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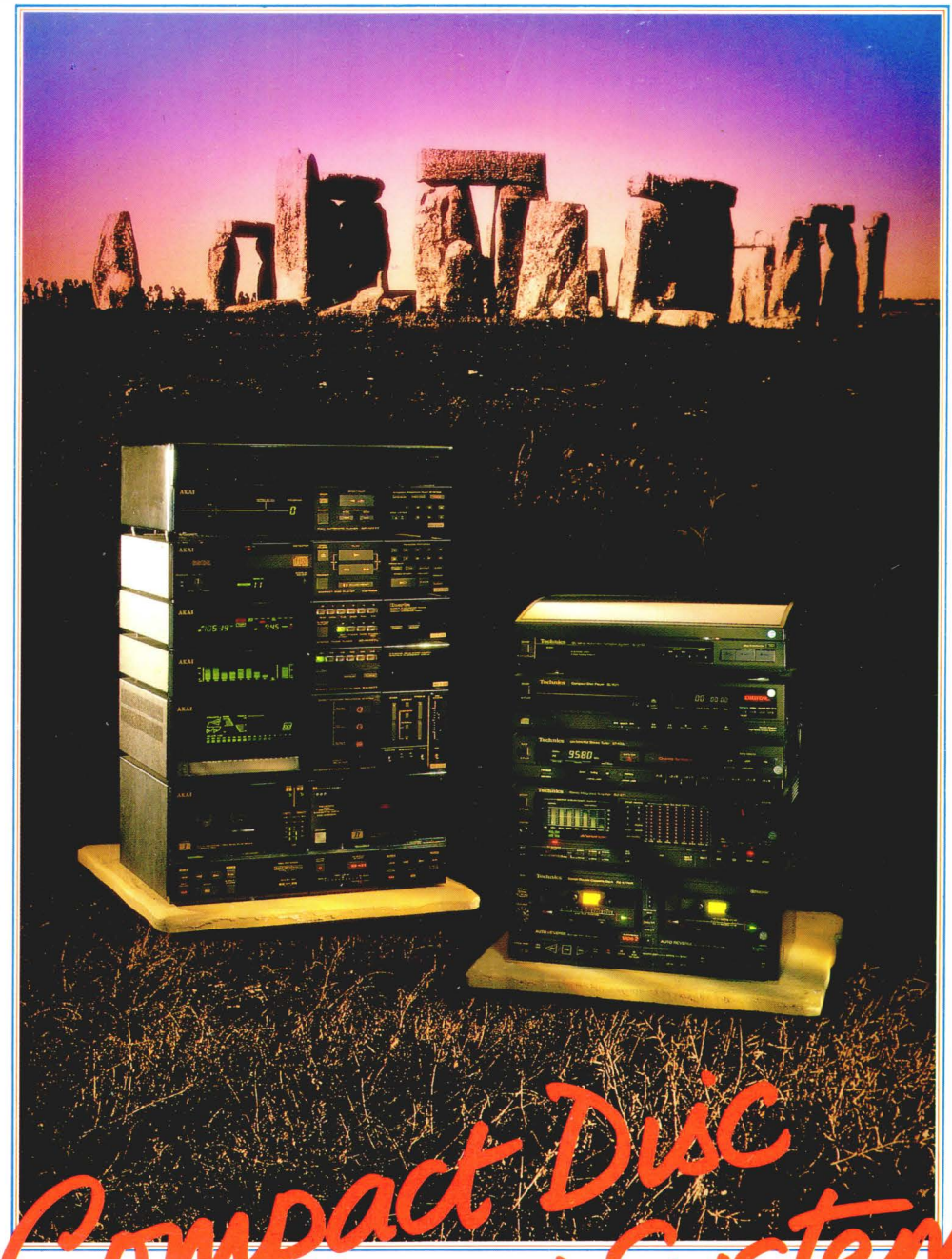
COMPACT DISC BASED MIDI SYSTEMS



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Taken from What Hi Fi Feb 1986
Jimmy Hughes

Dual CS505-2 deluxe *typically* £145

The Dual CS505-2 is very probably the best-sounding and most *complete* turntable package in its price range.

Our review sample was the deluxe version, (the conventional version retails for around £119) this version substitutes a heavy simulated rosewood finished medite plinth for the usual grey plastic type. The result is smarter appearance and better sound quality.

Not only is the 505 an excellent-sounding turntable, it is also consistent from batch to batch and very reliable over long periods of use. It is semi-automatic in operation and will lift (though not return) the cartridge at side-ends. Cueing the tonearm to play a disc is manual, but the damped lift/lower mechanism ensures that the stylus is lowered as gently as possible.

Furthermore, the arrangement of the deck's internal mechanisms is such that the lift/lower device is always set to 'up' as soon as mains power is cut off or the arm is returned to its rest position. A clever speed change lever ensures that the deck keeps to its selected speed as soon as the platter is stationary. This avoids belt damage (and possible subsequent replacement) that might otherwise occur.

Dual CS-505-2 Deluxe: *Excellent sounding, consistent and reliable*

Playing weight is easy to set and tracking force is optimised via a spring-loaded dial which helps ensure constant tracking pressure despite warped discs.

Speeds can be varied from their absolute settings and, to aid accuracy, the edge of the platter is cut with stroboscopic markings. You'd need to view these markings under mains-powered artificial light to gauge the deviation from true of the platter speed satisfactorily.

Our review CS505-2 was supplied with a ULM (ultra low mass) Ortofon cartridge. By the standards of really top-class magnetics this gave a rather colourless sort of sound. However, I found I tended to notice this most when making direct comparisons. Listened to in isolation, the supplied Ortofon sounded extremely acceptable. With it the CS505-2 deluxe sounded clean and open, with a nicely relaxed and detailed sort of musical presentation. Surface noice proved low while treble was quite sharp and extended. With a better cartridge, I know this turntable to be capable of even better sound. At times, the review sample exhibited just a slight lack of sparkle and brilliance.

All the same, the results with the supplied Ortofon were very acceptable indeed. The only 'sins' were sins of omission — if that makes sense. At its reasonable price the Dual CS505-2 is excellent value for money and, on the strength of this showing, it more than justified its reputation for good performance. Highly recommended.

☑	*Good sound; good value*
☒	*No serious complaints I can think of*
Construction	■■■■□
Ease of use	■■■■□
Sound quality	■■■■□
Value for money	■■■■□

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HI-FI CHOICE

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Hi-Fi Choice normally concentrates on the specialist hi-fi market, where sound quality is all and the sky forms the price limit. But 'real hi-fi' is not for everyone — it makes demands many are not prepared to tolerate, like manual operation, sensitivity to setup, and suchlike. Those who place appearance, convenience and compactness at the top of their list are likely to be attracted by the latest generation of packaged systems, the CD-equipped Midi System.

Midi systems are a comparatively new development, in every sense the latest variation in the music centre/rack system tradition. Furthermore, the recent arrival of compact disc has provided an excellent excuse to replace existing systems, and these attractive, compact packages are very much the fashion flavour of the year.

Accepting that the complete system package is the starting point, our task has been to pose the following question: Which of the many systems available offer a well-balanced package of appearance, ergonomics, construction and sound quality, capable of doing some justice to each of the music sources, and the CD medium in particular? We tested 35 complete systems — an Herculean task considering most had CD and record players, tuner, amplifier, double cassette deck and loudspeakers — some 200 components or combinations in all. Yet even that seems regrettably inadequate when there are probably a hundred or more on the market in all.

We had quite deliberately avoided reference to hi-fi separates as much as possible, because such criteria are largely irrelevant in a midi system context. However, we had a pair of B&W *DM110* loudspeakers on hand for those systems supplied without or with optional speakers. And with hindsight this was just as well: many of the system loudspeakers were so poor that they effectively 'strangled' the performance of the system as a whole, so substitution at least provided something of a rescue for the rest of the electronics in some cases.

Frankly the strong trend towards included speakers is something to be deplored, and one must applaud the stand taken by Laskys, whose buying muscle enables them to insist on stocking and selling systems with a choice of low cost specialist loudspeakers. So there is clearly a case for the buyer attempting to come to an arrangement with his dealer in this respect, and to provide some guidance we have reprinted a selection of appropriate alternatives from our specialist *Loudspeaker* issue (reviewed by *Martin Colloms*), plus a handful of cartridges and turntables.

The key factor in systems design is that of balance — the art of not spending too much money on one component at the expense of the overall capabilities of the system. And out of thirty-five complete systems tested, only a small handful managed to achieve anything close to this. The success rate was so low, one must assume that most of the other 70 or so CD Midi Systems on the market are similarly flawed.

But if the generalisations are regrettably negative, the specific systems which do achieve a reasonable balance certainly provide a lot of features for the money, and their ranks would have been substantially swollen but for the inadequacies of the supplied loudspeakers.

Compact Disc & Midi Systems

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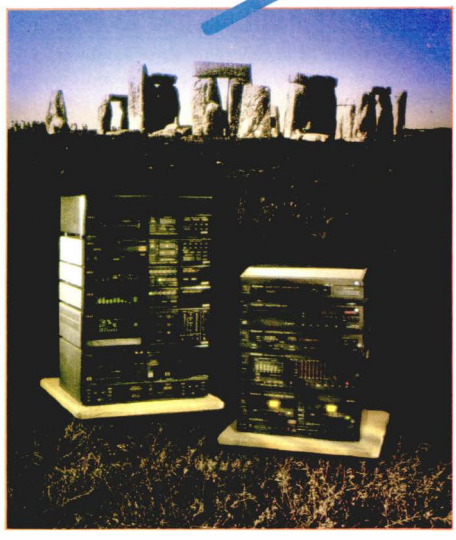

