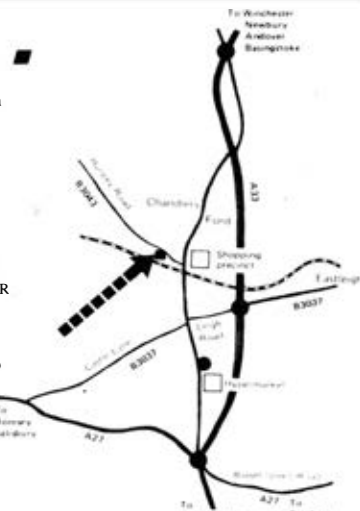
► EXTENSIVE FREE PARKING

► ACCESS AND BARCLAY CARD ACCEPTED BY TELEPHONE

► SPECIAL DISCS STOCKED

COMPARATOR DEMONSTRATIONS IN THREE STUDIOS

All enquiries with S.A.E.



. . .at Hampshire Audio Ltd

8 & 12 HURSLEY ROAD, CHANDLER'S FORD, HANTS. TEL: (04215) 2827 & 65232

FIDELITY 350



AMPLIFIER & TUNER

Power rating of the 350A amplifier is 35 watts per channel into 8 ohms (0.08 per cent total harmonic distortion). Essentials of performance were liked, although noise level (hum and hiss) was a shade worse than average. A normal set of inputs includes the 3mV pickup input with an acceptable overload level of 28dB. Trimmings included a pair of output-level meters, no more relevant to the actual power dissipated in the speakers than is usual with such gadgets.

Other facilities are a concentric volume and balance control, a two-position loudness switch, and provision for switching two pairs of speakers, which can be used independently or together.

High and low filters are provided, as are two headphone sockets. While the control layout is generous, it made a variable impression. The toggle switches are fine but the rotary controls felt much less positive.

Tuner model 350T is ambitious in its coverage, for it includes a short-wave band as well as MW, LW and FM. Further, it features six AM/FM presets. All this is supplemented by meter indicators of signal strength (no centre-zero

meter, though), muting and switched automatic frequency control. Tuning along the scale was stiff: a far cry from slick imported units.

Usable sensitivity on FM was $2.6\mu\text{V}$, but at least $400\mu\text{V}$ was needed for adequate stereo. So although the AM bands can provide some fun, the FM performance is hardly for the adventurous or the VHF connoisseur.

Quality on BBC FM in the service area was excellent, with a well-balanced sound, free from undue emphases. Careful attention to the aerial is necessary for acceptable signal-noise results. A 300-ohm aerial terminal is fitted but there is no provision for 75-ohm matching via a coaxial socket. This leaves two options: either connect the coaxial lead to the socket as it stands, or connect it via a device called a 'balun' (matching transformer) for optimum results. Suppliers can advise on this, no doubt, but Fidelity should have been more helpful in the first place. The instruction manual gives minimal information on this aspect.

Fidelity Radio's 350 is a British system sold complete with its own loudspeakers and a plain but strong cabinet of horizontal design arranged to provide storage for discs, cassettes and sundries. The system as a whole, on the evidence of power rating, is best suited to rooms of small to medium size, but the equipment is quite bulky because the units are big in relation to their capabilities. This is bound to be a factor affecting choice.

A welcome feature is the provision for mains distribution within the system. This is arranged by means of shuttered sockets and appropriate connecting leads, so that the supply can be drawn from a wall-socket via a single cable. Signal connections are made by DIN-pattern plugs and sockets. The record player is intended to stand on the cabinet in a position that puts the greatest distance between the pickup and other items.

TURNTABLE

Made by BSR, model 350P is a two-speed direct-drive turntable with electronic control and a fine adjuster for each speed, aided by an illuminated strobe. Largely formed from two plastics mouldings, the plinth is well finished and surmounted by a hinged acrylic dust cover of good quality.

This is a semi-automatic player with a reject control and return of the pickup to its rest at the end of the record side. The motor is started by moving the pickup away from its rest, and cueing at start of play (or elsewhere across the disc) is manual, aided by a damped lift/lower control. Platter mass is about 1.2kg, including a rubber mat of reasonably sensible design, and start-up time to 33 was 2 secs.

Of conventional design, the arm is in the upper range of mass (effective mass 15g plus cartridge) and equipped with a bias correction device

which has an acceptable action in the expected range of setting — above 1.5g. An ADC headshell is supplied, and in this is fitted a Shure M75-6 cartridge, a version with a conical stylus.

While the overall signal-noise performance was acceptable in relation to cost, as was isolation from mechanical shock, the sound quality made a poor impression. The coarse, poorly detailed sound was very disappointing, and the sensitivity of the unit to acoustic breakthrough was a disadvantage. Dynamic performance under practical conditions was open to question, and the turntable displayed a tendency toward speed-hunting, lacking short-term stability. Substitution of a more refined cartridge could overcome part of the objection to the 350P: a better, equally compatible example should have been fitted initially.

CASSETTE RECORDER

Companion unit 350C is a straightforward machine with a closed cassette compartment (with damped reject action) and mechanical press-key controls which were considered to be better than average in respect of ease of use. A cover over the compartment door is intended to improve access for purposes of maintenance.

The unit is Dolby-equipped and sports a pair of recording-level meters without benefit of any extra peak-warning device. Tape selection for standard, ferro-chrome and chrome dioxide is reduced to the simplest switching covering both bias and equalisation in one operation. So the machine is more for those who are uncritical when it comes to creative recording, and rather

less for those who experiment with innovations in tape.

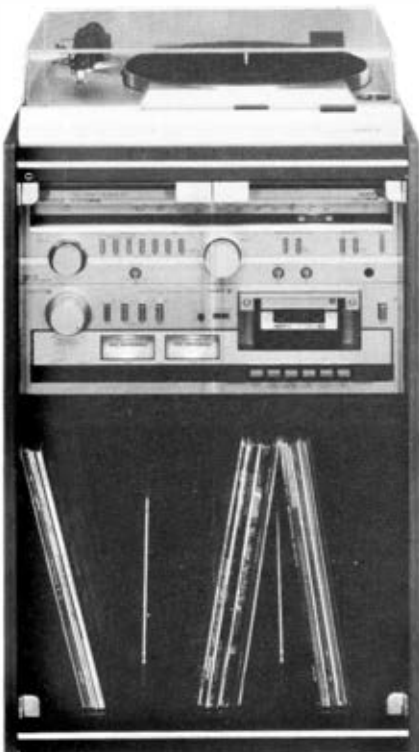
However, noise levels and distortion attracted no special criticism in view of the class of product and it was possible to obtain a useful response up to 15kHz. Speed stability was considered very good but mechanical noise was noticeable from the test sample. An honest design, if not an elaborate one, and it fits into the system quite well.



TRIO

HI-FI STEREO

- TRIO V-710 SYSTEM
- * 28 watts RMS per channel high speed DC three wave-band receiver.
 - * Belt-drive turntable complete with Ortofon FF15E11 cartridge.
 - * Dolby system cassette deck.
 - * Tailor-made rack with woodgrain finish and smoked glass doors.



See and hear the new Trio component systems at:-

Yeovil Audio

HOME ENTERTAINMENT FOR THE DISCERNING

3 Princes Street, Yeovil. BA20 1EN. Telephone 25430

PIONEER AND SONY SYSTEMS ALSO STOCKED.

LOUDSPEAKERS

A pair of 350S speakers are supplied as standard. This model is a three-way system (bass, midrange, tweeter) in a total-enclosure of 25 litres capacity, with a veneer finish and proportions that ensure a fair match with the rest of the installation. Nominal impedance is 8 ohms and the power rating is 40 watts. Use of fixed leads terminated with DIN plugs is inconvenient: it is bound to mean that some users must cut and extend the leads to suit themselves.

Despite some midrange colouration, these speakers were at least a cut above some of the sorry specimens supplied with packaged systems, for they yielded a reasonable tonal balance and fair clarity. On the other hand the bass was ill-defined and the speakers did not take kindly to very substantial inputs. It would have been better if Fidelity had not been so concerned with keeping the price down.

VERDICT

A lot of equipment is offered for the price, so it is tempting to rate the system highly for value. But there are weak points which forbid unqualified commendation, and trials with substitute speakers only served to show these up. Radio was well liked and the cassette unit is well gauged as an adjunct to a low-cost outfit.

Disc replay was a let-down, and this is serious because of the popularity of the medium. Fidelity should upgrade in this department. The speakers are not very exciting either. In short, the standard achieved is not uniformly up to expectations, and ideally one would use superior speakers and do something about the disc player.

FISHER RACK SYSTEM



Fisher's UK distributors put forward several complete systems of which this assembly is a middle-of-the-road example. It is certainly a smart-looking array with some neat design touches. As is often the case, all component units are available separately.

This system is supplied without speakers, but stacking rack VFR1 is included in the price quoted above. By the way, it is not so long ago, in their publicity blurb, that Fisher claimed to have 'invented' hi-fi. Presumably they take a different line over a system which, like this one, is made in Japan (though our Oriental friends lack nothing in inventiveness, of course).

AMPLIFIER & TUNER

Of virtually slimline design, the DC integrated amplifier CA-2320 has well judged controls and facilities. For instance, the main amplifier and preamp sections can be electrically separated by removing links on the rear panel, permitting connection of auxiliary units at that point if desired.

Again, there is a tone-control 'defeat' button and tape interconnections for two machines. Particularly welcome is the built-in preamplifier stage for moving-coil pickups. The separate magnetic pickup input is at 2.5mV with an adequate 135mV margin. Power rating is 60W per channel into 8 ohms, referred to 0.03 per cent THD.

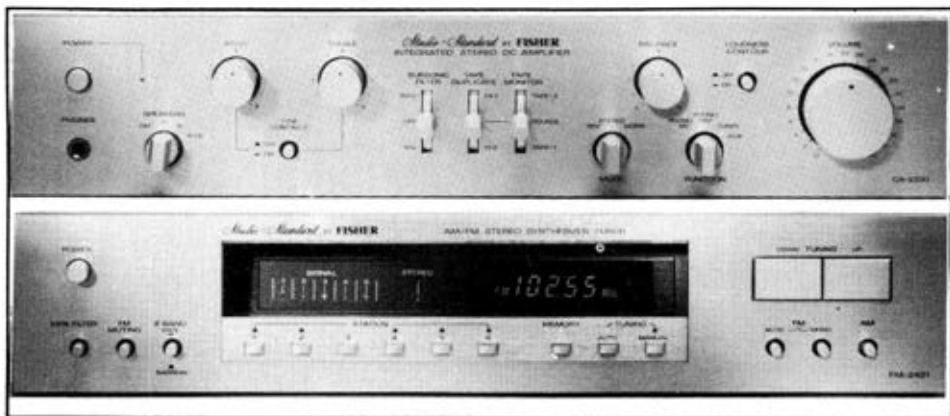
Other features include switching for two sets of speakers (off position is used for headphone listening) and a loudness button giving the customary lift at both ends of the frequency scale. No attempt is made to include 'power' indicators, though there is an approach to fussiness in the form of a two-position subsonic filter based on 20Hz and 5Hz. In all, this is

a thoughtfully designed and fairly potent unit.

Tuner FM-2331, offering FM and medium-wave coverage, is a nice visual match for the amplifier. The unit is unusual in that station frequency indication is provided both as a digital display and in the familiar long-scale analogue form. Facilities include muting and a noise filter.

Useful LED signal-strength and tuning indicators are provided. Aerial inputs are in terminal form, without a coaxial socket for 75ohm aerial connection. Basic usable sensitivity on FM is about 1.2µV, with a 38µV stereo requirement. A fully adjustable ferrite-rod is fitted. Indeed, the reception of both AM and FM was quite lively and interesting, with audio quality of low distortion and even response, and the smoothly effective tuning was liked too.

At an additional expense of £30 or so it is possible to substitute the similarly proportioned FM-2421. This is a digital synthesiser tuner with 12 presets (six on AM and FM) and both manual and auto station-scanning.



TURNTABLE

Model MT-6330 is a two-speed direct-drive unit with a novel AC servo motor which is said to employ a 120-pole magnetic system. This semi-auto player incorporates a monitoring system based on a magnetic pickup which scans pulses recorded on a strip under the platter. Fine-speed adjustment is possible and there is a platter-edge strobe. A reject button is provided for interrupting play, and the pickup cueing device is operated at the front of the plinth along with the other controls.

The plinth is largely of plastics but rigidly constructed and the finish is very good. However, the mat adorning the 1.0kg cast platter is badly designed with a large number of voids in its underside, so a replacement of solid design and correct top contour would be advisable. A compliant sub-assembly carries the main components but, with minimal effect as a suspension and a resonant behaviour near the pickup main resonance, it is not clear what

purpose the arrangement is meant to serve.

A well-made pickup arm of high mass is fitted. It exhibited very low pivot frictions, while bias correction was acceptable in the anticipated range of use, though not at lowest settings. The rigid plug-in shell was equipped with an Audio-Technica cartridge which was found to be a reasonable mechanical match for the arm.

The turntable displayed a slight speed-hunting tendency and a little more drift than desirable, but rumble was not intrusive. Acoustic break-through results were fairly good, though shock-resistance was indifferent. On sound quality, bass was firm but stereo imaging and detailing left a lot to be desired, while upper range quality was edgy.

So the MT-6330 does not impose any real matching problems with the rest of the system, but still it is not a particularly interesting choice in view of the amplifier and tuner standard. Surely Fisher can do better than this!



FISHER RACK SYSTEM

CASSETTE RECORDER

The CR-4140 is a very smart slimline unit with soft-touch bar controls for tape-transport functions and logic supervision of control employing integrated circuits. Stereo microphone inputs, record mute, Dolby noise-reduction, timer control and three-position tape selection of a simple kind (including metal) are among the facilities. Separate input level controls are neatly presented.

This is a two-motor machine with direct-drive capstan, exhibiting very good speed stability. Distortion was judged average for the class of

product and recordings of healthy dynamic range were possible. The level meters were less impressive than they looked as an aid to precise recording but fortunately were augmented by peak-indicating beacons. This unit was considered a quiet and smooth operator once one became used to it, though the tape controls were inconveniently close together — more a matter of cosmetics than ergonomics. Head accessibility was only fair but the damped cassette eject action was liked.

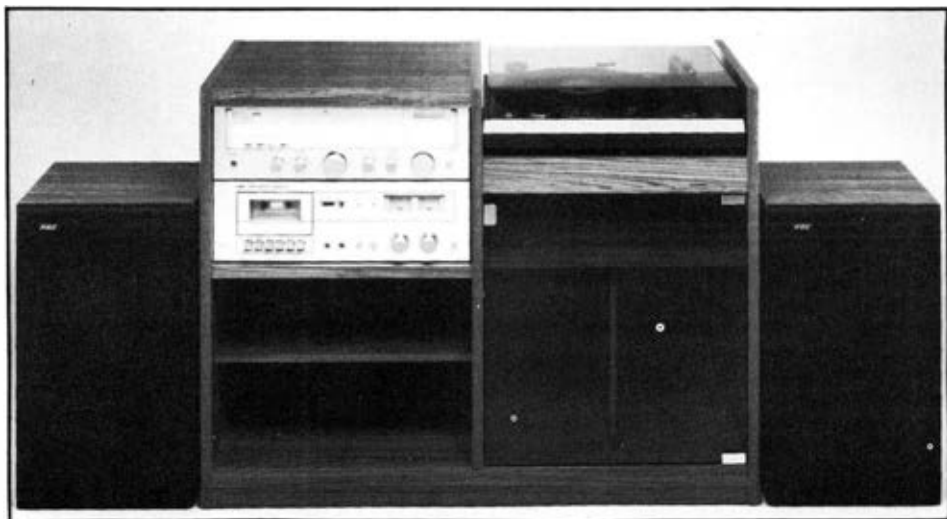


VERDICT

It can be objected that the turntable, as a relatively inexpensive unit, is not quite in accord with the system as a whole, for it affects balance and reflects on planning. Your view must depend on the importance you attach to disc reproduction, and you could of course inquire initially about a substitute.

The system's general standard, however, is still such as to warrant a top grading. It has a lot of technical merit, with some pleasing operational features. Value is fair enough, and trials with the MA-84 test speakers confirmed sonic merits.

GEC SYSTEM A1800



Since the name of GEC has been associated with some important audio developments it is saddening to find that the company has not made a stronger representation in the hi-fi market. In fact the A1800 is mostly drawn from Oriental sources and displays but a pale reflection of the standard achieved by major Japanese importing concerns.

Of course, an attempt to offer a comprehensive outfit at low cost will obviously capture attention. This system is centred on a receiver and comes complete with a cabinet and loudspeakers.

The receiver and cassette unit cases are finished with a simulated wood-grain effect, quite dreadful but mercifully hidden when the units are in the cabinet. Curiously, the system's instruction manuals contain no technical specifications and it was necessary to ask for a publicity leaflet to check even basics such as output power.

RECEIVER

Offering MW and LW coverage as well as FM, the A1800-R is a manually tuned unit with the usual muting and auto stereo switching plus a well contrived meter indicator of signal strength. As for the amplifier rating, there is mention of a 30W output (it may be 'music power') but this is followed by a claim for 18 watts per channel as a continuous rating, related to 1.0 per cent THD. In the event the latter is found to be a reasonable figure, though the distortion runs high. Basic facilities include a high filter (as ineffective as most) and a loudness control.

Tape recorder connections are well managed and there is a headphone outlet. Pickup input does not rate a mention in the sparse

specification but in fact there is a 3mV input with a 100mV overload margin. Basic sensitivity on FM was $4\mu\text{V}$ with a $52\mu\text{V}$ requirement on stereo. The hinged ferrite-rod could not be orientated for efficient use, so a long-wire aerial is advised for AM. Tuner performance will be found adequate in FM service area conditions but the audio quality was hardly inspiring, lacking clarity and refinement at high sound levels.

TURNTABLE

Of fairly light construction, with a plinth made largely of plastics, this is a semi-automatic unit with a belt drive and electronically governed motor. Fine adjustment of the two speeds is provided and there is an in-built strobe. The medium-mass pickup arm is fitted with a cartridge that was not readily identifiable, though the description attributes it to Audio-Technica.

Although the pivot frictions were adequately low there was some rattle in the arm bearings. The platter-mat design is particularly inept, for

the underside contains a large number of voids. Substitution of a plain, slightly heavier mat gave some improvement; but this is of little account, for the overall performance lacked detail and had a coarsely coloured quality.

While the rumble results were fair enough, the unit was rather poor in respect of acoustic breakthrough and shock-isolation. Speed stability was below average for a belt-driven unit of this type. Start-up time to 33 was a second and the simple control functions worked acceptably.

CASSETTE RECORDER

In some ways this simple Dolby-equipped machine is the most satisfactory part of the system, for the purely mechanical controls worked well and replay of music tapes was pleasant enough. But the servo motor arrangement was not at all good on speed stability, and it was not particularly easy to secure low-noise results when recording with the aid of the level meters. Bass definition was

questionable, as is often the case with low-cost cassette applications.

General ease of control otherwise will suit many users. The simple and very basic provision for tape settings (ferric, chrome, ferrichrome) may be thought acceptable in relation to cost. An efficient auto-stop and damped cassette eject are good points.

LOUDSPEAKERS

The S-1612 compacts of 27 litres internal size, well made and nicely veneered, would look well if stand-mounted. Rating is 30W. Bass/midrange driver is a 20cm unit, but the description shows some uncertainty about the tweeter by referring to a soft-dome unit as well as a 7.5cm round unit with 'curve linear' diaphragm. The latter turned out to be nearest

the truth.

Reproduction was fairly forward but not very well detailed and gave no real impression of depth in stereo. It was best on popular programmes, especially via radio, but the inelegant quality and midrange colouration were found tiring all too soon.

VERDICT

It is impossible to raise any enthusiasm over an outfit that reveals such serious audible vices. Some listeners might be prepared to take a kinder view and rate the system higher for value if they were only looking for a background-music standard at modest cost. But stricter judgement is demanded here, and it remains disappointing that GEC have not set their sights above a 'budget' package which tries to offer too much for too little.

GRUNDIG 700B SYSTEM



System 700B incorporates items from Grundig's own factories in Germany and Portugal. The line-up is an amplifier, FM/AM tuner, turntable and front-loading cassette machine. Grundig's recommended loudspeakers were supplied for the trials. All items are available separately.

The large and robust cabinet is supplied fully assembled. This led to the arrival of one of the biggest packing cartons I have ever seen for an item of hi-fi! Finish is black with a few discreet metallic parts, and castors are fitted. Since the system components have fairly brightly finished panels, the general effect is quietly luxurious.

However, the suggested compact speakers are not a visual match for the rest of the equipment since their shape and colour are in conflict. Scope for substitution of speakers is limited, except within a range (such as Grundig's) based on the low Continental matching impedance.

The cabinet has a cassette drawer, a record storage compartment (with a glass door) and an accessory shelf. A certain degree of rearrangement is possible. The turntable fits closely into a well in the cabinet, but the latter has a Plexiglass lid and so it is necessary to dispense with the turntable's own hinged cover.

There was no provision for distribution of mains to the components of the system, so the buyer or supplier would have to add a distribution box and attach it at the back of the cabinet. As expected of German-designed units, all audio interconnections are DIN pattern.

AMPLIFIER & TUNER

Centre-piece is the V2000 amplifier, a well made unit which, like its matching companions, is fairly plain. Maximum output is developed into 4ohm loads. Continuous rating is 50 watts per channel (0.03 per cent total harmonic distortion) and an output of 33 watts is specified for 8ohm loads. A DIN 'music power' is mentioned (it yields higher figures) but is of no more practical use than such a rating can ever be. The important point, though, is the 4ohm matching, since the use of speakers of higher impedance is permissible only if the resulting loss of output is acceptable.

This amplifier is devoid of luxury trimmings such as power indicators and function beacons. All the basics are there, though, and nicely presented too, with push-buttons and toggle switches which have a positive 'feel'. The only unusual feature — a questionable one — is a presence control which is capable of giving a hefty boost in the midrange. It has limited appeal: experience shows that nearly everything sounds better with a flat characteristic in the midrange.

Output protection with thermal devices is well devised and the design generally is sensible having regard to price level. The single pickup input has a nominal 2mV sensitivity but the overload threshold of about 70mV is far from generous. A line output yields a nominal 200mV

signal. Two pairs of speakers can be connected and there is appropriate switching. A single-position loudness control is included.

Due to very compact layout the chassis of the T1000 tuner is quite slim. Its casing is comparatively big, however, leaving a great deal of space within, but no doubt the aim was to ensure a visual match with the amplifier — and that is achieved. This unit covers medium-wave and long-wave bands as well as VHF/FM. It is necessary to use a wire aerial for AM reception.

The big attraction here is a series of seven presets — more than would be used by a typical UK user. These facilitate quick selection of stations. Initial setting-up is done by pushing a button and tuning the desired station via a screw on the panel, using the special key supplied. This procedure is followed along the row of presets. Having done this, few users would have any need for manual tuning along the FM scale, although knob-twirling is necessary for LW and MW station selection.

Other features are switched automatic frequency control, a tuning indicator and an array of LED indicators to register FM signal strength. This tuner is representative of units in the low to medium price bracket, with a 1.8 μ V mono sensitivity and 40 μ V on stereo. Frequency response is reasonably smooth and signal-noise performance good.

TURNTABLE

Made by Philips, the auto-return PS2000 is a lightly constructed unit based on a silver-finished moulded plastics plinth and incorporating a sprung chassis with platter and pickup linked on a common assembly. It is a two-speed turntable with a DC motor and tachometer to monitor the speeds, correction and control being applied by electronic means. The belt-driven platter is one of the lightest encountered: it is of spun aluminium and weighs only about 0.75kg.

A particular feature is a built-in tracking pressure gauge which 'weighs' the pickup when it is on its rest. The well-made pickup arm, in the medium range of mass, exemplifies current Philips practice, and there is acceptable matching, in the mechanical sense, between this and the GP400/II cartridge fitted as standard.

This fairly cheap cartridge has a spherical stylus tip and tracks at marginally under 2g.

Although this cartridge was probably thought to be the obvious choice, it does have something in common with other Philips Super M types — unusually generous output. This means that it is in conflict with the indifferent overload characteristic of the amplifier, reflecting bad planning. Behaviour of the player in respect of acoustic interference and shock-resistance were classed as fair with the unit seated in the cabinet well.

GRUNDIG 700B SYSTEM

Model CF5000 is a fairly conventional cassette machine designed for use of standard, ferro-chrome and chrome dioxide tapes, and equipped with Dolby noise-reduction. Operation is by a group of push-buttons which, though mechanical in action, require only a light pressure. Pause control, dual-concentric recording level controls and a three-digit counter are among the facilities. A welcome extra is the output control for setting the signal to suit particular circumstances of use.

This machine is a 'direct front-loader'. There is no covered compartment into which a cassette would be inserted: instead the heads, capstan and associated parts are exposed on the deck. One simply fits the cassette between the heads and an upper support frame. This means the

heads and part of the mechanism are vulnerable, being open to dust and prying fingers, but Grundig provide a plastics cover which clips over the vital parts when the machine is not in use. This can never be quite as safe as an enclosed compartment, but the arrangement does offer good accessibility for purposes of cleaning.

Although it cannot be said that the CF5000 is an enthusiast's machine (recording level indication by means of a few LED devices is hardly a precise aid), it is a simple-to-use unit of average capability, suited to the amateur who plays commercial music tapes and makes occasional forays into live recording and copying. It fits into the System 700B scheme satisfactorily.

LOUDSPEAKERS

Model M800 is a three-way speaker system in an enclosure of 20 litres volume and with a 60-watt nominal power rating. Construction involves much use of plastics, and the styling is smart, but this model consorts oddly with the equipment console in respect of visual matching. It comes complete with 4 metres of lead and fitted DIN plug, a fixed arrangement which will be inconvenient for some.

Audio matching is beyond dispute, for the M800 complies with Grundig's nominal 4ohm impedance. But this does mean that your choice

of possible alternative speakers is restricted: most are of higher impedance.

With a marked hollow colouration and poorly defined bass, the pair of M800s were least likeable at high sound levels. Use of the amplifier's presence control showed up midrange colouration effects in the most devastating way. In short, the system's amplifier and other units warrant a better pair of speakers. A check with the test pair of MA-84 revealed some cleaning up, as expected, although disc reproduction was decidedly rough.

VERDICT

Verdict

While the electronic components were liked for their quality and generally sensible design, the loudspeakers seem ill-chosen. A substitution is possible but scope is limited. Rather poor matching of pickup cartridge to amplifier is unfortunate.

Sound quality overall was most acceptable on radio and tape. Disc reproduction was forward and inelegant, with lack of fine detail. Planning of System 700B is open to question, I feel, and some revision could improve it a lot.

HITACHI SYSTEM 3



This system is very handsome with its contrast between the metallic-lustre of the equipment (matt rather than a high finish) and the black-surfaced cabinet with its glass doors. System 3, one of several arrangements advocated by Hitachi, is centred on the most powerful amplifier in a slimline-style series.

Since Hitachi make specific recommendations concerning loudspeakers, they were invited to submit a pair with the system. These are included in the price quoted at the top of the report. Quite apart from matters of performance, these speakers are small and consort a little oddly with a 'tower' cabinet. On the other hand this contrast may suit some buyers.

AMPLIFIER & TUNER

Neat and compact in relation to its capability, the HA-4700 amplifier specification includes connections for two tape machines, with dubbing facility, and push-button switching for two pairs of speakers. Output-circuit protection is based on a power relay and an integrated circuit device. Rating is 50 watts per channel into 8 ohms (0.02 per cent THD).

Most operations are by push-buttons, all of which require only a very light touch, and there is a 'defeat' switch to bypass the bass and treble controls. Other functions are a subsonic filter and the usual loudness control — with one position in this instance. Headphone listening is possible when the speaker selectors are set to off.

As with many amplifiers an attempt is made to indicate power levels by means of a bar display. No fewer than 12 LEDs are used for each channel. Most welcome of all, however, is the preamplifier stage for direct connection of moving-coil pickups, with simple switching between this and the usual magnetic cartridge input. Overload threshold is about 210mV for the 2.5mV input — reasonably generous. In all this unit gave a good impression in respect of signal-noise (above average), low distortion and general accuracy, although a slight misgiving remained about the bass definition, particularly

with the system's own speakers.

The FM/AM tuning circuits of the FT-4400 employ a digital synthesiser system based on a crystal oscillator and phase-locked loop, and a microprocessor permits automatic FM tuning in 50kHz steps plus scanning of the MW band. Auto tuning is by means of two buttons which give scanning up and down the band, the frequency being shown on a digital display, as is customary with such systems.

Muting acts to suppress interstation noise during tuning. Selected stations can be stored by pressing the memory button and passing the data to the preset section. There are six presets for each band. A back-up protects the memory contents when the power is disconnected. There is a tone-generating facility for use in setting levels while recording.

As ever with such tuners the presets are bound to be the big attraction. The usual aerial inputs are fitted (a coaxial socket for 75-ohm FM) together with an adjustable loop for AM. Sensitivity was 2µV FM for 50dB S/N, with a 32µV requirement for stereo. Sound quality was first-rate with very low distortion in service-area reception conditions. A tendency to brightness at the top of the audio spectrum was hardly a flaw in a performance that was largely unobtrusive.



TURNTABLE

Model HT-41S is a two-speed unit with a DC direct-drive motor of very compact design and quartz crystal control of speed. Of light construction, combining plastics and metal parts, the turntable is smartly finished in silver-grey and equipped with a hinged acrylic dust cover.

It is a semi-automatic player of the familiar kind: starting and cueing are manual but the end-of-play function is auto and the pickup is then returned to its rest. A reject control is included. Quartz lock is always operative, an arrangement that will doubtless suffice for many users.

Platter inertia was on the low side, as was the motor torque. Mass of the platter was nearly 1kg including a light mat of inept design. It supported discs reasonably well but had a series of voids underneath, quite unnecessary and affecting the damping effect on the platter. A replacement would be advisable. Start-up time to 33 was about 2 secs.

Best feature of the HT-41S was the pickup arm, of fairly low mass (8g effective) and with negligible pivot frictions. It has an offset plug-in

cartridge platform of the kind seen on several modern units and, with certain other details, virtually identical to the design associated with the enthusiasts' arm made for ADC.

Fitted as standard is a low-cost cartridge which, judging by its V-magnet stylus, is an Audio-Technica. This coped gamely at a tracking pressure of 2g but was not really up to the standard of the arm or, indeed, a match for the system.

The entire assembly was not really in accord with the potential of System 3. Its resistance to acoustic breakthrough was barely average for a medium-cost design and the dynamic behaviour betrayed some speed-hunting, inevitably reflected in sound quality, which lacked detail and impact.



HITACHI SYSTEM 3

CASSETTE RECORDER

The D-85S, top model among machines advocated for Hitachi systems, is presented in luxury style with emphasis on 'IC logic control' and feather-touch control buttons. In this context 'logic' refers to a clever system involving integrated circuits whereby the machine almost thinks for you, facilitating rapid changes of function without risk of mechanical disaster. For example, one can go rapidly from fast spooling to the play mode and allow the machine to make the change smoothly.

Additional ICs permit auto return of the tape to the start position after replay or recording, and

an auto muting function for short pauses such as planned gaps between recorded items. An external timer or remote control can be connected. Dolby is incorporated and a metal tape position is added to the usual bias and equalisation arrangements. Other features include a peak-level device as recording aid.

This is a virtually foolproof machine with a nice turn of performance, notably good speed stability and the potential for recordings of healthy dynamic range. Convenience in use is very good for a unit in this price-bracket. Accessibility to the mechanism is well arranged.

LOUDSPEAKERS

Matching speakers SS-8490 are large bookshelf-style models, very nicely made and finished, rated in accordance with the system's available output. They are total-enclosure types of medium sensitivity incorporating a 21cm bass/midrange driver with Hitachi's 'gathered-edge' cone surround together with a 25mm dome tweeter. Stand-mounting would be possible.

Although the speakers were plainly better than

the poor efforts accompanying many total systems, the keen and forward sound was found tiresome — it could prove fatiguing. Stereo presentation was not notable for any impression of depth or fine detail, and the bass was woolly in quality if reasonably extended. Experiments with British speakers including the Krystal, Mission and Monitor Audio test pairs showed up the system's virtues in much better light.

VERDICT

A system with many attractions and a lot of technical merit. The disc replay side may appeal if this aspect is not too critical for you. But the fact remains that System 3 reveals a flaw of planning and would respond to some uplift.

As ever, loudspeaker selection rests on personal preferences, but I was in no doubt that more thoughtful choice could extract the system's many qualities to better effect. What is beyond dispute is the excellent value offered. So a top grading is awarded on that account. Merit, bearing in mind the reservations, is OK. The system seems a good buy without its speakers, so consult your supplier about adaptation as required.

JVC G-X100



This is the least potent of the GX outfits but by no means whittled-down so far as facilities are concerned. The evident aim has been to offer a comprehensive system in the low-budget area, including at least some of the attractions found in more expensive arrays.

A particular plus-point is the inclusion of an amplifier from the company's Super-A series, and the power rating will satisfy many users' requirements for rooms of small to medium size. The system was submitted without loudspeakers, so the price quoted covers the equipment illustrated, including the simple but well-made rack housing.

AMPLIFIER & TUNER

Rated at 31 watts per channel into 8 ohms (0.007 per cent THD), the A-X1 is a very pleasing value-for-money unit with facilities in every way appropriate to the price level (and you may feel you can do without gimmicks, of which there are none). There is no moving-coil pickup input, and it could hardly be expected at this price level, but the 2.5mV magnetic cartridge input has a reasonable overload threshold of 165mV, slightly better than specification. Commendably low distortions and noise levels earned critical approval.

JVC find it necessary to include a peak power indicator involving two rows of LED devices — an attractive display of relative levels rather than a true reflection of power dissipated by complex speaker loads. The control line-up includes push-button selection of two pairs of speakers, tone controls, loudness contour and tape-recorder selection, with provision for two machines.

Model T-X1L was much liked for its crisp, clean audio output and simple but convenient manual tuning. Presets are not included (nor expected) in a basic budget tuner. Coverage is LW and MW as well as FM. Muting and LED indication of tuning and signal strength are included.

Customary 300 ohm and 75 ohm aerial inputs are fitted, with the latter arranged for coaxial connection. The AM ferrite-rod swings out from the rear but cannot be properly orientated, so as with many such units a long-wire aerial is best suited to the needs of keen medium-wave explorers. Stereo requirement was about 55µV for 50dB SN. This tuner is state-of-art in the budget-stereo category and an ideal partner for the A-X1. A good one for those who are content with service-area FM from the BBC and the occasional adventure across the bands.

CASSETTE RECORDER

The KD-A11 is Dolby-equipped and nominally compatible with current tapes including metal-particle, though there are no special adjustments to augment the simple switch-selection and, further, the record-level meters are not helped out by any system of peak level warning. It is hardly an enthusiast's machine but is nevertheless an honest effort at modest cost, yielding good speed stability and acceptable distortion characteristics, with the exception of poorly defined bass.

Mechanical aspects were admirable, as evidenced by the tight action of the tape-transport mechanism, and input arrangements including the microphone facility were adequate, but a variable line-output control would have been a welcome extra. Cassette eject was well designed, though head accessibility left something to be desired. On the whole a fair little unit, well chosen for the system.