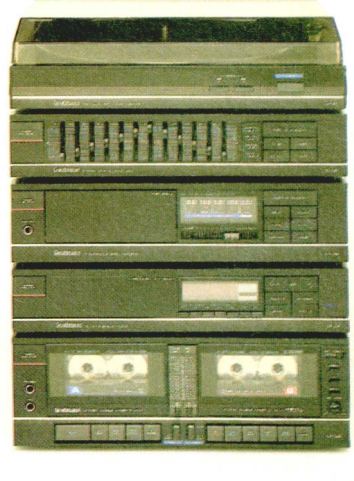

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OCTOBER

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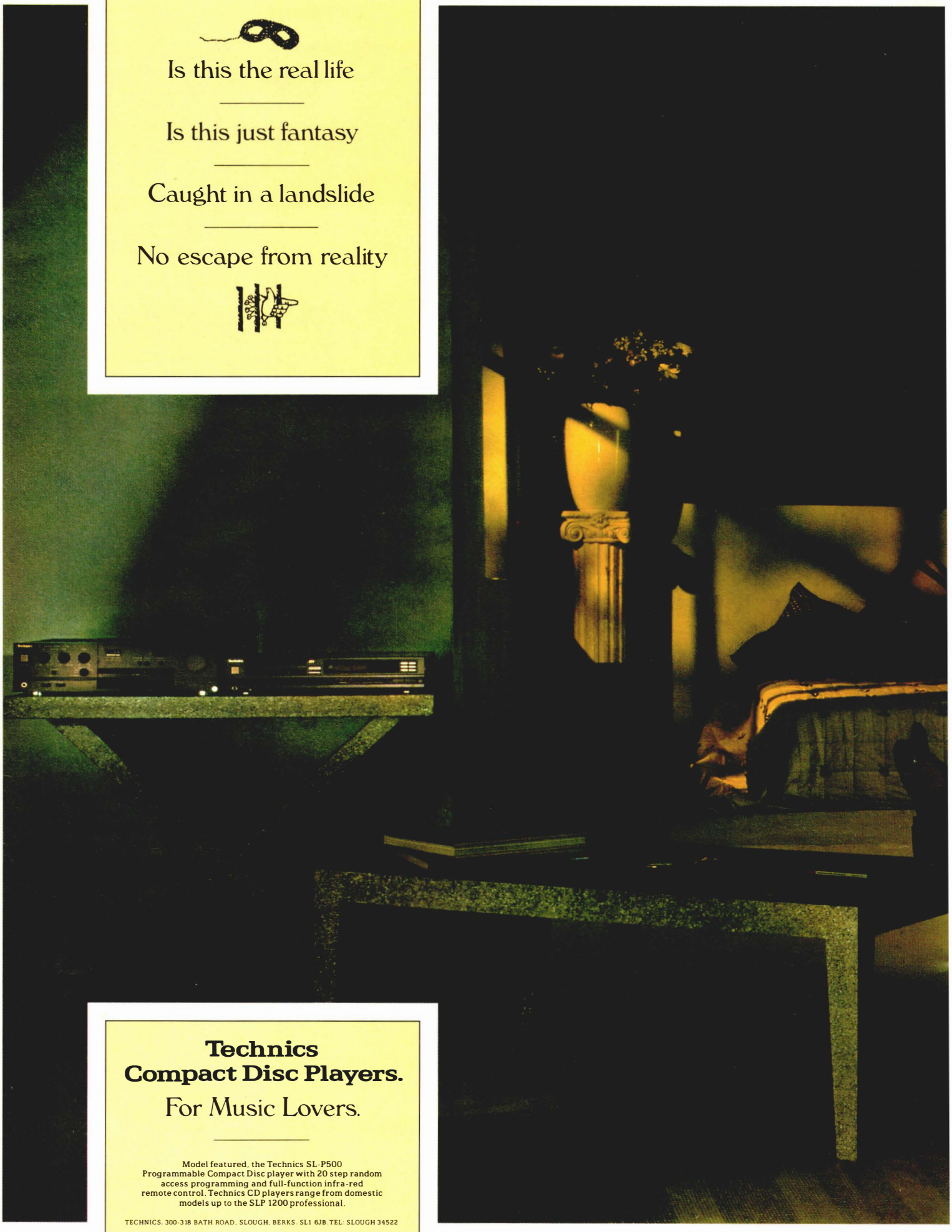

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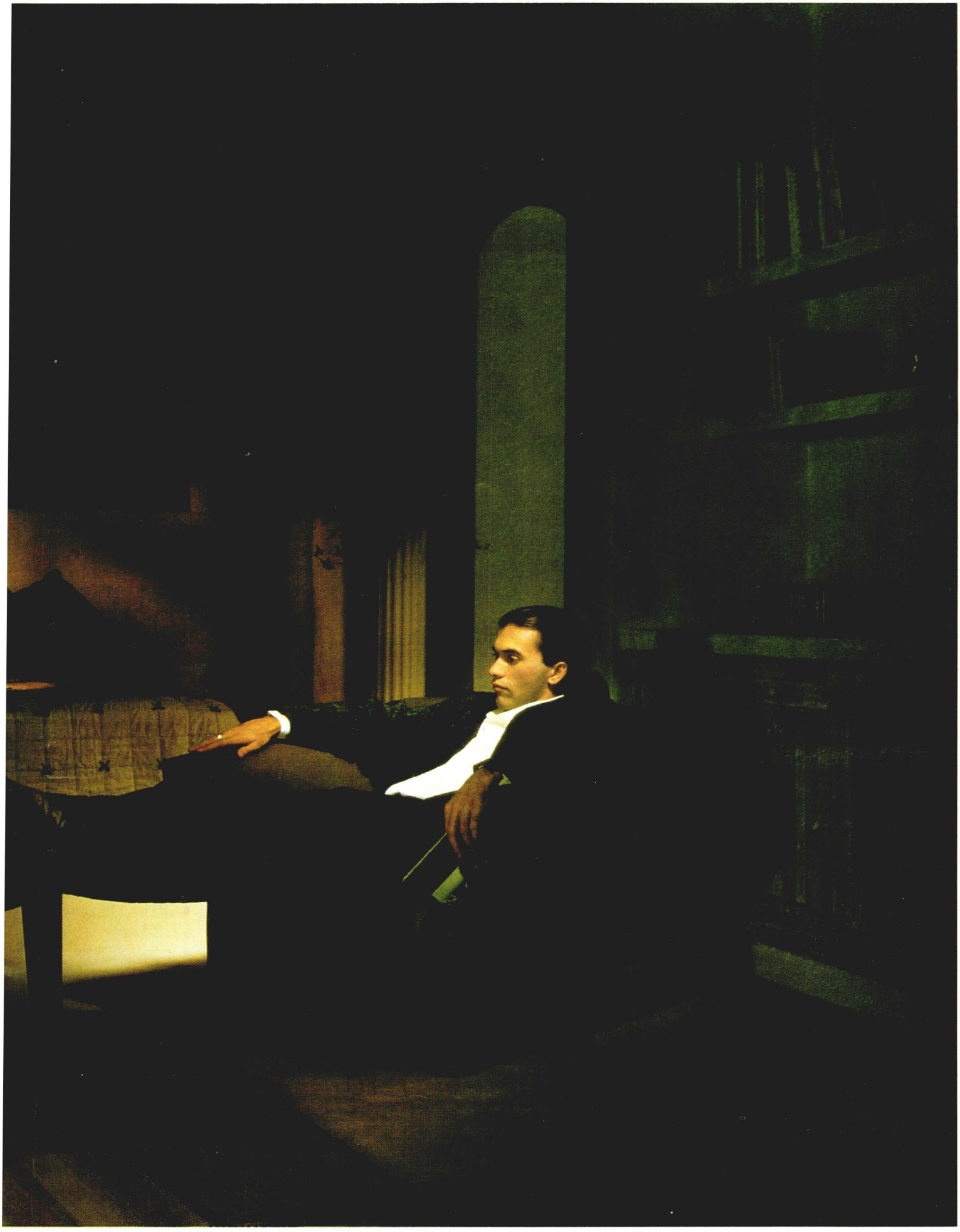


Complete stereo systems offer the promise of a genuinely hi-fi standard of sound reproduction, in a convenient and domestically acceptable package. While the shape, size and performance varies widely, the basics are similar. Here we look at the 'building blocks' of hi-fi.

Music is easily recorded and reproduced using our century's technology, yet is also easily corrupted in the reproduction. Our memories for sounds are good in many ways, yet extremely feeble in others, and in the absence of the 'real thing' we may be quite able to accept a poorly-contrived fake.

By itself this hardly seems important. If we're that easily fooled by the faking process — if we can 'hear through' failings in the reproduction process to the music beneath — why do we need to worry about the quality of the reproduction?

First although we may not find it easy to pick out the specific faults with reproduced sound, the fact remains that poor sound soon becomes tiring and unrewarding to listen to. Secondly, poor sound usually means *incomplete* sound. If musical information is missing, we're simply not hearing all the music, and again the act of listening becomes tiring and unrewarding.

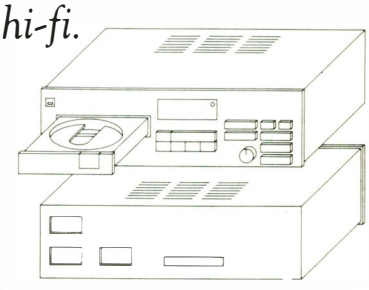
It is for these reasons and these reasons alone, that pursuing audio excellence is a worthwhile exercise. For countless thousands of people, a 'hi-fi' midi or rack system has become merely an ornamental centrepiece of the house rather than a tool for playing music, because after the initial excitement had passed, there was little joy left in listening to music. This is the effect of poor sound-reproducing equipment. But there are hi-fi systems which *will* give you musical enjoyment and enduring pleasure.

For many people interested in listening to music in the home, a packaged audio system of the type usually referred to as a midi system is the obvious choice. There is no doubt that choosing your own separates to make a working system has its satisfactions, and under ideal conditions will provide the most worthwhile and musical results. But it is also liable to end up with a rather Meccano-like appearance and wired up with 'a plateful of spaghetti,' to use Sony's memorable description.

The integrated system avoids these problems, with components of matching appearance, sometimes with a piece of furntiure to subdue the 'hi-tech' look of bright chrome, control knobs and displays. Choosing a one-make system might appear to guarantee optimum electrical and mechanical matching. But appearances can be deceptive and many apparently well-matched systems (in the technical sense) are anything but.

To warrant inclusion in this publication, all systems had to include a compact disc player, a cassette deck, a tuner and an amplifier, and many of them came with a turntable and loudspeakers too. However the choice of these components maybe left to the buyer, and in other cases the manufacturer provides a range of options. Where possible these options are detailed in the reviews and also indicated in the *Comparison chart*.

Increasingly, integrated systems are being made physically smaller than in the past. Typical component widths have reduced from 43-44cms to 33-35cm now, and this publication concentrates on the latter — hence the midi in the title. There is no inherent advantage in equipment being larger except perhaps that it's easier to hold costs down. There may be a cost factor in making things small, especially in the case of turntables where relatively complex expedients like parallel tracking arms are normally used to reduce the width requirements but even this may be offset by reduced transportations costs.



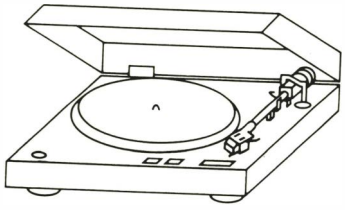
Compact Disc Player

The digital compact disc is a recent development in audio — a means of storing information in digital form on a small (12cm) disc, recorded on one side only and giving continuous playing times equivalent to both sides of a long playing record strung together. The information is stored in a spiral arrangement of 'pits' which are read by a laser which follows, but does not touch the surface of the record. Very low background noise and great linearity of frequency response (up to the cut-off point near 20kHz) are the hallmarks of the system, together with a degree of robustness not associated with conventional records. Small scratches, dust and fingerprints should not affect sound reproduction. CD reproduction is free of the 'pops and clicks' which mar LP sound.