HI-FI Connections

Personal Service Always

We offer you a comprehensive range of equipment featured in this guide from most leading manufacturers. We will willingly demonstrate systems from Aurex, JVC, Luxman, Optonica, Pioneer, Sansui, Trio, etc.

We Offer. . .

***Personal service from one of the two owners – no staff employed.**

***Two years parts and labour on all electronics. Five years on all speakers.**

***Free delivery and installation within a reasonable radius of our premises.**

***Demonstrations on anything and everything.**

We are situated within 50 yards of Clock House mainline station (25 min. from Charing X)
Bus route No. 227 between Crystal Palace and Bromley passes our door.

Parking is easy and our aim is to make choosing Hi-Fi a pleasure – not a problem.

51 BECKENHAM ROAD, BECKENHAM
KENT BR3 4PR
Tel (01) 658 3450

Competitive Prices

TURNTABLE

On the face of it the L-A11 would be a logical choice for this system, at least on grounds of cost and simplicity. It appears to be the only belt-driven turntable in the JVC series and, as might be expected, is a lightly constructed unit with a plastics plinth, smartly finished. Semi-auto operation gives pickup return at end of play.

The cast platter weighs about 0.75kg including a reasonably well shaped mat, and the main bearing was well finished. Start-up time to 33 was about 1 sec. Rumble elements due to the motor were marginally intrusive during checks with the test speakers, while acoustic breakthrough behaviour was below average and shock-resistance acceptable with the unit in its working situation.

Although the pickup arm is well engineered, with precisely made pivots (very low frictions), the effective mass is in the high range at 18g plus

cartridge, and compatibility with the supplied cartridge is not well judged. A Z1-S tracking at about 1.6g is fitted. This is a medium-compliance type which pushes the pickup resonance down too far (about 7Hz). Bias correction was acceptable in the anticipated range of use, above 1.5g tracking.

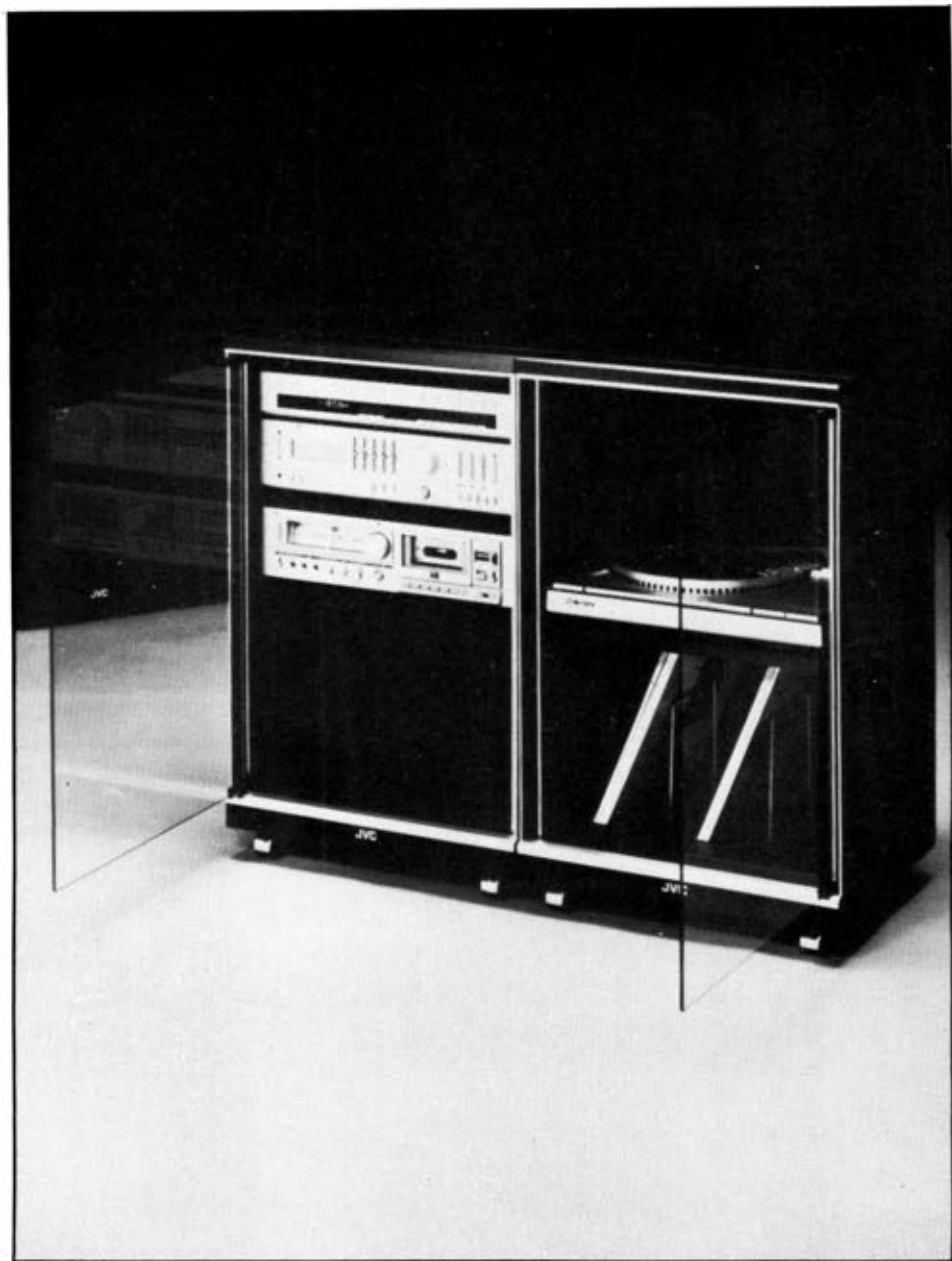
There was no particular criticism of speed stability and the turntable was dependable in operation, but the pickup quality was not really up to the system's general standard. Bass was ill-defined, tracking ability indifferent and sound quality brash. In other words the G-X100 could stand something better than this.

VERDICT

On the whole a well contrived system and arguably one of the best low-budget assemblies around, so a top-value grading cannot be denied. It offers a lot for the money. But compatibility of the turntable and pickup is open to question and causes misgivings.

Whether or not this warrants its down-grading must depend on the importance you attach to disc replay, and you may think it is marginal, but the fact remains that more care in this department would pull the overall balance more surely into line.

JVC G-X400



JVC inquire whether you know the meaning of PTL, QSC, DC-servo, Super A and a lot more besides. Possibly not. In that case 'you can get yourself a 100 per cent state-of-art hi-fi system without a crash course in electronics.' What you do, of course, is just ask for G-X400.

It looks like the usual blurb, but in fact it shows a commendable attitude. The G-X400 is a high-technology product and JVC want to interest non-technical folk in its undoubted merits. So it is up to them to plan a well-balanced system and convince their less experienced customers that they have done so. Commentary on such matters is what this Digest is all about.

This system is well turned-out, to say the least of it, and spreads itself over two nicely designed castor-mounted cabinets which provide space for disc storage and sundries. It is presented without loudspeakers (JVC can offer suggestions, of course) and the price quoted is the total for the units described in this report, including the cabinets.

TURNTABLE

Direct-drive model QL-A5 is recommended by JVC for this system. In fact the sample submitted had an 'R' suffix, indicating suitability for remote control, but this can be overlooked here as the necessary control unit for such operation was not part of the test outfit.

The turntable is a fairly expensive example of JVC's DC-motor quartz-lock designs, neatly presented with the smart finish expected of this company's products. It is an auto-return unit with reject control and a lift/lower control ranged along the front of the plinth with other facilities in such a way that operation is possible with the dust-cover closed.

Although not a specially innovative model, this turntable yielded good rumble results, in keeping with the standard of the system; motor torque was ample and speed stability very good. There is provision for switching off the quartz-lock so that fine adjustment (pitch control) can be made, but as usual one wonders about the need for such elaboration when all that most users require is an assurance of speed consistency.

This model is supplied without a cartridge. It may well be a blessing in disguise, in that experience shows the inadequacy of many cartridges supplied with complete systems. The pickup arm is quite massive (about 14g effective, plus cartridge) and can partner a cartridge in the lower range of compliance. Compatible examples by Nagaoka and ADC were tried. The instructions for fitting cartridges looked a little odd and as ever it would be best to use an alignment protractor to simplify accurate setting-up.

Dialled bias correction was accurate enough

enough except at lowest settings — somewhat below the anticipated working region for this arm. Vertical pivot friction was negligible; the lateral friction somewhat high at 50mg. The 1.4kg platter ran up to 33 in 1.3 secs. Shock-resistance was fair but signs of acoustic breakthrough were marked.

Audible results seemed to be limited by the pickup arm, especially in the bass area, and some midrange coloration also intruded. It is surely reasonable to expect that a better component would be fitted to a turntable of this calibre. Further, the platter-mat is yet another ineptly designed example, and a sensibly contoured replacement would be advisable.

AMPLIFIER & TUNER

Model A-X4 is closely related to JVC's top-ranking A-X9, a particularly fine integrated amplifier in the high-power range. The main difference lies in the power figures; but still the A-X4 is a fairly potent unit with its 63W per channel rating (8 ohms, 0.008 per cent THD). This manufacturer's Super-A design is directed toward the control of non-linearity and reduction of distortion, and recent tests have yielded evidence of its neutral character.

On test the A-X4 delivered its generous output gracefully and attracted no criticism in respect of signal-noise performance. As expected, this amplifier incorporates an extra preamp stage to cope with moving-coil pickups, the single input being switched between MC and MM conditions. The standard input at 2.5mV has a very satisfactory overload threshold of 210mV, with a pro-rata MC capability. Provision for auxiliary equipment is standard, with adequate tape facilities (monitor, dubbing) and button-switching for two pairs of speakers.

Subsonic filter and loudness tone controls are included. However, conventional tone controls are omitted in favour of an equaliser in the form of a five-way filter covering the range 40Hz to

15Hz. The usual reservations apply here — at least about the assumptions underlying use of such devices — but JVC have included a 'defeat' switch, giving the user the assurance that the filter section can be bypassed to secure a flat frequency response.

The T-X6L is a FM/AM tuner of the entirely electronic digital synthesiser variety employing a quartz oscillator as reference and with a seven-preset array for both AM and FM. The AM row is organised for four MW and three LW stations. The usual two-button control gives 'up' and 'down' scanning and any selected station can be transferred to the store for use as a preset at the touch of a button, as is customary with such tuners.

Aerial inputs are terminals only (no coaxial socket) for 300 ohm and 75 ohm matching, and the AM ferrite-rod is properly adjustable by means of a ball joint. FM mono sensitivity was 1.8 μ V with a 23 μ V requirement for 50dB S/N on stereo. In fact this tuner is a lively performer and one of the best of its kind encountered. Audio quality was marked by crisp clarity and low distortion.



CASSETTE RECORDER

KD-A55 is an interesting and well-equipped machine, virtually in the luxury class and offering a turn of performance well related to the overall G-X400 standard, with excellent speed stability and the potential for recordings of healthy dynamic range on metal tape as well as the more common varieties. Tape selection is simplified, however, and there is no specific bias adjustment. A JVC Sen-Alloy record/replay head is fitted and the unit employs an electronically governed motor for the capstan plus a separate spooling motor.

Light-touch buttons for the tape transport are associated with logic control based on integrated-circuit devices and the recording meters are augmented by a multi-point peak indicator which has a beneficial effect on accuracy. This unit includes JVC's Super-ANRS system of noise-reduction, and other features are timer standby, 'memory' and a remote control unit of the type connected to the

machine by a multi-way cord.

Another version of a programme-search system is incorporated. This time it is called 'music scan' and employs a very small sensing head which, via the square aperture in the cassette housing, detects programme gaps during fast wind or rewind. In short, this is a unit designed with emphasis on user-convenience in general rather than enthusiasts' particular technical needs, but attention to detail is good, extending all the way through to the damped cassette-holder mechanism and good accessibility to heads.

VERDICT

On the whole this system, though pretty expensive, is well balanced and displays much technical merit, being centred on a fine amplifier and tuner. Trials with the MA-84 test speakers were highly satisfactory and the big IMF/RSPMs were also brought into the audition — not inappropriate in view of the electronics.

Certain reservations apply to the disc reproduction and it is felt that the system deserves a higher standard. It would surely be better at this price level to give buyers the opportunity to use light-tracking cartridges of advanced design. But some users would not consider this to be of prime importance and thus would not see it as a special demerit.

MARANTZ MODULE 310



Economy-class stereo is not perhaps a strong element in the accepted popular image of Marantz, which is more associated with relatively elaborate and even flashy designs. However, this little rack system shows what can be done.

The main units, American designed but made in Japan (and what is not, you may ask), have a fairly discreet matt-gold finish. The quoted price includes a simple rack housing. A commendation to Marantz instruction manuals, which are above average in detail and clarity.

AMPLIFIER & TUNER

Nucleus of the system is the PM-310 amplifier, a neat and simple component rated at 25 watts per channel into 8 ohms (0.3 per cent THD). Power capability is strictly limited and indeed the system is strictly for small-room application, preferably with high-sensitivity speakers. Maximum delivery is not very gracious from a unit of this calibre loss of detail and bass definition reveals the limitation.

Signal-noise performance was better than average for low-cost designs. The single pickup input at 2.8mV was a little less good on overload than specified, but still a margin of 160mV was very satisfactory. The simple control line-up includes slider tone controls with notch positions, a loudness switch and a low filter.

Only one pair of speaker terminals is provided. Tape machine interconnection with a monitor switch, a headphone socket and an array of LED

devices for power indication complete the facilities. A pleasant little amplifier, well up the scale of 'budget' components.

Similarly simple and basic, the ST-310 tuner is a manually tuned unit (excellent flywheel tuning along an extended scale) with FM and medium-wave coverage. It is necessary to tune by ear — not too difficult — but the signal-strength indication is effective, as is the muting control.

A fully adjustable ferrite-rod is fitted for AM with terminals only for 300ohm and 75ohm FM input. Basic FM sensitivity was good at about 2.5 μ V, with a stereo (50dB S/N) requirement of 100 μ V. Reception was much liked in BBC service-area conditions; but be careful over aerial siting. Smooth audio with average distortion for a low-cost tuner and some lack of high-end detail and sparkle.

TURNTABLE

Model 6025 is a semi-auto player with belt drive from a synchronous motor, assembled in a light plastics plinth and equipped with a hinged dust cover of good quality. This unit has mechanical 33/45 speed change, reject control and auto pickup return.

Speed stability was good and 33 was spot-on during tests, although torque was only marginally adequate. Results in respect of acoustic breakthrough and shock-resistance were hardly average but not exceptional for a budget-range product. A platter-mat of all too familiar inadequacy was supplied but a more

solid replacement could of course be substituted.

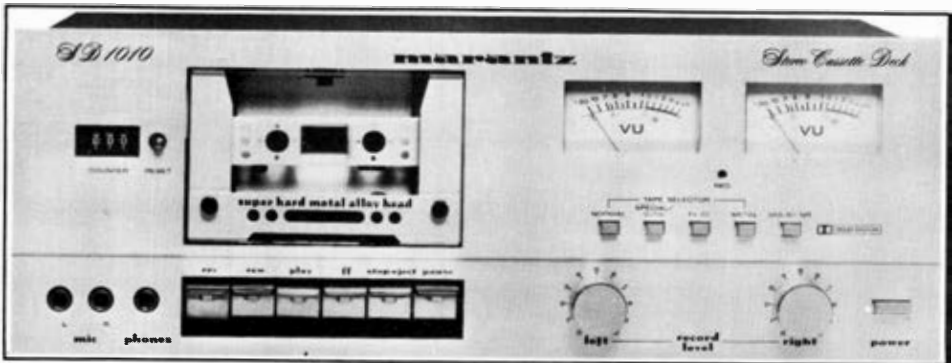
In the high range of mass (16g effective), the pickup arm exhibited acceptably slight pivot frictions but a marked degree of play in the lateral bearing. Possibly a quality control quirk — it should be improved. Bias correction was adequate above a 1.5g setting. The headshell, unduly flexible, carried a cheap magnetic cartridge which proved to be an edgy-sounding 2g tracker. Even an economy-class player deserves better.

CASSETTE RECORDER

Cassette unit SD-101D is strictly an auxiliary with very modest accomplishments, suited to occasional use with commercial music tapes and mild adventures in recording, provision being made for metal tapes as well as more commonly used varieties. It is rather bulky in view of its basic nature.

Record-level meters have the usual limitations

when it comes to checking high-level modulation and there is no extra peak-reading aid. Dolby is provided. The mechanical press-key controls had a light but positive feel and the machine ran quietly. Access to heads and capstan was satisfactory. Nothing exciting, then, but the machine is well in line with an inexpensive outfit.



VERDICT

A front-runner on value among small systems, with a likeable amplifier and tuner, and there are some good technical points too. It would be advisable to do something about the cartridge and platter-mat in the interests of refinement. So the snags are little ones and hardly such as to detract from a top grading.

MITSUBISHI SYSTEM 4



Another miniature system born of the age of integrated circuits and other diminutive electronic devices. A lot of conventionally proportioned units use these devices too, so the Mitsubishi solution suggests that many manufacturers finish up with a great deal of wasted space within relatively large housings — a suggestion you can confirm by simple observation.

System 4 was introduced as a group of matching units centred on a separate power amplifier and preamplifier (control unit) with a radio tuner and cassette machine as auxiliaries. These are intended for vertical stacking, so a rack has been devised and a turntable of novel design added to complete a space-saving system. The price quoted includes all these items but excludes loudspeakers, choice of which is left to the purchaser.

AMPLIFIER & TUNER

Splitting of the power amplifier and preamplifier seems to have more to do with establishing the right mini proportions than with anything more deeply technical in this instance. The result is certainly neat, though. The M-A04 amplifier's output is 50W per channel (continuous rating, related to 0.02 per cent THD) and there is provision for converting it to the mono mode to yield 100W into 8 ohms. Simple controls include switching for two pairs of speakers and the main front-panel feature is a bar-type level indicator for each channel.

On the preamp unit M-PO4 we find such items as tone-control defeat (bypass, that is), useful switching for use with two tape machines, a single-position loudness control and a subsonic filter button (18Hz roll-off, but not a sharp enough cut). Best of all is the in-built preamp stage to enable moving-coil cartridges to be used. Overload threshold for the 2.5mV pickup input was about 230mV. The M-PO4 is separately mains-powered.

Performance of this little combination was

impressive: maximum power was delivered with good grace and the sound quality displayed fine clarity. It was found that the sound exhibited a slightly hard quality on pickup input, a subtle effect which experiment indicated was attributable to the preamp. By the way, M-A04 and M-PO4 together measure only 24 by 27cm with a height of 21cm. The tuner adds about 7cm to the height.

Although it would have come as no surprise if this system sported a digital tuner, partnering unit M-FO4 is in fact a simpler manually-tuned type with a long tuning-scale for FM and the medium-wave bands.

Aerial arrangements include a ferrite-rod for AM — socketed for adjustment — but the FM 75-ohm connection is by terminals rather than a coaxial socket. FM sensitivity: 3.5 μ V and a requirement of 48 μ V on stereo. The tuner is of merit for service-area reception on FM, offering moderate distortion and a very clean sound with a hint of response uplift at the extreme top of the range.

CASSETTE RECORDER

Model M-TO4 is a direct-loader with external cassette-holding frame, to which Mitsubishi have added a hinged cover in order to protect the heads and capstan. It is a two-motor unit of very neat design with fairly sensible provision for setting up metal and other tapes. The familiar record-level indicators of the bar type employ 15 LEDs on each channel, though warning of too-high levels is not particularly precise.

The Dolby-equipped machine has the 'logic' control and feather-touch switching of the more advanced and costly units, making it a delight to

use, and there is also yet another version of the programme-location system — an auto spacing/pause facility of use to the diligent tape user.

In short, this little machine packs a lot of attractions into a small volume. Speed stability was exemplary; recordings with healthy dynamic range were possible given care in manipulation, though special concentration was needed to keep distortion within bounds. Directly-radiated noise was noticeable.

TURNTABLE

If you want something different, then you may well find the LT-5V irresistible. It is designed specifically for use in a vertical position, standing on the steadying feet supplied. This novel arrangement imposes certain design and constructional requirements, but the makers have covered them remarkably well and fairly expensively (this player accounts for around £200 of the system cost).

The advantage of a vertical format is evident enough: the space occupied on a cabinet or shelf is minimised. It is also obvious that, as electronic units become smaller, disc-players do not (though they will in the future, no doubt). The use of the 12-inch LP imposes the limitation, and a conventional turntable occupies a cabinet area that looks vast against the space demanded by a miniature system.

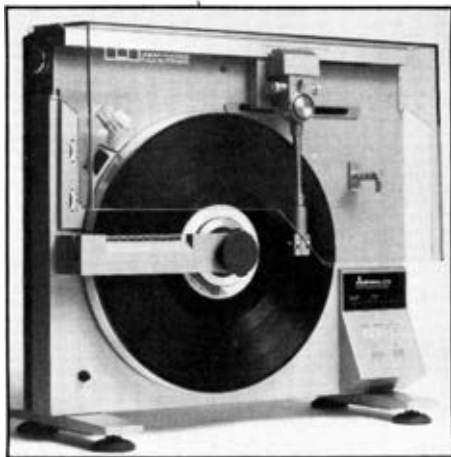
Of course, the LT-5V is as big as any other player: the vertical design simply alters one's view of layout. However, there is a penalty in that extra parts are needed to secure the disc during play. These are incorporated in a swing-arm which clamps the disc and engages the centre-spindle. You may accept this as logical or it may try your patience sorely, but it has to be done with care lest the disc fall off the platter during play!

A prominent feature of this massively constructed unit is the radial-tracking pickup arm, statically balanced, which is carried across the disc radius by a mechanism at the top of the housing. An Audio-Technica AT-12E cartridge (elliptical stylus, 1.5g tracking) is fitted as standard.

A radial-tracker is essentially part of an automatic system. This unit is a logic-controlled design with a DC motor and servo system plus fine-speed adjustment. Automatic disc-size

selection is part of the system, so that the mechanism senses the position for dropping the pickup to the disc's run-in groove. This works only on black discs of the usual kind, not on other colours or on see-through discs. Therefore it is necessary to place a thin black mat under a non-black disc, and Mitsubishi provide these in 12-inch and 7-inch sizes.


Apart from that, a degree of semi-auto use is made possible by means of a control giving selection of tracks via the radial mechanism. Performance with regard to S/N and acoustic breakthrough was very satisfactory and there was no intrusive rumble under practical conditions. Sound quality was pleasing, with firm bass and a somewhat peaky high range. The AT-12E seems a fair choice, though this player could accept an even better cartridge.



VERDICT

Clearly this is a well balanced system, though it is not easy to sum up on value. System 4 is perhaps a little expensive. But much depends on whether the advantages of miniaturisation are important to you. The superficial attractions are obvious enough. So the value judgement is marginal.

The pros and cons of a vertical turntable must also be considered — but you can order the system without this item if you wish. Technically the outfit was much liked and a top grading cannot be denied, as trials with the test speakers confirmed.



They're changing the face of music. By putting superb equipment into elegant cabinets, our Hi Fi consoles are harmonising technology with style.

System 7, the combination shown here, illustrates the point eloquently.

The amplifier is class A type. (Most slimline amps are class B. They may be thin, but they have fat distortion figures.)

You get hyper-accurate tri-state tuning on three wavebands.

Naturally enough, the cassette deck takes metal tapes.

And the whole thing is topped off with the slimmest direct drive turntable you ever saw.

If you want to know more, write for details to Hitachi Sales, Dept F, P.O. Box 4SY, London W1A 4SY.

If you don't, simply turn up at your Hitachi dealer and hear for yourself how good this equipment sounds.

Hitachi Hi Fi consoles. The latest technology, stacked up with style.



HITACHI

In a word, reliability.

**Stores music
beautifully.
Plays it superbly.**

The JVC guide



G-X200R. The height of fi.

to the highest fi.

Or from around £350
to the sky's the limit.

JVC have been the leaders in Hi-fi for over 50 years.

Now JVC have taken components from their range, matched them perfectly and put them together in a superb stack system.

There's a JVC stack system to suit almost every pocket.

The G-X100 features a Super-A Stereo Integrated Amplifier, Stereo Tuner, Belt-Drive turntable and a metal tape compatible cassette deck, all for around £450.

£550 or less will buy you the G-R550 – a superb combination of a Stereo Receiver, metal tape compatible cassette deck and auto-return Quartz-locked turntable.

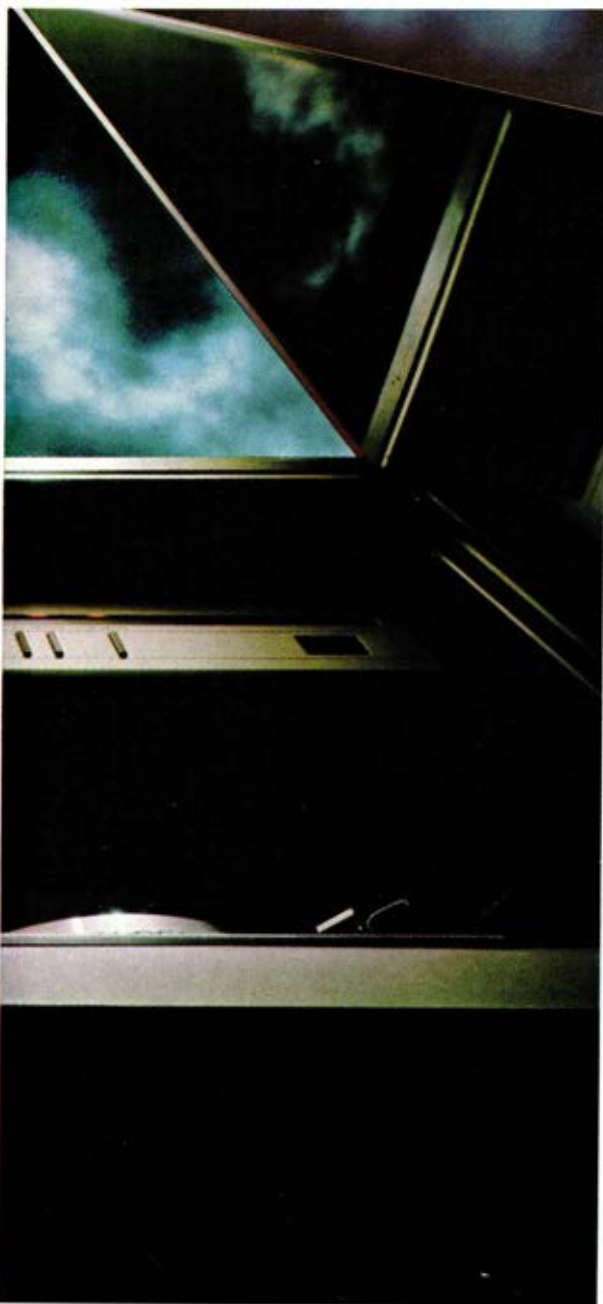
Few stack systems can match the G-X200R. This system features infra-red remote control, Super-A Stereo Integrated Amplifier, metal tape compatible cassette deck, auto-return Quartz-locked turntable and a digital synthesizer Tuner.

Just three of nine recommended Hi-fi systems from JVC.

Your JVC dealer can tell you more. See him soon and hear what's best in stack systems.



JVC is the trade mark of the Victor Company of Japan



Listen to Aiwa, then size up the opposition.



From the world's leading Cassette Deck manufacturer comes the world's most advanced Micro System.

Never a Company to make idle boasts, Aiwa truly believes the Series 50 offers superb, full size Hi Fi performance from miniature components.

With this system there is no compromise. The beautifully designed units are at home anywhere and can out perform most others, big or small.

The high efficiency power amplifier delivers 50 Watts per channel into 8 ohms with no more than 0.02% THD. The matched pre amplifier gives superb S/N Ratio (88dB phono MM) with minimal harmonic distortion of 0.002%. The quartz synthesizer Tuner offers preset, auto or manual tuning with outstanding FM sensitivity and excellent stereo separation of 45dB at 1 KHz. The Cassette Deck - as you would expect, has many up to the minute design features such as Metal Tape Capability, IC Logic Controls, Dual Motor Drive System (wow and flutter only 0.04% wrms) and Optical Peak Level Display.

With the addition of a comprehensive range of matching optional equipment such as the world's first auto front loading turntable, an infra red wireless remote control to operate all components, digital audio timer and High-Com noise reduction unit, this system is in a class of its own. Don't take our word for it. Visit your Aiwa Dealer and ask for a demonstration.

While you're there, size up the opposition. You will come to the same conclusion we did. There is simply no alternative.

Aiwa (UK) Ltd, Aiwa House,
30/32 Concord Road, Western Avenue,
London W3 0TH.

AIWA

Sound science at its best

* Dolby is a registered trade mark of Dolby Labs. Inc * In some circumstances, recording from disc, radio or external tape may infringe copyright. Refer to statutory legislation. * High-Com is a trademark of E.G. Telefunken.

CRAIG HI-FI Ltd

47 TOTTENHAM COURT ROAD, LONDON W1. Tel: 580 9951
13 SOUTH STREET, ROMFORD, ESSEX. Tel: 70-28902
309 HIGH ROAD, LOUGHTON, ESSEX. Tel: 508 2715
OPEN: 9-6 MON-SAT

JVC

G-X400 Hi-Fi System The Best of the Separates



Do you know all these technical features and what they mean to musical performance? — Super-A, high-gain DC-servo phono EQ for MM/MC cartridges, S.E.A., frequency synthesizer, PTL, QSC, PLL MPX, Quartz servo, SA heads, logic control? Believe us, we could go on. If you do know all these terms, you won't have any trouble combining your own system of state-of-the-art separates. If you don't, you'll be relieved that you can get yourself a 100% state-of-the-art hi-fi system without a crash course in electronics: Just as for the JVC Hi-Fi System G-X400.

- A-X4 Super-A Stereo Integrated Amplifier • T-X6L Quartz-Locked Digital Synthesizer FM/MW/LW Tuner • QL-A5 Auto-Return Quartz Turntable • KD-A-55 Metal Cassette Deck • LK-G645x2 Audio Racks • Recommended Speaker System

We are JVC main stockists with a comprehensive range of Hi-Fi and Video Products

JVC at CRAIG HI-FI

**CREDIT FACILITIES AVAILABLE TO
PERSONAL CALLERS — DETAILS
ON REQUEST**

Also instant Credit Facilities to holders of Bankers Cards, Diners Club, American Express, Barclaycard, Access Card, Balance up to £750 after deposit. Products subject to availability.

GUARANTEE

All goods carry 1 year guarantee including parts and labour (excluding styli). Cheques up to £50 with banker's card. Cheques above this amount will be specially cleared before goods can be taken.

ONKYO MIDI-20



RECEIVER

Slimline receiver TX-20 is engagingly neat and smartly styled. Particular features are a servo-lock system designed to combat frequency drift and a touch sensor for the tuning. When manual tuning has selected an FM station the mechanism locks and a LED beacon warns of this situation—unless a weak signal is deliberately selected, requiring cancellation of servo-lock. LEDs indicate signal-strength and tuning accuracy.

Audio rating of the DC amplifier section is 33 watts per channel into 8 ohms (0.08 per cent THD) and the usual inputs are provided together with switching for two pairs of speakers. Pickup input is at 3mV with a satisfactory overload threshold of 210mV. A proportion of the controls hide behind a hinged flap, a solution which looks very neat while tending to make operation a bit fiddly.

Surprisingly, the tone controls (behind the flap) have no centre-click positions and there is no defeat switch either. Therefore it is specially important to check their settings if the assurance of a nominally flat response is required. A loudness button gives boost at both ends of the range for low-level listening, and there is a high filter of the usual feeble characteristics.

FM aerial input is for 300-ohm twin feeder only, and there is no coaxial socket. AM coverage is medium wave only, and the terminal for a long-wire aerial is augmented by a well designed ferrite rod, widely adjustable on a ball and socket union. FM sensitivity was 2 μ V with a stereo requirement of 40 μ V for 50dB S/N. Lively reception was moderate in distortion, while audio quality as a whole was well liked with its clarity, smooth response and firm bass.

Onkyo's name for this receiver-based system refers to compact design and implies that 'midi' units fall somewhere between conventional (and very common) bulkiness and the much smaller miniature designs. This applies to quite a lot of Japanese equipment by now, of course, and where the Onkyo outfit is concerned it is especially true of the receiver and loudspeakers.

In fact the presentation is pleasingly different from the normal, for it involves a castor-mounted trolley housing rather than a rack. Most unusual is the provision for placing the speakers at each end of the trolley. It must be emphasised that speakers should not be left in that position for listening at high volume levels! The price quoted includes everything shown in the picture — disregarding items in the accessory compartment.

TURNTABLE

For this system Onkyo choose to include a turntable unit in the low-budget area. The CP-1010A is a semi-auto player selling separately at just under £70. The system warrants a better example — that is clear from the results. But the same could be said of some other package deals submitted for the Digest, and Onkyo can hardly be singled out for criticism.

Belt driven and with two speeds, this unit employs a servo system and offers a fine speed adjustment (about 2 per cent) on each speed plus an illuminated strobe. Auto pickup return and reject are provided, and the lift/lower device for the pickup is operated from the front panel. With its plastics plinth the unit is lightly constructed and was found to be barely average for its class on acoustic breakthrough, the shock-resistance also being rather poor. Start-up to 33 was about 1 sec. Slight rumble intruded in working conditions.

This turntable sports yet another example of a

badly designed platter-mat, if 'design' is the word to apply to such things. It has large voids moulded into its underside, and a replacement would be essential. On the other hand the straight pickup arm with miniature plug-in headshell (ADC-pattern socket) is not at all bad, despite a hint of play in the lateral bearing, presumably due to a quirk of quality control. Pivot frictions were very slight. This component is in the lower medium range of mass (11g plus cartridge).

Bias correction was hopeless at the lowest settings but acceptable in the intended range of use with the cartridge supplied. An unidentifiable magnetic cartridge with a spherical-tip stylus, capable of tracking at 1.8g, is in fact fitted. Its sound was coarse and inelegant, quite at odds with the potential of the system, and the arm could accept something better. As things stand the disc reproduction throws the system out of balance. What a pity.



QUADRAPHENIA

HI-FI CENTRE



10 Nursery St. Sheffield S3 8GG Tel.(0742) 77824

19 Bradford Row (Hallgate) Doncaster DN1 3NF Tel.(0302) 21215

MAIL ORDER : Please contact Sheffield branch FREE DELIVERY

BY TELEPHONE: Phone in your order before 3pm for same day despatch. **BY LETTER:** Please print your name and address clearly. **All Mail Orders to Sheffield Branch Only Please.** The prices in this advert were correct at time of preparation, but can vary from day to day. Please check the latest price by phone, you may find our latest price even cheaper.

BUSINESS HOURS: Sheffield: Mon.-Sat. 9am-5.15pm. Doncaster: Mon.-Sat. 10am-5.00pm.

SEND 10p STAMP FOR FULL LIST OF ACCESSORIES

All rack systems below purchased with loud speakers qualify for FREE headphones or loudspeaker stands



**A60 Amp
T60 Tuner
D90 Cassette
Deck
P50 Turntable**

QUADRAPHENIA
PRICE
£355.00

Sansui
system
including
Celestion 120
Loudspeakers

Technics

SLB2 Belt Drive Turntable
SU22 Amplifier
STZ1 Tuner
RSMB Cassette Deck
OMAR W/encoder
loudspeakers

£370.00 QUADRAPHENIA
PRICE
£359.00



PIONEER

(excluding
speakers)
X-300 £309.95



X-500
S £399.95

X-500
T £414.95

X-700
S £509.95

X-700
T £524.95

X-900
S £584.95

X-900
T £599.95

marantz.

**REAL HI FI AT MUSIC
CENTRE PRICES**

MODULE 200
inc. free headphones and
loudspeaker stands or
brackets
PM 200 30 Watt Amplifier
ST 300 Tuner
SD 1000 Cassette Deck
6025 CT Belt Drive
Turntable inc. Cartridge
AVON Loudspeakers
MR 700 Rack inc. handles



QUADRAPHENIA
PRICE
£349.90

**Once you've seen it
you'll never get it out
of your system**



OPTONICA
5100
Series System

QUADRAPHENIA
PRICE
£525.00

ONKYO MIDI-20

CASSETTE RECORDER

If the disc aspect threatens uniformity and balance, the TA-2040 (which costs more than the receiver) only serves to highlight the fact. It is fairly advanced cassette machine with light-touch controls (electrical actuation) and logic supervision based on integrated circuits. Further, it is not only prepared for use of metal-particle tapes (as well as other types) but also has adjustable bias, which Onkyo back with useful advice on settings for amateur use. All very well presented, and indeed the machine yielded creditable results in respect of distortion, noise and dynamic range.

So the TA-2040 is every bit a match for the system's receiver, and it seems that Onkyo regard cassette record/replay as something of a speciality, placing emphasis on quality and ease of control. All functions of this Dolby-equipped

machine were considered to be first-rate. Facilities include separate-channel LED arrays for peak-level indication, dual concentric level controls, stereo microphone sockets and a headphone outlet.

The cassette compartment is well arranged with a removable cover that ensures good accessibility to the heads and associated parts. Thus manual tools or a cleaning cassette can be used. Remote control is an optional extra, and microphones are also available.

LOUDSPEAKERS

A pair of HS-20 loudspeakers could be excluded from the scheme, since all equipment is listed separately, yet for reasons of appearance and size they seem virtually inseparable from it. This model, matching the housed units very nicely with its silver-grey finish, is a robust and well made little speaker, almost a miniature with an internal volume of about 8 litres.

Rating is 50 watts and nominal impedance 6 ohms. Sensitivity is quoted as 90dB at 1 metre for an input of 1 watt. This seems optimistic, but still it is apparent that the speaker is above the average in that respect. Drivers are a 16cm bass unit and a 5cm tweeter with crossover at about 2kHz.

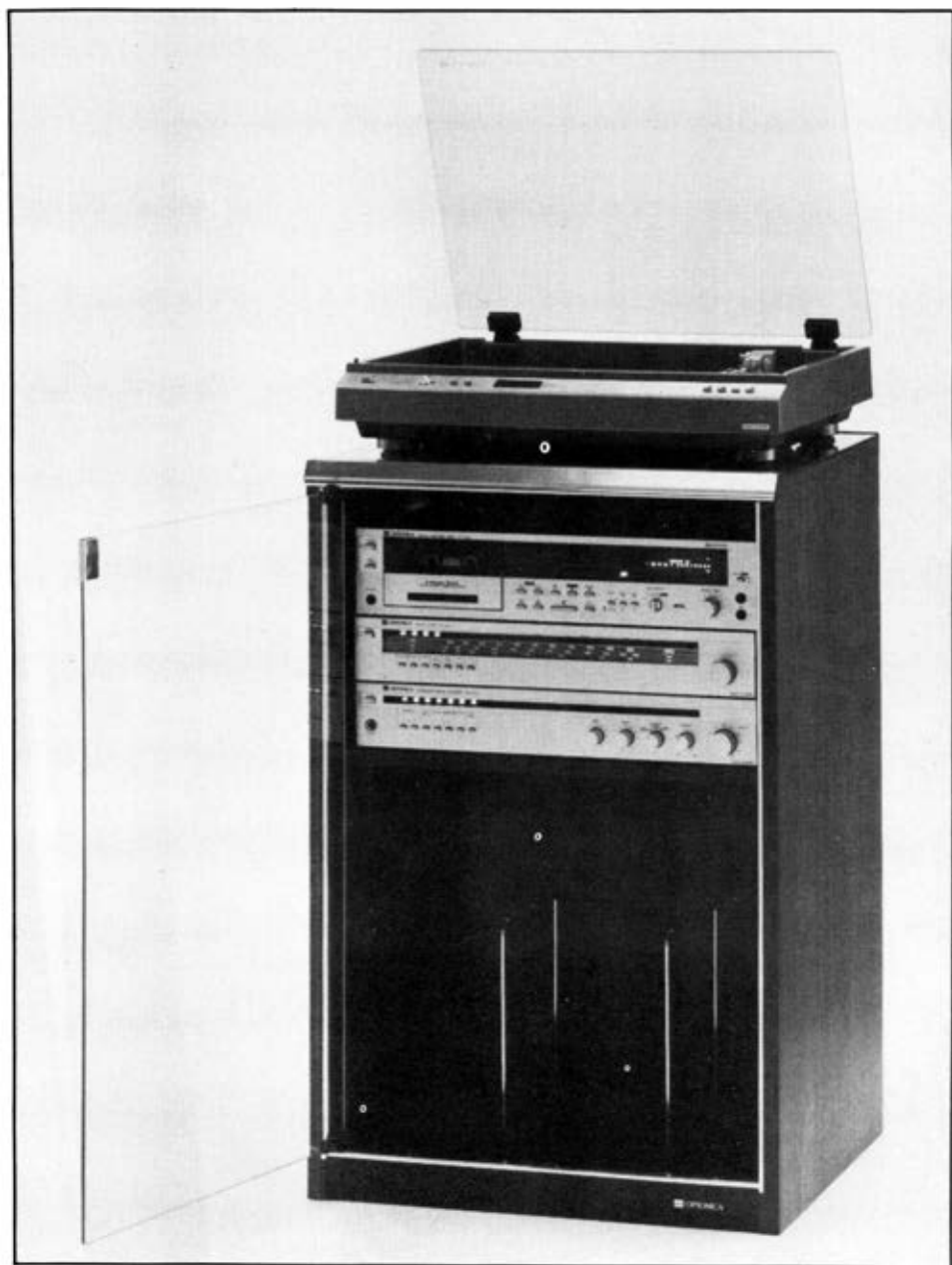
As might be expected from a near-miniature, the bass was somewhat thin, though certainly

clean. Quality generally was brightish and the detailing good, but there was no impression of depth in stereo. The HS-20 did not respond gracefully to high inputs, but otherwise was judged above the norm for speakers supplied with complete systems, mainly because midrange coloration was less marked than is so often the case. Even then, the system could take a better standard of reproducer, as quick checks with the test speakers confirmed.

VERDICT

Value is fair if not exceptional and the equipment is well presented. You may feel inclined to rate it more highly on technical merit if disc reproduction is not very important to you. But the fact is that discs *are* paramount for most users, and without doubt the turntable represents an error of planning. A better cartridge would help, though that cannot provide the complete solution. However, there seems to be no reason why a more up-market player should not be substituted.

OPTONICA SYSTEM



This smart system is assembled from well made and nicely finished slimline units in Optonica's recently introduced range. All items are available separately. The selection advocated as a properly balanced system is housed in a rack-style cabinet of plain design — type SY-7100 as illustrated — and the price quoted above excludes loudspeakers.

In most respects this outfit is a cut above the Sharp System 30, which comes from the same distributors. The power rating suggests use in a medium-sized room with reasonably efficient speakers.

AMPLIFIER & TUNER

Model SM-4100 is as neat a unit as one will find in the popular area of hi-fi, for it is elegant and has a sensible control layout on a slim panel (unit height is only 75mm). Much the same can be said of the matching tuner. The amplifier's output rating is 33 watts per channel into 8 ohms (referred to 0.09 per cent total harmonic distortion).

The makers do not seem too sure of their figures in minor instances and are inclined to hedge their bets over the odd detail such as pickup preamp characteristics. In fact the single pickup facility, for magnetics only (not moving-coils), is at 2.8mV with an overload threshold which is better than claimed at 182mV. The control array includes a click-position volume control and the usual tone controls, but a 'defeat' switch is not included for the latter. Optonica could enhance this unit's appeal by adding it.

Facilities embrace tape dubbing and monitoring. A set of seven push-buttons with associated LED indicators offer selection of two pairs of speakers, a subsonic filter, the usual loudness gimmick working at both ends of the frequency range, stereo/mono switching, and the dubbing and monitoring controls. A headphone socket accepts the standard jack-plug. Flashy 'power' indicators are absent, but the unit is none the worse for that.

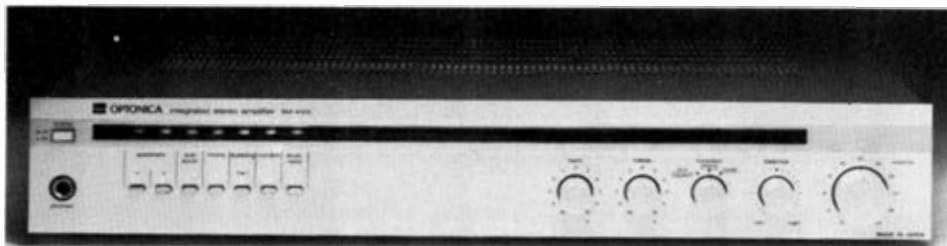
Tuner ST-5100 is a precise visual match for the amplifier. With MW and LW coverage as well as

FM, this manually tuned unit features phase lock-loop together with other circuit techniques to foster stability in use, which indeed proves very satisfactory. Performance generally was average for this class of product with about 2.5µV basic sensitivity and a 45µV requirement for 50dB S/N on stereo.

Noise level and distortion performance likewise was acceptable and no special criticism could be directed at the results from what is a modestly priced and basically simple unit. The limited adjustment of the AM ferrite-rod meant that exploration of the relevant bands would be very restricted unless a long-wire aerial was used. FM performance was quite lively, though, and there was a 75ohm coaxial input as well as 300ohm terminals for twin feeder from external or indoor aerial.

Adequate signal-strength and tuning beacons are provided, and the controls include muting and an 'air check' button, the latter bringing in a 400Hz tone to aid setting of recording levels on the associated cassette machine.

The amplifier and tuner combination will surely give a lot of pleasure, for the results are somewhat above average in relation to cost. Some lack of tightness and definition in the low bass could be attributed to marginal power delivery with enthusiastic driving but again this would not be a factor in the smaller room for which this outfit is best suited. Generally the sound had a nicely open and analytical quality.



TURNTABLE

Attractively styled, the RP-5100 direct-drive turntable is a two-speed auto unit built into a shallow plinth, largely of plastics but quite substantial. The design is such that the platter and pickup are in a sunken position, so that the hinged lid is flat and meets the plinth flush, leaving the controls exposed at the front. Usually, the lid is of plate glass, adding usefully to the mass of the assembly. It is a pity that all this is not complemented by better mounting arrangements. The plinth feet do nothing of any consequence to aid resistance to vibration, and resonant behaviour intrudes too near to main pickup resonance.

Control is of the DC servo variety with a frequency generator as the basis of speed monitoring, and speed stability proved to be above average for the type of unit. The cast platter weighs 1.6kg including a reasonably effective mat, and start-up time to 33 was about 2 secs. A pitch control and illuminated strobe are provided. Cue and reject functions are included among the buttons at the plinth's front edge, all neatly arranged and precise in operation.

The pickup arm is of medium mass (13g

effective plus cartridge) and carries a headshell of skeletal design with an acceptably secure plug-in union. Bias correction showed good accuracy in the anticipated range of setting and the pivots were well adjusted, though the lateral friction was somewhat high at 60mg.

An Audio-Technica cartridge was included. This was neither better nor worse than most inexpensive and ill-specified types supplied with packaged systems. Although a match for the arm, it was an inelegant tracker and sounded coarse, lacking midrange detail and high-range definition. The system warrants a higher standard and the first thing to do would be to substitute a cartridge more in accord with its potential.

Experiment indicated that acceptable tracking, stereo imaging, acoustic breakthrough and sound could be achieved, while rumble was never intrusive. Not a bad motor, actually, and Sharp Optonica have pitched it about right — except for the cartridge. Audio-Technica's standard range is very good, so why not explore it?



OPTONICA SYSTEM

CASSETTE RECORDER

RH-5200H is not quite as 'slimline' as the partnering units but is still a neatly presented machine and offers the advantages of light-touch controls and a logic system based on the use of integrated circuits, with electrical actuation of solenoid devices and the facility for changing rapidly from one tape-transport function to another. An auto-search system scans recorded tapes to give quick spotting of programme starts and it is possible to add an electronic timer.

This Dolby-equipped machine has a four-position tape selector, including a metal tape facility but without the refinement of bias adjustment, together with a useful fluorescent display of recording level. Stereo microphone inputs and an efficient auto-stop are included. The damped cassette action was satisfactory but accessibility to heads and capstan was not of the

best, so that regular use of a cleaning cassette device will be essential.

Speed stability of this two-motor machine was above average and superior results were achieved in respect of noise and dynamic range using Maxell UDXL and TDK metal tapes. Mechanical noise was low while distortion was average for the class of product. The controls were convenient in use, and in all the machine was well up to the ostensible standard of the system.

VERDICT

There can be no doubt about the value offered here, for such a well-endowed system can only gain a firm commendation in that respect. Technical merit also is well up the scale, and sound quality was considered very promising as evidenced by trials with the Krystal speakers and further supported by Mission 700 compacts which arrived for evaluation when the report was prepared.

Any slight misgivings concern the turntable, but here the main objection is directed at the cartridge, which could be changed without any great expense. So the benefit of the doubt is awarded, and with this goes a marginal A grading on technical grounds.

PHILIPS BT 305



Combining several units from the Black Tulip range, this system is in many ways characteristic of Philips with its discreet styling and general air of quality. A solidly made walnut-finished rack incorporates storage space for discs and cassettes, and the top well is fashioned to accept certain turntables from the current series.

For trials the BT-305 was submitted as shown in the picture, without speakers. Philips can advise on speaker selection if required; but since the company designs for 8-ohm matching nowadays, the choice is wide open.

AMPLIFIER & TUNER

Well made (in Belgium) with an easy-to-use control layout, the AH-305 amplifier and AH-103 tuner are fairly bulky in relation to their capabilities. The amplifier is rated at 50 watts per channel but the distortion runs rather high and it is not really practicable to enjoy a very wide dynamic range despite the promise of the specification. Noise levels were reasonable, though.

A particular aspect of the distortion problem arises on pickup, since the overload threshold is about 120mV for the 2.5mV input. This lack of a generous margin is highlighted by use of the manufacturer's own cartridges, which are inclined to be generous with output voltage! Controls include a loudness button, speaker selection (two pairs), high filter and a balance control concentric with the volume knob. Tape facilities are good. There is additional provision for driving 'motional feedback' speakers (a Philips speciality). Simple output meters offer some indication of relative levels.

The AH-103 is a manually tuned unit with a long scale and a useful flywheel effect on the control. Coverage is FM, LW and MW. A particular advantage is the inclusion of five FM presets, each being separately tuned by a set-

screw in the panel and with reference to a meter. A similar meter is used for signal-strength indication on manual tuning. Switched automatic frequency control is included and there is the bonus of a line-output control.

Aerial provision is for 300 ohm and 75 ohm (coaxial) FM. There is an internal AM aerial but this is of minimal use in a racked system because orientation would involve moving the equipment around. Therefore a wire aerial is essential. Basic FM sensitivity was 1.8 μV with 100 μV requirement on stereo. Sound quality was fair if a bit dull and there was an impression of dynamic range restriction. The amplifier/tuner combination can, just about, be classed as average in the context of systems examined in the Digest.

CASSETTE RECORDER

Decidedly bulky, the N5431 cassette machine is very well made, though basically a simple unit with provision for commonly used tapes, excluding metal. Dolby noise-reduction is included. The controls and mechanical aspects were well liked, and the press-keys for the tape transport felt more positive and solid than many examples of their kind. A wide variety of accessories can be obtained from Philips dealers.

Record-level meters are augmented by a peak warning beacon. The cassette eject action was

smooth and head accessibility good. Aspects of performance such as noise levels, response and speed stability — all acceptable in relation to cost — suggested that the machine would please those who enjoy cassettes for auxiliary and occasional use. Indeed, this unit causes fewer qualms than the disc player.

Without AKG headphones your hi-fi system is incomplete.

Make a comparison test between AKG stereo headphones and any good make of hi-fi loudspeakers and you will hear that AKG headphones easily match the clarity and performance of the best loudspeakers for a fraction of the cost. Plus, they are lightweight, comfortable to wear and give you freedom of movement without ever losing the perfect stereo image. There is no disturbance of others even at high volume. At the same time, you remain undisturbed by outside sound.

Try this simple comparison test at your AKG stockist straight away and be convinced that AKG headphones will complete your hi-fi listening enjoyment.



AKG Acoustics Ltd
191 The Vale, London W3 7QS
Tel: 01-749 2042 TX: 28938 akgmic g

Test hear AKG headphones
at your hi-fi dealer



LOOK OUT FOR
THE RED
KEY

TURNTABLE

Model AF-777, one of a series of players displaying a family resemblance, is a lightly constructed belt-driven unit with automatic operation. It is based on a servo system with DC motor and tachometer, fine-speed (pitch) adjustments being provided for each of the two speeds. The fairly light plinth, made largely of plastics, incorporates a sprung sub-chassis linking the platter with pickup. Manual operation is possible with the aid of a damped lift/lower control adjacent to the pickup.

The pickup arm is almost in the low range of effective mass at 10g plus cartridge and carries a plug-in shell fitted with a GP401 Mk2 cartridge (elliptical stylus). The main resonance at about 8Hz is perhaps a little lower than the makers intended (and is near to the resonance of the assembly suspended in the plinth), while a question of compatibility also looms with the high output of the cartridge, which might otherwise be regarded as a good choice. Although arm frictions were acceptably low,

there was some play in the pivots.

A somewhat coloured and muddy sound quality, with loss of fine detail, was presumably the result of a number of quirks of design and assembly, though bass was quite firm. The specified cartridge, a relatively cheap model, is known to have better potential under different conditions, and all in all disc reproduction gave rise to some reservations. However, results on acoustic breakthrough were satisfactory, everything functioned dependably, and rumble was not intrusive. Start-up time to 33 was 1.3 secs. An interesting extra is the tracking-pressure indicator built into the arm-rest.

VERDICT

This system cannot be greeted with special enthusiasm for, despite the reasonably good overall balance contrived, there are incompatibilities and some points of detail which attract criticism. The distortion level is somewhat high, revealed by checks with the test speakers, and disc replay is not to the standard expected of Philips (and which it is known they can achieve). Performance at high outputs was disliked. Value is not too bad, but some attention to detail could result in improvement.

PIONEER X300



Pioneer's budget stereo outfit X300 is at the bottom end of a series of four rack-mounted systems, which of course follow the expected trend of escalating power ratings and general elaboration characteristic of such Japanese equipments. In this instance the rating is appropriate to small rooms and the emphasis is on simplicity.

Although Pioneer can supply loudspeakers and advise on choice, it is the company's practice to quote a price which excludes these and other extras, such as the DT-500 timer unit. Therefore the price shown covers the amplifier, tuner, cassette recorder and turntable together with a CB3 rack housing.

AMPLIFIER & TUNER

Amplifier and tuner

Simple but smart, the SA-410 amplifier is rated at 21W per channel (8ohms, 0.1 per cent THD), and in this respect fulfilled expectations admirably, although full power delivery was not very gracious on audition and the bass, if fulsome, was none too well controlled. The single phono input at 2.5mV was found to be marginally under specification in respect of overload at 140mV but the result was in any event good for a low-cost design.

This amplifier sports switched outlets for two sets of speakers, simple tape input/output and monitoring for a tape recorder, a loudness button and the usual tone controls with centre-stop positions. Signal-noise results were particularly good, and in all the unit furthers Pioneer's reputation for value in this sector of the market.

Tuner TX-410L which, like the amplifier, is listed at just under £60, provides a pleasant

surprise, for it is a straightforward unit with a nice turn of performance in relation to its cost (good quality on BBC FM), although the required input for optimum stereo is at least 100µV. Distortion on FM was moderate and the simple tuning and muting aids were acceptable.

Coverage is LW and MW in addition to FM and the FM aerial arrangements are comprehensive, including a coaxial cable input. A long-wire aerial will be essential for AM. Manual tuning along the extended and very clear scale was aided by a smooth flywheel action.

With an even audio response and some top-end brightness, plus commendable stability, this tuner will surely win the approval of those who accept the limitations of an economy-class design. Put it with the amplifier and the value is very attractive, requiring no serious qualification, although close attention to the FM aerial is vital.

CASSETTE RECORDER

CT-200 is one of the least costly of all machines with an electronically governed mechanism and light-touch controls with integrated-circuit 'logic' supervision. Tape-transport control is the interesting part, and all other features are very simple, namely dual-concentric level controls, three-position tape selection and twin microphone inputs, together with Dolby and auto-stop.

The record-level meters have familiar limitations and additional peak-warning devices

are lacking, so that diligent practice is needed to 'feel' the recording capability and make the best of the system's reasonably good S/N potential. Speed stability was about average.

Control functions were precise and convenient and the damped cassette eject action was liked. Use of a cleaning cassette can make up for limited access to heads for maintenance purposes. So it is not a bad machine for auxiliary entertainment.



AERCO of WOKING

SURREY'S LEADING AUDIO-VIDEO CENTRE

Sansui High Rise Hi-Fi



**Music
lovers can't
miss it**

If you want the performance of separate hi-fi without the tiring wiring, raise your sights.

To Sansui High Rise Hi-Fi.

It's as neat as a music centre, but it's pure hi-fi from top to bottom. With Sansui High Rise, you can enjoy records, radio, or tapes — and we do mean enjoy.

A pulsing light indicates radio signal strength. Two large meters tell you when your recording levels are spot-on. There's even a cunning little 'traffic light' which first monitors peak reception, then locks in the station for you.

The cassette deck is Dolby* of course — and there's a press-button selector to get the best performance from different types of tape.

Now the best feature: prices for the range of Sansui High Rise systems start from around £300 complete with speakers.

Get the lowdown on Hi-Fi.

Post the coupon.

Sansui
Even the name
makes music

SYSTEM A4 24 WATTS PER CHANNEL

Comprising: A40 Amplifier, T60 Tuner, D90 Dolby cassette deck, P50 Belt drive semi-automatic turntable inc. cartridge, GX 70 Audio cabinet with glass doors, ESP 601 2 way speakers. **£349.00**

SYSTEM A6 45 WATTS PER CHANNEL

Comprising: A60 Amplifier, T60L Tuner, D90 Dolby cassette deck, P50 Belt drive semi-automatic turntable inc. cartridge, GX 70 Audio cabinet with glass doors, ESP 601 2 way speakers. **£379.00**

SYSTEM A8 65 WATTS PER CHANNEL

Comprising: A80 Amplifier, T80 Digitally Quartz-Locked Tuner, D100 Dolby drive semi-automatic turntable inc. cartridge, GX 80 Audio cabinet with glass doors, ESP 801 3 way speakers. **£519.00**

SYSTEM R3 25 WATTS PER CHANNEL

Comprising: R30L Receiver, D90 Dolby cassette deck, P50 Belt drive semi-automatic turntable inc. cartridge, GX 60 Audio cabinet with glass doors, ESP 601 2 way speakers. **£299.00**

SYSTEM R7 65 WATTS PER CHANNEL

R70 Receiver, D100 Dolby cassette deck (Metal Tape), P50 Belt driven semi-automatic turntable inc. cartridge, GX 60 Audio cabinet with glass doors, ESP 801 3 way speakers. **£389.00**

SYSTEM A8F

As System A8 but with FRD3 direct drive turntable ex. cartridge. **£529.00**

(All prices correct at time of going to press)

SYSTEM R5

As above but with R50 Receiver 45 watts. **£319.00**

Other complete systems stocked: Pioneer, Dual, Philips Black Tulip, Hitachi, Trio, Rotel, Technics, Aiwa Micro, Toshiba (Aurex), Onkyo, Fisher, Akai, JVC, Teac, Marantz, NAD.

AERCO

27 CHOBHAM ROAD,
WOKING, SURREY
Tel: (04862) 4667/4926

ORDER BY POST OR TELEPHONE. If you have an Access or Barclaycard just phone Woking (04862) 4667

PLEASE SUPPLY _____

(Cheque/P.O.

Access/Barclaycard No.)

I ENCLOSE £ _____

NAME _____

ADDRESS _____

SD11

Delivery complete systems add £10.00 or individual items add £4.00

PIONEER X300

TURNTABLE

The PL-100 is a neat-looking semi-auto player with a slim plastics plinth. Its cosmetics are more notable than its substance, which is slight. The servo-governed motor drives the light cast platter via a belt, and fine speed adjustment is included. Motor start is effected by moving the pickup away from its rest; then a damped lift/lower control aids pickup positioning and drop. Partial decoupling of the pickup from the body of the player seems to serve no particular purpose.

In the higher range of mass (17g effective), the pickup arm carries a rigid plug-in headshell and an unidentifiable magnetic cartridge, equipped with a poorly finished conical stylus and bearing Pioneer's name. Tracking at 2g was uneasy but

represented the limit of capability. The main resonance appeared lower than optimum and sound quality was brash and short of real detail. The general effect was tiresome.

A very strong criticism would perhaps be out of line at this price level, but the fact remains that the system deserves a better pickup. Acoustic breakthrough and shock-resistance checks yielded below-average results, and rumble noise was just detectable with small test speakers. The impression is gained that Pioneer 'budget' disc equipment is not what it used to be.



VERDICT

A high-value system, without doubt, and nothing less than a top grading can be awarded. So the technical aspects should be examined, and here the reservations mainly concern disc reproduction. Although the level of ambition is modest, it is considered that greater refinement should be possible. This finding was confirmed after trials with small test speakers.

Don't expect too much of the very limited power capability, but the X300 is one of the better bets where hi-fi pretensions have to be curbed.

PIONEER X900



This system offers anticipated contrasts with the small-room X300. Here we have a high enough power rating for a very large room and considerable dynamic range, given the use of loudspeakers of typical efficiency, while the control facilities are more advanced. The price quoted excludes loudspeakers but covers the CB9 tall rack housing.

£599

merit **A** value **1**

AMPLIFIER & TUNER

Model SA-710 is the most powerful amplifier in Pioneer's standard range, although there is a separate high-power range of different design. This DC amplifier is rated at 65W per channel (8ohms, 0.02 per cent THD), and indeed its power capability is in practice generous and freely delivered. It is perhaps surprising that no extra input stage for moving-coil cartridges has been included, but the standard 2.5mV phono input has satisfactory characteristics and a 200mV overload threshold.

This excellent amplifier, offering very good S/N results and low distortion, has a plain and almost severe aspect, relatively free from expensive seldom-used facilities. The only real embellishment is the "fluroscan" power indicator, with a bar display for each channel. It is a safe middle-of-the-road unit, characteristic of Pioneer's current design approach.

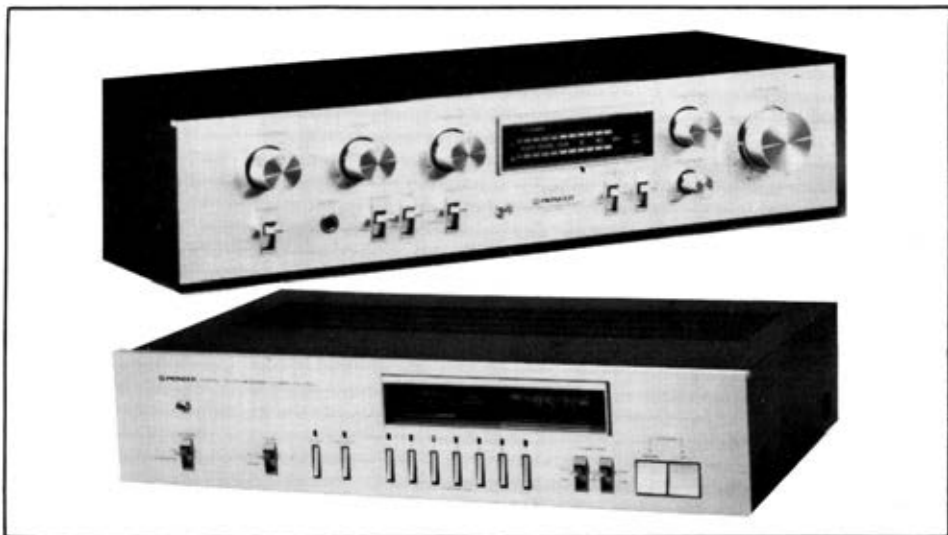
At the rear there are three safety-approved AC outlets for connection of other units in the system — a very good point. Instructions warn against connecting irons and toasters; so evidently some folk have very odd ideas about the versatility of hi-fi!

Provision is made for connecting two tape recorders with appropriate switching, and other facilities are tone-control defeat, loudness

contour, subsonic filter and switching for two pairs of speakers. In all a sensible high-performance unit, which by the way sells separately at a little under £150. It goes to show that watts are cheaper, in real terms, than they were a few years ago.

Tuner TX-710L is a fitting partner. This is a digital synthesiser unit with seven preset buttons giving a total of 14 options across the FM, LW and MW bands, rapid up and down station-scanning, and the necessary provision for passing selected frequencies into store. Digital readout is on a blue 'fluroscan' display and there is a five-point LED signal-strength indicator. A pretty piece of work and a lively performer, although it looks bulky and, with crafty use of miniature parts, could have been made half the height without any technical disadvantage.

Both aerial terminals and a 75ohm coaxial socket are fitted, but the AM ferrite-rod has very restricted adjustment. A long-wire aerial is advisable here. Input for optimum FM stereo was 55µV and the sound quality was excellent, evidence of smooth and extended response, though with some slight extreme-top emphasis. On the whole a credit to the system.



TURNTABLE

In some respects the PL-400 offers what a lot of users would require, especially a fixed quartz-lock system without the fuss of fine adjustment of speed which has to be switched in. Oddly, there is a strobe which, in the circumstances, adds pointlessly to cost and can only provide a visual attraction. Speed accuracy and stability were outstanding and the torque generous, while the start-up time of the 1.3kg platter to 33 was 1.4 secs. The removable platter-mat was considered more sensible than most, though its damping effect was not very good.

This is an auto player with reject/repeat functions and manual disc-size selection, all controls except the pickup cueing device being ranged along the plinth front and operable with the cover closed. Bias correction is set on a dial close to the pickup, and could only be described as a reasonable try, lacking ideal accuracy, within the anticipated range of settings.

The familiar S-shaped Pioneer arm carries a plug-in headshell fitted with a mediocre moving-magnet cartridge designated PC-150. This latter item, with a conical stylus and an uneasy tracking ability at 2g pressure, is simply not good enough for the system. Explanation of such obvious matters becomes wearisome, but the fact is that low-cost cartridges belong to low-cost systems.

Although the pickup arm in this instance restricts cartridge choice to some extent, bearing in mind the high effective mass of 17g, there is still some scope among magnetic types of low to medium compliance. A low-compliance moving-coil would be a possibility, given the use of a matching transformer in this case. Otherwise it can be reported that arm pivot frictions were very slight and the unit's behaviour average in respect of acoustic breakthrough, shock-resistance and rumble.

CASSETTE RECORDER

Model CT-400 is an easy-to-use machine, well gauged to meet the needs of those with a general rather than specialised interest in cassette usage as an adjunct to hi-fi. The blue bar-type display of recording level is better than many and the logic supervision of tape functions, together with feather-touch controls, is state-of-art in popular cassette units.

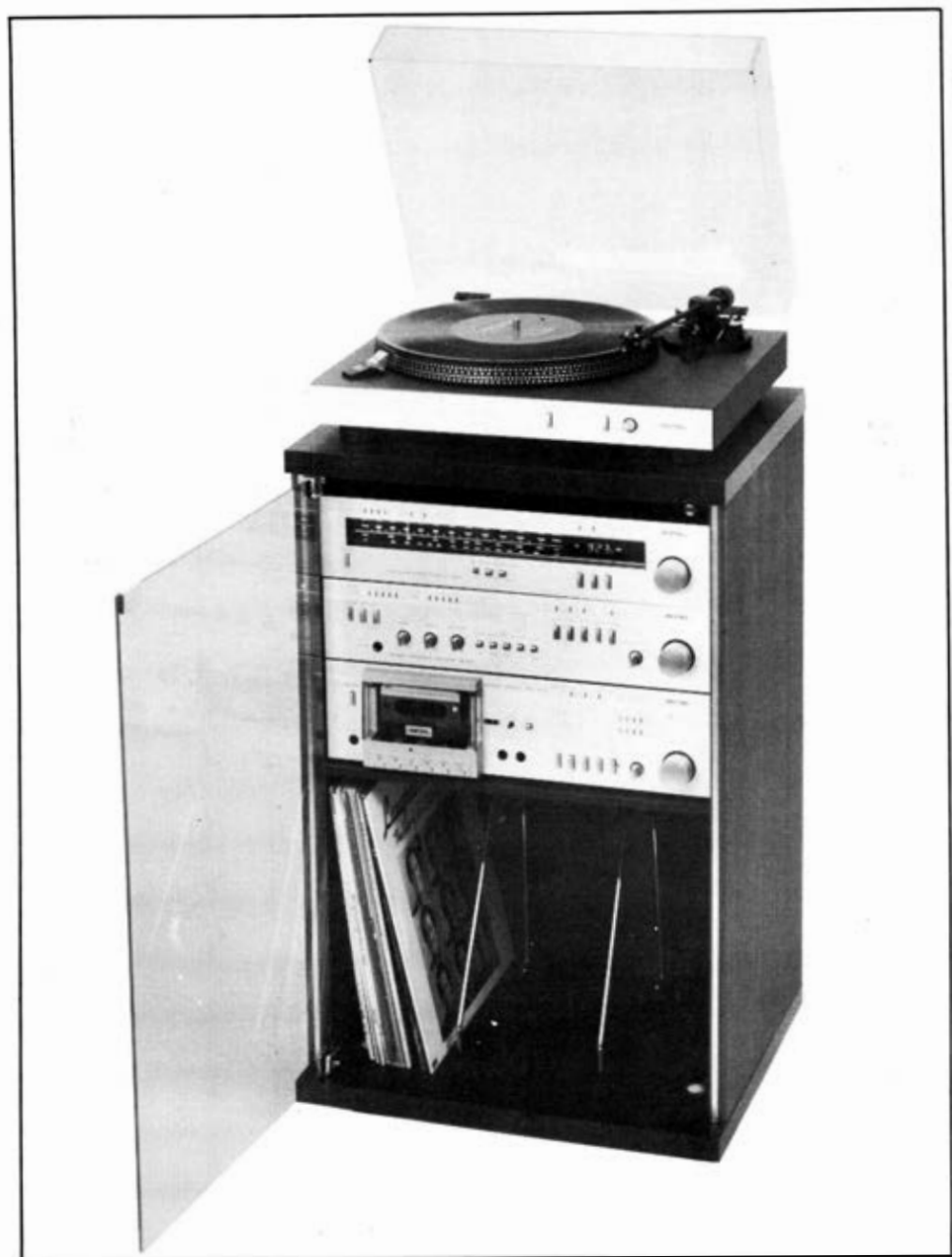
This single-motor machine has a timer facility, twin microphone jacks, a record-mute switch,

Dolby noise-reduction and simple selection of tapes including metal. An output level control would have been welcome on a unit of this calibre. Head accessibility was adequate. Recording was very straightforward and yielded respectable S/N and dynamic range judging by results with BASF low-noise and TDK metal tapes. Pioneer are helpful on the subject of tape choice for best results.