In the few short years compact disc has been on sale, it has grown in strength to the point where it rivals the more traditional sources in popularity. Many systems (including all those reviewed) are now available with compact disc, and there are already isolated cases (eg Marantz, Panasonic) where CD is pushing the traditional record player off the scene altogether.

Compact disc is the easiest source of all to operate. All a CD player needs is a mains feed and one of the inputs on the systems amplifier. If no dedicated CD input is fitted an auxiliary or even a spare tape input will suffice. So owners

of old systems wishing to add 'stand alone' compact disc players to their existing equipment will be able to do so if such an input is available — and if not, 'input expander' accessories are available, from QED and others.



Turntable

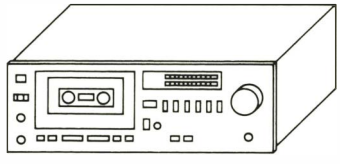
The usual type of system turntable is a simple design which includes auto-return at the end of side, and a magnetic cartridge. Recent design trends have seen S-shaped arm tubes giving way to straight ones, and simpler types of interchangeable headshell, where they're interchangeable at all. In some ways these design trends look worrying; there is an almost universal use of flimsy plastic mouldings in areas of structural importance (eg headshells) whilst the weight and build quality of the turntable chassis has tended to become lighter and stay static, respectively. The change in arm tube form is a matter of style and fashion rather than function.

Quite a number of turntables are fitted with so-called parallel tracking arms, where the whole arm slides along a runner parallel to the line the stylus describes as it plays the record, Most manufacturers claim that as records are cut with such mechanisms in the first place, it makes technical sense to play them back this way, pointing out that parallel tracking mechanisms reduce stylus geometry errors which are inevitable in a pivoted arm. Although this looks like a reasonable proposition, its worth remembering that the error on a well-designed pivoted arm need result in distortion no higher than about 1% maximum, which is better than managed by the arm-drive servos on many parallel players.

It turns out though, that turntables with parallel tracking arms are frequently (not always) more resistant to feedback and the effects of externally applied shocks to the rack housing or shelf on which the turntable is stood. Parallel tracking arms are also invariably associated with fully automatic operation and in some cases, programmable track-search facilities.

As in previous years, the majority of cartridges are readily interchangeable if required. A significant number of the more upmarket turntable designs incorporate the new T4P or 'P'-mount cartridge fitting, where the cartridge plugs into the end of the arm using the terminal pins. These cartridges all have a common specification which means no alteration to any of the arm settings is required no matter what cartridge is fitted. With some turntables, cartridges are not interchangeable at all, and where this is the case, it's indicated within the reviews. The ability to change cartridges provides an easy, if limited route to improving system performance at a later date.

There is a remarkable uniformity in the types of cartridges fitted. Nearly all are standard magnetic designs, bearing the rack maker's name in most cases, but often recognisable as coming from Audio-Technica. The exceptions are to be found in the very inexpensive systems included in this project. The majority of these systems cost under £400 complete with CD player, and are generally equipped with plastic moulded turntables of very basic design, and ceramic cartridges of the type familiar to users of table-top gramophones 15-20 years ago. These cartridges cannot be changed for magnetic ones, which would neither fit in the arms or give enough output to work with the amplifier properly.



Cassette deck

There have been changes in the cassette decks supplied with systems too, especially in peripheral areas like transport control and record level meter designs.

Ignoring the sub £450 systems for a moment, the archetypal cassette deck looks something like this. It will have two transport mechanisms, one for recording and playing back in the usual way, the other for playback purposes only. Using the two in combination allows tapes to be dubbed, or played back from one deck and recorded onto the other, and played back one after the other (often known as sequential play or — perhaps confusingly — as continuous play). The dubbing can be done in real time, that is at normal playback speed, but the majority of designs tested also allow double speed dubbing. However, there are severe tradeoffs when using this high speed alternative, and sound quality always suffers quite severely.

Cassette decks will also have a range of buttons to operate the transport, a number of controls to set the tape type, the recording levels (with the aid of record level meters), and the noise reduction system.

On virtually all modern cassette decks the controls are power assisted, or go still further by being fully power operated from panel switches which in effect 'instruct' built-in micro-processor circuitry, whose job it is to collate and route these instructions appropriately.

Both types of control can incorporate so-called 'logic' operation, though the fully powered transport more usually have this ability. Logic operation acts like a watchdog, so if you try any sequence of operations that might damage the tape (direct from fast rewind to play, for example) the deck will 'pace' these instructions out so that nothing untoward happens. Such decks are often recognisable by the fitting of light-touch controls and are usually very silky and responsive in use. They don't intrinsically offer or deliver better sound quality though.

Better sound quality, however, is the aim of Dolby C noise reduction system which works very much like the familiar Dolby B but with twice the noise reducing effect. Dolby C is fitted to the more expensive decks, whilst Dolby B is almost universal as it is needed to replay pre-recorded cassettes which are invariably recorded to the B format. There are other changes too, in some cases intended to make operation simpler and more foolproof. Instead of manually instructing the deck what kind of tape you've inserted, cassette decks are learning to recognise tape types for themselves using the notches on the rear of the cassette housings for the purpose. Another (perhaps less welcome) trend is to automatic record level control, or ALC. This means no record level adjustments and is an undoubted boon from the convenience point of view. But the trade-off can be severe, taking the form of a loss of dynamics and increased background noise; this is because the ALC shunts the record levels up and down continuously in an attempt at making everything sound the same volume!

A number of systems lack microphone inputs, on both the cassette deck and the accompanying amplifier. It's perfectly true that the mike input is among the least used of all cassette deck features, so we have not reduced the rankings of those systems without, just noted the omissons for the benefit of mike users.

Elsewhere cassette deck design has become relatively static. The most popular feature is one or other variety of programme search where the deck 'listens' for gaps between tracks when in fast wind/rewind mode, switching through stop to play when it finds the gap. This is of obvious use with popular rock music (or when tapes are used to store a number of computer programs!), but the system tends to break down when presented with material with built-in gaps or long quiet passages. Speech and much classical music are examples of such programme-search-busting material, and for this reason we were disappointed to see the eclipse of normal memory search features linked to the tape counter. It was also disappointing to find so few decks incorporating 'real time' tape counters — those which count in minutes and seconds, rather than in numbers linked only to the number of tape spool revolutions, which give an arbitrary reading.

Tape acceptance in most cases is standardised for the three major types: ferric (or standard bias), chrome (or high bias) and metal.

The very inexpensive decks fitted to the sub £450 systems tended to follow their own rules. With mechanical transport controls and no search facilities, some of them are fitted with what the manufacturers call 'noise reduction' which is neither of the Dolby variety nor deserves to be described as noise reduction in the normal hi-fi sense of the term. Noise reduction is a term applied to any system (Dolby, dbx etc) which works whilst recording and playing back and which reduces tape and other hiss within the noise reduction 'loop' whilst leaving the tonal balance of the music more or less intact. In our opinion, the use of the term 'noise reduction' to describe what is a simple filter to reduce high frequencies of both music and hiss alike is clearly misleading and is to be strongly deplored. This practice has been highlighted where it

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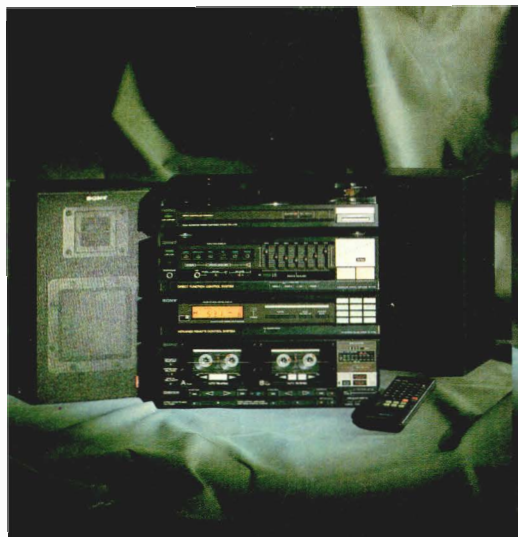

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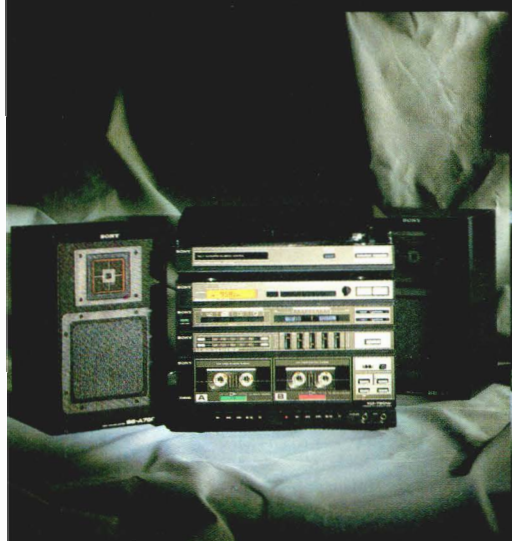

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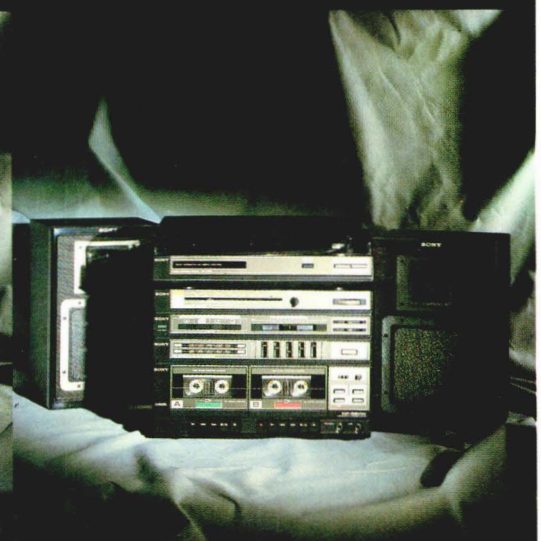

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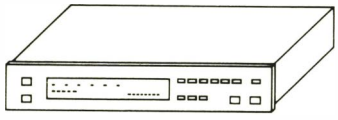
SONY

occurs, in the text of the reviews. Remember that Dolby B is essential for replaying pre-recorded cassettes which carry the Dolby logo, if high quality sound is required.



TUNER

The tuner provides the means of listening to radio broadcasts , and is commonly capable of reception over the three main broadcast bands of interest to UK listeners — FM, MW and LW.