VERDICT

Another good-value system with some nice technical attributes. The standard of disc reproduction is a let-down, but fortunately the turntable is a fair performer and there is some scope for cartridge replacement. A top grading is awarded for merit on the understanding that a cartridge replacement is neither difficult nor necessarily costly.

ROTEL SYSTEM A550



Long-term enthusiasts with good memories will associate Rotel (possibly with some affection) with keenly priced hi-fi units in a wide range — down to 'budget' specialities — and newcomers may well have noticed how the current series of products typifies the Oriental something-for-everyone planning.

With racked systems Rotel concentrate on the middle price-range. All items are available separately. Appropriate examples are brought together in balanced outfits, each supplied with a castor-mounted rack. A550 is the more powerful of the 500 series, available with matching loudspeakers at a guide-price of £499, but for test purposes it was submitted without speakers. The price quoted at the end of this report includes the rack.

AMPLIFIER & TUNER

Rating of the RA-550 amplifier is quoted as 40 watts per channel (0.08 per cent THD) into 8 ohms but it can do a little better than that (and conservative specifications are always commendable). Of plain aspect but up-to-date in technique, this unit boasts an input preamp for moving-coil cartridges. There is a single switched connection for moving-coil and MM types, and the overload threshold for the latter's 2.5mV condition was an adequate 170mV.

Provision is made for connection and switching of two tape machines, with dubbing facility, and there is a conventional line-up of tone and loudness controls, muting and subsonic filter (which does not cut sharply enough to be of much use). A headphone socket is fitted, and selection of two pairs of speakers is by push-buttons. LED output indicators cover two ranges according to use of push-button switching.

Although output-circuit protection is effective, a distinct switching thud was heard through the speakers. Since this is usually avoided with modern amplifiers, Rotel were asked about it and have confirmed that it will be eliminated in

further production. Sound via this amplifier was judged open and clear, with commendably low noise levels. Bass sounded subtly less tight and defined than from some more advanced units, but it was neither curtailed nor out of line with the modest cost.

Tuner RT-550L, covering LW and MW as well as FM, is a lively performer with enough potential to interest fairly ambitious users. There are no presets but the manual tuning, with a nice flywheel action and augmented by LED indicators of signal-strength and tuning centre (plus a digital frequency readout), should suit many listeners. Stability was good, and audio quality was crisp and well balanced.

This unit has basic controls and the usual aerial terminals, with a coaxial socket for 75 ohm FM. Basic sensitivity on FM was 2 μ V, with 38 μ V for 50dB S/N on stereo. The ferrite-rod for AM hinges outward but does not swivel any other way, so it is hardly ideal for a system that is likely to stand in a fixed position. A long-wire aerial is advisable for exploration of the relevant bands, especially if interference is to be minimised.

CASSETTE RECORDER

RD-550 provides facilities for metal and other, more commonly used tapes and offers the advantage of adjustable bias. It is a 'direct loader', with the superior head accessibility bestowed by such designs, and there is a cover to protect the vulnerable parts when the machine is not in use. Record/replay head is of the Sendust type. The mechanism and electronically controlled motor gave very good speed stability, though directly radiated noise was marginally more noticeable than average.

Tape functions are ordered by light-touch

buttons and other functions, apart from the dual-concentric level controls, are controlled by switch buttons. Other features of this straightforward and simple unit are stereo microphone inputs, LED arrays for record-level indication and, of course, Dolby noise-reduction. Amateur users should find it easy to make recordings of healthy dynamic range, of good quality in relation to cost. Bass was a bit lumpy, but that is often the case with this medium at relatively low cost.

PIONEER®

***Beauty is in
the ear as well
as the eye of
the beholder!***

Just looking at any of the new X Series rack systems from Pioneer gives you the impression that it's something out of the ordinary. Slim, matched component separates that are beautifully integrated to produce the very best in sound. And in style.



Technically, every separate matches every other perfectly. Leaving all the problems of compatibility and ill-matched separates with other systems.



In effect, what you can't see of the X Series you can hear. The amplifier 20 Watts (X300) to 65 Watts (X900), enables the X Series systems to give you the best of both sound and vision.

But don't take our word for it. Why not pay us a visit and hear just how good a beautiful piece of equipment can sound.

JEFFRIES HI-FI 4 ALBERT PARADE, GREEN ST.
EASTBOURNE Tel: 31336.

*Late night dems. Wednesdays 6-9 p.m.
The Quality and Service Centre of the South-East
Full credit facilities and mail order available*



AMERICAN EXPRESS DINERS CLUB



Additional Address: 69 LONDON ROAD, BRIGHTON

**Tel: 609431
(Closed Mondays)**

ROTEL SYSTEM A550

TURNTABLE

Model RP-550 is a direct-drive turntable of the semi-auto variety with reject control and automatic shut-off plus the customary manual lift/lower control for the pick-up. As a servo system centred on a DC motor it offers fine adjustment of each of the two speeds. Main controls are on the front of the plinth, so they can be used with the dust-cover closed.

An interesting feature is the low-mass pickup arm (about 7g effective), a straight-tube component with offset glass-fibre headshell. Precisely assembled and with negligible pivot frictions plus the usual dialled sidethrust correction (acceptable in settings above 1g), this item is much like some others now appearing on medium-cost players.

From the specification it seems likely that this model is sometimes fitted with a MM cartridge. However, the sample RP-550 carried an Audio-Technica AT30E moving-coil. This is ambitious by packaged-system standards, though it is one of the less costly examples of the breed. In any event there is the advantage of a low-distortion sound, better detailed than one often gets from

typical magnetics in this area. Curiously, though, the AT-30E, of fairly low compliance, is not an ideal match for the arm, and the resulting resonance falls further up the spectrum than is normal.

Nevertheless the turntable is on the whole a reasonable choice for the system. Its plinth, formed from particle board, is rigidly made. The platter (about 1.4kg) ran up to 33 in just over 1 sec. There was no intrusive rumble under practical conditions and the unit showed fair results in respect of acoustic breakthrough. The smooth platter-mat displayed one oddity in the shape of a small central raised portion around the spindle area. It will have to be cut off if it is not to render the label recess ineffective.

VERDICT

Any quirks in this system are of a minor kind, the pick-up arm/cartridge compatibility being a particular example. Certainly it is a real value-for-money outfit and, having regard to the price bracket, there can be no heavy criticism of the deal offered by Rotel. Trials with the Krystal and Monitor Audio test speakers revealed the many merits of this assembly.

ROTEL MICRO 80



Another diminutive set of 'micro' units — but with a difference. Simplicity of functions and controls, likely to appeal to many, has kept the price down. Rarely will one find such an attractive array of clever little components at this price, which includes the disc input; yet the stacked units are real micros. The amplifier and tuner are each just over 6cm high.

Secure stacking is ensured by placing each unit's feet into indents on the one beneath. However, Rotel have been preparing a rack housing (to be available at extra cost) to enable the turntable's association with the rest of the system to be closer. At the price quoted the outfit arrives in the form depicted in this report — without speakers.

Provision is made for AC distribution from the amplifier to the other two stacked units via interconnections which are peculiar to the system. Thus the units are intended to work together and are not sold separately. An acceptable arrangement in the circumstances.

AMPLIFIER & TUNER

RMA-80 is a neat little amplifier with a lot of appeal as the nucleus of a small-room installation. Specified output rating is 25 watts per channel (8 ohms, 0.08 per cent THD) and the usual inputs are provided. For the single 2.5mV pickup input the overload threshold is 180mV, superior to some more costly designs. Only one set of speaker outlets is provided.

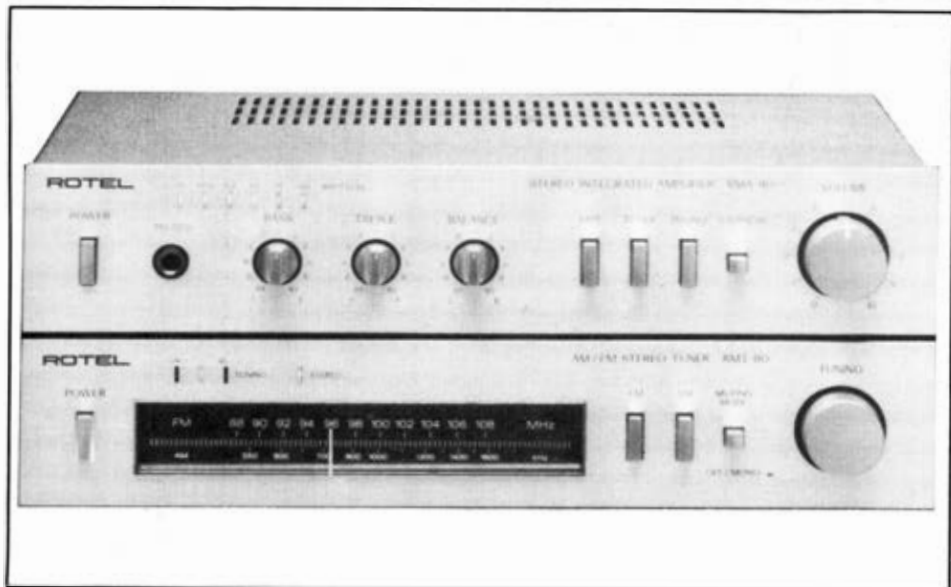
Other facilities are a headphone socket, an LED array for output level indication and a loudness button. Tone controls have centre-stop positions but no defeat switch. Some emphasis is placed on the power supply (toroidal transformer) and its output regulation.

Partnering tuner RMT-80 is a manually tuned unit with LW and MW coverage as well as FM. Tuning has a satisfactory flywheel action and fairly precise station selection is possible with careful use aided by the centre-tune LED system, but there is no signal-strength indicator. Muting and auto stereo/mono switching are expected features.

With a usable 2.5 μ V mono sensitivity, the stereo requirement was 46 μ V for 50dB S/N. A reasonably interesting FM performance can be secured with careful aerial siting, though the

tuner is essentially one for service-area users, offering smooth audio with a hint of high-range decline.

Both coaxial 75ohm and screw-terminal 300ohm aerial inputs are fitted, and the AM ferrite-rod is widely adjustable. The combination of amplifier and tuner was regarded highly in relation to cost, though performance at high levels lost some of its clean, unstressed quality, marked by loss of detail.



TURNTABLE

Model RP-500 appears to be the intended partner for another of Rotel's systems but is also a fair choice for the micros. It is a semi-auto turntable (auto pickup return) built into a particle-board plinth, plainly but neatly finished and equipped with a hinged acrylic dust cover. A synchronous motor is employed (this is not an electronically governed unit) and the mechanical belt-shift on the motor pulley is operated from the front of the plinth where there is also a reject button.

The light cast platter carries a plain mat which is sensible in every way except one, for it has a small central raised part which will have to be cut off before the disc can settle down properly. Start-up time to 33 was just over a second and stability was good. Error was only 0.2 per cent on the fast side during tests.

Bright spot is the low-mass straight arm with offset cartridge platform (ADC pattern again)

similar to that on the turntable accompanying the other Rotel system in this Digest. Effective mass is only 7g. Bias correction was satisfactory above 1g setting and the pivots were well assembled, with negligible frictions. The moving-magnet cartridge appears to be yet another of Audio-Technica's OEM specials (that is, a product supplied by one maker for use by another under the latter's brandname).

Cartridge compatibility with the arm was reasonably good but the sound was hardish and lacking in definition of detail. The arm can take something better, and much depends on whether the buyer wishes to accept the extra cost of making an improvement. Turntable shock-resistance was indifferent but acoustic breakthrough was about average for the type of unit.



ROTEL MICRO 80

CASSETTE RECORDER

Like its matching units, the RMD-80 cassette recorder displays simplicity and the basic facilities for amateur use. Tape selection is by four push-buttons, including a metal-tape position. Purely mechanical tape-transport operation is by press-keys which, though locking positively enough, have a very long throw.

The single motor is electronically governed and the heads are Permalloy for record/replay and ferrite for erase. Dolby noise-reduction is included and there are twin microphone inputs. Concentric input-level controls are mutually friction locked and, being small, were found

difficult to use independently.

The cassette holder was more heavily damped than many and the eject action was quite slow. But head accessibility was fairly good with partial dismantling of the door. The LED recording-level array is of average characteristic for the class of machine: patient experiment will be necessary to make the best of the dynamic range potential in view of the limited indication. But S/N performance was found to be acceptable in relation to the modest cost and should satisfy the user who places cassettes in an auxiliary role.



VERDICT

Rotel seem to have gauged the balance of this little outfit well, for it displays good uniformity through the several components. On value it can only be greeted with enthusiasm and rated highly.

As for technical merit, and with final evaluation using the test speakers, the system lacks the authority and refinement that could have secured a top grading. But still it is not far away from the accolade, and the finding is marginal.

SANSUI SYSTEM 900

Many possible combinations can be organised with Sansui's extensive popular series of units. The buyer can pick his way through this Super Compo range (as it is called) or get his supplier to propose a balanced system. Rack-mounting of all likely combinations is made simple by a choice of glass-doored cabinets.

Sansui have proposed two contrasting systems for the Digest, and this Series 900 example is in some ways the most ambitious. Any of this maker's systems can of course be ordered without loudspeakers, but the recommended models were in fact submitted together with the GX70 cabinet, and the price mentioned below embraces all items covered in the report. A cassette machine was excluded.

AMPLIFIER & TUNER

A B-77/C-77 combination of DC 'Linear A' amplifier and control unit was submitted. This consists of a hefty amplifier chassis and a much smaller but well-equipped control preamplifier, the two having common fascia styling and intended to stack together in the cabinet with partnering tuner T-77. Amplifier rating is 60 watts per channel into 8 ohms (0.03 per cent THD).

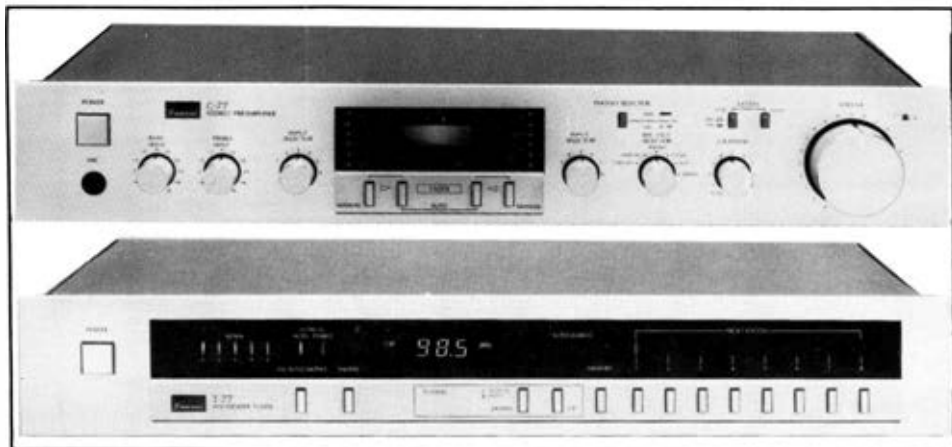
Sansui have included a number of what they term 'fun-to-use' features which must have had some significant impact on the cost. They may be regarded as having high entertainment value or as gimmicky intrusions on the real business at hand, depending on personal views. There is no reason to suppose that they affect performance one way or the other.

For example, the amplifier unit boasts a spectrum analyser as well as a peak-power display, and these together involve a very

considerable number of beacon devices. The analyser is based on rising and falling columns of beacons, arranged along a frequency scale and, upwards, a dB scale. There is a moment-to-moment picture of frequency content of music, voices and so on. This display can be switched between channels if desired.

The power display is arranged as a V-shaped reading on appropriate scales, adjustable in a ten-to-one ratio by a range switch. Anything else? Yes, there is even an auto-dimmer, which uses a light-sensitive cell. This causes the analyser and power gadgets to be bright when the surroundings are bright, but dim when the room lights are turned low. A nice luxury extra.

Control unit C-77 features an auto/manual fader which permits blending of any two of six programme sources in any desired proportion. Complete fading is also possible. Sansui suggest such uses as dubbing and 'seamless' party



LOUDSPEAKERS

Suggested speakers, provided for the tests, are a pair of ESP-801s. This model is a well-made compact total-enclosure, suited to mounting on a stand. It is a three-way system with a 25cm bass driver, a doped-cone midrange unit and a paper-cone tweeter. Rating suits the amplifier (60W programme) as does the nominal

impedance.

Although the speaker was judged to be a little above the average for 'compacts' put forward for total hi-fi systems, its lack of high-range sparkle (not a very nice tweeter) and a degree of hollow colouration did not impress. Stereo imaging was indifferent.

AMPLIFIER & TUNER CONTINUED

music — easy to control with a little practice. The three-second fade is augmented by a bar display which changes from green to red with in-between shadings to indicate the degree of mixing at any moment!

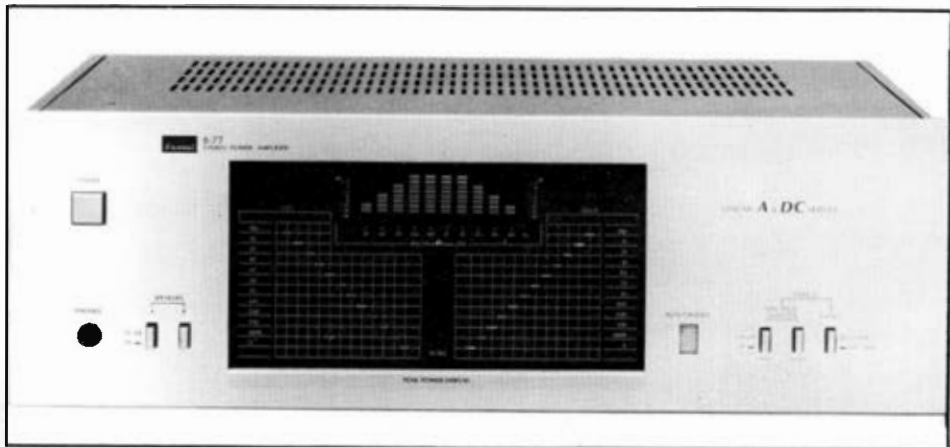
As for statutory facilities, the power chassis provides button switching of two pairs of speakers. The control unit has a preamp section for moving-coil pickup input, while the standard input is at 2.5mV (overload margin about 160mV). All the usual items are there, including tape connections, loudness control and, as ever, filters of limited use. A microphone jack is included.

In view of all the superficial attractions, an assurance that hi-fi essentials have been looked after will surely be needed. The amplifier/control unit combination does indeed promote a high standard of reproduction with splendid detail and firm bass, as judged with the test speakers held

at the ready for evaluation. Very low noise levels were enjoyed.

Similar compliments are due to the audio quality of tuner T-77, a digital synthesiser unit with quartz control. This pretty-looking FM/MW tuner offers auto and manual station-searching together with eight presets for selection of stations across the bands using the store facility. A pair of cells can be inserted to keep the store activated, so that presets are retained if the system is disconnected from the mains supply.

The customary aerial inputs are fitted for FM (terminals but no coaxial socket) and there is a ferrite-rod for AM, nicely adjustable via a ball-joint. Basic sensitivity was 2µV with a 35µV requirement on stereo, and all functions were very much liked. LED beacons and signal-strength indicators are provided.



SANSUI SYSTEM 900

TURNTABLE

Chosen by Sansui for this particular system, the FR-D4 is a fully automatic direct-drive unit, substantial in construction and with a superior motor and very finely finished main bearing. This is not a quartz-locked model (another in the series has that attraction), but is a good example of an auto model, offering acceptable stability under dynamic conditions.

Controls are speed and disc-size selection, start/stop and repeat. Functions are in the charge of an integrated circuit system and controls are of the feather-touch button type. The pickup is not intended to be handled. The cast platter weighs about 1.4kg including a mat of sensible design, smooth and well contoured. Start-up time to 33 was 1.5 secs. The unit has fine adjustment of the two speeds plus an illuminated platter-edge strobe.

The S-shaped pickup arm with plug-in alloy headshell is a characteristic high-mass Japanese component (18g effective mass plus cartridge) of good construction and finish, though the lateral

pivot friction was on the high side at 50mg. The dialled bias correction device gave good results but had to be underset to allow for its excessive correcting force.

Unexpectedly, this player was supplied without a cartridge. It appears from Sansui literature that the company's SC-50 would be their first and obvious suggestion, since it is mechanically compatible with the arm. On the other hand the omission is something of a relief, for on recent experience the SC-50 is hardly the most elegant of trackers, nor does it give a very gracious sound to match the quality of the amplifier.

In fact, the arm will accept moving-coil cartridges of low compliance, and results were reasonably likeable with an Audio-Technica AT-30E, although stereo imaging was never really ideal. The turntable was not quite up to specification on S/N performance, but still there was no intrusive rumble in practical conditions. Breakthrough and shock — fair.

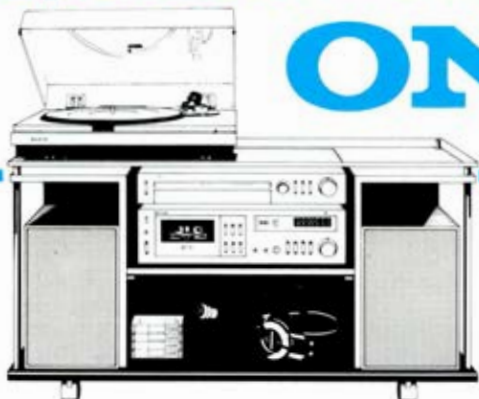


VERDICT

This system is in many ways impressive, but it is also somewhat expensive. Your views on its attractions must depend on consideration of the luxury extras. The amplifier and tuner are first-rate, though the turntable is not quite to the same standard and Sansui could have done better in this department. The undoubted fact that the speakers are not up to the potential of the electronics leads to the grading shown — on the understanding that an A for merit applies if the speakers are excluded.

Step ahead into the 80's with –

ONKYO®



MIDI 20 by ONKYO

With it's classy good looks Midi 20 is almost irresistible – the coffee table presentation in black and chrome with a glass top surface makes it unlike most other racks available today. Midi 20 provides 33 watts power output per channel, full radio reception, a record player with automatic arm return at the end of a record and two speakers. A matching "soft-touch" cassette deck is available as an option.

Price with TA 2040 cassette deck £574

FROM
£395

Midi-20

Expertly matched
– beautifully racked!

ONKYO centres
Visit your local stockist

ENGLAND

BIRMINGHAM R.S.C. 30-31, Gt. Western Arcade

CANTERBURY CANTERBURY HI-FI, 1-2, The Friars

COVENTRY R.S.C. 17, Shelton Sq., The Precinct

CROYDON KJ LEISURESOUND, 89, London Road

ENFIELD A.T. LABS, 191, Chase Side

HARROW KJ LEISURESOUND, 340 Station Road

LEEDS R.S.C. 5-9, County Arcade, Briggate

LONDON KJ LEISURESOUND, 48 Wigmore St W1

LONDON AUDIO FACTORS, 305, Edgware Rd. W2

LONDON PIERCEYS, 56-62, Lupus Street, SW1

LONDON KJ LEISURESOUND, 53, Fleet St. EC4

MIDDLESBOROUGH R.S.C., 103, Linthorpe Road

NEWCASTLE-UPON-TYNE R.S.C. 59, Grainger St.

ST. NEOTS A & N AUDIO, 66, Huntingdon Street

SHEFFIELD QUADRAPHENIA, 10, Nursery Street

SHEFFIELD R.S.C. 134 Exchange St. (Castle Mkt.)

UXBRIDGE KJ LEISURESOUND, 278, High Street

WATFORD KJ LEISURESOUND, 101 St. Albans Rd

WHITLEY BAY TOM S. FORD, 242, Park View

N. IRELAND

BELFAST AUDIO TIMES, 85, Royal Avenue

SCOTLAND

BATHGATE S & J HI-FI, South Mid Street

DUNFERMLINE ANDREW THOMSON, 68 Bonner Street

EDINBURGH R.S.C., 101, Lothian Road,

GLASGOW THE MUSIC ROOM, 221, St. Vincent Str. G2

GLASGOW R.S.C., 403, Sauchiehall Street

For more information send off the coupon below to:
AUDIOTREND, BRIDLEPATH, WATFORD, HERTS WD2 4BZ

Please send details of the Onkyo range

NAME _____

ADDRESS _____

SD 1

TURNTABLES

CP 1010A



All 3 turntables in the Onkyo range feature straight line low mass tone arms, heavy anti-magnetic aluminium die cast platters, speed/pitch control, illuminated strobe and front panel controls accessible when the lid is down. A practical approach offering excellence in turntable performance at realistic prices.

CP1010 A – belt drive, auto arm return and fitted with cartridge

CP1020 F – direct drive, fully automatic, repeat memory, Cartridge fitted

CP1030 F – direct drive quartz, fully auto.,

CP1010 A **£69.90**

CP1020 F **£99.90**

CP1030 F **£159.00**

THE ULTIMATE IN HI-FI



Looking at the X-900 pictured above, gives you the impression that it's something out of the ordinary.

And out of the ordinary it most certainly is; it's the ultimate hi-fi system.

One of a range of four Pioneer hi-fi systems called the X-Series: X-900, X-700, X-500, X-300.

Slim, matched component separates that are fully integrated to produce the very best in sound. And in style.

Each separate measures under 10cms in height and has uncomplicated controls that are clearly laid out and easy to use. Stacked one above the other they create a neat, uniformity of design.

But there's more to integration than meets the eye. Technically, every separate matches every other perfectly. Leaving all problems of compatibility and ill-

matched separates with other systems.

In effect, what you can't see of the X-Series integration, you can hear. From 65 Watts (78 Watts DIN) per channel with the X-900 amplifier to 20 Watts (27 Watts DIN) per channel with the X-300.

On all the amps, except on the X-300, there are bright blue, multi-peak Fluroscan™ meters which give accurate level readings.

But across the range, every cassette deck boasts metal tape compatibility and IC logic tape transport control.

The first allows you the pleasure of listening to recordings at the highest standard yet achieved, through the invention of metal tape cassettes. Which give a wider dynamic range and less distortion than any other tape.

The Finishing Touch..



... to even the best system is a pair of Tannoy Loudspeakers.

Their smooth reproduction and easy power handling will really bring out the full potential of the new rack systems.

British made, with a sound renowned throughout the recording world, the range of Tannoy Loudspeakers includes a model to suit both your system and your pocket.

When you're looking for a new system, don't waste superior electronics on inferior speakers.

Ask to audition a pair of the World's Finest Loudspeakers from . . .

TANNOY[®]

The Name for Loudspeakers

TANNOY PRODUCTS LTD.
77/79 High Street,
Watford,
Herts. WD1 2DT

Telephone: Watford (0923) 48868

Some of our systems are . . .

MORE THAN JUST RECOMMENDED



from us they're a best buy!



Like . . .

PIONEER X-300

System Comprising: The superb SA-410 20W + 20W amplifier, a true Pioneer budget winner. Next comes the TX-410 tuner with MW & LW as well as FM stereo. Now the new CT-200 cassette deck — superbly styled with feather touch and logic controls. Top up with the new PL-100X semi-auto turntable (complete with cartridge), throw in a well made rack with full glass door, and you have a more than just good value for money at the price of around £300 (without speakers).

Or . . .

The 3020 System

Comprising: The famous 3020 amplifier which sounds much larger than its rated output of 20 + 20 watts. The new 4020A AM/FM stereo tuner — an equally good design, and the 6020 dolby cassette deck. Providing the disc source, either the NAD 5020 turntable or the famous Sansui SR-222 mk II, with choice of cartridge from such models as the A & R C77, Grado FCE1+, etc. Prices start around £339 complete with glass fronted rack, or now, with the new NAD 6040 dolby HX cassette deck — prices around £369 (exc. speakers).

**FOR DEMONSTRATIONS AND PRICES RING 01-318 5755
FOR MAIL ORDER AND EXPORT RING 01-852 1321**

How about . . .

The 550

System Comprising: The RA 550 50 watt per channel amplifier with MC input. The RT 550 3-wave band digital tuner. The RD 550 direct-load dolby cassette deck, and the turntable department is handled by the RP 550 direct-drive deck which comes complete with a free Audio Technica AT30E M/C cartridge. An addition to this superb system is the RE 550 graphic equaliser to compensate for room acoustics. Ring for further details and prices — with what you save you can have another birthday!

Or . . .

Small is beautiful with AIWA MICRO 50

Comprising: A high efficiency 50 watt per channel power amp, a matching pre-amp with thoroughbred spec, a quartz digital tuner featuring automatic/memory pre-set, and a cassette deck that has peak metering and logic controls. Many extras are available, such as a hi-com noise reduction system, digital timer, and front-load direct-drive turntable etc. As for prices, they are so low we dare not print them, but they are only a phone call away!

BILLY VEE SOUND SYSTEMS

World wide
export service
Mail Order

68 Lee High Road, London SE13
Ring 01-318 5755 or 01-852 1321
(Mon-Sat 10.00-7.00 pm. Thurs 10.00-2.00 pm)

Personal
service
Part Exchange

Most other leading systems in stock

Prices indicated are subject to change — but we have been known to get 'em down!

SANSUI SUPER COMPO



Less elaborate than the Series 900 system, this Super Compo line-up is also a good deal less expensive. On the other hand it is a comprehensive outfit of nice-looking products, centred on an amplifier in the medium-price range. Alternatives are possible, and a somewhat similar system can be based on an amplifier of higher rating if preferred. This would not have a very great impact on cost. This is System A6 plus cassette deck.

As with the Series 900, you can of course exclude loudspeakers from the order. However, recommended small speakers were submitted, so again the price quoted is inclusive of all the items mentioned in the report together with a GX-70 cabinet.

AMPLIFIER & TUNER

These units are perhaps rather unwieldy in relation to their functions and capabilities but the controls are sensibly arranged and simple to use. The A-60 amplifier is rated at 45 watts per channel into 8 ohms (related to 0.05 per cent total harmonic distortion). At this level of cost one can hardly expect a facility for moving-coil pickups, though it is easy enough to interpose a transformer in the event that such a low-output cartridge is ever used. The standard phono input is at 2.5mV sensitivity and the overload margin is an adequate 160mV.

Tape-machine interconnections are good (monitoring and dubbing with two recorders) and the controls include a high filter, switching by push-buttons for two pairs of speakers, and a variable loudness control giving an adjustment of boost for low volume levels. Tone controls have centre-click positions. The power indicator has 12 LED segments per channel and there is the familiar claim concerning its 'accuracy' in showing power delivered to loudspeakers.

Matching tuner T-60L is a manually-tuned unit with a long easy-to-read scale, the control

having a smooth flywheel action. The usual beacon arrays aid tuning accuracy and reading of signal strength. Muting and band selection are reduced to their simplest with push-button controls.

The swivel-jointed AM ferrite-rod is intelligently devised for a range of adjustment. On the other hand the FM aerial terminals are of a type which have to be turned hard to clamp the wire-ends. Although such a method is sometimes used for comparatively robust speaker wires, it is much less appropriate to aerial connections. Small screw-terminals would be more suitable.

With a basic 2.2 μ V sensitivity and 42 μ V for stereo (50dB S/N) the tuner displayed good stability and audio quality, open and clear with a hint of high-end emphasis. It is a well-made and honest example of a low-cost tuner, well gauged for the needs of those who do not tour the wavebands too diligently. The same impression of sensible design and value applies to the amplifier, and the partnership of these middle-of-the-road units was judged a good one.

TURNTABLE

It appears that Sansui put forward the recently introduced P50 belt-driven turntable for certain Super Compo systems, but the well-known SR222 Mk2 is quite similar and also available. Indeed it was the Mk2, a Sansui best-seller, that arrived with the Digest system. As a basic belt-driven turntable it has for some time been acknowledged as a leader in its low-cost class.

For those who are not familiar with it, the Mk2, combining simplicity with sensible design, has benefited from recent attention to detail such as its black-lustre finish, a new plug-in headshell and an improved platter-mat which is

distinctly superior to many placed as afterthoughts on much more costly turntables. Changing between 33 and 45 speeds is by a control which shifts the belt on the two motor-pulley diameters. Pickup handling is manual, aided by a very good lift/lower device with the usual cueing facility.

It had been expected that a cheap cartridge of some sort would be included but in fact the headshell was empty. However, there is plenty of scope for fitting compatible cartridges. Interestingly the pickup arm, of excellent quality, is in the medium range of mass (12g effective,

BUYER'S GUIDE TO HI-FI SYSTEMS

Model	£	Components	Mounting	Accessories
AIWA				
SERIES 25	—	SAA25, STR25, SDL25, SCE1	—	—
MICRO 30A	380	SAP30, SAC30, STR30, SDL30	—	—
MICRO 50A	480	SAP50, SAC50, STR50, SDL50	RHK7 (extra)	HR50 HiCom, M150 Timer, RCR300 Remote
SERIES 50B	600	AS50A+SCE50 Speakers	—	HR50 HiCom, M150 Timer, RCR300 Remote
SERIES 50R	330	AXS50, SDL50	RKM7 (extra)	HR50, M150, RCR300, SCE30 Speakers

Model	£	Components	Mounting	Accessories
AKAI				
PRO-20	350	APB-20C, AAR20, CSMO1, RM51, SWT30, MH4	rack	none
PRO-30	430	APD30C, AAR30, CSMO2, RM51, MH4, SWT50	rack	none
PRO-501	400	APB20C, AM-UO1, ATKO24, CSMO1, RMH51, SWT30	rack	none
PRO-502	450	APD30C, AM-UO2, ATKO24, CSMO2, RMH52, SWT30	rack	EAG40 graphic eq., DT100 audio timer
PRO-503	570	APD40C, AM-UO3, ATKO34, CSMO2, RMH52, SWT50	rack	EAG40 graphic eq., DT100 audio timer
PRO-504	740	APQ50C, AM-UO4, ATVQ4L, CXM10, RMH52, SWT50	rack	EAG40 graphic eq., DT200 audio timer
PRO-601	750	APQ50C, PAWO4, PRAO4, ATVQ4L	rack	EAG80 graphic eq., DT200 audio timer
UC-2 (mini)	N/A	UC-U2, UC-K2, UC-M2, SW-N2	none	none
UC-5 (mini)	600	UC-W5, UC-A5,	none	RC-ST:remote control UC-S5, UC-F5, SW-N5

Model	£	Components	Mounting	Accessories
ALBA				
2000 series	—	2025, 2000, 2200, 2002, 2001, 2003	—	—
2000 series	—	2125, 2200, 2002, 2003, 2004	—	—
3000 series	—	3000, 3035, 3300, 3002, 3001, 2003	—	—

Abbreviations

H-rack - horizontal rack. V-rack - vertical rack.

Components of the systems can be identified with previous listings.

Model	£	Components	Mounting	Accessories
AUREX				
System 10	399	SB-A10, ST-10L, PC-D10	rack	AD-15 Adres
System 12	499	SC-M12, SY-C12, ST-10L, PC-D10	rack	AD-15 Adres
System 15	1006	SC-M15, SY-C15, ST-F15, PC-D15, RM-15	rack	AD-15 Adres
System 50H	599	SB-A50, SI-150, PC-E50, SR-Q550, AR-455H	H-rack	AD-3 or ADJ
System 50V	581	SB-A50, SI-150, PC-E50, SR-Q550, AR-455V	V-rack	AD-3 or ADJ
System 530H	882	SC-530B, SY-530B, ST-530B, PC-530B, SR-Q630B, AR-455H	H-rack	AD-3 or ADJ
System 530V	864	SC-530B, SY-530B, ST-530B, PC-530B, SR-Q630B, AR-455V	rack	AD-3 or ADJ

BANG & OLUFSEN

Model	£	Components	Mounting	Accessories
1700	445	Begram 1700, Beomaster 1700, Beovox S35/2	cabinet	—
1900/2400	800	Begram 2302, Beomaster 1900, Beocord 1900, Beovox S35	cabinet	—
2200	875	Begram 2302, Beomaster 2202, Beocord 1900, Beovox S45/2	—	—

BOOTS AUDIO

Model	£	Components	Mounting	Accessories
Boots/Aiwa Micro System	350	AIWA MICRO 22, amp., AM/FM Tuner, CD, Boots X22 Speakers, H22 housing	—	—

DENON

Model	£	Components	Mounting	Accessories
System 50	630	PMA510, TU520, DR220, DP30L, DL8A, ARC80D rack	rack	—
System 70	670	PMA530, TU530, DR230, DP30L, DL8A, ARC80D rack	rack	—

DUAL

Model	£	Components	Mounting	Accessories
System 1500	1450	CV1500, CF1540, CB39, CS680, RC154	V-rack	—

SANSUI SUPER COMPO

TURNTABLE CONTINUED

plus cartridge), so that cartridges just falling into the medium-compliance area can be used — and there are plenty of examples. Tests were completed with suitable Nagaoka and Audio-Technica types.

Apart from some inaccuracy of bias correction, which was not adequate in the anticipated range of use, it was not possible to criticise this unit in relation to its modest cost. A

commendable replay standard was achieved, with good bass, though the midrange was not as detailed or neutral as might be secured at higher cost. A well-balanced result, supported by fair behaviour in respect of shock and acoustic interference. Turntable start-up time to 33 was about 1 sec. Speeds are not adjustable but remained within 0.2 per cent of nominal.

CASSETTE RECORDER

Model D-100 front-loading cassette unit is equipped with Dolby noise-reduction and offers basic switching via push-buttons for ferrous oxide, chrome dioxide and metal-particle tapes. This recorder is available in even simpler form as the D-90 without equalisation for metal tapes. The recorder is of course made to ensure a visual match to other units and therefore appears bulky in relation to its functions.

The press-keys for the tape transport are

reasonably positive in action, and the recording-level meters augmented by an LED peak-warning display represent a commendable feature on a low-cost machine which achieves an acceptable average in respect of distortion, noise levels and speed stability. A line output control would have been a useful extra. This model is well in line with the rest of the system and offers an adequate standard of performance if the amorphous bass quality is acceptable.

LOUDSPEAKERS

A pair of ESP-601 total-enclosure bookshelf speakers accompanied the system, and these are suitably related to the amplifier so far as power rating and nominal impedance are concerned. This well-finished model has a 25cm bass/midrange driver and a paper-cone tweeter.

According to the manufacturer, this speaker is in accord with the system to the extent of giving 'the sound the European connoisseur appreciates'. Your reporter has a different

impression of the connoisseur's preferences and finds it hard to believe that a very coloured sound, with very poor revelation of detail, could possibly qualify except for background-music listening at low levels. Lack of high-range sparkle is a notable fault (the tweeter is similar to that in the bigger ESP-801) and the stereo imaging is very poor. It is difficult to imagine that a discerning listener could take it seriously.

VERDICT

Another awkward one. The electronics of the system are clearly first-rate and generally the same can be said of mechanical aspects. So the Super Compo comes out well in important ways and is certainly very honest value.

In fact it would have been considered to shine if it had not been necessary to include the speakers in the evaluation! These are simply not good enough and Sansui should give the matter urgent attention. So order the outfit without speakers and you can apply an A for merit. Otherwise it's as shown — and only just.

SANYO H880



This recently introduced compact system is centred on a receiver with an output rating appropriate to rooms of small to medium size. It is in every way complete and arrives with its own loudspeakers, which match both technically and in respect of appearance.

The horizontal-style trolley cabinet is equipped with shelves and a glass door, while the speakers are supplied with stands. All these items, as illustrated, are included in the price quoted.

CASSETTE RECORDER

RD-880 is a two-motor unit (direct-drive capstan) with simple provision for the main tape varieties including metal, timer standby, Dolby noise-reduction, a separate output level control, memory counter, record mute, auto repeat and twin microphone inputs.

Light-touch controls for tape-transport operation were liked, as was the solidly made cassette holder with its damped eject action. The cassette door, when partially dismantled, gave reasonably good head accessibility. Although causing a shade more mechanical noise than

average, the machine exhibited satisfactory speed stability. The record-level meters, no better than usual because of problems of ballistics, are helped out by peak warning beacons. The solidity of this machine gave a good impression and its characteristics promised decently balanced performance for occasional amateur use. Bass was a bit thumpy, but not worse than average for the class of unit, and a fairly smooth response extension to 15kHz was possible.

RECEIVER

Almost a slimline unit, the DCX-880 is a nice-looking receiver with a fair balance of attributes, likely to appeal where potency is not the first need. Output rating is 30 watts per channel into 8 ohms (0.02 per cent THD). Provision is made for switching two pairs of speakers, and a special feature is a microphone input with provision for mixing with other programmes — a sort of 'voice-over' effect.

Simple tape-recorder connection is catered for, while there are the customary loudness button and tone controls (but no defeat switch). Radio coverage is FM and medium wave, with manual tuning and no presets, and the signal-strength and tuning indications by means of LEDs are simple but effective.

A servo-lock system associated with a tuning knob sensor is an aid to accuracy when selecting FM stations. The lock functions when the tuning knob is released. Both 75ohm coaxial and 300ohm twin feeder aerial terminals are fitted, and there is also a fully adjustable ferrite-rod for

AM. Basic FM mono sensitivity was $2\mu\text{V}$, with a requirement of about $70\mu\text{V}$ for optimum stereo. Performance was marked by good tuning stability and should please those who augment BBC service-area listening with the odd adventure around the bands.

The single 2.5mV pickup input stage had an overload threshold of about 110mV, fair rather than generous. Sound was clear and quite smooth, though relative lack of authority in the bass reflected the modest power capability. Results were liked best on radio, and some subjective lack of sparkle was not held to be a major factor.

TURNTABLE

Direct-driven turntable TP-800 has some distinctive features and is in this context an ambitious unit, for it is supplied with an infra-red remote control unit which commands the start, reject and pickup-drop functions. Operating distance can be up to about 6 metres. The turntable is, of course, controllable from the front of the plinth and incorporates servo control, fine adjustment of the two speeds with a platter-edge strobe, and disc-size sensing for auto operation.

Largely of plastics but rigidly formed, the plinth is nicely presented with controls at the front, outside the cover. A silver-grey finish to the platter mat lends an unusual aspect to appearance. However, the mat is another 'bouncy' type, and a plain mat without voids underneath would be preferable. The platter is a 1.2kg casting and the centre-bearing is of excellent quality. Run-up to 33 was 1.3 secs.

The medium-mass pickup arm has a fixed headshell carrying a magnetic cartridge, apparently another from the vast selection supplied by Audio-Technica. Mechanical compatibility was questionable, for the stylus

compliance proved higher than the suppliers probably realised, dropping the resonance unduly in the subsonic range. Stability was none too good. It was noted also that the acoustic breakthrough result was quite poor.

A compliant mounting for the pickup seemed a perverse feature and certainly not an aid to sound quality, which lacked precise stereo imaging and bass definition. Lateral pivot friction was highish at 60mg and there was a hint of play in the bearing. Tracking error reduction at end of side was not quite optimum. In short, a few design factors have not been well enough considered, though operation was on the whole satisfactory. Speed stability was not of the best, though a 0.3 per cent drift is perhaps not the main criticism here.

BUYER'S GUIDE TO HI-FI SYSTEMS

Model	£	Components	Mounting	Accessories
DYNATRON				
GC1410PW	699	receiver, turntable, cassette, speakers	Queen Anne Walnut	—
GC1510PM	699	receiver, turntable, cassette, speakers	Regency Mahogany	—
GC1730PK	469	receiver, turntable, cassette, speakers	Jacobean Oak	1S6 128PK
GC1830PW	499	receiver, turntable, cassette, speakers	Queen Anne Walnut	1S6628PW
GC2030PM	469	receiver, turntable, cassette, speakers	Regency Mahogany	1S6728PM
MC1930PM	499	receiver, turntable, cassette, speakers	Regency Mahogany	—
MC2130PW	499	receiver, turntable, cassette, speakers	Queen Anne Walnut	—
MC2230PK	499	receiver, turntable, cassette, speakers	Jacobean Oak	—
MC2340PM	999	receiver, turntable, cassette, speakers	Regency Mahogany	—
MC2440PW	799	receiver, turntable, cassette, speakers	Queen Anne Walnut	—
MC2540PM	799	receiver, turntable, cassette, speakers	Regency Mahogany	—
MC2640PK	799	receiver, turntable, cassette, speakers	Jacobean Oak	—
Richmond	765	receiver, turntable, cassette, speakers	—	—
EAGLE				
A80	552	D7500, A8500, T8500, C8000, P750E	V-rack H-rack	—
R80	504	D7500, R8400, C8000, P450S	V-rack H-rack	—
FERGUSON				
3949 HiFi System 15	315	—	rack	N/A
3955 HiFi System 20	315	—	rack	N/A
3934 HiFi System 25	450	3939, 3938, 3936, 3937, 3935	rack	3942B speakers
3948 HiFi System 30	315	3943, 3944, 3945, 3947	—	3941 record player 3946 cabinet 39227 speaker 3942B speaker
3972 HiFi System 40	240	3973, 3974, 3975, 3976	—	3941 record player 3946 cabinet 39227 speakers 3942B speakers

Model	£	Components	Mounting	Accessories
FIDELITY				
S200	349	200A, 200T, 350c, 200P, 200S, 200R	200R V-tower	—
S350	389	350A, 350T, 350C, 350P, 350S, 350R	350R H-rack	—
S450	319	450TA, 450C, 450P, 450S, 450R	450R H-rack	—
GEC				
A1800	340	A1800-R, turntable, cassette, speakers	H-rack	—
GRUNDIG				
Minisystem 25	315	MR100, MCF100, M320	—	—
Minisystem 50	850	MXV100, MT100, MA100, MCF600, M600	Mini rack 2	—
System 400A	560	CS400, PS2000, R1000, CF5000, 5006	CS400	—
System 400B	599	CS400, PS2000, V1000, T1000, CF5000, 5506	CS400	—
System 400C	673	CS400, PS2000, V2000, T1000, CF5000, M800	CS400	—
RACK 400X System	699	Rack400, V2000, T1000, PS2000, CF5000, M800	rack 400	—
RACK 400Y System	1250	Rack400, V5000, T5000, CF5500, PS2000, SM2000	rack 400	—
System 700A	699	CS700, V1000, T1000, CF5000, PS2000, M600	CS700	—
System 700B	760	CS700, V2000, T1000, CF5000, PS2000, M800	CS700	—
HMV				
S4000	545	4000A, 4000T, 4000C, 4000P, 4000S, 4000R	rack 4000R	—
S5000	365	5000TA, 5000C, 5000P, 5000S, 5000R	5000R rack	—
HITACHI				
System 1	369	HA2700, FT3400, D35S, HT324, SS8470	V-rack	—
System 2	450	HA3700, FT3400, D35S, HT40S, SS8480	H-rack	—
System 3	694	HA4700, FT4400, D85S, HT41S, SS8490	V-rack	remote control
System 4	299	SR2010, D22S, HT324, SS8470	V-rack	—
System 5	409	SR4010, D45S, HT40S, SS8480	H-rack	—

LOUDSPEAKERS

A pair of compact speakers, model SX-880, come with the system. Proportioned to match the trolley-mounted equipment, this 38cm-high total enclosure speaker is robustly constructed and well finished — certainly displaying more attention to detail than is often bestowed on products supplied with complete systems. Stands are supplied. Nominal rating is 50W and impedance 6 ohms, while sensitivity was found to be in the upper medium area.

Drive unit complement is a 3cm tweeter plus a 20cm bass unit, an impressive unit with a very rigid diaphragm. The specification mentions 'carbon metal', though its relevance was not apparent. Sanyo have gauged this speaker quite well for the application, and the bright sound quality, with fairly good detail, had merit. Stereo imaging was fair, given a suitable input for evaluation, but the reproduction became muddly and stressful on high levels. However, it was better than average in more restrained use, and preferable to the sad afterthoughts attached to some of the systems in this price-range.

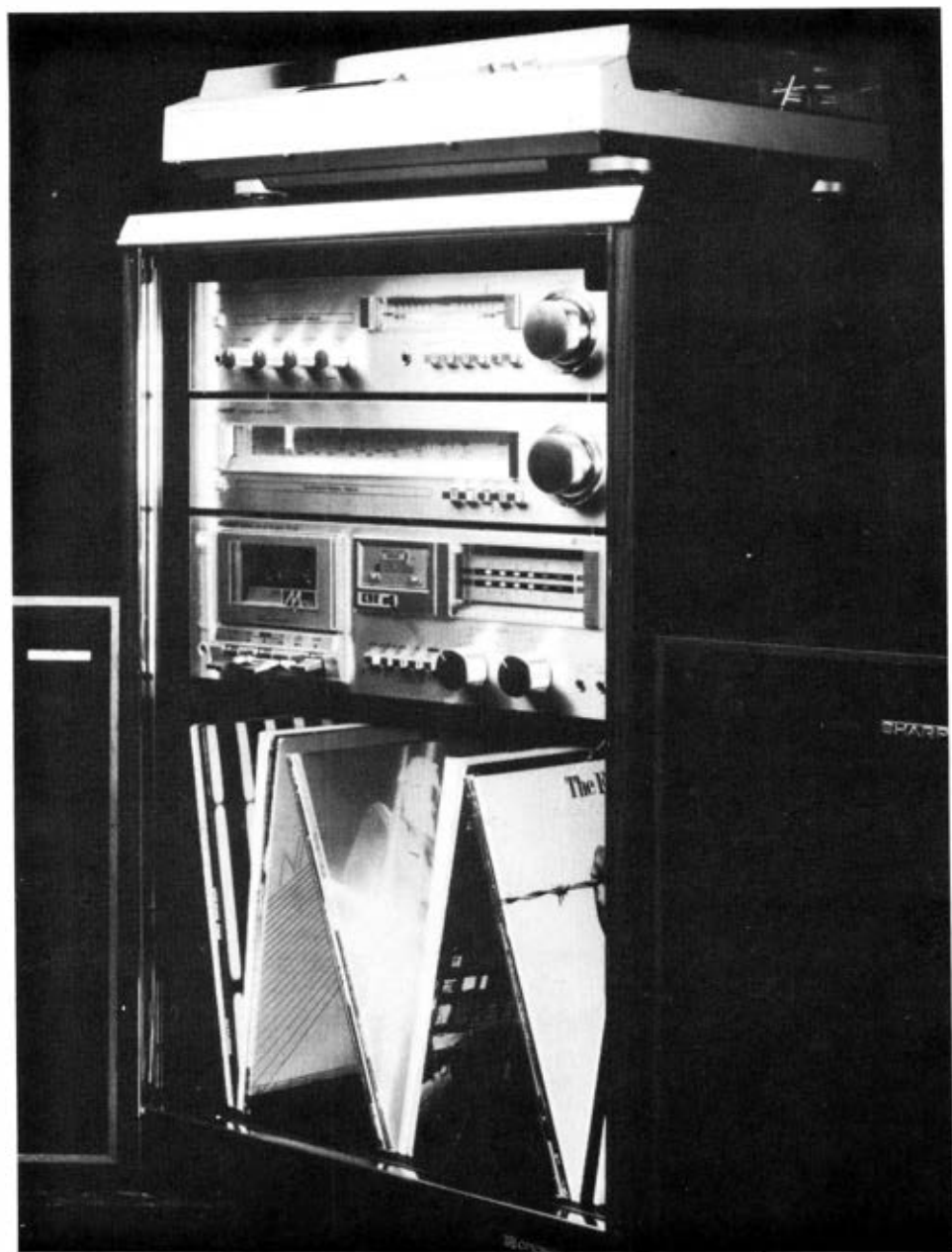


VERDICT

Evident technical merits reside in the receiver and cassette machine. The speakers also emerge more satisfactorily than is often the case, but that is hardly an uplifting commendation in the context of Digest reports, alas!

In fact, this system is something of a mixture and is a mite expensive in view of the power rating and facilities provided. It is also unbalanced a little by its turntable, which clearly adds a fair bit to cost without offering special sonic advantages. Presentation is imaginative, and the value grading is perhaps marginally pessimistic. Some may find that the particular combination has special appeal.

SHARP SYSTEM 30



“Just a quick look at any one of the components . . . and you will appreciate the great performance each individual component is designed to offer.” So runs the sales blurb. But buying, alas, turns out to be less smooth than selling. We learn also that “a greater issue” is the generous employment of highly responsive LED indicators! Sharp of Japan are certainly generous with the LED lights but they have also devoted attention to more vital matters. Just as well.

Audio products from Sharp, well known for some excellent radios and television sets, have been coming into more prominence in recent times, although they are hardly in the eye of the dedicated enthusiast. There is now a neat line in well-finished, modestly priced equipments, exemplified in System 30, which includes loudspeakers and an unobtrusive rack housing at the price quoted. A mixture of DIN-pattern and phono connections is used in this system.

AMPLIFIER & TUNER

Model SM-30H is a cleanly presented little amplifier rated at 33 watts per channel (0.8 per cent THD). This rating relates to 4ohm loads, a specification which is not particularly common in Japanese systems. An output of about 26 watts is delivered into 8ohms. Design is conventional, direct-coupled with an output capacitorless final stage. The DIN sockets for speakers are actually linked to screw terminals, so that leads with bare wire ends can just as easily be connected.

Pickup sensitivity is 3.5mV, with overload threshold of about 140mV. Control, with a mixture of push-buttons and rotary controls, is simple enough, but there is an unusual feature (at this price level) in the form of a microphone mixing facility. A single-position loudness control is included, as are simple tape record/replay facilities. The much-vaunted LED display for output indication is no more relevant to estimation of peak power than most such devices but it offers a pretty enough show of relative levels.

The ST-30H tuner is a manually-tuned unit

covering VHF/FM, medium-wave and long-wave bands. Usable FM sensitivity is 2 μ V and overall performance indicates that the tuner will satisfy the needs of those whose listening is limited to BBC local transmissions. No complaints about distortion, though the sound is inclined just a little toward high-range emphasis. Very careful tuning is necessary. LED signal-strength and tuning indicators are provided.

Experiments with the in-built AM aerial gave poor results: for best reception one would have to orientate the system as a whole to suit this one requirement. Use of even a short external wire aerial gave uplift to medium and long-wave capture. Other tuner features are muting and a button labelled ‘air check’. The latter is not quite the same as a ‘rain check’, for it brings in an aid to level-setting when recording on the associated cassette machine. By the way, the tuner is designed specifically for interconnection with the SM-30H amplifier, so that it fits immediately beneath.

LOUDSPEAKERS

Matching speakers are a pair of CP461, which were in fact submitted for evaluation and are taken into account in the price quoted in this report. They are ‘compacts’ incorporating three drive units, matched to the system visually and technically, and will look well if stand-mounted. Fixed leads are fitted, inhibiting positioning.

Unfortunately these speakers are not to the standard of the system, which deserves better. Reproduction was marked by a pervasive hollow

colouration and a lack of detail in the midrange, the sound being especially unpleasant at high inputs. Stereo imaging was very poor. A lot of sound with indifferent quality.

The nominal 4ohm matching is inclined to limit choice of substitute speakers: the penalty is a loss of available power if speakers of higher impedance are used. This was evident when the standard test speakers were tried, although the sound was cleaned up very nicely.

BUYER'S GUIDE TO HI-FI SYSTEMS

Model	£	Components	Mounting	Accessories	Model	£	dB/W, 1m	W	Finish	Size (mm)	
JVC											
G30	POA	AS3, TV3L, LA11, KDA11	V-rack LK-G142R	—	302	299	AH302, AH102, N5581, AF685, 2xAH403/16T	V-rack	—	—	
GR110	POA	RS11L, LA11, KDA11	V-rack LKG142R	—	305 B1	549	AH305, AH103, N5438, AH080	V-rack	—	—	
GR330	POA	RS33L, LA55, KDA11	V-rack LKG142R	—	602B1	449	AH602, N5431, AF777	V-rack	—	—	
GR550	POA	RS55L, QLA5, KDA33	V-rack LKG645	—	603H	560	AH603, N5430, AF777	H-rack	—	—	
GX100	POA	AX1, TX1L, LA11, KDA11	V-rack LK-G142R	—	603V	480	AH603, N5430, AF777	V-rack	—	—	
GX200	POA	AX2, TX2L, LA55, KDA33	V-rack LK-G342R	—	606	589	AH606, N5430, AF877	Modular rack	—	—	
GX200R	POA	AX2, TX2L, QLA5R, KDA33, RM505	V-rack LKG645	—	Micro system	600	AH109, AF1209, AH309, N5581	—	—	—	
GX300	POA	AX3, TX3, LF66, KDA55	V-rack LKG545R	—	PIONEER						
GX400	942	AX4, TX6L, QLA5, KDA55	V-rack LKG645	—	X300	310	SA410, TX410L, CT200, PL100	CB3 rack	—	Speakers CS343 Timer DT500	
MERIDIAN					X400 (short)	400	SA510, TX410L	CB7 short	—	Speakers CS544 Timer DT500	
101+104+M1	1927	101, 104, M1	—	—	X500 (tall)	415	CT300, PL200	CB9 tall	—	Speakers CS545 Timer DT500	
101+104+M2	1167	101, 104, M2	—	—	X700 (short)	510	SA610, TX710L	CB7 (short)	—	Speakers CS546 Timer DT500	
MITSUBISHI					X700 (tall)	525	CT300, PL300	CB9 (tall)	—	Speakers CS646 Timer DT500	
System 1	361	DAR430, DT530, DP630	cabinet	—	X900 (short)	585	SA710, TX710L	CB7 short	—	Speakers CS646 Timer DT500	
System 2	427	DAU530, DT530, DAF630, DP630	cabinet	—	X900 (tall)	600	CT400, PL400	CB9 tall	—		
System 3	460	DAU630, DT530, DAF630, DP630	cabinet	—	ROTEL						
System 4	498	50W micro component system	—	—	Micro System	270	RMA80, RMT80, RMD80	none	—	RML80 Speakers	
N.A.D.					System A550	330	RA550, RT550L, RP550, RD550	V-rack	—		
NAD R1	385	3020, 4020A, 5020, 9100, 6020	V-shelves	—	SANSUI						
NAD R2	370	7020, 5020, 9100, 6020	V-shelves	—	System A4	324	A40, T60, D90, P50, ESP601	CX70W	—		
ONKYO					System A6	351	A60, T60L, D90, P50, ESP601	CX70W	—		
Midi 20	599	TX20, TA2040, CP1010A, HS20, CB2 rack	—	—	System A8	477	A80, T80, D100, P50, ESP801	CX80W	—		
PANASONIC					System A8f	495	A80, T80, D100, FRD3, ESP801	CX80W	—		
2700 system	350	SU2700, ST2700, SLH302, RS619, SB2700, SH519	rack	—	System R3	270	R30L, D90, P50, ESP601	CX60W	—		
PHILIPS					System R5	288	R50, D90, P50, ESP601	CX60W	—		
170 BT	828	AH107, AH280, AH380, N5348, AH080	V-rack	—	System R7	360	R70, D100, P50, ESP801	CX60W	—		
180 BT	1568	AH180, AH280, AH380, N5748, AH080	V-rack	—	SANYO						
					System H20H	POA	JCX2150, RD5030, TP1005, HF250, HF C2 run on	H rack	—		
					System H20V	POA	JCX2150, RD5030, TP1005, HF250, HF C2 run on	V rack	—		
					System H880	823	DX880, RD880, TP880, SX880, AP880, APS880	H rack	—		

SHARP SYSTEM 30

TURNTABLE

With a silver finish on its plastics-moulded plinth, the RP-30H is a two-speed direct-drive unit of the semi-automatic variety with push-button control of the cueing device plus a reject control. The motor is started by moving the pickup away from its rest and there is the usual end-of-side trip with auto return of the pickup to its rest position. The mechanism is based on a DC motor in a servo system, with fine-speed adjustment and illuminated strobe.

The well-made platter is a casting weighing 1.75kg including the rubber mat, which is adequate though covered with superfluous fine grooves. Start-up time to 33 was about 2 secs. Performance in respect of noise level and speed stability was commendable for a unit in this price-range.

Big surprise was the pickup arm, which is uncommonly like ADC's low-cost arm, give or take a few details. It is a low-mass component (about 6g effective) with negligible pivot frictions

and a straight alloy tube, and a headshell which appears to be detachable, equipped with the necessary fittings. However, the wiring goes straight through to the cartridge, so the headshell might as well be fixed. Bias (sidethrust) correction is by means of a well-designed weighted lever gadget.

An unidentifiable magnetic cartridge is fitted. It coped reasonably well at 2g tracking pressure but its peaky high-range performance was not liked and the coarse, brash sound was at odds with complex high-level disc recording. This choice seems to have been made without much thought: the turntable deserves something better, and the options are wide open. Taking it as it comes, the RP-30H was judged to be satisfactory in respect of acoustic breakthrough and fair on shock-resistance, but this player's relationship with its system is uneasy because of the cartridge.

CASSETTE RECORDER

Simple and straightforward in design and use, the RT-30H offers another version of the search-and-stop facility that enables the user to find particular items on a tape. This time it is termed 'auto programme search system'. Controls are entirely mechanical but demand only moderate working pressure. The unit is equipped with Dolby noise-reduction.

Particular features include the DC motor with electronic control, a Permalloy record/replay head, auto-stop and push-button selection of tape types. This latter arrangement gives ferro-chrome and chrome dioxide positions plus an overriding metal-tape switch, without any variable-bias provision. There are separate level controls on each channel and level indication is by a two-channel LED display without benefit of

any other short-response peak warning — reasonably helpful in use.

Interconnections and matching were found to be well considered and everything worked smoothly. The damped cassette door has a removable panel which is supposed to improve access to the compartment, but in fact manual cleaning of head and capstan is not at all easy and it is far better to use a cleaning cassette device regularly.

Speed stability of the sample was not consistently acceptable, for some flutter intruded, but generally the record/replay results and facilities were adequate for the relatively uncritical user who views the cassette as an auxiliary for occasional experiment.

VERDICT

There are no special excitements here, but taken as a whole the system represents reasonable value and looks pleasing. It offers good radio reception and a cassette facility to suit the amateur user. Disc replay would benefit from a better cartridge — the arm would accommodate it. System 30 is most acceptable without its own speakers but choice of alternatives is limited if specified output is to be ensured.

SONY MODULE 1



Whereas Sony's ZR-300 system is centred on a receiver, Module 1 follows the more common scheme of separate tuner and amplifier. Slimline design does, however, permit a compact installation, and the cabinet (on castors, fitted with a glass door) is so proportioned that it can be used as a chair-side trolley.

The reduced height of the cabinet restricts storage space, but an additional module could be purchased to take discs. Module 1 can be ordered without loudspeakers, cutting the total price by about £104, but the recommended speakers were submitted and are included in this report.

AMPLIFIER & TUNER

Rated at 40 watts into 8 ohms (0.02 per cent THD) from a DC power-amp stage, the TA-F35 (Korean-made, this one) is a simple unit, at least where controls are concerned. Notable, though, is the provision for moving-coil pickup input — just one input, switched for MM and MC conditions. As for the MM input at 2.5mV sensitivity, overload margin was about 160mV, adequate if hardly generous.

Control line-up includes a low filter and normal tone controls with centre defeat positions. Basic facilities are provided for tape record and replay, and two pairs of speakers are catered for. LED output-level indicators are of the familiar type.

All this may seem a bit spartan compared with some but it is adequate for most needs. Smooth power delivery and clean quality are not disputed; Superior S/N results were obtained in

practical conditions.

Matching tuner ST-A35L (FM, MW; LW coverage) impressed with a pleasing audio quality that showed just a shade of high-range emphasis. It is a manually tuned unit, lacking presets, and featuring a muting-level selector and a 'hi-blend' control for use on noisy, weak stereo FM. Tuning and signal-strength indication is by LED's.

Tuning has a useful flywheel action. A calibration tone can be selected for setting-up when recording on cassette. An adjustable ferrite-rod is handy for the AM side. Basic FM sensitivity was 4 μ V, with a 50 μ V requirement for 50dB S/N stereo. A fair middle-of-the-road design with good potential for BBC FM listeners: distortion characteristics are average for this class of product.

CASSETTE RECORDER

With Dolby and simple provision for metal and other tapes, the TC-K44 is a little more advanced than companion K22 in respect of distortion and response, though again the bass definition was not all it might be. Controls include dual-concentric level knobs, press-keys for tape functions, buttons for tape selection, adjustable headphone outlet, and a record-muting control.

LEDs are used for record-level indication. All leads are fixed, intended for direct connection to the amplifier. This recorder seems a good choice for its system where performance basics are concerned. Slicker control design would have aided convenience but is perhaps a lot to ask at this price level.



BUYER'S GUIDE TO HI-FI SYSTEMS

Model	£	Components	Mounting	Accessories
System S3510	529	ET3510, DC43510, FMT3510K, RD3510M, TP1010, HFC351	H or V rack	—
System V30	529	DC430, AMT30, RD30, TP1010, HF350, V30	V rack	—
System V35	941	A35, T35, D60, Q25, JR55	V rack	—
System V55	1176	P55, C75, T55, Q40, D60, JR55	V rack	N55 noise reducer, Ess timer

SCHNEIDER

Team 30	330	—	rack	—
Team 200	400	—	rack	—
Team 300	475	—	rack	—
Team 6070RC	1500	—	rack	—
SPP 7035	460	—	rack	—
SPP 7050	510	—	rack	—
SPP 7270	650	—	rack	—

SHARP

System 10	200	SA10H, RP10H, RT10E, CP270E.	RV10V rack	—
System 30	320	Priced less spks/rack RP30H, SM30H, ST30H, RT30H, CP461E.	SY7100X rack	—
System 2210	270	Priced less spks/rack RP1122H, SM1122H, ST1122H, RT10EB, CP461E.	—	—
System 6600	420	Priced less spks/rack RP1266H, SM1266H, RS1266H, CP461E.	SY1288X rack	—
System 8800	690	Priced less spks/rack RP1288H, SM1288H, RS1288H, CP8800E.	SY1288X rack	—

SONY

CG15F	656	TAM15F, TAE20F, ST10FL, TC15F, PS10F, SSE31	—	—
Z220	476	PST22, TA242, ST242L, TCK33, SU91, SSE20	—	—
Z300	506	PST22, TA343, ST242L, TCK33, SU91, SSE30	—	—
Z600	1380	PS636, TA636, SI636, TCU70, SU636, SSE50	—	PT79R timer RM79 remote control
ZR220	423	PST22, STR242L, TCK22, SU92, SSF20	—	—

Model	£	Components	Mounting	Accessories
ZR300	463	PST22, STR343L, TCK22, SU92, SSE30	—	—
Module 1	624	PST33, TAF35, STA35L, TCK44, SUL11A, SSE50	—	—
Precise Compo	682	TAP7F, STP7J, PSP7X	—	—

TEAC

Libero 3000	399	BX300, TX300, PX300, CX210	LX300	—
Libero 5000	499	BX500, TX300, PX500, CX270	LX350	—

TECHNICS

80's system	950	SLQ33, SEA808, STK808, SBR3, SHR808, RSM445, SH546	H-rack	—
D-system	499	SU22, STZ1L, RSM8, SLD3, SB3050, SH517	V-rack	—
Z-system	380	SU21, STZ1L, RSM5, SLB2, SB3030, SH517	V-rack	—

TENSAI

T30	430	TFL806C, TA2330, TT3345, TD861B, TS9040	rack	—
T50	500	TFL806C, TA2350, TT3345, TD530Q, TS8055	rack	—
T60	530	TD530, TP2200, TM2250, TT3245, TS9055, TFL810	rack	—
T70	600	TFL807, TA2350, TT3345, TD750, TS9075	rack	—
T80	630	TFL807, TD750, TS9075, TP2200, TM2250, TT3245	rack	—

TOSHIBA

SK-01	229	amplifier, tuner, cassette	—	—
System 115V	429	SB115, SRA115, ST115L, PC115, SS115x2, AR115	V-rack	—
System 225H	575	SB225, ST225, PC230D, SRF225, 2xSS255, AR5H	H-rack	—
System 225V	561	SB225, ST225, PC230D, SRF225, 2xSS255, AR4V	V-rack	—
System 230H	506	SB230, ST230, PC230, SRA30, 2xSS235, AR6H	H-rack	—

SONY MODULE 1

TURNTABLE

PS-T33 is very like the unit supplied with system ZR-300 but offers full auto control. Speed-sensing and servo arrangements are similar, and again the plinth is of dense moulding compound plus plastics parts, smartly finished. All operations were beyond reproach, quietly executed; results on acoustic breakthrough and isolation from shock were fair.

The pickup is the same as on the companion model, but a spare headshell is included as a

bonus. This seems to suggest an alternative cartridge might be tried: indeed, the MM cartridge supplied is similar to that on the ZR-300 outfit and the same reservations must be expressed about tracking ability and sound. The potential of this turntable is not realised: a better cartridge and a more scientifically contoured platter-mat can both yield audible improvements.

LOUDSPEAKERS

Matching speakers are a pair of SS-E50, a three-way model made in Germany. It is a total-enclosure speaker employing a 20cm bass driver, 8cm cone midrange unit and 20mm dome tweeter. Nominal rating is 45W and sensitivity is above average.

With slightly firmer bass and more even

response this model displayed marginally greater refinement than the SS-E30 offered with system ZR-300. But still the projection of detail was disappointing and, with its marked colourations, the speaker was not liked for the study and enjoyment of natural stereo.

VERDICT

An attractive and well-planned outfit, on the whole, and honest value. No doubt some listeners would substitute a better cartridge at an early stage: otherwise there are no big snags. A top grading for merit acknowledges the potential of the system as revealed by test speakers of British make. Module I is most appealing if its own speakers are excluded, though our price allows for them.