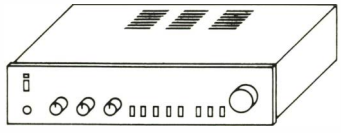
Only FM broadcasts are inherently capable of high-quality results in stereo. FM can give a smooth, even frequency response to about 15kHz, which is close to the limit of most people's hearing. FM is also the only band where stereo broadcasting takes place. The snag with FM, apart from the relatively complex circuitry necessary to make it work effectively, is the fact that it is a short distance medium with a typical range of only a 30 mile or so radius from the transmitter. Although indoor strip (wire) aerials are usually provided for FM reception, the use of such devices tends to be unreliable if good, hiss-free reception is required. This comment holds especially in the case of stereo reception which requires typically ten times the signal needed for good mono reception. So where a portable (mono) radio may work perfectly adequately with a rod aerial, a stereo tuner will normally benefit from a multi-element (typically four or more elements) aerial mounted on the roof — or something similar. It's worth taking some time and trouble over the aerial, and employing a specialist local aerial erector who knows the neighbourhood reception problems. Aerial fitting is not usually expensive; note that even a high-quality, expensive tuner will not give of its best from an inadequate aerial.

A good aerial will provide more than just quiet, hiss-free reception. It will also provide a generally more reliable result, free from impulsive 'crackling' interference and other reception problems.

The two AM bands, medium and long wave, offer longer distance reception and provide the only way of listening to BBC Radio 4, for example, when the VHF band is given over to educational broadcasting; Radio 1 is also only sporadically represented on FM at present. However, AM sound quality has very limited treble, and a generally uneven, closed-in kind of sound. The aerials supplied with the tuners — usually a ferrite loop or rod — are about optimum. They may need to be swiveled for the best reception, but attempts to increase the signal level by adding an external long wire aerial are often met with increased interference too. Although reception and sound quality on AM are 'iffy' at the best of times, there turned out to be quite remarkable differences between the best and worst of the tuners tested.

The tuners tested divide conveniently into two categories — the traditional analogue or scale-and-pointer tuner; and the digital or quartz synthesiser tuner. The very useful feature of preset timing is usually associated with the digital tuners which lend themselves naturally to this kind of facility. Digital tuning can also mean more accurate tuning, though there was evidence from the tests that this was not always the case.

Many synthesiser tuners also had other problems, in particular background whistles and buzzes in the less well engineered examples. The better synthesiser tuners were free of this defect, however, and were particularly easy to use in preset mode.



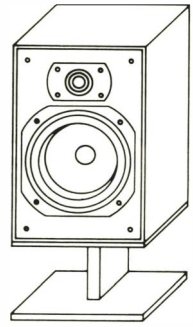
AMPLIFIER

Aptly thought of as the heart of any system, the amplifier accepts the low-voltage outputs from the turntable, CD player cassette deck and tuner, and boosts them to a level suitable for driving loudspeakers. It also performs a variety of subsidiary functions such as tone controls, filtering and so on.

Although the amplifiers built into the systems came in a wide range of power outputs, this was usually related to price, the more expensive ones generally going louder — though not necessarily sounding better! Where loudspeakers were supplied with lower price systems, their high sensitivity generally made up for the limited power of the amplifier, so that the maximum available volume was still quite adequate.

A pair of conventional high-fidelity B&W *DM110* loudspeakers (see Technical Section) were also used during the listening tests, and in most cases the systems were fully able to drive these to high enough volumes to satisfy most requirements. The moral of this is obvious enough — it usually makes little sense to choose a system simply on the basis of its power output unless you've an unusually large room to fill with sound, or you throw a lot of parties!

Sound quality and power output apart, the more up-market amplifiers tended to accumulate additional input facilities and more complex tone controls, often described as graphic equalisers. But many of the features on offer are less than they seem. Leaving all theoretical considerations aside, a system that works well in the first place will not benefit greatly from using tone controls. Graphic equalisers, which are effectively a number of such controls, each responsible for a narrow band of frequencies, are merely gilding the lily. We tried 'correcting' known, measured response inaccuracies in loudspeakers by compensatory settings on graphic equalisers with some of the systems, with results that were generally worse, and certainly no better than the 'flat,' unaided sound.



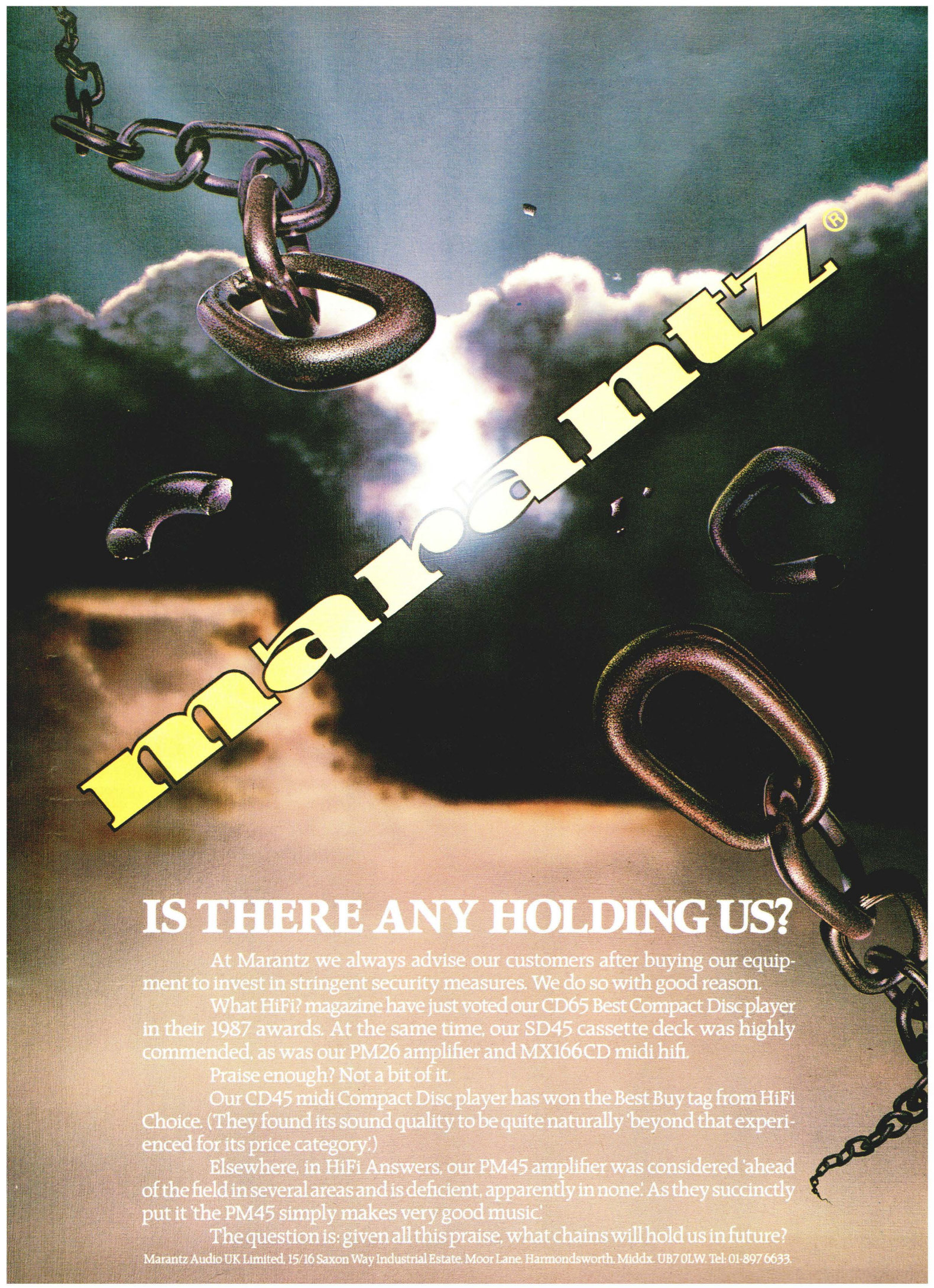
LOUDSPEAKERS

The loudspeaker is not, as if often thought, *the* determining factor for sound quality — the system as a whole is as good as its weakest link, no more. But the loudspeaker does have the crucial role of translating the electrical signal from the amplifier into the vibrations in the air we call sound. The simplest loudspeaker consists of a box housing a single drive unit, but most of them divide the sound into two bands, and channel the low bass frequencies to a large coned unit capable of moving large quantities of air, and the high frequencies to a smaller unit capable of responding quickly. A third midrange unit of intermediate size is sometimes used as well, but it's worth making the point that it's extremely difficult to make a three-way loudspeaker work as well as an equivalently-priced two-way one.

This leads to a fairly generally-applicable rule with loudspeakers. The more ambitious the design, the harder it is to get right. The difficulties tend to increase dramatically with increasing size, and it cannot be assumed that a large, impressive three-way loudspeaker will perform better than a simple, small two-way one. Indeed the larger speaker may not even give better bass. It usually will give *more* bass, but often bass of a flaccid and boomy nature which is hardly worth having. These factors are examined in detail in the reviews.

There is one other crucial factor that determines how well a loudspeaker auditions — and this is how it's used. It is important to support loudspeakers properly, preferably on tall, open stands of the type stocked by most specialist hi-fi dealers. It's equally important to place them correctly, which often means well away from walls and other obstructions. Occasionally shelf (or wall bracket) mounting gives good results — let your ears be the guide — but placing loudspeakers on the floor and/or behind furniture is a virtual guarantee of unsatisfactory sound. Many systems are available with a choice of loudspeakers, or without speakers at all, and in such cases it should be possible to choose a small, relatively unobtrusive model (perhaps specifically designed for wall proximity use) and still obtain good results.

One final point here. Most loudspeakers sound best with their grille covers removed. It might be worthwhile checking you can live with the appearance of an unclothed loudspeaker in your living room!



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What HiFi? magazine have just voted our CD65 Best Compact Disc player in their 1987 awards. At the same time, our SD45 cassette deck was highly commended, as was our PM26 amplifier and MX166CD midi hifi.