SONY ZR-300



Among the smallest Sony systems, centred on a receiver, the ZR-300 appeals because of its compact design and smart styling. There is a system option: two very similar but differently power-rated receivers are offered. The more powerful version was submitted for this report.

Sony provide for AC mains distribution within the system by use of shuttered safety sockets on the receiver, so that the set-up is convenient and tidy. The cabinet is supplied with a glass door and is offered in alternative finishes. ZR-300 can be ordered without loudspeakers (then the price is around £356) but Sony's recommended models were submitted and are included in the higher price quoted.

RECEIVER

Model STR-343L, rated at 30W per channel (8 ohms, 0.08 per cent THD), is a characteristic Sony product with its bright finish and generous control array. Coverage is FM plus LW and MW. Five presets for FM are tuned by using the manual control and operating a button to pass the selected station to the preset section. This is less precise than a separate fine-tuning system but is satisfactory if used with care.

The manual tuning lacks a flywheel action, so that control feels deliberate and less rapid than would otherwise be the case. Small bar-type controls requiring only a light touch are used for presets and some other functions, while other facilities such as rotary controls and signal strength/tuning beacons are first-rate. Simple tape-machine connection is included, as are two pairs of speaker outlets.

Sound quality from the direct-coupled amplifier was well in tune with the modest price level, exhibiting a slight softening of bass (questionable definition) at advanced outputs, while FM with a good aerial (basic $4\mu\text{V}$ sensitivity, about $50\mu\text{V}$ stereo) promised well for service-area reception, the audio showing a hint of treble emphasis, readily controllable. Useful AM results can be secured with the pivoted ferrite-rod.

TURNTABLE

Matching turntable PS-T22 is a two-speed direct-drive unit with fine-speed control and built-in strobe. Speed-sensing for the servo system is by means of a magnetic head scanning a series of pulses recorded on a strip around the inside of the platter rim. Semi-auto operation gives end-of-play pickup return and there are also a reject button and lift/lower control.

The plinth, formed from a dense moulding compound, has a hinged dust cover and the controls can be used with the cover closed. Specially commendable is the medium-mass pickup, which is a straight arm with offset headshell — a miniature plug-in component. A moving-magnet cartridge, intended to track at a little under 2g, is part of the deal but is not a very elegant tracker and displayed a coarse sound quality with indifferent high-range definition.

Turntable operation in respect of noise level and general use could not be faulted. Results on acoustic breakthrough and isolation from shock were fair. But this model could be improved by a replacement cartridge. A more substantial platter-mat is also warranted.

BUYER'S GUIDE TO HI-FI SYSTEMS

Model	£	Components	Mounting	Accessories
System 230V	506	SB230, ST230, PC230, SRA30, 2xSS235, AR4V	V-rack	—
System 335V	547	SC335, SY335, ST335, PC335, SRF325, AR4V	V-rack	speakers
System 335 MkII	562	SC335, SY335, ST335, PC335, SRF325, AR335MkII Rack	V-rack	speakers
System 445H	655	SB445, ST445, PC445, SRF440, AR445H	H-rack	speakers
System 445V	637	SB445, ST445, PC445, SRF440, AR445V	V-rack	speakers

TRIO

V-60T	—	KA60, KT60L, KD1600C, KX440, 2xSRC80	V-rack/H-rack	AT500 Timer, AT-80D Timer, RA80 Reverb, PM80 PPM, GE80 Graphic Eq
V-80	—	KA80, KT80, KD3100C, KX600, 2xSRC80	V-rack/H-rack	AT500 Timer, AT80D Timer, RA80 Reverb, PM80 PPM, GE80 Graphic eq
V-300X	—	KA300, KT400L, KD1600C, KX400, SRC120X	V-rack	—
V-400X	—	KA400, KT400L, KD1600C, KX500, SRC120X	V-rack	—
V-1000R	—	KA500, KT500, KD4100C, KX600, AT500, RC500, 2xSRC500	V-rack/H-rack	—
V-710	—	KR710L, KX440, KD1600C, SR-44W rack	V-rack	—
V-720	—	KR720, KX440, KD1600C, SRC-120X	V-rack	—
V-B30	—	KA300, KT400L, KD1500C, KX400, (SRB15 (Black))	V-rack	—
VW30	—	KA300, KT400L, KD1500C, KX400, (SRW15 (Wood))	V-rack	—
V-B40	—	KA400, KT400L, KD1500C, KX400, (SRB15 (Black))	V-rack	—
VW40	—	KA400, KT400L, KD1500C, KX400 (SRW15 (Wood))	V-rack	—

Model	£	Components	Mounting	Accessories
V-60S	—	KA60, KT60L, KD1600C, KX600, 2xSRC80	V-rack H-rack	AT500 Timer, AT80D Timer, RA80 Reverb, PM80 PPM, GE80 Graphic eq

UHER

Mini System	900	CR240, VG840, EG740, Z140	Rack TEI	—
Paco System	350	CG305, EG705, VG805, LG105	Rack Z904	—
Slim line	635	CG343, EG730, VG830, LG130	—	—

VIDEOTONE

SAS 1	375	222MkII or P50, SA4130, ST4120, SC3200, 555E, SA4, GB2, HP80	V-rack	777EX, 777E MC Cart.
-------	-----	--	--------	----------------------

LOUDSPEAKERS

Model	£	dB/W, 1m	W	Finish	Size (mm)
ACOUSTAT					
Monitor 2	989	105	100	T, W	508x147x376
Monitor 2	2012	110	—	W, A	711x1550x178
Monitor 4	2817	110	—	W	914x1550x229

ACOUSTIC RESEARCH

AR9	1081	87	275	W	1340x380x402
AR18	99	86	60	T, W	244x419x159
AR25	149	86	60	T, W	298x544x195
AR90	784	87	250	W	1102x368x386
AR92	371	87	150	W	797x356x290
AR93	299	87	150	B	778x356x273
AR94	229	87	150	B	778x356x273

AKAI

SE-L50	299	90	80	W	342x665x278
SE-L70	399	90	110	W	390x760x295

Abbreviations

A - ash B - black, Bh - birch Bn - brown, C - ceramic, Ch - cherry, E - ebony, M - mahogany, Mb - metallic, brown, N - Nextel, O - oak, Prot. - protected, S - silver, Sl - slate, T - teak, W - walnut, Wh - white.

SONY ZR-300

CASSETTE RECORDER

Even low-cost machines nowadays boast provision for use of metal tapes — after a fashion, anyway. The TC-K22 makes such provision, nominally and as part of the simple tape-selection. In fact, results with Sony metal tape were good for a 'budget' unit, though it was no surprise to find distortion ran higher than with more precisely set-up machines, while the bass end was inclined to lumpiness.

Wow and flutter were marginally intrusive but, again, not out of line with cost. This machine was simple to use and the control operations worked smoothly, but the cassette compartment mechanism was flimsy. Dolby noise-reduction, dual concentric level controls, a pair of meters, twin microphone jacks and a headphone outlet complete the line-up.

LOUDSPEAKERS

Recommended speakers are a pair of SS-E30, British-made. This is a two-way speaker: a 20cm bass/midrange unit and dome tweeter are fitted in a 'reflex' (vented) enclosure of 23 litres volume. Rating is 30W and impedance 8 ohms, while sensitivity is on the high side. Excellent finish, clip-in fabric grille.

These speakers pack quite a punch and may well be favoured for radio and popular material in variety. They displayed a hollow colouration, though, with masking of detail, and there was none of the in-depth presentation favoured for classical stereo, natural balances and the like.

VERDICT

Only a few minor reservations about a well-balanced outfit of modest cost and pretensions. If the disc side is important to you, a change of cartridge will be worth while. On the whole it's a fair deal for the price, and in view of the overall quality there is no reason to deny a top grading if the speakers are excluded and a more ambitious pair chosen.

TECHNICS LA MINI SÉRIE

As the name suggests, components in La Mini Série are of the miniature variety (or 'micros' as some call them), and very neat they are too. Like other such units, they are stackable and will look tidy without a housing, but at the time of writing a cabinet was being prepared for early introduction.

A system can be completed with a pair of mini-speakers which are about the same height as the stacked units, but the test system excludes these. The price quoted above does however include the novel SL-10 turntable, which is an obvious if expensive choice for a diminutive outfit (it accounts for around £330 of the total). In the circumstances, available small speakers of high quality were used for evaluation.

AMPLIFIER & TUNER

Nucleus of the system is the SU-C03 DC amplifier, rated at 45 watts per channel into 8 ohms (0.02 per cent THD). Pickup input is for MM types only (not moving-coils) and is at 2.5mV sensitivity with a maximum capability of 160mV, which is acceptable. Controls and other facilities are fairly simple, and Technics have managed to do without flashy arrays of LEDs for 'peak power' indication. On the other hand there is some emphasis on low-noise input stages, and the unit is highly satisfactory in that respect.

Push-buttons actuate the input selection and

there are the usual tape monitor, loudness and headphone facilities. The familiar subsonic and high filters are no more effective than is so often the case. The tone controls have centre-click positions so that a nominally flat response can be assured. Two pairs of speaker outlets are push-button selected, and both buttons are released if 'phones are to be used.

Model ST-C03 is a quartz synthesiser tuner with digital frequency display, FM and medium wave coverage, manual tuning (up and down buttons) and eight presets which, used in



AMPLIFIER & TUNER CONTINUED

conjunction with the memory function, can be applied to both FM and AM. In the event that the unit is to be disconnected from the mains when not in use, batteries have to be inserted in a compartment to keep the preset store active.

Everything worked admirably. Aerial input emphasises 300ohm connection and there is no coaxial input. The AM ferrite-rod is more adjustable than some, but still it was judged best to use a wire aerial. Basic FM sensitivity was

$2\mu\text{V}$ while stereo requirement was $32\mu\text{V}$ for 50dB S/N. Low-distortion characteristics on FM were much liked and the audio quality was clear and crisp, with just a hint of extreme treble uplift. Since the amplifier was notable for clean power delivery and superior S/N performance, the combination of these units gave a very good impression indeed.

CASSETTE RECORDER

As engagingly compact as everything else in this system, the RS-MO4 caters in simple fashion for metal tapes as well as more commonly used varieties, though unusually the selector switch is on the machine's rear panel. Light-touch controls are a good feature of this Dolby-equipped recorder, as are the cue-and-review and record mute facilities. The 'tune selector' is the basis of the scanning system enabling programme starts to be located.

The auto-stop disengages the tape-transport mechanism so that mechanical parts are not stressed when the stop condition is reached. Other features include timer standby, a separate output level control, stereo microphone sockets

and an elaborate but effective fluorescent display for level indication on each channel.

A Permalloy record/replay head and Sendust erase head are fitted. Very good S/N performance was secured, encouraging dynamic range being possible with chrome and metal-particle tapes (TDK and Sony), while the audio was liked for its clean quality, accepting the lack of low bass definition as customary in a non-professional unit at this price level. The well damped cassette door can be partly dismantled to give fair access to heads. Not perhaps a machine for the creative enthusiast but a fair proposition for less demanding users.



TURNTABLE

Any good turntable could of course be used with La Mini Série. However, the choice of the SL-10 is well-nigh irresistible since it fits the scheme so beautifully. This clever Technics model is unusually small, with a top surface the same size as an LP sleeve, and it is barely 9cm high. So it seems to be as small as disc players can go — until LPs become smaller.

On the other hand, despite its compactness it

is massively constructed, and the weight of almost 7kg comes as a surprise. In respect of resistance to shock-resistance and isolation from acoustic breakthrough the unit was above average and much better than most of the turntables in the Digest.

Model SL-10 is a two-speed turntable with quartz control and is certainly one of the best direct-drive units around. The quartz lock is not



TECHNICS LA MINI SÉRIE

TURNTABLE CONTINUED

switchable and so there is no fine adjustment of speed — which very few users would miss, one suspects. Central to the design is the radial-tracking pickup, mounted in the heavy hinged lid of the unit, which has to be closed before playing can commence. The pickup carriage passes along the disc radius and is therefore small, with very low mass (about 3g effective). It is this arrangement that largely accounts for the deck's small size: the LP occupies the internal area and no extra space is needed for the pickup mounting.

A special feature of the design is the facility for using the player at an angle or vertically. It could be wall-mounted in its vertical position. A necessary fitment is a sprung stabiliser to hold the disc against the mat, and this also is accommodated under the lid together with an illuminated strobe. Speed selection is automatic and normal play is started by simply pressing the start button. The pickup carriage returns at the end of play.

Manual cueing, for the selection of particular LP tracks, is also catered for. The pickup is simply moved along under push-button control. Muting ensures that noises of operation do not get through to the loudspeakers. However, cueing revealed one minor snag. The automatic illumination which comes on during starting and cueing is not bright enough, so that track-selection is not as convenient as it would be with a conventional player and an open lid. A small design revision is warranted.

Justifiably, since the SL-10 deserves a really good cartridge, Technics include an EPS-310 moving-coil, which has an elliptical stylus and tracked at 1.2g. This is a low-output cartridge and Technics have chosen to provide a built-in

linear preamplifier. This has an on/off switch, however, so that it can be bypassed in the event that the user prefers to employ an alternative (as is included in some hi-fi amplifiers).

Good isolation from the acoustic environment has already been mentioned, and the SL-10 was also found to have exemplary properties in respect of rumble and speed stability. Sound quality was far superior to that from the average cartridge supplied with complete systems, with an open and sweet character, low in distortion and well detailed. The bass did not have the firm authority that one might achieve with the best conventional pickups but the difference was subtle and not such as to attract serious criticism.

Any real catch? Yes, the auto size/speed selection prevents use of 12-inch discs mastered at 45. A pity, since there are both direct-cut and extended-play discs recorded in that fashion.

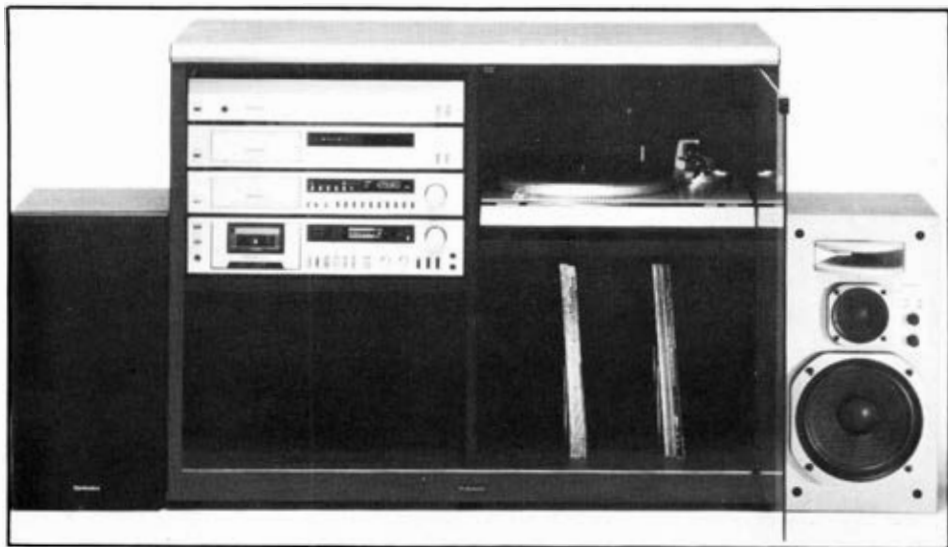
There is, by the way, a recently introduced SL-7 model. This has much in common with the model under review and is the same size, but is simplified and, being equipped with a moving-magnet cartridge, lacks the built-in preamplifier. It is significantly cheaper.

VERDICT

A pleasing system of considerable technical merit, and the distinguished turntable helps it toward a top grading. Tests were completed with the Krystal loudspeakers, and a pair of Mission 700s arrived in time to aid evaluation, confirming the system's likeable sound quality.

The electronic units alone are not unduly expensive. How you view the total package in value-for-money terms must depend on your liking for the turntable, which is both novel and excellent, though it pushes the price up considerably. The critical view is that the SL-10 is a fine adjunct to the system and that its addition is very desirable.

TECHNICS SYSTEM 80'S



AMPLIFIER & TUNER

One advantage of a separate power amplifier of this kind is that provision can be made to convert it to mono. That is what Technics have done: addition of a second chassis gives a nominal doubling of rating, so that a very potent system results. As it stands the SE-A808 is a stereo amplifier rated at 40 watts per channel into 8 ohms (0.02 per cent THD). This unit has a headphones socket and button-switching for two pairs of speakers. Two pairs can be used simultaneously if the total impedance is not substantially less than 8 ohms.

A lot is packed into the ST-K808 preamp and tuner unit, which is of slimline design. It does, however, lack an input stage for moving-coil cartridges, and some will think that is a sad omission from a product of this calibre. The single phono input is at 2.5mV sensitivity and the overload threshold is specified as 95mV. The margin is in fact about 110mV, a little better but far from generous.

Audio controls are small and concealed behind a hinged flap. Although the effect is neat, accessibility is not particularly good. Centring of tone controls is difficult, and this is highlighted by lack of a 'defeat' facility. Filter and loudness controls are also contained in the small available space, so the result is hardly a triumph of

ergonomics. But the design is ingenious with its timer section with quartz reference, on/off control of four inputs, and one-off and everyday timer settings.

A FM/MW tuner of the digital synthesiser variety is incorporated in the control unit. This section offers push-button scanning for station selection and, as usual with such designs, there is a store to which chosen frequencies can be consigned for use as presets. Eight of these can be used across the bands. All this proved more handy in use than did the audio controls.

Conventional FM aerial inputs are partnered by a nicely adjustable AM ferrite-rod. With a basic FM sensitivity of 2.2 μ V and a 26 μ V requirement for 50dB S/N stereo, the results were much liked in respect of noise levels, and the tuner gave a lively performance. About average on distortion levels, the sound quality was clean and smooth, with a hint of extreme high-range decline.

With their System 80's, Technics present a comprehensive installation with a difference. The emphasis is on a wide range of control facilities rather than high output, and there is the unusual configuration of a separate power amplifier used with a combined preamplifier/tuner unit and remote control.

All the racked units depart from the glittering appearance of much Japanese equipment, for the panels have a more discreet semi-matt finish. A complete system consists of the units mentioned together with a turntable, cassette recorder, rack and a pair of SB-R3 bookshelf speakers at a total of around £999. The system came without speakers, so about £200 is deducted from our quoted price to allow for this omission. Safety-approved sockets are incorporated for interconnection of mains within the system.

REMOTE CONTROL

Remote control is a natural part of this system and, taking the design of control layouts into account, it is easier to operate the equipment remotely than to cope with individual control panels. Receiver unit is the SH-R808, a slimline matching unit that goes in the rack, and with this one uses a handheld transmitter.

Based on radiation in the infra-red part of the spectrum (which has turned out to be preferable to ultrasonic energy for audio purposes), remote control is possible up to a distance of about 7 metres. In practice this range is more than adequate for use in the largest rooms.

The transmitter is battery-powered at 3V and the interconnections between the receiver and

other parts of the system are well arranged with prepared leads. Control functions are radio presets (with audio/radio selection), turntable and tape machine operation, muting and two-button volume control. It is all neatly arranged and easy to use.



BUYER'S GUIDE TO LOUDSPEAKERS

Model	£	dB W, 1m	W	Finish	Size (mm)
SE-L150	560	90	230	W	342×900×340
SW-T30	99	92	60	W	200×580×214
SW-T50	159	93	80	W	350×695×273
SW-T70	189	93	100	W	390×790×273

ALBA

2003	—	—	30	T	315×510×222
------	---	---	----	---	-------------

ALLISON

Allison One	714	90	400	W	483×1020×273
Allison Three	552	90	250	W	387×1020×254
Allison Four	326	90	100	W	492×279×250
Allison Five	240	87	70	W	464×279×254
Allison Six	182	87	70	W	286×286×286

AMSTRAD

EX250	44	—	25	T	250×350×300
EX350	64	—	35	T	260×490×260
EX450	84	—	45	T	300×560×350
LS101	42	—	25	T	100×180×110

AUDAN AUDIO

Audan 2	512	96	15	O, M, T, W	495×914×381
Audan 3	328	96	15	O, M, T, W	432×679×381
Audan 7	208	96	15	O, M, T, W	317×546×260
Audan 8	199	96	15	O, M, T, W	312×448×257

AUDIOMASTER

LS3/5A	190	78	50	T, W	193×308×160
MLS1	133	80	60	T, W	230×372×192
MLS2	178	82	75	T, W	287×463×231
MLS4	222	83	75	W	275×625×312

AUDIO PRO

2.25	208	90	100	A, W	285×515×260
4.14 Biamped	747	—	—	A, W	308×520×265
B2.50 Sub Woofer	399	—	—	A, W	460×540×450
B4-200 Sub Woofer	1030	—	—	A, W	540×1080×540

B & W

801	1075	85	prot.	T, W, A	432×960×560
802	779	85	prot.	T, W, A	300×1040×370
DM2 (II)	326	95	200	T, W, A	270×898×330
DM6	499	95	350	T, W, A	410×931×380
DM7 Mk2	399	86	prot.	T, W, A	270×900×382
DM11	129	87	100	T, W, A	254×504×254
DM12	199	85	prot.	T, W, A	220×355×270
DM14	265	86	prot.	T, W, A	256×567×295

BANG & OLUFSEN

C40	149	—	40	B, S	120×205×205
M75	469	—	75	T, R	350×650×270

Model	£	dB W, 1m	W	Finish	Size (mm)
M100	685	—	100	R	400×750×310
P30	135	—	30	T, R	300×540×90
P45	195	—	45	R	350×650×140
S25	89	—	25	T, R	220×410×150
S35/2	135	—	35	T, R	260×480×180
S45/2	195	—	45	T, R	260×480×210
S75	275	—	75	T, R	320×590×250
X75	209	—	75	B, S	120×320×205

BECKER (USA)

IDS model I	75	92	30	W	483×279×203
IDS model II	112	91	40	W	559×330×254
IDS model III	160	91	60	W	686×381×254
IDS model IV	210	93	100	W	737×457×305
Radian 8-2	90	93	40	W	480×280×250
Radian 8-3	117	93	40	W	533×292×248
Radian 10-3	172	94	60	W	584×317×273
Radian 12-3	201	94	80	W	641×362×302
Radian 2-10-3	276	94	120	W	921×330×349
Satellite	83	91	100	W	235×160×132

BOOTS AUDIO

X22	100	85	60	W	188×262×188
X202	150	87	100	W	282×562×309

BOSE

301 II	170	—	60	W	431×266×241
501 III	314	—	100	W	368×609×368
601	427	—	100	W	381×647×330
901 IV	685	—	—	—	533×320×330

CANTON

AC200 Active	106	—	35	B	190×120×144
C800I	172	—	80	B	275×275×275
GLE40I	96	—	40	B, I	265×180×150
GLE50	138	—	50	B, I	320×220×180
GLE70	202	—	70	B, I	440×285×240
GLE100	303	—	100	B, I	550×340×285
GLE310	115	—	45	B, I	265×180×180
GL550	100	—	120	B, I	340×340×340
HC100	64	—	30	B	190×120×144

CASTLE ACOUSTICS

Conway II	290	86	100	T, W, O, M, R	350×635×370
Conway IIA	350	86	100	T, W, O, M, R	340×875×360
Howard II	500	86	150	T, W, O, M, R	400×990×415
Kendal II	160	89	80	T, W, O, M, R	290×525×280
Richmond II	110	89	50	T, W, O, M, R	230×415×250

CELEF

Domestic I Improved	155	86	100	T, W, R, B, O, M	304×558×254
Domestic II Super	125	84	60	T, W, R, B, O, M	241×406×203

TECHNICS SYSTEM 80'S

TURNTABLE

Two-speed model SL-Q33 is evidently the same as the SL-Q3 with the exception of provision for remote control. It is a direct-drive unit with front-mounted controls and automatic functions including pickup return and repeat. The quartz-lock speed control, ensuring quite superb speed stability, is not switched and there is no fine adjustment of speeds, and doubtless this will suit many users.

Disc-size selection is by photo-sensor with which is associated a system of platter prisms.

This substantial unit employs a motor of superior quality with a well-made bearing. The cast platter weighs 1.6kg including the well-contoured mat which offers good damping and disc support. Start-up time to 33 was 1.1 secs.

A pickup arm of medium mass (13g effective)

is fitted and the medium-compliance magnetic cartridge is a 207C with elliptical stylus. While the cartridge is not a very ambitious choice, it is at least a cut above those selected for many packaged systems. It tracked reasonably well, offering a forward and smooth if explicit sound, at 1.6g. Not very thrilling, but the arm imposes a restriction. Main resonance was on the low side at 9Hz. Arm pivot friction was rather high at 50mg lateral, but negligible vertically.

This well-engineered turntable has much to commend it, although the standard of the pickup could with advantage be improved. No adverse criticism could be made of rumble, speed stability or control functions. Behaviour in respect of acoustic breaththrough and shock-isolation were regarded as average.

CASSETTE RECORDER

The RS-M45, a medium-priced recorder by this manufacturer's standards, is prepared for remote control. This well-endowed slimline unit (barely 10cm high) has a servo direct-drive motor for capstan drive plus a DC spooling motor. Features include a Sendust record head, a Sendust/ferrite erase head, record-mute, timer standby, auto-stop and a bar-graph display for recording-level indication.

Dolby-equipped and designed for all tapes including metal-particle (though without bias adjustment), the machine offers the advantage of soft-touch buttons for mechanical and

electronic functions and integrated-circuit logic control. There is a separate output level control.

It all worked well and conveniently and, with a variety of tapes (including TDK and Sony metal) the unit made possible a dynamic range which was considered commendable for a design that does not have semi-professional pretensions. Speed stability was very good. The damped cassette-eject system was liked, but poor head accessibility inhibited the use of cleaning tools, though regular use of a cleaning tape in cassette format would be effective. In all the RS-M45 seems a good choice for the system.

VERDICT

At first sight this system seems expensive in view of the modest output rating. However, its luxury features have a certain appeal and it must be judged with an eye on convenience (remote control, in particular) as well as an ear for audible results, which generally are of a high order, as evidenced by trials with Monitor Audio and Krystal test speakers.

Reservations concerning disc replay are mild: Technics could do better. But there is not enough here to deny a top grading for technical merit, and the amount of high-technology gizmos add up to fair value too. So again the question is: are you seeking basics or do you feel happy to pay for interesting extras?

TELETON TC-380



Of Japanese manufacture, Teleton audio components, mostly at the low end of the price range, have been marketed in the UK for many years. A relatively pricey system, introduced not long ago, took Teleton somewhat outside their usual province, but the new outfit based on 380-series units clearly represents an attempt to offer a comprehensive installation at very modest cost. It comes complete with speakers and a cabinet.

TURNTABLE

TRP-380 is a semi-auto turntable with reject control, end-of-side trip and manual pickup positioning. It is a belt-driven unit, well finished but lightly constructed, the plinth being formed as one piece from plastics. Operation was smooth and dependable, though some low rumble was evident. Acoustic breakthrough was not a problem with the system's speakers.

A nondescript magnetic cartridge was fitted in the plug-in headshell (which showed a tendency to flex) and, although matching to the high-mass arm was satisfactory, the midrange sound was coarse and poorly detailed. A suitably compatible but better-sounding choice could be made if there was not such emphasis on cheapness.

AMPLIFIER & TUNER

The A-380 amplifier and T-380 tuner are lightly constructed, with plastics cases, but the frontal aspect is smart and the simple facilities prove to be convenient in use, with positive-acting switches and rotary controls. A-380 is rated at 20W into 8 ohms (0.7 per cent THD). High and low filters are provided but do not cut sharply enough to be of much use.

Switching includes simple provision for tape-machine connection, and the pickup input sensitivity is 2.5mV, with a meagre overload margin of 110mV. There is no output-level indicator but the unit has connections for two pairs of speakers. The amplifier delivered its full wattage quota with rather bad grace, audible

stress and questionable bass definition being features of high-level performance, though the S/N was acceptable.

With MW and LW as well as FM, the tuner also is of simple design, with none of the gimmicks of more costly units, indicators being limited to stereo and turning beacons. Stability was not particularly good, and about 90 μ V was required for 50dB S/N stereo, though adequate noise suppression could be achieved and the sound quality was quite good, with a little high-range emphasis. A wire aerial is necessary for AM. The tuner draws its power at low voltage from the amplifier.

CASSETTE RECORDER

Model C-380 seems well gauged as an auxiliary for occasional use: distortion runs rather high and it is not as easy to make wide-range recordings as it would be on more refined units, but music cassette replay was pleasant. Dolby is included, and basic provision is made for selection of tape characteristics, excluding metal types.

Separate record-level controls, a headphone socket and stereo microphone connections are fitted. Control actions were more positive than on some low-cost machines, and head accessibility was good. Record-level meters could provide only a rough guide — they were not responsive enough — and a LED indicator would have been better.

LOUDSPEAKERS

Each small total-enclosure (18 litres volume) contains a 20cm bass/midrange unit and a tweeter. Power rating is nominally related to amplifier capability and sensitivity is in the medium range.

Unfortunately — and inevitably — inexpensive speakers cramp the performance of the system

as a whole. These speakers sound best on low inputs, though obviously this restricts use of the system to background listening (which is pleasant enough). Higher-level listening was not encouraging: it was marred by a hard and forward quality with a coarse effect and strong colourations.

VERDICT

It is difficult to make any harsh criticism of a company that tries to offer such a lot at a modest price. This system is not bad value but it can only appeal if hi-fi ambitions are strictly curbed. Distortions are high and disc replay lacks refinement, while the speakers could with advantage be upgraded.

TOSHIBA SK-01



Model SK-01 has both novelty appeal and, at its modest level, some technical merit. At first sight it looks like a stacked set of units in a rack, but in fact all the components (tuner, amplifier, cassette section) are integrated into one housing. In that respect the system is like a 'music centre', with inseparable parts.

However, the SK-01 scores over any table-top outfit because it is neater and less vulnerable. Channels at the back cater for wall-mounting, and since the unit weighs about 10kg there is no reason why this space-saving solution should not appeal, bearing in mind that much heavier weights, such as loudspeakers, are often hung on wall brackets.

Alternatively the system can be used free-standing if the steadying feet supplied are fitted across the base. Depth of the unit is about 16cm. The SK-01 does not include a turntable, but if one is used it could be bracketed to the wall nearby, resulting in a compact layout. Speakers also could be wall-mounted if it is essential to avoid using floor-space.

AMPLIFIER & TUNER

Output rating is 25 watts per channel (0.1 per cent total harmonic distortion) with 8ohm loads. The radio connection is made internally to the amplifier, of course, but there are pickup and auxiliary inputs with nominal sensitivities of 2.5mV and 150mV respectively. Pickup input overload threatened at just over 100mV but results were not out of line with the low price. It would be wise to avoid magnetic cartridges of unusually high output.

Conventional facilities include tone controls and a single-position loudness switch. The radio

section generously includes long-wave and medium-wave coverage as well as FM, the latter having a usable sensitivity of about $5\mu\text{V}$. Service-area FM listeners to BBC stations should not be displeased if they pay proper attention to the aerial, for the tuning accuracy and sound quality are to a fair standard for a unit of simple design. Since the outfit may be wall-mounted there is no ferrite-rod aerial at the rear for AM, so it is necessary to connect a long-wire aerial. LED signal and tuning indicators complete the facilities.

CASSETTE RECORDER

The cassette section is quite ambitious for an outfit in the economy class, for it is equipped with Dolby noise-reduction and has a 'music quick transport system' to detect unrecorded parts of tapes and enable programme-starts to be picked up. Toshiba have been keen to exploit the cachet of metal tape and, although there is no adjustable bias feature and the LED indicator array is hardly a precise aid to recording, there is

at least token switching for metal as well as other, more commonly used varieties.

Mechanical press-key controls for tape functions are not unduly heavy in action. Other good points are the mixing control, headphone connection and cassette compartment design, although accessibility to the heads is not a strong point (use a cassette cleaner device rather than tools).

VERDICT

A fair deal for the price: clever design too. Attention to detail is commendable, although the brightly metallic presentation is perhaps a bit flashy. Toshiba loaned a pair of their SS-M25 bookshelf speakers for trials: these may be acceptable for background listening, but the results were not liked for serious use because of enclosure resonances and marked midrange colouration.

Substitution of better 'compacts' such as the Krystal test pair gave a better impression, especially on disc input. A Sansui SR-222 Mk2 turntable was to hand for this purpose and a compatible low-cost Nagaoka cartridge was fitted. Radio reception was acceptable if a bit edgy in quality in the high range, while bass quality was somewhat amorphous, reflecting paucity of power delivery from a relatively cheap design. Cassette facilities are hardly likely to attract the adventurous user — they are not intended to.

But in all there are no strong reservations about this package. The outfit could have appeal as a secondary installation in, say, a guest room or for children, since security and compactness would be clear advantages. And what a delight it would be (the idea is irresistible) to find something of this sort in one's five-star hotel room! With a coin in the slot . . .

TOSHIBA SYSTEM 115



System 115 represents Toshiba's attempt to offer a comprehensive high-value outfit. It comes complete with loudspeakers and the AR-115 castor-mounted cabinet in simulated teak finish with useful space for disc storage. All these items are included in the price quoted above. This system is primarily a contender for small-room use, as the power rating suggests, although it is not a space-saving design.

AMPLIFIER & TUNER

The SB-115 amplifier looks uncommonly bulky for a unit of such limited rating but it is nicely made with well presented easy-to-use controls. In fact the power rating is 25 watts per channel (0.3 per cent total harmonic distortion). Control line-up is basic, with tone controls, loudness switch giving boost at both ends of the range, and a low filter which cuts by about 10dB at 50Hz. There are simple tape record/replay facilities for one machine.

Switched outlets for two pairs of speakers are included. Pickup input is at 2.5mV with an overload margin of 110mV, which is not too bad for the class of unit. Indeed, the SB-115 has fair appeal as a low-power amplifier of modest cost, fostering a clean sound if it is not provoked by running very close to its maximum capability (where results are decidedly rough).

Noise levels were acceptable and indeed commendable for an inexpensive product. One concession to glamour is a pair of 'peak power'

meters. Familiar problems of ballistics prevent these offering more than an interesting display of relative levels.

Like the amplifier, the companion tuner ST-115L is a straightforward and basic component. Coverage is LW and MW as well as FM, and the manual tuning is smooth with a useful flywheel action. Other controls are reduced to muting, mono switching and waveband selection. Signal-strength and tuning meters complete the panel array.

Screw terminals are fitted for the usual aerial inputs but there is no coaxial socket. An external wire aerial is essential for AM reception and a careful arrangement here can yield quite lively results. Basic FM sensitivity was about $4\mu\text{V}$, with a stereo requirement of $65\mu\text{V}$. In average service-area conditions reception of BBC programmes should be found adequate given close attention to the aerial, and sound quality pleasant with a hint of high-range decline.

TURNTABLE

Semi-automatic SR-A115 is a two-speed player of light construction, with a plinth made largely of plastics plus a hardboard base, and surmounted by a hinged dust cover of good quality. The unit is belt-driven by a synchronous motor. Controls are reduced to basics covering power on/off, stop and pickup cueing. There is of course the usual return of the pickup to rest at end of play. The light cast platter carries a mat of hopelessly bad design, made 'bouncy' with spaces beneath it, so a replacement would be essential.