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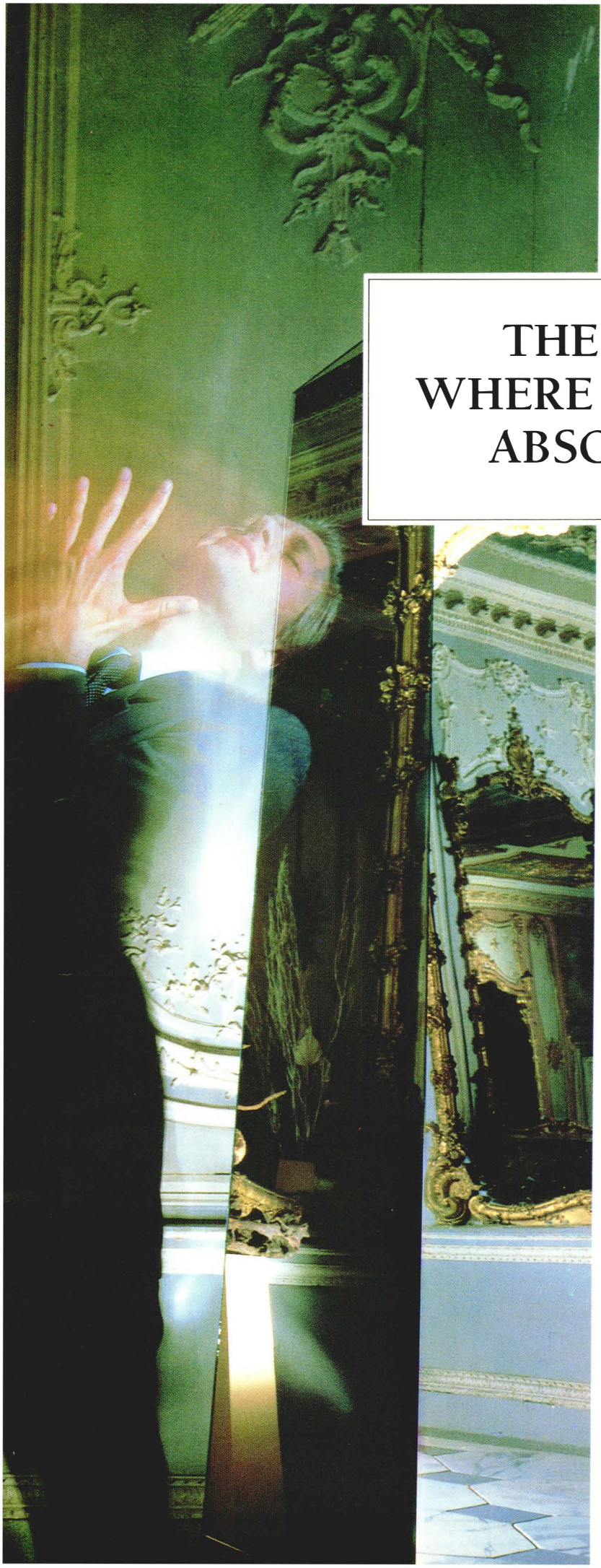

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With remote control unit, gold plated phono sockets and a new, slimmer design, the CD 650 gives voice to the highest sound quality available, elevating mere memory to absolute fidelity.

And that's the truth.

PHILIPS. TAKE A CLOSER LOOK.

TECHNICAL INTRODUCTION

Every review includes a table of laboratory test results. This chapter explains how each test was carried out and how to interpret the results

This section describes the measurements, in the order in which they're listed with each review. Occasionally it proved necessary to alter the procedure, especially where the system concerned lacked the usual inputs and outputs, making it difficult to connect the test gear. In general, these alterations are described within the reviews themselves. Nearly all the measurements were conducted by my colleague, Robert King, the aim in all cases being to help illuminate the practicalities of each system's performance as far as possible under normal domestic operating conditions.

Dimensions and prices: We have given dimensions of the stacked system components with the turntable (if fitted) lid up, and of the speakers. Prices quoted are typical retail prices including VAT. While to the best of our knowledge these were correct at the time of going to press, they obviously are subject to fluctuation from time to time, and this should be taken into account when interpreting our 'value for money' judgements.

AMPLIFIER

Power Output: The figures presented are the RMS output in watts with both channels driven together to a point immediately prior to amplifier output waveform clipping at 1kHz. Equipment used: Dual beam oscilloscope, dual 8ohm dummy load and Nakamichi *T-100* audio analyzer, both for generating the sine wave signals and displaying the output on its wattage scale.

RECORD DECK

Speed variations (wow and flutter): The measurement given is peak DIN-weighted, as measured using a 3kHz recorded tone from HFS 75 and the Nakamichi *T-100*.

Speed drift: This is an assessment (not a measurement) of long-term drift (low-rate speed variations) using the same test set up as above.

Speed Accuracy: percentage error, derived from tests using the Ortofon *TC 3000* test computer. The more accurate, the better — although of course a slightly incorrect speed is less serious than appreciable speed variations.

Arm/cartridge resonant frequency: This is the average vertical/lateral resonance, also derived from the Ortofon *TC 3000* test computer. This frequency is related to the mass of the arm and cartridge, and the stiffness (compliance) of the cartridge cantilever (the thin rod that supports the stylus at its visible end, and which is secured loosely at the other end). Very low figures, below about 8Hz, may cause the cartridge to be easily disturbed by problems such as warped records, and (where fitted) turntable spring suspensions. Sound quality may suffer — pitch reproduction can become unstable and low frequencies generally may become muddy and ill-defined. Too high a frequency — above about 16Hz say, may result in a rather fluttery and under-characterised bass. The 'ideal' figure is 10-14Hz.

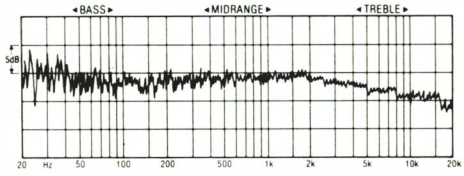
Cartridge channel balance: Again derived from the Ortofon *TC 3000* test computer. The smaller the difference between the two channels the better, of course.

Cartridge channel separation: The figure indicates the amount of left hand channel signal appearing on the right hand channel output — or vice versa, the 'worst case' figure being quoted each time. The higher the figure, the better the result. Test equipment again was the Ortofon *TC 3000*.

Cartridge tracking ability: This figure indicates the highest recorded velocity the cartridge can track at the quoted tracking force — so the higher the figure the better. The measurement is not a comprehensive test of tracking ability, but it gives a useful general indication. Any perceived shortcomings in tracking ability on music programme have been commented upon separately.

Cartridge frequency response: For these systems we used the ⅓-octave pink noise test bands on B&K *QR 2011*, which is designed for system response checks. The signal measured was from the tape output of the system where possible, or alternatively the headphone output.

Theoretically the test described above should give something approaching a straightline response, but this never happens in practice. For reference, see the charted response of a Koetsu Black cartridge (fitted to a Linn Ittok arm and LP12 turntable) when measured this way (the output in this case being from the tape feed of a Musical Fidelity preamplifier). As you can see, the trace shows a slight loss of output at high frequencies.



Frequency response of a reference cartridge, the Koetsu Black in Linn Ittok arm; note expanded (25dB) vertical scale

Note that all cartridge responses were run with the standard 50dB scaling often used in cartridge tests.

CASSETTE DECK

Tape used for tests: Measurements all refer to Type II (Chrome bias) tape. The brand chosen was either Maxell *XL IIS* or TDK *SA-X*, according to the manufacturer's recommendation (where available). Tapes used were always C90s.

Frequency response: The plot was made using the Type II tape selected as described above, and was run conventionally at −20dB ref 0VU on the deck's meters. Equipment used was a Neutrik sweep generator and chart recorder.

Speed variations (wow and flutter): Record/replay, DIN Peak weighted. Equipment used: Nakamichi T-100 audio analyzer. The lower, the better.

Speed drift: Exactly as for the equivalent measurement of record decks, this is an assessment rather than a measurement of long term drift (low rate speed variations) using the Nakamichi T-100.

Signal-to-noise: CCIR/ARM Weighted signal-to-noise ratio. The figure quoted is for the complete record/playback cycle at 400Hz and is referred to 0VU as indicated by the deck's meters and with any noise reduction switched out. The higher the number the better.

The presence of automatic level record controls, where there is no stable reference point for the measurements, frustrated this measurement.

Distortion: Measured at 0VU on the deck meters, this should be read in conjunction with the signal-to-noise figure. A poor figure for the latter test may still be satisfactory in the light of a very low distortion figure (say 0.8%), because there will still be several dB of headroom to play with above 0VU. Conversely, an apparently good signal-to-noise result may in reality be no better than average if the distortion level is high (say 2-3%) at 0VU.

TUNER

Sensitivity and Signal-to-noise: These are assessments rather than measurements. A laboratory FM stereo generator, which can be pictured as a small transmitter that can encode any source connected onto FM, was used for these, and for a major part of the listening tests as described in the general introduction. The generator — a Radiometer SMG1 — has a range of outputs ranging from 10μV, an extremely low level which is barely sufficient for good mono reception even with a sensitive tuner, to 100mV, approximately 100 times the amount necessary for good, low noise stereo. By feeding an unmodulated carrier to the tuner under test (that is, a transmission of silence) it was possible to obtain a reliable and repeatable idea of how sensitive and quiet each tuner was. As part of these tests, the tuner was also driven with a range of signal voltage levels using a very low-level piece of music, which gave an idea of the annoyance value of noise in the presence of a music signal. The music signal was derived from a Sony *CDP-303ES* compact disc player. ►

What it looks like.

LOUDSPEAKERS

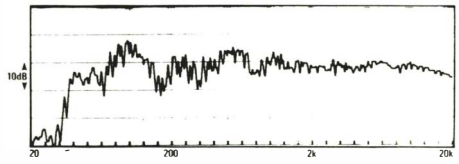
Frequency response: One loudspeaker from each pair was measured in the room used for the listening. Each loudspeaker was driven from its accompanying amplifier, which is therefore taken account of in the tests — along with the room of course.

The listening room itself clearly has a significant effect on the loudspeaker measured response as reflections from the walls add to and subtract from the loudspeakers inherent response. To get some sort of feeling for what the room was doing, the main loudspeaker model used for the test — the B&W *DM110* — was measured in the room and also in B&W's own anechoic chamber. In theory, the difference between the two plots is simply the effect of the listening room, but in practice there are certain other factors to be taken into account. The test equipment used was different, and so was the method of measurement. The in-room response was made with a ½ octave warble tone signal, which is a normal sine wave modified so as not to excite room resonant modes unduly. The equipment was a Neutrik generator, a high grade calibrated microphone and chart recorder, the microphone being essentially flat (*ie* accurate) to 20kHz.

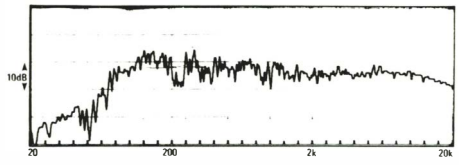
Allowing for the differences in test procedures, there is a reasonable agreement between the two curves, the room being responsible for a suck-out at 200Hz and some boosting of the curve between 400 and 600Hz. The sharpness of these effects is critically dependent on the geometry of the loudspeaker itself. Where the bass unit is equidistant from the base and the two sides of the enclosure the effect is more sharply defined. Small changes in the microphone position also have a dramatic effect here, as they do at the top end of each drive unit's pass band, where drivers tend to become very directional.

Taking all these effects into account suggests that any in-room curves should be treated with a degree of trepidation, but we were able to obtain much useful information from them. First, we looked for an overall shape that was reasonably smooth and lacking in severe peaks and dips. Secondly, some idea of the frequency balance of a loudspeaker could be gleaned by looking at the area under the curve. Thus although the room is responsible for some modification to the response in the range of frequencies from 200Hz to about 1kHz, the energy output of a speaker in this region (represented by the total area under the curve between these two points) should be roughly equivalent to the trend elsewhere. So we looked for a smooth mid-range and extended treble response — the *DM110* rates as good in these respects — and a smooth averaged-out response below 1kHz. Our comments on speaker performance, then, are based on these tests as well as on listening.