The S-shaped pickup arm carries a plug-in headshell fitted with a cheap moving-magnet cartridge. This latter item delivers a relatively high output, has a spherical-tip stylus and tracks at 1.8g. Although is it reasonably compatible with the arm, which is of medium mass, its characteristics were not liked. Sound quality was

coarse and lacking in detail, with poor stereo imaging.

Further, the lateral pickup bearing exhibited some play, possibly due to lack of care in assembly, though the pivot frictions were acceptably low in relation to the anticipated tracking pressure. Lack of bias correction was an unusual omission. Indeed, the pickup characteristics overall reduced disc reproduction to an inferior standard, effectively putting it out of the hi-fi running except for low-level background listening.

Results in respect of acoustic breakthrough and shock-resistance were barely average for the class of product, but speed stability was good. Start-up to 33 was 1.2 secs. In all, the turntable is not up to the modest standard of the system.

BUYER'S GUIDE TO HI-FI SYSTEMS

Model	£	dB/W, 1m	W	Finish	Size (mm)
Domestic III Super	195	88	100	T, W, R, B, O, M	254×558×304
Domestic Monitor	595	88	150	T, W, R, B, O, M	342×762×381
Mini Pro HE	260	86	100	T, W, R, B, O, M	279×584×304
Monitor II	220	84	100	T, W, R, B, O, M	279×520×254
PE1/II	350	84	150	T, W, R, B, O, M	279×635×304
Proac 2	290	86	150	T, W, R, B, O, M	279×558×305
Proac 3	375	84	150	T, W, R, B, O, M	279×584×304
Proac Studio 3	1200	86	300	T, W, R, B, O, M	304×685×330

CELESTION

Ditton 120	79	86	40	T, W, B	265×395×230
Ditton 130	110	87.5	50	W, B	250×485×240
Ditton 150	140	86	60	W, B	280×545×218
Ditton 200	185	87	80	W, B	330×598×266
Ditton 300	219	87.5	100	W, B	350×630×260
Ditton 332	269	85.5	100	W, E, B	356×650×285
Ditton 442	319	85.5	120	W, E, B	390×762×290
Ditton 551	359	85	140	W, E, B	395×720×328
Ditton 662	499	85.5	160	W, B	400×1057×300

CEOL

PSL 5:15	199	—	40	B, Bn	146×222×126
PSL 5:20	245	—	60	O, B	253×620×369
PSL 5:25	899	—	100	O, B	316×684×488

CHARTWELL

LS3/5A	206	80	40	R	185×300×160
LS3/5A	189	80	40	T, W, B	185×300×160
PM110	195	86	80	T, W, B	227×210×460
PM1210	321	89	100	T, W, B	345×285×660
PM410	454	92	150	T, W, B	385×330×870
PM450P	678	94	200	T, W, B	760×460×412

CLEARWATER

I	485	83	400	W	279×622×291
II	440	87	150	W	291×597×305
III	550	88	150	B-cloth	291×622×377

CORAL

Coral XVII	450	97	120	R	390×710×350
------------	-----	----	-----	---	-------------

DALESFORD

D	110	86	70	W	260×340×220
D Major	260	87	100	W	365×605×283

DIESIS

DF1	234	82	60	I, W, M	305×535×270
DF2	148	85	60	I, W, B	240×345×200
DF4	303	91	100	I, W, M	305×535×270

EAGLE

L 7300B	106	86	35	B	284×474×210
L 7300W	106	86	35	W	284×474×210

Model	£	dB/W, 1m	W	Finish	Size (mm)
L 7500B	157	90	50	B	320×546×245
L 7500W	157	90	50	W	320×546×245
L 7700B	199	92	75	B	348×628×270
L 7700W	199	92	75	W	348×628×270

ELITE

EE12000	1450	92	250	choice	470×1000×500
---------	------	----	-----	--------	--------------

EXPERT BRAVURA

Bravura 1, MkII	109	87	60	W, B	246×391×187
Bravura 2, MkII	136	87.5	80	W, B	271×451×191
Bravura 3, MkII	189	89	100	W, B	358×602×236

FERGUSON

39227	65	88	35	I, B	240×460×200
3942B	75	88	35	T, B	240×460×200

FERROGRAPH

S22	104	88	20	T	181×332×215
S23	168	90	35	W	190×440×280

FIDELITY

200S	45	3	20	W	278×475×210
350S	60	3	40	W	280×570×230
450S	45	3	25	W	278×475×210

G. A. AUDIO

SD1000	350	87	60	various	300×590×280
--------	-----	----	----	---------	-------------

GALE

GS401A	564	83	200	B, S	605×330×270
GS401C	518	83	200	W	620×335×290

GENESIS

I+	169	88.5	100	O, W	559×317×241
V-6	129	88.5	75	W	470×273×178
2	199	88.5	100	O, W	673×368×292
2+	279	88.5	100	O, W	838×368×267
3+	379	88	150	O, W	953×368×305

GOODMANS

Achromat Beta	129	85	70	leather	349×210×229
Achromat Kappa	170	85	95	leather	540×273×267
Achromat Sigma	242	86	95	leather	686×330×279
Mini 2	56	87	30	B	187×121×102
G30	59	91	30	I, W	601×302×267
HE1	234	93	85	silversand	876×343×356
HE2	206	93	65	silversand	724×343×356
HE3	186	93	55	silversand	581×430×257
XB25	92	86	60	T, W	502×292×254
XB35	117	86	60	T, W	622×318×254
XB45	134	86	60	T, W	699×330×286

CASSETTE RECORDER

According to Toshiba the PC-115 cassette unit 'will satisfy the most demanding tape enthusiast.' But such critical persons would most likely expect a little more than is provided on this low-cost machine, in which facilities are whittled down to some extent, as exemplified by a normal/chrome tape option. In fact it was found quite tricky to obtain the sort of dynamic range implied by the specification, what with the problems of identifying peaks on the level meters.

Speed stability was only marginally acceptable — not too seriously out of line with basic nature of the machine. However, the mechanical key controls for tape transport were satisfactory, as

were the other controls such as the dual-concentric knobs for recording-level setting.

Accessibility to the heads and capstan was reasonably well arranged. The unit has two microphone sockets, a headphone outlet and Dolby noise-reduction. In short it is a basic machine with characteristics likely to suit the user who places cassettes in an occasional role. Modest though the standard is, the results marginally surpass those from disc replay in this system.

LOUDSPEAKERS

A pair of teak-finished SS-115 loudspeakers is included in this package deal. This small two-way model is of the total-enclosure type and of 22 litres internal volume, with proportions that suit it to shelf-mounting or free-standing use (stands could be used). Units are a 22cm bass driver and a pulp-cone tweeter.

Power rating is 25 watts on programme and the nominal impedance 8 ohms. Sound quality

was considered poor in view of the lack of high-range sparkle and the hardish, coloured midrange effect. Bass was fair for a speaker of low cost. Lack of depth and detail in stereo was a disappointment, though, and the sound was distinctly unpleasant on high inputs. Low-level listening to popular programmes via radio may be found acceptable but the speaker is not really a serious candidate for anything else.

VERDICT

This outfit gives further reason to query the policy of offering a lot of gear for too small a price. Although the system is centred on an amplifier of passable quality, the characteristics elsewhere cause qualms. The speakers are simply not good enough, and the turntable unit gives rise to misgivings too. Since the technical merit is questionable, value cannot be rated generously despite the size of the package.

TRIO V-710



Although most current systems include a separate amplifier and tuner, there is of course no reason why a compact installation should not be based on a receiver (that is, a tuner-amplifier). For technical reasons a housed system will rarely include a high-power receiver, but there is no problem in the lower range of output powers, as the V-710 shows.

Like the bigger system representing Trio in this Digest, the V-710 outfit was supplied for test without loudspeakers. A neat rack with wood-grain finish, glass doors and a storage compartment is included in the price mentioned.

RECEIVER

Smartly styled with the metallic presentation common to most Trio hi-fi, the KR-710L receiver is rated at 28 watts per channel into 8 ohms (0.08 per cent THD) and has conventional inputs for associated units (one 2.5mV pickup input) with convenient interconnections for use of a cassette machine. Radio coverage is FM, LW and MW with the usual provision for aerials plus an adjustable AM ferrite-rod at the rear. FM sensitivity for 50dB quieting is 4 μ V.

Tuning aids are convenient and include a servo-lock system in which the tuning knob acts as a touch-switch. LED signal-strength indicators are provided, and the centre-reading tuning aid is unusual in that it is associated with the pointer on the tuning scale. FM performance was lively, so that the user with an adequate aerial should be able to adventure successfully along the band. Sound was crisp

and clean, if a shade light in the bass.

Other facilities include switched outlets for two pairs of speakers, a loudness control and a high filter — merely a token, since it does not cut sharply. Interestingly, the tone and balance controls are reduced to tiny knobs, suggestive of very occasional use (which is so often the case in practice). Trio's version of the familiar LED output-level indicator is also included.

TURNTABLE

Lightly constructed on a moulded plinth, the KD-1600C is a two-speed belt driven unit. It is of the semi-automatic type, with end-of-side trip and pickup return, but is slightly unusual because the pickup has to be placed over the disc's run-in before the motor is started. Pressing the button then switches on the motor and actuates a mechanism to lower the stylus to the groove.

Feature of greatest interest is the pickup arm, a low-mass component (about 7g effective), nicely made and fitted with a bias-correction device of the pivoted lever variety. The light, detachable cartridge platform is fitted with an Ortofon FF15E Mk2 as standard. The arm is above-average for the class of turntable, and indeed a better cartridge would be justifiable (a lower tracking pressure would then be permissible).

The turntable's precise operation was liked. Start-up to 33 was about 1 sec. Platter mass was 0.8kg including an oddly designed mat, full of unnecessary moulded shapes. A substitute mat, better contoured, is warranted here. Signal-noise result was average for the class of unit, as was the fair resistance to mechanical shock. Behaviour in respect of acoustic breakthrough was barely average.

BUYER'S GUIDE TO LOUDSPEAKERS

Model	£	dB/W, 1m	W	Finish	Size (mm)
GRUNDIG					
BOX M600	60	—	50	MB	240×410×180
BOX M800	74	—	60	MB	270×500×200
BOX M1500	100	—	100	MB	290×550×220
BOX 5M2000	114	—	120	MB	250×900×210
BOX 5506	50	—	35	MB	230×390×210
Microbox 320	34	—	30	MB	120×200×150
HARBETH					
HL	343	87	100	T	325×640×300
HL	344	87	100	W	325×640×300
HEYBROOK					
Heybrook HB3	349	89	100	T, W, O, B	335×625×285
Heybrook HB2	170	83	60	T, W, O, B	230×407×230
HMV					
40005	70	3	40	W	280×570×230
50005	52	3	25	W	278×475×210
HITACHI					
HS1	80	85	80	S	117×185×121
HS330II	219	92	100	W	315×630×275
HS530	299	92	120	W	355×630×275
SS8490	100	—	80	T	285×516×273
SS8500	129	—	150	T	321×622×252
IAS					
Ashurst	246	—	85	T	305×635×305
Beaulieu	540	—	150	T	343×660×406
Beaulieu Active Professional	1295	—	180	T	343×660×406
Hamble	126	—	60	T	203×330×229
Hartley	149	—	85	T	254×457×241
Midhurst	368	—	85	T	305×635×305
IMF					
ALS30	294	83	50	—	300×570×280
ALS40II	407	82	60	W	250×680×150
RSPMIV Improved	1306	80	150	W	500×1160×430
TL550IIA	545	81	70	W	390×1000×350
TL580IIA	909	82	100	W	460×1060×400
Super Compact II	214	84	50	—	300×460×280
INFINITY					
InfiniTesimal	224	—	100	O	160×280×130
Qe	167	—	100	Bn	300×460×250
RSa	230	—	150	O	350×630×250
RSb	348	—	150	O	250×630×250
RS Monitor	443	—	250	O	380×670×254
Ref. Std. 1.5	599	—	250	O	380×670×280

Model	£	dB/W, 1m	W	Finish	Size (mm)
Ref. Std. 2.5	1108	—	300	O	460×1290×280
Ref. Std. 4.5	2329	—	—	O	662×1606×362
JBE					
Diamond 1	252	89	100	SL+T	444×388×444
Diamond 2	180	85	50	SL+T	280×438×280
Diamond 3	271	88	75	SL+T	343×489×343
JBL					
Radiance 55VX	150	—	80	—	343×546×284
Radiance 77VX	209	—	150	—	404×648×284
Radiance 99VX	255	—	200	—	434×699×326
L50	450	88	200	—	362×622×314
L110	599	89	250	—	362×597×286
L112	700	89	300	—	362×622×333
L150	999	88	300	—	432×1054×330
L220	1699	90	400	—	512×1225×390
L300	2099	93	400	—	584×803×572
JPW					
Barton	159	—	60	T, W, B	317×635×305
Buckland	119	—	60	T, W, B	254×457×203
Denham	549	—	200	T, W, B	317×838×356
Lopwell	99	—	50	T, W, B	229×406×203
Lydford	349	—	100	T, W, B	311×813×330
Meavy	79	—	40	T, W, B	229×406×203
Milton	179	—	70	T, W, B	317×635×305
Tony	59	—	35	T, W, B	229×330×203
JR					
JR149	159	83	60	W, R, T, L, Wt, B	230×370 (cylindrical)
JR150	246	87	100	W, R, T, L, Wt, B	280×550 (cylindrical)
JR Sub Woofer EXA System	299	—	100	W, R, T, L, Wt, B	510×470
JR Sub Woofer LPA System	207	—	100	W, R, T, L, Wt, B	510×470
Metro	119	85	60	N	160×280×190
JVC					
CB1ED	338	50	—	—	343 diameter
RB50	59	—	5	S	—
SK31	53	91	15	B	242×420×165
SK41	74	91	35	B	236×473×217
SK51	85	91	45	B	264×505×218
SK600 MkII	132	92	60	B	315×497×306
SK700 MkII	202	93	70	B	341×564×333
SK1000 MkII	332	94	100	B	395×645×339
SM3	101	86	25	S	114×180×115
SM5	135	88	40	S	147×233×150
Zero 3	290	91	75	B	322×580×340

CASSETTE RECORDER

The KX-440 is an inexpensive unit of merit for occasional use, though lacking the facility for precise tape matching (bias and equalisation) required for more serious experiment. Selection is reduced to standard and chrome, the settings being used in combination for a desired approximate characteristic. Facilities are generally good, if basic, with DIN signal interconnection, record-mute switch and recording level meters.

Tape control is purely mechanical, with press-

keys which have a long throw to their action, though offering a reasonably positive feel. This unit is another example of a direct-loader, with an open compartment which must be protected by a small dust cover (supplied) when not in use. The design ensures good accessibility to heads and other parts for cleaning. Results were well in line with the modest cost, S/N and distortion being average for the category of product, although the bass was muddy in character.



VERDICT

A pleasing example of a compact receiver-based system, best suited to the smaller room. Results on radio and disc were specially favoured during trials using the test pair of Krystal speakers. A few minor points have been raised: in particular, disc replay would respond to a more ambitious cartridge. It's an honest package as it stands, though.

TRIO V1000R



The distributor's PR consultants were quick to inform me that Benny Hill has one of these systems in his home (the picture was taken there). Lucky chap: what he has lined up there is a versatile medium-power outfit presented in luxury style with interesting trimmings such as remote control and a timer. It is great fun to drive.

You can of course choose from the Trio range of speakers or any other, subject to the usual simple matching requirements. However, the price given at the end of this report excludes speakers, as they were not provided for tests. The package does, of course, embrace the pair of attractive racks, which have glass doors and storage space, as well as provision for mains distribution within the system.

AMPLIFIER & TUNER

Model KA-500 amplifier is rated at 43 watts per channel into 8ohms (0.1 per cent total harmonic distortion) and is a fine performer, delivering its power with good grace and proving highly satisfactory in respect of signal-noise performance. It is a pity that there is no provision for moving-coil pickup input, but the normal phono input at 2.5mV caters for other types and has a reasonable overload threshold around 150mV.

This unit is distinguished by a novel control layout. There are no rotary controls at all, but instead there is a mixture of sliders and feather-touch bars. Volume is controlled by a pair of push-bars which give a rise or fall of level, said by Trio to approximate to the turning of a conventional rotary control. Without doubt an ordinary control is simpler and, some may feel, more positive.

It must be remembered, however, that remote control is the big attraction of this system, so the mode of control on the amplifier itself may be seen as secondary. Whether or not the remote facility is used, an LED bar display indicates the actual setting, so that it can be seen from a distance. There is also a display to give continuous monitoring of volume level

dynamically. A further feature — almost a novelty — is the inclusion of microphone mixing with a separate slider control.

Tuner KT-500, matching the amplifier in style and dimensions, is again controlled by feather-touch buttons and is at its most convenient with remote control. As in some other modern tuners continuous tuning is dispensed with. The unit incorporates a quartz-lock synthesiser system with digital display and station-seeking is in frequency steps up and down the FM and AM (medium wave) bands.

Digital codes for preset stations are stored in a memory, so that any station can be selected on the unit or remotely. So the emphasis is on selection of six stations on either band, as that surely is the way most listeners would use such a tuner. A design of this sort is not really for those who go in for radio globe-trotting.

One can, of course, change any of the presets quickly when required. Usable FM sensitivity is $2\mu\text{V}$, or $35\mu\text{V}$ stereo (46dB signal-noise). Very much liked was the signal-noise performance achieved on FM in practice during BBC service-area listening, as was the crisp, even-sounding response, though it was not without a hint of bass decline.

TURNTABLE

Attractive with a bright finish and equipped with a hinged dust cover, model KD-4100RC is a two-speed direct-drive unit with a slotless DC motor and servo circuits. So far as basic functions and qualities are concerned it seems a fair choice for the system, and it falls into the appropriate medium-price bracket. It is in fact a more substantial unit than some in this category, largely due to the use of one of the new heavy and dense moulding compounds in the plinth.

It is a fully automatic player in that a separate drive mechanism positions the pickup according to the disc size selected; and then there is auto-return at the end of side. There is a reject button, and the turntable has fine-speed adjustment and an illuminated strobe. The cast platter weighed 1.2kg including the rubber mat. This latter item has a couple of annular recesses moulded in its underside — completely unwarranted as they affect the support given to discs. A substitute mat could be used, of course.

The motor can be started by moving the pickup away from its rest, overriding the auto-start, and then control is dependent on the damped lift/lower (cueing) device. Start-up time to 33 was just under 2 seconds. A conventional pickup arm of medium mass (16g effective) with plug-in headshell is fitted with the Ortofon FF15E Mk2 cartridge as standard. Pivot frictions were 25mg lateral and about half that vertically.

Although the Ortofon suits the arm and yielded the expected clean and fairly positive sound, the impression remained that the system deserved something a little more ambitious — just a matter of refinement. As for other aspects, under practical conditions the slightest hint of rumble could be detected from the turntable. Susceptibility to shock and acoustic interference could be regarded as average for a unit of this calibre.

BUYER'S GUIDE TO LOUDSPEAKERS

Model	£	dB/W, 1m	W	Finish	Size (mm)
Zero 5	460	92	100	B	365×655×340
Zero 9	750	92	150	B	408×1048×410

JORDAN-WATTS

Flagon	48	89	40	C	300 diameter
G.T.	72	89	40	T	680×324×166
Janet	39	89	40	T, W, Wt	300×200×150
Jumbo	39	89	40	T, W, Wt	420×200×90
Jetico	150	93	100	T	690×330×320
Jodrell	120	85	80	T, W	760×345×220
Jun	50	89	40	T, W, Wt	610×300×160
Juliet	50	89	40	T, W, Wt	400×250×230
Quibige	32	89	40	O, W, C	300 cube
Double Quibige	120	85	80	O, W, C	600×300×300

K S ELECTRONIC

Linea B530	350	—	100	B, W	470×280×280
Mega E80	1127	—	250	B, O, W	660×460×360
Prisma A450	276	—	100	B, W	420×275×250
Tertia D70	615	—	120	B, W	600×350×330

KEF

101	190	81	100	W, T, R, A	180×340×190
103.2	260	86	150	W, T, R, A	265×506×249
104aB	250	83.4	100	T, W	330×630×260
105.2	900	85	200	W, T, R, A	415×965×455
105.4	640	86	200	W, T, R, A	350×936×380
Celeste IV	125	86	50	B, Br, red, beige, blue	265×524×230
Concord IV	210	87	100	B, Br, red, beige, blue	280×692×315
Corelli	130	82	50	T, W	280×470×220

KLH

1	620	89	200	W	260×775×260
2	420	89	200	W	260×530×220
3	279	88	200	W	320×220×150
4	179	88	60	W	320×220×150
150	209	90	100	W	—
160	139	90	100	W	—
317	159	91	60	Bh	300×580×250
327	237	92	100	Bh	350×590×270
331	99	90	45	Bh	300×530×220

KLIPSCH

Cornwall	927	98.5	105	B, Bh, W, T, O, Ch, Spec.	648×908×394
Heresy	582	96	105	B, Bh, W, T, O, Ch, Spec.	395×543×334
Klipschorn	1978	104	105	B, Bh, W, T, O, Ch, Spec.	793×1320×725

Model	£	dB/W, 1m	W	Finish	Size (mm)
La Scala	1401	104	105	B, Bh, W, T, O, Ch, Spec.	603×900×622

KRYSTAL

Explorer	174	80	85	W, T	290×520×260
Voyager	122	80	50	W, T	230×330×215

LENTEK

Lentek S4	253	84	100	W	250×495×255
Monitor X	506	86	150	W	393×1073×406

LUXMAN

MS10	178	89	60	R	250×540×260
MS20	299	90	80	R	320×636×300

MARANTZ

SP235	49	87	40	W	286×486×216
SP245	64	87	45	W	286×486×216
HD345	79	88	50	W	286×486×216
HD445	99	91	55	W	286×486×216
HD545	119	92	60	W	286×486×216
P830	174	90	100	W	292×570×273
P1030	—	92	150	W	320×660×273
P1230	249	94	200	W	400×762×323

MERIDIAN

M1 Active	1510	active	—	B	500×1060×340
M2 Active	750	active	—	B, W	180×500×375

MISSION

700	115	86	80	W, B	260×460×250
710	179	87	80	W	290×520×260
720	287	88	125	W	320×670×320
730	385	89	175	W	320×900×320
770	365	85	125	W, B	300×590×285

MONITOR AUDIO

MA2	397	88	120	T, W	851×351×300
MA6	212	87	80	T, W	300×580×285
MA9	119	86	60	T, W	229×406×216
MA10X	680	87	200	T, W	381×800×381
MA16	99	89	40	T, W	229×406×216
MA84	288	88	100	T, W	280×768×330

MORDAUNT SHORT

Carnival	100	88	80	T, W	240×400×145
Festival	135	88.5	90	T, W	280×455×185
Pageant	200	89	100	T, W	330×533×230
Signifer	600	88	250	T, W	385×810×325

TRIO V1000R

CASSETTE RECORDER

KX-600 is a front-loader with a cassette-locking frame rather than a closed compartment, an arrangement found on a few other machines (the Grundig, for instance). So again there is the question of vulnerability of heads and other parts; and again a little cover is supplied to protect this area when the machine is not in use. The recorder is prepared for metal tape as well as more common varieties and there is adjustment of bias each side of a nominal central setting.

Most of the controls are either buttons or bars, requiring only a light touch. The KX-600 has this in common with some much more expensive units, and it all turns out to be simple and logical

is use. Nominal frequency range is 30-16,000Hz with metal tapes. Facilities include a pair of microphone inputs and two recording-level meters which are reasonably responsive and augmented by peak-reading beacons for 0, +3 and +6dB.

Although the presentation and operating precision may not quite match the needs of enthusiasts with a flair for experiment, the machine is very well gauged for the music-lover with simpler demands. It fits into the Trio system particularly well. Simple closely-miked and more distant recordings on TDK metal tape conveyed an impressive dynamic range.

OTHER COMPONENTS

Remote control system RC-500 consists of two parts, the control centre, housed in the rack, and the cordless, handheld remote-controller. For their use it is necessary to fit connectors which link the system components to the control centre. Remotely activated functions are on/off, volume (with up and down buttons), muting, amplifier input selection, turntable operation and FM/AM preset stations.

All this is very engaging and will delight

push-button addicts and students of automation. The same is true of the AT-500 audio timer, which works over a period of eight days and has a 24-hour time display. Using a microprocessor the unit allows 12 settings for FM and AM preset recall and possible setting intervals are as short as one minute. It can be set-up for everyday mode and a one-week mode of timing. Beware: it could become your master rather than your servant.

VERDICT

It is not particularly easy to sum up this system in value-for-money terms, though it is evident that a lot is offered at what is, in the context of this Digest, a pretty substantial price. Much depends on whether you want the extras or whether you dismiss them as gimmicks. Since Trio units are available separately in the usual way, you could ask your supplier to organise a simplified system.

As the system stands it has many an impressive feature, and generally the overall performance and sound quality do credit to the makers, judging by results with the test pair of MA-84 loudspeakers. Reservations are few and slight. The standard of disc replay has been questioned, but upgrading this, though easily possible, implies extra expense. Indeed, it may even raise the question of a different turntable/pickup combination.

UHER RACK SYSTEM



Uher's latest luxury-class components are offered as a matched set, and a rack housing (not illustrated) has been prepared. At the time this report was written Uher did not advocate any particular turntable, neither did they submit one for tests. So in that respect the field is wide open and it can only be said that the equipment warrants a turntable of the highest quality. The price quoted covers the items described and includes the rack. Suitable speakers and a turntable would clearly add very appreciably to the total.

AMPLIFIER & TUNER

Slight confusion had arisen over the rating of the massive VG-851 amplifier, since a reference to 60W had been seen at one stage, but in fact the figure is 80W per channel into 4 ohms (0.3 per cent THD) and nearly as much for 8 ohms. Distortion runs a bit higher than in many competitive amplifiers but the power capability is generous, offering ample margin to ensure clean results in most conditions.

Switched outlets for two pairs of speakers are terminated via DIN sockets and screw fittings, while the pickup input is DIN/phono duplicated. Sensitivity here is 2.4mV with a 130mV margin. Omission of a moving-coil pickup input is unfortunate, but it seems that such a facility is rarely found on Continental equipment. There is no attempt to provide output power indication, but that is no great loss.

Controls include a loudness button, a subsonic filter, a microphone control (for use as a fader) and a tone-control defeat switch to give a straight-through linear condition. Switching for two tape machines provides for copying and monitoring. All these controls are well arranged

on the black panel, though one has to get used to a mixture of German and English legends.

The EG-751 tuner, weighing over 6kg, is uncommonly bulky but is well endowed. It is a quartz-controlled synthesiser unit with digital frequency display, very precise and convenient in use. Auto and manual station-scanning is provided, and there is a set of touch-button presets offering seven FM and two MW stations (presumably this reflects relative interest in FM in the unit's home territory). A filter acts on weak and noisy reception, and there is even a switchable indicator of multipath reception conditions.

Although there is nothing here that could not be housed in a tuner less than half the size, everything worked admirably well. Basic FM mono sensitivity was an impressive $1\mu\text{V}$, with a $50\mu\text{V}$ requirement for optimum stereo. AM performance was lively and the tuner carried a fully adjustable ferrite-rod aerial. Smooth response and generally clear audio were commendable, though stereo information was not as consistently detailed as in some designs.



BUYER'S GUIDE TO LOUDSPEAKERS

Model	£	dB W, 1m	W	Finish	Size (mm)
MITSUBISHI					
DS25	153	90	60	W	320×530×292
DS35	240	91	80	W	365×655×321
SS080	77	89	25	W	265×470×242
SS630	115	89	50	W	305×554×257
NIGHTINGALE					
NM1	445	86	100	T, W, R	406×908×286
NM3	575	88	100	T, W	355×825×485
Point 5	352	88	75	T, W	267×800×368
OMAR					
C.R. 251	101	86	50	T, W	513×280×242
C.R. 351	136	86	50	T, W	548×302×245
C.R. 455	179	85	80	T, W	585×317×240
C.R. 501	219	85	80	T, W	815×370×305
Goring	57	86	30	T, W	355×228×197
Henley	47	87	25	T, W	275×165×187
Wendover	74	86	40	T, W	458×282×242
Wentworth	149	85	80	T, W	585×317×240
Westminster	119	86	80	T, W	548×302×245
Winchester	95	86	50	T, W	513×280×242
OPTONICA					
CP5100	239	90	60	W	330×590×300
CP7100	289	91	70	W	330×590×330
CP9100	379	92	130	W	370×655×290
PANASONIC					
SB35UK	99	85	35	T	164×117×204
SB50UK	97	85	50	R	265×470×240
PHILIPS					
AH482	60	87	70	W, B	255×385×155
AH483	70	89	80	W, B	285×437×180
AH484	90	91	100	W, B	330×515×200
AH489 BT	142	90	110	foil	355×560×248
AH494 BT	230	89	140	foil	390×604×250
AH585 MFB BT	320	—	—	B	229×348×197
AH587 MFB BT	480	—	—	B	300×487×237
RH545 MFB BT	—	—	—	B	436×650×320
PIONEER					
HPM130	100	88	60	B	300×530×291
HPM150	165	91	80	B	325×570×317
HPM170	206	92.5	120	B	350×610×321
HPM1110	400	92.5	200	B	390×670×393
PROFLE					
Model 10	549	86	100	W, F, B	315×680×380

Model	£	dB/W, 1m	W	Finish	Size (mm)
QUAD					
ESL	300	86	—	—	880×790×270
RADFORD					
M90	495	—	100	T	381×800×343
M180	575	—	100	T	381×800×343
S90	667	—	100	T	445×110×381
T90	310	—	100	T	318×533×241
RAM					
Compact	85	—	40	T, W	229×330×184
Ram60	199	—	65	T, W	254×495×279
Ram70	249	—	70	T, W	254×584×292
Ram80	299	—	75	T, W	267×660×318
CD10	109	—	40	T, W	230×332×185
CD20	139	—	50	T, W	249×419×230
RED					
Amplifier	—	—	150/B	—	480×84×280
Compact Stereo System	776	Active	—	B	245×335×205
Studio Monitor	690	Active	250/B	B	480×345×335
REFERENCE					
Standard	169	—	65	T, W, B	267×457×280
REVOX					
BR320	240	86	50	W, N	265×475×275
BR430	299	86	80	W, N	340×560×315
BR530	386	87	110	W, N	385×610×345
BX350	386	84	80	W	350×520×295
BX4100	1000	85	200	W	450×790×433
Triton	860	—	130	W	1055×500×460 (2)
RICHARD ALLAN					
Charisma	230	91	30	T, W	392×686×305
Maramba	144	89	—	T, W	248×597×219
Monitor 80	322	87	—	T, W	305×661×280
RAB	126	86	30	T, W	266×395×247
RA821	218	79	45	W	345×724×292
Tango	116	89	20	T, W	266×395×247
ROGERS					
LS58	2185	—	118	T, W	760×460×412
LS35A	189	80	40	T, W, B	185×300×160
LS35A	206	80	40	R	185×300×160
Export Monitor	310	86	100	T, W	635×305×305
Compact Monitor	212	86	80	T, W	505×280×275
Reference Monitor System (inc. LS35A)	896	86	100	T, W	825×419×457

UHER RACK SYSTEM

CASSETTE RECORDER

Model CG-343 is a logic-controlled machine with light-touch buttons for tape functions. Even cassette eject is electrically actuated. Dolby-equipped, this machine has four-position tape selection, including metal. There are separate motors for spool and capstan drive, the latter being a DC servo arrangement, and speed stability was very good. A Sendust record/replay head is fitted.

A 'memory' function is included and there is provision for a timer to start recording at the level previously set. Separate record-level controls for each channel are augmented by a master control to facilitate quick fading, and turning this to zero places the machine in its 'pause' condition — an

unusual but useful arrangement.

Well designed level indicators are helped out by a further beacon which can be set to warn of transient peaks. With the well-contrived control system it is possible to avoid overload and exploit the excellent S/N potential. Bass performance was not quite as well defined as had been hoped, but generally the response was smooth, extending to about 16kHz, and the sound of a superior quality as evidenced by checks with BASF and TDK metal tapes.



VERDICT

In view of the high power capability and the facilities included, there is no reason to deny a top grading for value, despite the omission of a turntable. Likewise the Uher combination has a lot of technical merit, as is to be expected from equipment in the higher range of price. Audition with the test speakers — Monitor Audio and IMF RSPMs — revealed superior quality

VIDEOTONE SYSTEM



It is no great surprise to find that something a little different is offered by the firm of enthusiasts responsible for Videotone loudspeakers. Indeed, their enterprising mixture, drawn from several sources, is welcome. The contrast with most other systems in the Digest is very marked, for just over one-third of the total cost is allocated to the speakers, and they are by Videotone needless to say.

Speaker drive units by Coral of Japan and a cartridge from the same source is included. The system is centred on units by Seoum of Korea and a stacking rack has been introduced by Videotone. All the items in this report (and the rack) are included in the price quoted above. The instruction manuals are a bit difficult to follow and would benefit from further editing.

AMPLIFIER & TUNER

Seoum amplifier SA-4160 is rated at 60W per channel into 8 ohms (0.02 per cent THD) and must be one of the least expensive to offer such an output, for it sells separately at £95. Massively constructed and tipping the scales at nearly 10kg, this unit is well finished and gives the impression of quality and attention to detail. A moving-coil pickup input is a welcome feature. Ordinary pickup input is at 2.5mV with an overload threshold at about 110mV, which is fair though not generous.

A tone-control defeat switch is included and there is adequate provision for tape machine interconnection plus switching for two sets of speakers. Then there are loudness, muting and subsonic filter controls. A single microphone input is fitted, and an unusual feature is a beacon to warn of a fault or overload condition. A small LED bar display, one per channel, represents a superficial attempt to indicate power levels.

Basically simple and manually tuned, the ST-4120 is a nice-looking slimline unit and a fair example of a low-cost FM/AM tuner with medium and long wave coverage. The long, narrow tuning scale is hardly a model of clarity but the controls generally are adequate.

Muting is included for suppression of inter-

station noise while tuning to strong stations, and the LED signal-strength and tuning indicators proved acceptable. The ferrite-rod for AM swings outwards but is not properly adjustable, so a long-wire aerial will be advisable, especially for medium-wave use. FM inputs are terminals (no coaxial socket) and best mono performance is about 2.5 μ V, with a 60 μ V requirement for stereo.

FM service-area reception was of good quality having regard to the modest standard claimed, though distortion ran a shade high and was sometimes noticeable in upper midrange and high treble. Amplifier performance generally was creditable except at high levels where some impression of stress was gained, while the low bass was not as tightly controlled as could be wished, as judged with both Videotone and standby test speakers. On the whole the combination emerged well having regard to the modest cost devoted to this part of the system.

TURNTABLE

For this system Videotone advocate and supply the Sansui SR-222 Mk2, which of course is well known as the most recent version of a popular belt-driven turntable, virtually in the economy-class area but significantly ahead of many in this class on account of sensible construction, good rumble results and relative lack of susceptibility to the acoustic environment which is commendable in an inexpensive and simple unit. Pickup control is manual, with a cueing device on the arm.