Efficiency: This should be read in conjunction with the amplifier output figure to get a rough idea of the maximum attainable volume levels with each of the systems. Low loudspeaker efficiency implies that more amplifier power will be needed to shake the neighbours up, and *vice versa*. A combination of low efficiency and low or medium power levels should act as a caution, especially for those with large listening rooms or a penchant for playing music at realistic volume levels.



B&W DM110 in room response, wall mounted



B&W DM110 in room response, open stand

LISTENING TESTS

A great deal of thought went into designing listening test procedures which would be repeatable and give consistently useful results. As far as possible, all test conditions were standardised, and system evaluation was based in the first instance on so-called 'substitution' tests. This involved careful listening to a 'reference' system, chosen as being one of good basic sound quality without being ludicrously expensive compared with the system under test. One at a time the components of the test system were then introduced into the reference system, and notes made on the performance in each case.

After this, the 'reference' system was set aside, and the system under test was assembled and listened to thoroughly as a whole, further detailed notes being made on the performance.

In each case, the cassette decks were evaluated for sound quality by listening to pre-recorded cassettes, and by listening to the results of recordings made both from the standard system, and also the one being reviewed — records and Compact Disc being used for source material. Compact Disc was also used to drive a laboratory FM generator which fed a 'broadcast' signal to each tuner in turn, simple A-B switching between the tuner and a straight feed to the amplifier (in this case a QED *A240 SA*) being used to establish sound quality in a particularly repeatable way. Each tuner was also listened to off-air from a four-element roof-mounted aerial which provided a good quality and strong signal from local transmitters.

All listening was done with only the test pair of loudspeakers in the listening room — that is under 'single loudspeaker' conditions. While I made no attempt to keep to a selected batch of records and CDs, I did maintain consistency from system to system by keeping a number the same from one review to the next — but not always the *same* two or three records. There were several reasons for this, though it had a lot to do with wanting to keep a fresh ear and brain for each review.

The complete reference or benchmark system was as follows, the equipment in each case being loaned by the manufacturer (the turntable was loaned by Grahams Hi-Fi in London N1):
Rega Planar *3/RB300* turntable and arm
Linn *K9* cartridge
QED *A240SA* amplifier
B&W *DM110* loudspeakers
A&R *Arcam Alpha* tuner
Sony *CDP-303ES* and Mission *7000 CD* players, plus headphones and sundries, mostly from Sennheiser and QED.

This system is representative of good quality, medium price record playing systems. The loudspeakers, which were used with each system tested, are relatively easy to drive and efficient, as well as fitting the bill on sound quality grounds.

PROGRAMME MATERIAL

Musical programme used for the listening tests included the following:

Records

Malcolm Arnold *English, Scottish & Cornish Dances* (Lyrita *SRCS 109*)
Debussy *Nocturnes etc/Boston SO/Abbado* (DGG *2530 038*)
Battle Imperial *Jonathan Woods/Harpsichord* (Decca *SDD 530*)
Music of Kodaly *LSO/ Kertesz* (Decca *SXL 6136*)
Incredible String Band *Liquid Acrobat as Regards the Air* (Island *ILPS 9172*)
Beach Boys *Surf's Up* (Stateside *SSL 10313*)
Ry Cooder *Chicken Skin Music* (REP *54083*)

Compact Discs

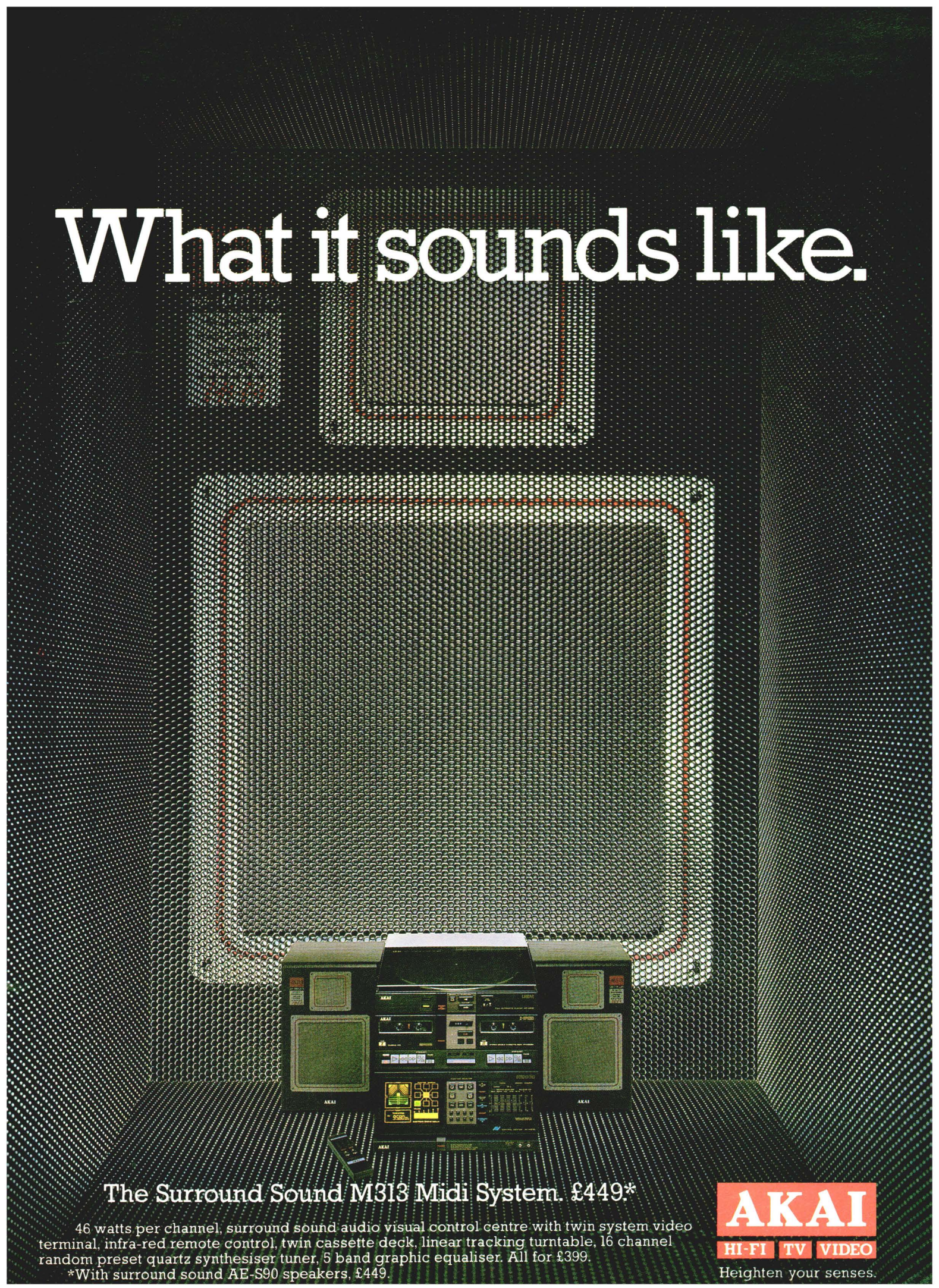
John Lewis/JS Bach *Preludes and Fugues from the Well-Tempered Clavier* (Philips *824 381-2*)
Debussy *Nocturnes etc/Boston SO/Abbado* (DGG *415-370-2*)
Mendelssohn *Symphony No 4 etc/Bern SO/Maag* (Pickwick *PCD824*)
Vaughan Williams *Works for String Orchestra* (Nimbus *NIM5019*)
Sibelius *Symphony No 2/Gothenburg SO/Jarvi* (BIS *CD-252*)
James Newton Howard & Friends (Sheffield Lab *CD-23*)
Simply Red (Elektra *960 452 2*)
Sting — The Dream of the Blue Turtles (A&M *DREMD 1*)

ACKNOWLEDGEMENTS

First, my thanks to Robert King, who sat at the test bench day after day performing most of the test programme. Thanks are also due to Grahams Hi-Fi, QED Audio Products, B&W Loudspeakers, A&R Cambridge, Sony UK, Mission Electronics and Hayden Laboratories for loan of equipment.

Last but not least, thanks to my family, and especially my wife Kathy, for perseverence in the face of considerable domestic disruption.

What it sounds like.



The Surround Sound M313 Midi System. £449.*

46 watts per channel, surround sound audio visual control centre with twin system video terminal, infra-red remote control, twin cassette deck, linear tracking turntable, 16 channel random preset quartz synthesiser tuner, 5 band graphic equaliser. All for £399.

*With surround sound AE-S90 speakers, £449.

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Two versions of this system are available. The *V3300* reviewed here has a single transport cassette deck; the other, known as the *V3400*, has a twin cassette deck with tape-to-tape dubbing facilities. The other option is the *SX-770* CD player, which brings the system price up by £249.95 to just short of £650.

The system itself is well integrated, with an absolute minimum of spaghetti around the back because the components all draw mains power from the amplifier and are linked together with single multi-function cables, mostly of the ribbon type. As a result none of the components apart from the CD player (and technically the amplifier and loudspeakers) enjoys a truly independent life of its own, so the separate packaging of the individual components is really something of a sham.

The major centralised systems are automatic source selection (press play on the cassette deck for example, and the amplifier switches to its tape input), and a programmable timer in the tuner box which allows such facilities as unattended recordings (see later). Furthermore, the Aiwa is equipped with a rudimentary surround sound matrix, along the line of Dolby Stereo, but inferior to and not compatible with that system.

The equipment stack is physically small and very neatly built, in the best traditions of the marque.

LX-330 TURNTABLE

The *LX-330* is no new departure for Aiwa, just a version of their bread and butter midi system parallel tracking turntable. The deck is fully automatic, but without record size or speed sensing (which means the stylus can be lowered onto a bare platter). The arm can only be placed elsewhere than in the run-in groove by shuttling it around with a pair of control keys — a tedious process alleviated partly by the fact that it can be done with the lid up. (Arm in lid players can't do this.)

Structural integrity is up to the usual system turntable standards. Sorry, I meant down. Notice how the response trend is quite flat (*ie* accurate) through the midband, but also how it rolls off above 2kHz or so.

TX-330 TUNER/TIMER

As a tuner, the *TX-330* is a straightforward digital design, with a full 8 presets on FM and a further 8 which can be shared as required between MW and LW. Apart from the usual indicators and mono/muting switch, there is also a 5 LED signal strength meter. The idea is that more lights equals more signal, but four were alight on test at 10μV, an unusably low level for stereo, and all five were ablaze below 100μV.

Low signal strength reception was accompanied by quite high levels of spurious background whistles and buzzes, which became very high level foreground effects at very low levels. Above 1mV, however, they disappeared altogther. This is a good tuner for non-problem area reception.

The unit includes a 5 event timer, each event being a one-off within a seven day period, or a once per day event. This may seem like an unnecessary sophistication for unattended recordings with the longest good tapes just 90 minutes long, but the cassette deck is auto-reverse, so the whole 90 minutes can be programmed in one go — and in any case the facility is still welcome. When not used for tuner frequency readout, the LED display shows which time and day is up.

FX-R330 CASSETTE DECK

The *FX-R330* has characteristic Aiwa style, and is neat and practical if a bit of a dust trap. All tape types can be used *via* an automatic tape type select system, and Dolby B and C noise reduction are fitted. The transport is a full auto-reverse model with bi-directional record and a row of 'record' keys, each to start one of the source components (tuner/phono/CD/aux) in synchronisation with the tape (auxiliary excepted). No tape types were recommended specifically. Maxell Type II gave the bright response shown, whilst playback responses suggested azimuth misalignment. Wow and flutter was satisfactory but note the absence of record level controls

DX-770 CD PLAYER

This compact player is conventionally equipped with a 16-track random order memory, track, programme or disc repeat modes, and the usual range of search modes, all of which worked smoothly and satisfactorily. Unlike an early Aiwa CD player, discs load the 'right' way up. The only problem — and it was important in practice — was severely limited tracking ability, leading to quite frequent locked grooves. The player was also shock prone.

MX-330 AMPLIFIER

Measured amplifier output was 35 watts/channel. Facilities include a 'super bass' switch, a 7-band equaliser, surround sound switching and socketry (a 'stereo wide' label is probably more accurate, it should be avoided for serious listening) and a microphone

SX-220 LOUDSPEAKERS

The loudspeakers are shoddily built 2-way designs, both drivers being cone based. The system has flashy out of character styling, pseudo-high-tech trimmings, and a lightweight enclosure.

HOW IT SOUNDS

The bass end of the loudspeaker passband sounds shallow (*ie* lacking bass depth and weight) and boxy, which is a common form of coloration which often arises when the loudspeaker has all the structural integrity of a wet paper bag, as here. In cases like this, I fancy I can hear the boxes being shaken up and energised by the music, which of course is exactly what is happening. High frequencies are crudely presented, but repressed just enough so that they are not overtly objectionable. The midband meanwhile does a passable imitation of sounding large in scale and tonally neutral, but it is also severely lacking in detail and information. If you like it spelt out, they sound thick, as in treacle — a bloated upper bass is partly responsible.

The speakers should be used well away from walls, on tall open stands if at all possible. To an extent, and even with loudspeakers as unsatisfactory as these, what you get out of them depends on what you put in, though naturally the fairly gross effects they are responsible for tend to dominate the sound of the complete system. As usual, the reference B&W speakers were also used to audition the individual components.

The cassette deck turned out to be perfectly reasonable, allowing for some fluttery effects noticed best (worst) on cymbals. But Dolby C sapped all the life and vigour from the sound. It is remarkable how cassette sound can suffer from Dolby when that apparently innocuous circuit has been insensitively or just plain badly implemented. The amplifier lets much of the vitality and strength of a good performance through that Dolby kills stone dead, and this

is a measure of the quality of the amplifier but no credit to the cassette deck.

Listening clearly demonstrated that recordings with Dolby B sound better than those done with the more powerful Dolby C, and that no Dolby was better still. Best of all were metal tape recordings made without noise reduction, but the problems here are the obvious ones: metal tapes are expensive, and most tapes of music will end up sounding rather hiss bound.

As already suggested, there was nothing whatsoever wrong with the amplifier as auditioned *via* the supplied speakers, which it matched perfectly to the extent that the rather dry, detailed quality of the first helped offset the slackened, slow presentation of the latter. The amp was able to drive the speakers hard, and to high volume levels. Using other, better speakers, the Aiwa revealed a distinctly tight, ungraceful quality, but it really wasn't bad in its own market context. Most people would accept this as a product with genuine high fidelity pretensions.

The record deck also wasn't too bad, strangely enough. As so often, in an attempt to reduce microphony, the springy feet have been tuned to quite a high frequency (listen to the kind of noises made when knocked gently in the middle of a record), and the result was essentially zero bass. The treble sounds restrained but fairly clean, and dynamics were squashed to a degree. But the effect wasn't disastrous.

Off air FM radio sound quality was one of the strengths of the system. Although slightly bright, the tuner sounded natural and clean. But both AM bands were characterised by dullness, compression and monotony.

As so often in this project, the CD player helped the system clean up its act.

Verdict

Strengths of this system are good build quality, extensive features, and neat packaging. Straight audio criteria take a back seat, but in this respect it's in good company, and the price is reasonable. It misses recommendation by a hair's breadth, and is certainly worth considering.

Test Results

Cost complete ____ £399.95
Options?DX-770 CD player. Also available with FX-W440 twin cassette deck as V3400
Size main unit - lid open, w/o projections 72×33×37cm (h×w×d)
Size loudspeakers ____ 37.5×22×17cm (h×w×d)

Turntable

Wow & flutter wtd ____ 0.10%
Drift ____ poor
Speed accuracy ____ n/a*
Arm/cartridge resonance ____ n/a*
(<10kHz too low, OK,> 14 Hz too high)
Cartridge channel balance ____ n/a*
Cartridge channel separation ____ n/a*
Cartridge tracking ability ____ n/a*
[*]test equipment could not be interfaced with system for these tests

Tuner

Sensitivity ____ fair
Signal/noise ____ good

Cassette Deck

No tape recommendations given
Wow & flutter (wtd) ____ 0.10%
Signal/noise ref 0dB Type II ____ n/a**
Distortion 0dB Type II ____ n/a**
[**]auto record level

Compact Disc Player

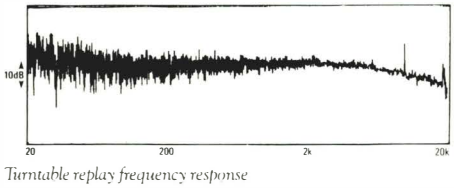
Weighted signal/noise (measured at amp Tape Out) ____ 98dB

Amplifier

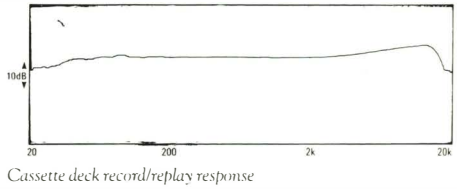
Power output/channel (8ohms) ____ 35 watts
(1kHz both channels driven)

Loudspeakers

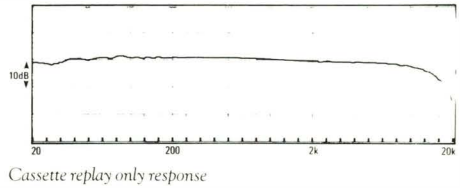
Efficiency ____ medium



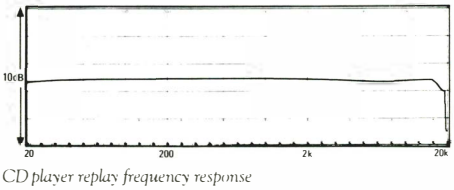
Turntable replay frequency response



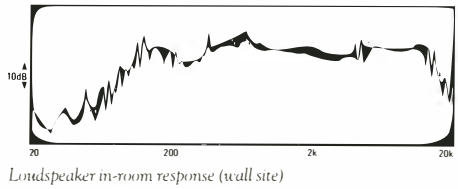
Cassette deck record/replay response



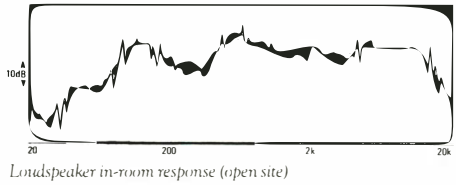
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

ENTER THE SONY/HI-FI CHOICE

Sony's *Compact 76* (pictured above), is a superbly designed midi system, which comes complete with the ultimate in hi-fi reproduction — Sony's excellent *CDP 35* compact disc player, as shown on the opposite page. Albums, cassettes, compact discs — all of these can be played on this single system, which is already proving a runaway success in the British High Street.

In this issue *Hi-Fi Choice* is offering you the chance to win this stylish hi-fi system. The *Compact 76*'s components include the following outstanding features:

— A 35 watts per channel amplifer section with more than enough power to do justice to the special sound of compact disc. The amplifier also includes a useful 5 band graphic equaliser.

— The *CDP 35* is a full function CD player with touch sensitive drawer-loading operation. Track selection can either be facilitated manually or by utilising Sony's unique 'shuffle-play' feature, by which the player itself selects and plays tracks at random.

— The quartz locked, digitally synthesised tuner, has 5 pre-sets per band to enable you to reach your choice of station directly.

— A sophisticated double deck cassette system.

— Fully automatic turntable plus a pair of speakers in a black finish.
The *Compact 76* retails for approximately £500.00.

DIGITAL READY COMPETITION

For a chance to win the Sony *Compact 76*, simply answer the questions below on the cut-out form, and send it to *Hi-Fi Choice* by the closing date for entries.

MIDI SYSTEM ENTRY FORM

Choose A, B or C

1 The cassette deck in the Sony Compact 91 features an unusual numeric keypad. This controls (A) timer start (B) 'go to' tape counter reading (C) RMS play/dub? ☐

2 Which component in the Sony Compact 58S uses a keypad selector? (A) the CD player (B) cassette deck (C) tuner. ☐

3 The arm/cartridge resonance of the *PS-LX 910* turntable in the Sony Compact 91 measured (A) just about right (B) too low (C) too high? ☐

Sony Compact Hi-Fi is a natural choice for quality midi systems, because ___

_____

_____ (not more than 20 words)

Name _____

Address _____

Postcode _____

Closing Date For Entries 30th January 1987

Send your entry to Hi-Fi Choice/Sony Competition,
Freepost 7, London W1E 4EZ

RULES

The competition is open to anyone except employees of Hi-Fi Choice (and subsidiary companies) and Sony. All entries must be submitted on the above entry form. No cash alternatives to the prizes shown will be offered. The publishers reserve the right to publish any entry submitted and entries become the property of Hi-Fi Choice. The winners will be notified by post. In the event of more than one correct entry, the winner will be decided by the 'Sony ES' tiebreaker above.

RECOMMENDED

AIWA V4400

AIWA UK LTD, UNIT 2, DUKES ESTATE, WESTERN AVENUE, LONDON W3 0SY.
TEL: 01-993 1672

At its simplest, the *V4400* system is a kind of de luxe version of the *V3300*, with similarities that are much greater than the differences. This means that the *V4400* is well made and well finished, with a very modern set of controls, a restrained if somewhat complex exterior, and the advantage of physically smaller than average packaging. Numerous special convenience features are offered, including a built in clock and timer and automatic source selection. No more groping around with the amplifier when you want to change from records to tape, say. Just press play and you're moving. Furthermore, the *V4400* includes a full function remote control.