Videotone ensure a distinctive touch by supplying a Coral 777EX moving-coil cartridge. One of the least costly examples of the breed, its stylus is not user-replaceable (it has to go back to the supplier). Fitted with an elliptical tip, the cartridge tracks at about 2g, nothing of consequence being gained by an increase. Being of medium compliance it is compatible with the Sansui arm as well as others in the middle range

of effective mass.

This is a low-output cartridge for which the Seoum amplifier is suited. Otherwise a Coral T-100 transformer can be supplied. The cartridge was also checked via an equalised preamplifier for purposes of study, revealing its well-extended treble — fairly smooth. It is not such a confident tracker as some more expensive types, and seemingly it has an over-damped stylus, but the sound was sweet and moderate in distortion when discs made only modest demands. More challenging stuff produced edginess and glassy effects on incipient mistracking.

BUYER'S GUIDE TO LOUDSPEAKERS

Model	£	dB/W, 1m	W	Finish	Size (mm)
ROTEL					
RL310	55	89	55	W	450×250×220
RL350	85	88	60	W	510×260×254
RL500	65	89	55	W	450×250×220
RL550	85	89	75	W	510×260×254
RL1000	130	93	130	W	590×315×260
RL1010	175	93	160	W	650×370×340

Model	£	dB/W, 1m	W	Finish	Size (mm)
SANSUI					
ES207	76	87	90	W	282×592×281
ES209	88	87	110	W	335×670×292
ESP601	30	90	45	W	270×490×215
ESP801	45	90	60	W	285×510×210
J11	41	85	60	S	122×300×131.5
SPM1	41	85	50	W	128×204×120
SPX6700	136	95	130	W	383×633×295
SPX7700	165	97	160	W	443×661×295
SPX8700	205	99	220	W	470×688×270

Model	£	dB/W, 1m	W	Finish	Size (mm)
SANYO					
HF250	—	—	50	—	290×595×210
HF350	—	—	32	—	240×470×310
HF650	—	—	50	—	310×600×300
HF3510	—	—	50	—	310×565×250
MC102	—	—	15	—	230×365×160
MC203	—	—	18	—	240×380×180
MC303	—	—	27	—	270×395×183
MC403	—	—	54	—	300×500×183
MC903	—	—	27	—	270×480×190

Model	£	dB/W, 1m	W	Finish	Size (mm)
SMC					
A540 Studio	329	86	70	T, W	324×635×356
AL50 Studio	689	84	120	T, W	381×737×432
Super Nova	249	85	70	T, W	292×595×295
Super Saturn	174	84	50	T, W	250×455×250

SNELL ACOUSTICS					
Type A	£	dB/W, 1m	W	Finish	Size (mm)
1615	86	100	O	—	1200×600×340

SONY					
Model	£	dB/W, 1m	W	Finish	Size (mm)
SSG1 MkII	200	—	70	W	340×595×300
SSG3	280	—	60	W	345×615×340
SSG7	690	—	100	W	510×940×445
SSE20	48	91	25	W, T	255×480×215
SSE30	62	91	30	W, T	300×600×295
SSE50	104	91	45	W, T	270×570×280
SSE70	160	91	65	W, T	310×610×280

SOUND BARRIER					
Model	£	dB/W, 1m	W	Finish	Size (mm)
Concord II	49	—	50	B	200×120×120

Model	£	dB/W, 1m	W	Finish	Size (mm)
SPENDOR					
BCI	340	86	55	W, T, O	302×635×302
BCII	358	89	50	W, T, O	302×635×302
BCIII	622	88	70	W, T	394×800×394
SA1	216	82	40	W, T, O	216×304×225
SA3 passive	676	90	100	W, T, O	380×850×460
SA3 Ex (active)	1318	—	—	W, T, O	380×850×460

STUDIOCRAFT					
Model	£	dB/W, 1m	W	Finish	Size (mm)
110 MkII	95	87	60	W, B	246×391×187
220 MkII	119	87.5	80	W, B	271×451×191
330 MkII	165	89	100	W, B	358×602×236
RM200	385	85	60	T, W, B	318×66×305

SWALLOW					
Model	£	dB/W, 1m	W	Finish	Size (mm)
ALS1	580	91	100	T, W	—
CM35	162	82	50	T	197×318×203
CM70	184	83	60	T, W	241×362×235
CM100	209	85	60	T, W, B	305×572×267

TANDBERG					
Model	£	dB/W, 1m	W	Finish	Size (mm)
Fassett	125	88	25	B, Wt	280×250×220
TL25.20	176	90	40	B	530×300×220
TL35.20	249	90	50	R	590×360×260
TML3005	950	90	150	B, R	880×600×280

TANGENT					
Model	£	dB/W, 1m	W	Finish	Size (mm)
PS4	299	86	120	T, W, B	355×749×270
PS6	449	86	180	T to order	375×875×295
PS8	637	86	200	T to order	406×1003×381
RS2	179	85	80	T, W, B	255×370×285
RS4	269	85	100	T, W, B	305×630×315
SPL1	79	85	70	T, W, B	179×275×197
TM1	174	86	80	T, W, B	305×630×315
TM3	129	86	60	T, W, B	255×370×285
EXCELSIOR	89	88	80	B	273×508×248

TANDY					
Model	£	dB/W, 1m	W	Finish	Size (mm)
MC-600	50	—	40	W	225×342×133
MC-1200	60	—	50	W	270×450×191
MC-1401	80	—	55	W	300×451×90
MC-2001	90	—	60	W	330×572×210
MC-2200	90	—	70	B	207×430×205
Mach-one	280	—	100	W	448×721×305
Minimus 0.5	20	—	10	W	120×188×114
Minimus-3	20	—	10	W	216×254×140
Minimus-4	30	—	12	W	200×310×145
Minimus-5	40	—	20	W	230×310×160
Minimus-7	60	—	40	B, S	132×200×134
Minimus-8	30	—	10	W	120×250×140
Minimus-11	80	—	50	B, S	178×266×178
Minimus-21	80	—	80	B	150×258×145

VIDEOTONE SYSTEM

CASSETTE RECORDER

The SC-4200 is essentially a simple machine with some up-market trimmings such as light-touch controls with logic supervision for tape-transport functions. In its way it is as substantial as the partnering amplifier. The Koreans seem less inclined than some to economise in materials used in their products! Particular features are the separate output-level control, twin microphone inputs, Dolby noise-reduction and nicely damped cassette loading and eject. Head accessibility was fairly good.

Simple one-knob tape selection (including metal), an LED bar display for recording level and 'memory' control are among the facilities. Mechanical noise from the sample was on the high side, though speed stability was acceptable. With the control arrangements it was not as easy as might be desired to record to the unit's apparent potential in respect of dynamic range; but a lot is offered in relation to the price-bracket and the machine is well gauged to appeal to amateur users.

LOUDSPEAKERS

Videotone's GBS free-standing loudspeakers (43 litres volume) are larger and more specialised than most speakers offered with complete systems. The enclosure, which can be stand-mounted and was in fact tested on 15cm spacers, is of the vented type with an internal duct and houses three drive units together with midrange and treble controls. Line-up is a 25cm bass unit with roll surround, a dome midrange unit and a dome tweeter with duralumin diaphragm.

Nominal power rating is 80W and impedance 8 ohms, while sensitivity is well up the medium range. The GBS was found to be a fairly explicit reproducer and its attack and presentation of details were not in dispute, while stereo imaging

was better than average in the context of systems latterly tested. On the other hand the impression of depth in stereo was not particularly striking, so that the reproduction tended to favour highly 'produced' popular material.

Bass was reasonably well defined. Midrange transparency was not a strong feature and there was a slightly dull character, while the extended high treble had a hint of 'tizzly' quality about it. This became most apparent with awkward disc programmes using the Coral cartridge.

VERDICT

A system with a difference, then, quite unlike most of the assemblies in the Digest. Summing-up is peculiarly difficult where such a high proportion of the cost is devoted to the loudspeakers, though in principle there is nothing wrong with such an arrangement. Indeed, some of the other suppliers could take a leaf or two out of the Videotone book.

Value is quite good and much will depend on the buyer's view of the recommended speakers on which the supplier places such emphasis. In this regard the verdict is marginal, and it may be uprated by anyone who specially favours the combination offered.

Technically the assembly is ingenious, leading to more than a sneaking regard for the Videotone approach. But again it is a marginal conclusion in that mild doubts arise about pickup and speaker compatibility.

YAMAHA RACK SYSTEM

This is a mid-priced example from several possible combinations of units, all with the distinctive Yamaha control layout and metallic semi-technical design. Some models are available with a black finish. The test system, centred on a receiver, was supplied without loudspeakers but the price includes a robust rack housing of unobtrusive design. Power rating suggests suitability for the smaller room.

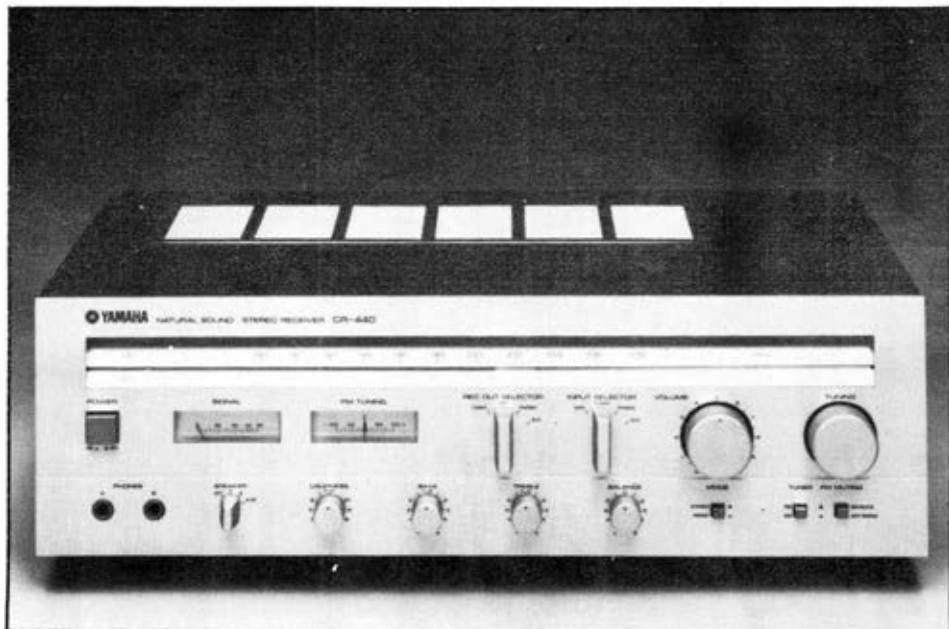
RECEIVER

Although bulky in relation to its capabilities, the CR-440 is a nicely made and finished unit with the customary Yamaha air of good breeding. Power rating is 33 watts per channel into 8 ohms referred to 0.02 per cent THD, while the single phono input at 2.5mV has the acceptable overload threshold of 142mV.

Radio coverage is FM plus medium wave, with manual tuning offering a useful flywheel action along a clearly presented scale. FM muting and the meters for signal-strength and tuning were liked, although tuning needed special care with an ear to accurate centring. Basic FM sensitivity was $2\mu\text{V}$, with $40\mu\text{V}$ needed for 50dB S/N on stereo. AM reception is aided by a loop aerial but the results were not particularly lively and a long-wire aerial would be advisable.

Controls include the usual bass and treble, without benefit of a defeat switch, simple provision for tape-machine connection, switching for two pairs of speakers, and a somewhat pointless variable loudness control. FM input is via a coaxial socket for 75ohm connection as well as terminals for twin feeder.

FM reception was considered to be outstanding in relation to the receiver's modest cost, and the audio rendered a brightish sound indicative of a response uptilt from bass to treble. Audio with pick-up input supported the impression and confirmed well-controlled distortion as judged with the test speakers, though the quality at very high levels was a bit glassy.



TURNTABLE

Matching turntable P-350 is a belt-driven unit mounted in a nicely finished plinth of plastics and compound, and equipped with a clear hinged dust cover of good quality. This two-speed model is of the semi-auto variety with pickup return and a reject button. A simple servo system is incorporated.

The 0.7kg cast platter, deeper at the rim than usual, carries a mat of sensible design, substantially flat with a label recess. However, for some unfathomable reason there was a central raised blip which has to be cut off before the disc can sit down properly. Start-up time to 33 was about 1 sec.

A rigid plug-in headshell, offset and with a union of the ADC pattern, clamps precisely to the straight arm (and a spare shell is supplied). The cartridge, though not immediately recognisable, appears to stem from Audio-Technica. It is a medium-compliance type, a reasonable choice for the arm, which is in the medium range of mass (12g effective).

Tracking its best at 1.8g, the cartridge lacked elegance on highly scored material, and its keen sound, with some hardness, suggested that some users might well look for an early upgrade, choosing an equally compatible but more refined type. Bias correction was acceptable and all turntable functions worked well.

Speed drift reached a rather high 0.3 per cent during tests but S/N caused no qualms and rumble was not a problem. Torque was far from generous, while acoustic breakthrough and shock results were only fair. Probably a mixture of dynamic behaviour and pickup characteristics accounted for the less than ideal stereo imaging and detail noted in the reproduction. But still the results overall were preferred to those from some of the ill-chosen, inexpensive players advocated for packaged systems.



BUYER'S GUIDE TO LOUDSPEAKERS

Model	£	dB/W, 1m	W	Finish	Size (mm)
Optimus-10	200	90	75	W	330×635×270
Optimus-11	120	90	50	W	311×559×260
Optimus-23	140	91.5	75	W	123×565×298
Optimus-25	160	—	75	W	356×635×292
Optimus-T70	160	90	75	W	260×749×260
Optimus-i 100	180	90	75	W	330×902×311
Optimus-T200	260	90	150	W	318×876×318
Optimus-X100	200	—	100	W	380×585×250
Wall Baffle	18	—	10	W	216×254×140

TANNOY

T115 Cambridge	129	91	120	W	302×496×250
T125 Oxford	154	93	150	W	330×560×270
T145 Ascot	305	93	175	W	340×485×248
T165 Chester	305	93	175	W	350×524×268
T185 Dorset	356	93	175	W	370×670×288
T225 Mayfair	407	93	175	W	370×714×290
Arden Mk2	695	95	250	W, T	660×990×370
Berkeley Mk2	542	95	250	W, T	536×846×308
Buckingham	2450	96	500	W	600×1175×454
	2700	—	—	R	—
Cheviot Mk2	543	93	200	W	466×846×260
Windsor	1605	94	300	W	580×875×400
	1800	—	—	R	—

TECHNICS

SB7	360	—	130	W	360×630×318
SB10	599	—	150	R	402×711×318
SBF1	90	—	60	S, B	118×210×126
SBF2	110	—	75	S, B	138×254×157
SBF3	160	—	90	S, B	179×321×191
SBR4	220	—	130	W	296×556×308

TENSAI

TS1000	220	95	100	W	445×690×316
TS9040	70	90	40	W	320×540×237
TS9055	90	91	55	W	320×560×287
TS9075	130	92	75	W	370×620×317
TS9130	35	90	30	W	265×400×186
TS9135	55	90	35	W	270×500×181
TS9155	75	94	55	W	288×560×252
TS9170	105	90	70	W	320×615×251
TS1000	180	90	100	B	370×620×357

TOSHIBA

SS40GB	90	86	40	W	284×500×218
SS45GB	113	88	45	W	286×536×287
SS50GB	149	87	50	W	286×536×287
SS100GB	195	86	100	W	284×500×218
SS115	69	—	25	W	285×500×235
SS225	78	87	35	W	283×500×218
SS235	69	—	35	W	283×500×218
SS250GB	50	—	25	W	257×460×200

Model	£	dB/W, 1m	W	Finish	Size (mm)
TRIO					
LS 800	180	91	90	W	300×590×311
LS 1000	250	89	90	W	300×590×311
LS 1200	345	90	100	W	350×650×327
LS 1600	685	92	120	W	390×710×323
LS 1900	1600	92	170	W	560×1055×450
LSK 200B	73	90	40	W	302×455×223
LSK 400B	125	89	80	W	356×611×280
S3	105	88	60	S	215×360×205
S5	148	88	80	S	230×410×216

VIDEOTONE

D93	40	—	25	B, Rn	100×280×210
D100	38	—	25	T	170×279×197
D132 Minimax	44	—	40	T	152×254×229
GB2	60	—	80	T	—
GB3	50	—	40	T, W	254×483×279
GB5	207	89	80	T	315×620×305

VISONIK

SUB1	125	—	150	N	—
SUB2	150	—	120	N	495×365×310
David 40K	65	—	40	B	109×172×100
David 4000	86	—	40	N	109×172×100
David 6000	110	—	60	N	495×365×310
David 7000	120	—	70	N	161×250×170
David 9000	160	—	90	N	235×365×248

WHARFEDALE

E20	170	95	65	W	305×365×240
E30	210	94	75	W	335×580×261
E50	325	95	100	W	342×665×342
E70	395	95	150	W	342×815×360
E90	565	95	200	W	380×1130×420
LASER 40	70	88	65	T, W, B	246×355×242
LASER 60	85	88	75	T, W, B	264×412×243
LASER 80	105	88	80	T, W, B	264×476×244
LASER 100	135	88	105	T, W, B	305×565×246
LASER 200	180	87	65	W	305×565×275
LASER 400	225	89	120	W	342×665×348
TSR108	245	90	80	W	309×577×285
TSR110	300	90	140	W	332×695×335
TSR112	575	90	190	W	380×1087×394

YAMAHA

NS044	79	—	60	W, B	216×371×180
NS100M	229	—	100	B	216×371×180
NS590	299	91	100	O	370×665×315.5
NS1000	799	90	100+	E	395×710×369
NS1000M	549	90	100+	B	375×675×326

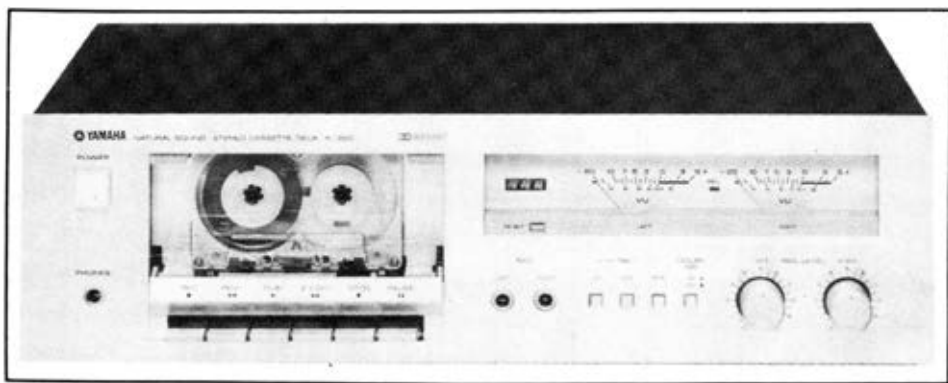
YAMAHA RACK SYSTEM

CASSETTE RECORDER

Model K-350 is a 'direct loader', another of those with an exposed cassette holder but equipped with a flip-up cover to guard the heads and mechanism. It employs a single motor with servo control, Sendust record/replay head and ferrite erase head. Dolby noise-reduction is included, and simple push-button tape selection covers metal-particle as well as chrome and low-noise standard.

The record level meters would hardly suit the very critical enthusiast, and no supplementary

peak-indicating aids are provided, but generally the low-noise performance with commendably low distortion was well gauged for the amateur's occasional use. Speed stability was good. Mechanical press-key operation was good of its kind despite the longish throw in action. Head accessibility was good, as expected in a direct-loader. A high-value machine.



VERDICT

Any factors which could conspire against a top grading are of a minor kind, and so the benefit of the doubt — slight that it is — goes to this manufacturer. The result of Yamaha's planning is a brightish low-distortion sound, as confirmed by trials with Krystal and Mission test speakers. So try it and decide. The critical view is that the package is an honest one, representing very good value.

SYSTEMS ROUND-UP

	AMPLIFIER		TUNER			TURNTABLE			CASSETTE			Sound quality
	Output (W)	Distortion	Stereo sens.	S/N	Distortion	S/N	Speed stability	pu matching	Distortion	S/N	Wow & flutter	
AIWA	50.0	●	●	●	●●	—	—	—	●	●	●●	●
AKAI Pro-501	23.0	●	●	●	●●	○	●	○	●	●	●	○
AKAI Pro-504	50.0	●●	●	●	●●	●	●	○	●	●	●	●
B&O	31.0	●	●●	●●	●	●	●	●	—	—	—	●
DENON	60.5	●●	●	●●	●●	●	●●	—	●●	●	●	●●
DUAL	60.0	●	●	●	●	●	●	●●	●	●	●	●

PERFORMANCE RATINGS

Simple ratings show the status of each system based on an average for equipment submitted for Digest reports. Symbols for ratings are:

- An average result
- An above-average result
- A below-average result

Output is the maximum continuous power per channel related to the load specified by the manufacturer. This load is usually a nominal 8 ohms but is a lower figure in a few instances. If the system is based on a receiver, the amplifier and tuner ratings are listed as if for separate units.

Turntable speed stability relates to performance under dynamic conditions. In this context a turntable is an integrated unit which includes a pickup arm. Matching refers to the suitability of the pickup for the system. Other aspects, such as compatibility of arms and cartridges, are dealt with in individual reports. There is no rating if a cartridge was not supplied.

Loudspeaker quality is highly influential in the evaluation of a system, so that inadequate speakers may lead to a low rating for reasons given in the reports. It is sometimes the case that a system's potential is much greater than the speaker quality would suggest. So overall sound quality refers to results with the speakers supplied. If none were submitted, the rating refers to trials with alternative speakers as explained earlier.

	AMPLIFIER		TUNER			TURNTABLE				CASSETTE			Sound quality
	Output (W)	Distortion	Stereo sens	S/N	Distortion	S/N	Speed stability	pu matching	Distortion	S/N	Wow & flutter		
DYNATRON	42.0	●	○	●	●	●	○	●	●	●	●	●	
FERGUSON	28.0	●	●	●	●	●	○	●	●	●	○	○	
FIDELITY	35.0	●	○	●	●	●	○	○	●	●	●●	○	
FISHER	60.5	●	●	●	●	●	●	●	●	●	●●	●	
GEC	20.0	●	○	○	●	●	○	●	●	●	○	○	
GRUNDIG	51.0	●	●	●	●	●	○	○	●	●	○	○	
HITACHI	51.0	●	●	●●	●●	●	●	○	●	●	●	●	
JVC GX100	31.5	●●	●	●	●●	●	●	○	●	●	●	●	
JVC GX400	63.5	●●	●●	●	●	●	●	—	●	●	●●	●	
MARANTZ	25.5	●	○	●	●	●	●	○	●	●	●	●	
MITSUBISHI	50.5	●	●	●	●	●●	●	●	●	●	●	●●	
ONKYO	33.0	●	●	●	●	●	●	○	●	●	●	●	
OPTONICA	33.5	●	●	●	●	●	●	○	●	●	●●	●	
PHILIPS	50.0	○	○	●	●	●	●	○	●	●	●	○	
PIONEER X300	22.0	●	○	●	●	○	●	○	●	●	●	●	
PIONEER X900	68.0	●●	●	●	●●	●	●	○	●	●	●	●	
ROTEL A550	48.0	●	●	●	●	●	●	●	●	●	●●	●●	
ROTEL 80	28.0	●	●	●	●	●	●	●	●	●	●	●	
SANSUI 900	61.0	●	●●	●	●	●	●	—	—	—	—	●	
SANSUI S.C.	46.0	●	●	●	●	●	●	—	●	●	●	○	
SANYO	30.0	●	●	●	●	●	●	○	●	●	●	●	
SHARP	32.5	●	●	●	●	●	●	○	●	●	○	○	
SONY ZR-300	32.0	●	●	●	●	●	●	○	●	●	●	●	
SONY I	41.0	●	●	●	●	●	●	○	●	●	●	●	
TECHNICS 80's	42.0	●	●	●	●	●	●●	●	●	●	●●	●	
TECHNICS M.S.	46.0	●	●	●	●●	●	●●	●●	●	●	●	●●	
TELETON	22.0	○	○	○	●	●	●	○	○	●	●	○	
TOSHIBA SK-01	25.0	●	○	●	○	—	—	—	●	●	●	●	
TOSHIBA 115	25.5	●	○	●	●	●	●	○	○	●	●	○	
TR10 V1000R	44.0	●	●	●●	●	●	●	●	●	●	●	●●	
TRIO V710	29.5	●	●	●	●	●	●	●	●	●	●	●	
UHER	80.0	●	●	●	●	—	—	—	●	●●	●●	●	
VIDEOTONE	60.0	●	○	●	●	●	●	●	●	●	●	●	
YAMAHA	33.5	●	●	●	●	●	○	●	●	●	●	●	

ADDRESSES

- Aiwa (UK) Ltd, 30-32 Concord Road, Westwood Park Trading Estate, Western Avenue, London W3. (Tel: 01-993 1672).
- Akai (UK) Ltd, 12 Silver Jubilee Way, Haslemere Heathrow Estate, Hounslow, Middlesex (Tel: 01-897 7171).
- Bang & Olufsen UK Ltd, Eastbrook Road, Gloucester (Tel: 0452-21591).
- Denon, Eumig (UK) Ltd, 14 Priestley Way, London NW2 7TN (Tel: 01-450 8070).
- Dual, Hayden Laboratories Ltd, Churchfield Road, Chalfont St. Peter, Bucks. SL9 9EW (Tel: 02813 88447).
- Dynatron Radio Ltd, Ditton Walk, Cambridge (Tel: 02205-2781).
- Ferguson, Thorn Consumer Electronics Ltd, 284 Southbury Road, Enfield, Middlesex (Tel: 01-363 5353).
- Fidelity Radio Ltd, Victoria Road, London NW10 6ND (Tel: 01-965 8771).
- Fisher, Sanyo House, 8 Greycaine Road, Watford WD2 4UQ.
- GEC (Radio & Television) Ltd, Langley Park, Slough, Berks. SL3 6DP (Tel: Slough 22201).
- Grundig International Ltd, 40-42 Newlands Park, Sydenham, London SE26 (Tel: 01-659 2468).
- Hitachi Sales (UK) Ltd, Station Road, Hayes, Middlesex. (Tel: 01-848 8787).
- JVC (UK) Ltd, Eldonwall Trading Estate, 6-8 Priestley Way, London NW2 (Tel: 01-450 2621).
- Marantz Audio UK, 193 London Road, Staines, Middlesex (Tel: Staines 50132).
- Mitsubishi Electric (UK) Ltd, Otterspool Way, Watford, Herts. (Tel: Watford 40566).
- Onkyo, Audiotrend Ltd, 33 Bridle Path, Watford, Herts. (Tel: 0923 33010).
- Optonica, Sharp Electronics (UK) Ltd, Sharp House, Thorp Road, Manchester M10 9BE. (Tel: 061 205 2333).
- Pioneer High Fidelity (GB) Ltd, The Ridgeway, Iver, Bucks. (Tel: 0753 652222).
- Rotel Hi-Fi Ltd, 2-4 Erica Road, Stacey Bushes, Milton Keynes, Bucks. (Tel: 0908 317707).
- Sansui UK, Unit 10A, Lyon Industrial Estate, Rockware Avenue, Greenford, Middlesex (Tel: 01-575 1133).
- Sanyo Marubeni (UK) Ltd, Sanyo House, 8 Greycaine Road, Watford WD2 4UQ. (Tel: Watford 46363).
- Sharp Electronics (UK) Ltd, Thorp Road, Manchester M10 9BE. (Tel: 061 205 2333).
- Sony (UK) Ltd, Sunbury Cross, Sunbury-on-Thames, Middlesex (Tel: Sunbury-on-Thames 87644).
- Technics, National Panasonic UK Ltd, 308-318 Bath Road, Slough, Berks. (Tel: Slough 27516).
- Teleton Electro (UK) Co. Ltd, Somerton Works, Prince Avenue, Westcliff on Sea, Essex (Tel: 0702 337681).
- Toshiba (UK) Ltd, Frimley Road, Frimley, Camberley, Surrey GU16 5JJ (Tel: 0276 62222).
- Trio, B. H. Morris & Co (Radio) Ltd, Heather Park Drive, Wembley, Middlesex (Tel: 01-902 9422).
- Uher Sales & Services Ltd, 24 Market Place, Falloden Way, London NW11. (Tel: 01-455 1771).
- Videotone Ltd, 98 Crofton Park Road, London SE4 (Tel: 01-690 1914).
- Yamaha, Natural Sound Systems, 10 Byron Road, Wealdstone, Harrow, Middlesex HA3 7TL. (Tel: 01-863 8622).

FOLD THREE

Postage
will be
paid by
licensee

Do not affix Postage Stamps if posted in
Gt. Britain, Channel Islands or N. Ireland

BUSINESS REPLY SERVICE
Licence No. WC 3697

**HI FI FOR PLEASURE
40 LONG ACRE
LONDON WC2E 9BR.**

2

FOLD TWO

CUT HERE

TUCK IN THIS END

FOLD ONE

FREE READER ENQUIRY SERVICE

For further details about any of the products advertised in this issue of HI FI FOR PLEASURE SYSTEM'S DIGEST (see advertisers index), or of products mentioned in the editorial columns, fill in coupon, tear out page and fold as indicated. NO POSTAGE REQUIRED. Your enquiry will be forwarded to the advertiser immediately upon receipt. Use as many coupons as you like. This service is not available for advertisers requesting money for brochures, etc.

● PLEASE ENSURE THAT ON EACH ENQUIRY YOU PRINT IN BLOCK CAPITALS YOUR NAME AND ADDRESS IN FULL

NAME	Page No. Product	NAME	Page No. Product
ADDRESS	Information Request	ADDRESS	Information Request
.....		
HFD 1		HFD 1	
NAME	Page No. Product	NAME	Page No. Product
ADDRESS	Information Request	ADDRESS	Information Request
.....		
HFD 1		HFD 1	
NAME	Page No. Product	NAME	Page No. Product
ADDRESS	Information Request	ADDRESS	Information Request
.....		
HFD 1		HFD 1	

When it comes to hi-fi we cover everything!

hi-fi
for pleasure

NOISE REDUCTION
UNITS:
worth shelling out for?
Also on test:
turntables, loudspeakers,
Lux system



hi-fi
for pleasure

OPTONICA IN CLOSE-UP



CANINE MUSIC—PHONES IN FOCUS
INDOOR ANIMALS—BIC GO OFF-BEAM
CORD 347—BRITAIN'S SQUARE DEAL

hi-fi
for pleasure

VIDEO
RECORDERS
PHILIPS &
PANASONIC

HEAVENS
NEW RACE
SYSTEM
ON TEST

CUT
OFF
CASH

AUDIO
CONNECTOR
THE MATING GAME



hi-fi
for pleasure



hi-fi
for pleasure


HiFi for Pleasure
On sale every
month only 60p

hi-fi
for pleasure

*AVC system tops the list
Don't do it the old
Plus your golden
50 more products on test
Sound circuits
Music of Autumnal hi-fi*

DON'T BODGE IT!

Sub-Passive stereo-DT speaker—design made



hi-fi
for pleasure

HARROGATE
SHOW GUIDE

SPEAKERS:
BRITANNIA RULES
SYSTEM: IS AKAI OK?

WIN
1000000
1000000



hi-fi
for pleasure

TRIO—ALL SYSTEMS GO
TAPE INDEXING
PIONEER PHOO ON TEST
GRAPHIC EQUALISERS—
NEW FRICTS

CUT
OFF
CASH

1000 CASHES



hi-fi
for pleasure

Turntable/arm relations
Triple speaker test
Digital pressing problems
Acoustic holograms
Amplifier protection

CASSETTES COME OF AGE:
11 decks—which take the cake?





ADVERTISERS INDEX

Absolute Sound & Video 210	Fisher Hi-Fi 72	Rotel Hi-Fi 38
Aerco 126	Hampshire Audio 75	Rush Hi-Fi 12
Aiwa 110	Hi-Fi Connections 96	Sansui 35
Akai 36,37	Hi-Fi Markets 73	Sanyo Hi-Fi 2
AKG 122	Hitachi 107	Sevenoaks Hi-Fi 34
Audio Technica 88	Homesound Music Centre 54	Simply Hi-Fi 130
Bang & Olufsen 211	Jeffries Hi-Fi 134	Tannoy Products 146
Beyer Dynamics 66	JVC 108,109	Technics 212
Billy Vee Sound Systems 147	Krystal Electronics 14	Trio (B.H. Morris) 74
W.A. Brady 22	Onkyo (Audiotrend) 143	Wharfedale (Rank Hi-Fi) 4,5
Cavandish Sales 32		Yeovil Audio 78
Celestion International 42		

absolute

OXFORD: 19, Old High Street, Headington. Tel: Oxford (0865) 65961
SWINDON: 60, Fleet Street, Swindon, Wilts. Tel: Swindon (0793) 38222

sound & video

REAL HI FI in OXFORD & SWINDON

We don't just stock
**Dual, Marantz, Teac,
 Hitachi, Pioneer, Technics,
 JVC, Optonica, Yamaha.**
 We stock the best of
 British Hi Fi as well.
 Come and check out for
 yourself if the Japanese
 can really do better.



TOP TAPE FULL 2 YEAR GUARANTEE



Complete Hi-Fi system; full remote control, random track selection, direct drive turntable. Mos Fet RF amplifier section. Phase lock loop MPX quadrature detection FM/AM tuner section. Power output 30 watts per channel into 8ohms at 0.03%THD. Two motor direct drive Dolby cassette deck with soft touch controls and metal tape facility. Unique carbon metal cone 2-way speaker system. Matching cabinet, speakers and speaker stands complete the system. Phew!

SEE SANYO, THEN DECIDE

SANYO MUSIC SYSTEMS FROM AROUND £179.95 (INC. SPEAKERS) TO AROUND £1294.90 (EXC. SPEAKERS). MODEL SHOWN HI-FI SYSTEM AROUND £399.95 INCLUDING CABINET, SPEAKERS AND SPEAKER STANDS. FOR A FULL DEMONSTRATION CONTACT YOUR NEAREST SANYO DEALER.

SANYO
 Technology at your fingertips

After you've built a direct-drive turntable to broadcast standard (and such is our SL-1000 Mk II), what do you do for an encore?

If you're Technics, you start thinking smaller than anyone's thought before.

So enter the Technics SL-10, a direct-drive turntable just 7.5mm wider than an LP.

To make a turntable this small, you have to forget about conventional notions of design.

Instead, the SL-10 is made to a "high-rise" design with the tonearm and a microprocessor built into the lid.

The microprocessor automatically selects the proper speed and sets the stylus down in the lead-in groove.

After which, the linear-tracking arm

carries the stylus across the record at precisely the angle record grooves are cut.

You can also forget conventional notions of how a turntable should play.

Thanks to its built-in record clamp, the SL-10 can play at any angle you like.

Upright, sideways or upside down.

You see, we didn't just stop at making it the world's smallest direct-drive turntable.

But then what do you expect from the people who make the best?

Technics

300-318 Bath Road, Slough, Berks SL1 6JB. Tel: Slough 34522.



**How the world's smallest direct-drive
turntable measures up to the best.**