Let's compare this system to the *V3300* by running through the components. The turntable is exactly the same. The tuner and amplifier are different, but the differences are minor in both cases. The cassette deck with this system is the *FX-W440*, a twin transport model where the *V3300* has a single transport machine. However, the insides are very similar — to a first approximation the *FX-W440* is simply a 'doubled-up' *330*. (In any case, the *440* is available as an optional extra with the cheaper *V3300* system).

This leaves the loudspeakers. To judge by the covers of the instruction booklets, you'd think that the two systems are quite differently endowed. But somewhere between producing the instructions and putting the systems on sale, someone responsible changed their mind. The current situation is that neither system comes with the loudspeakers listed in the instructions. They both come with what appears to be a lower cost *SX-220* model instead.

LX-330 Turntable

The *LX-330* is no new departure for Aiwa, just a version of their bread and butter midi system parallel tracking turntable. The deck is fully automatic, but without record size or speed sensing (which means the stylus can be lowered onto a bare platter). The arm can only be placed elsewhere than in the run-in groove by shuttling it around with a pair of control keys — a tedious process alleviated partly by the fact that it can be done with the lid up. (Arm in lid players can't do this.)

Structural integrity is up to the usual system turntable standards. Sorry, I meant down. Notice how the response trend is quite flat (ie accurate) through the midband, but also how it rolls off above 2kHz or so.

TX-440 Tuner/Timer

Although there are minor circuit improvements, the *TX-330* is functionally and aesthetically identical to the *TX-440*, which is covered in the *V3300* review, except that it can be operated by remote control.

FX-W440 Cassette Deck

This is a well equipped machine, which is no surprise given that well equipped cassette decks are an Aiwa trademark. It consists of two transports, one a unidirectional unit designed for playback purposes only, and the other a full auto-reverse recording deck. All the usual facilities are there, including Dolby B and the more powerful Dolby C noise reduction systems, continuous play of the two cassettes, and timer controlled recordings, using the multi-event timer packaged with the tuner.

And there's more. One neat device called 'blank skip' will literally skip over prolonged silent passages, such as the end of the shorter side on a musicassette, where no recording has taken place. The tape type is selected automatically, the input level is preset, while a limiter is fitted to prevent tape overload. Although this system works quite satisfactorily for much of the time, it can be caught out badly when recording sources that register unusually high or low on the deck's record level meter. This compromise is designed to make operation slightly easier and more foolproof, but is also unfortunately at the expense of sound quality.

DX-770 CD Player

This compact player is conventionally equipped with a 16-track random order memory, track, programme or disc repeat modes, and the usual range of search modes, all of which worked smoothly and satisfactorily. Unlike an early Aiwa CD player, discs loaded the 'right' way up. The only problem — and it was important in practice — was severely limited tracking ability, leading to quite frequent locked grooves. The player was also shock prone.

MX-440 Amplifier

The *MX-440* amplifier differs only in minor respects from the *V3300's MX-330*. Unfortunately, one of these is that the dearer model has a clumsy electronic volume control, made necessary by the provision of remote control.

SX-220 Loudspeakers

The *SX-220* loudspeakers were discussed at length in the Aiwa *V3300* review. And are no better here than there, you'll not be amazed to discover.

How It Sounds

Although the amplifier in this system is a good deal less sophisticated than the one in the 770 system — on paper at least — and despite the fact that it sounds less overtly detailed, it is almost startlingly better to listen to. It has a more tangible, believable and solid way of presenting music. To take just one example, records sound much more interesting and varied, without any recourse to 'pushiness' or aggression. But the bass was a bit rich — OTT is the right phrase, though not in a particularly destructive sense.

The tape recorder offered broadly the same set of virtues and vices as the single transport *FX-R330* from the *V3300*. It didn't do a wonderful job of coping with some of the test compact discs. It sounded uncertain, volume levels varied significantly, and so did stereo image placement, which was distinctly vague. But in a story that is repeated elsewhere by Aiwa as well as numerous other manufacturers, the player responded well to being used with high bias tapes (metal rather than chrome bias — most of which sounded too bright anyway — and chrome rather than ferric). And to being used without noise reduction, or with the less powerful Dolby B. There was a straight tradeoff here between something that approached the visceral qualities, natural dynamics and unforced nature of real music making (the *FX-W440* isn't that good, but you get the idea), and low hiss levels. The right balance depends partly on the kind of music you're dealing with. Dense, heavy rock should record best without noise reduction, but solo unaccompanied voice will probably require Dolby B at least. Of course, all pre-recorded material will need Dolby B.

Then there is the compact disc player, which can only be described as a disappointment. Anyone new to CD will probably be bowled over by the effortlessness of it all, and the sheer punch and sense of clarity that CD can provide. But even with the very limited potential of this ultimately modest Aiwa system interposed between player and listener, it was all too obvious that the player has a 'samey' quality. It

lacked repose and sounded variously 'hard' and over-emphatic, whereas the reference CD player (on this occasion a Sony CDP-303) produced a sound that was simultaneously easier on the ear, more colourful and better resolved. More natural if you like. Aside from this, the tracking limitations of the player proved to be a serious handicap to extended listening, as I could almost guarantee I would hit trouble at some point on most discs.

The other components have been commented upon in the review of the *V3300* system, and those comments apply equally here. The tuner worked much like the one in the cheaper system, even though they did not share the same model number. There was a suggestion however that the AM bands were a little crisper and easier on the ear, and that the FM circuits were less bright and warmer in the bass. Small differences, but in this system's favour.

Verdict

This is not an easy system to sum up, partly because there's such a spread of ability in the individual units, and partly because at least as far as the manufacturer is concerned, raw sound quality isn't the only issue of importance. In the end, it's all a question of priorities.

The record deck surprised a little by performing rather better than expected, despite the relatively unsatisfactory design priorities it reflects. Similarly, the tuner was pretty satisfactory, even on low-fi AM, and the amplifier also gave quite a good account of itself. But the cassette deck was surprisingly uncompetitive — it simply sounded out of sorts for much of the time. And the CD player was below average sonically for a modern player, your reporter finding it fatiguing. Less surprisingly, the loudspeakers were —well they were what system loudspeakers so often are . . .

But it should not be forgotten that the *V4400* is compact and attractively designed, and that it has a number of operational advantages such as remote control. And that all things considered, it is far from being over-priced.

Test Results

Cost complete _____ £[illegible]
Options? _____ DX-770 CD player
Size main unit - lid open, w/o projections 72×33×37cm (h×w×d)
Size loudspeakers _____ 37.5×22×17cm (h×w×d)

Turntable

Wow & flutter wtd _____ 0.10%
Drift _____ poor
Speed accuracy _____ n/a*
Arm/cartridge resonance _____ n/a*
(<10kHz too low, OK,>14Hz too high)
Cartridge channel balance _____ n/a*
Cartridge channel separation _____ n/a*
Cartridge tracking ability _____ n/a*
*[*test equipment could not be interfaced with system for these tests*

Tuner

Sensitivity _____ fair
Signal/noise _____ good

Cassette Deck

No tape recommendations given
Wow & flutter (wtd) _____ 0.14%
Signal/noise ref 0dB Type II _____ n/a**
Distortion 0dB Type II _____ n/a**
[**]auto record level

Compact Disc Player

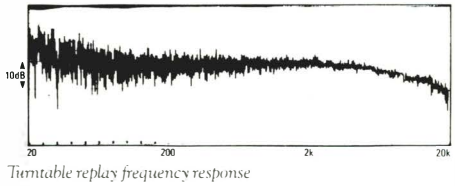
Weighted signal/noise (measured at amp Tape Out) _____ 108dB

Amplifier

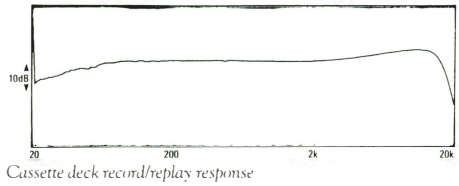
Power output/channel (8ohms) _____ 35 watts
(1kHz both channels driven)

Loudspeakers

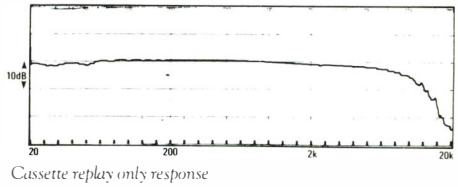
Efficiency _____ medium



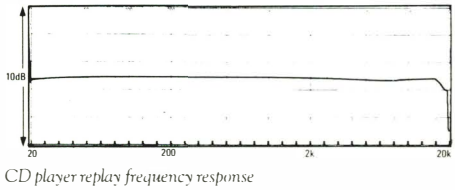
Turntable replay frequency response



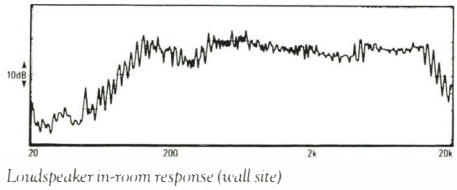
Cassette deck record/replay response



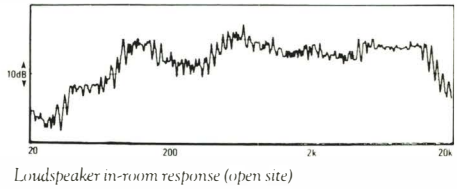
Cassette replay only response



CD player replay frequency response

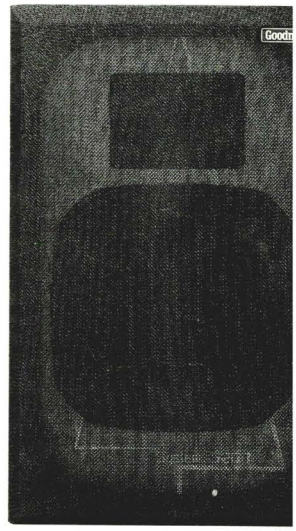


Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

WAIT!



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COMPACT DISC GCD500S

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Telephone 0705 486344

AIWA V7700

AIWA UK LTD, UNIT 2, DUKES ESTATE, WESTERN AVENUE, LONDON W3 0SY.
TEL: 01-993 1672

The *V7700* is a top system in Aiwa's lineup, and costs a cool grand and a half with CD, or £1,250 without. This compact system based on elaborate versions of a standardised range of components, offers 100 watts/channel (on paper — it didn't meet this claim on test), full remote control, a 6-tape twin transport cassette deck (!), unusual dedicated loudspeakers, a control count somewhere in the low zillions, and a strong 'family' feel. Operating the system will prove a doddle to anyone with a Master's degree and an IQ above 180.

Supplied with the system is a low rise unit called the *RC77* which acts as a receiver for the remote control, as a distribution centre for commands received, and as a receptacle for the infra-red handset when not in use. The handset allows remote access to all normal functions including power on/off, volume controls, source selection and initiation — and all with the bare minimum of control buttons.

LX-770 Turntable

Although this unit has full programmed play (you probably won't bother because it's so tediously slow) and intro-play (a few seconds from each track), the main feature is automatically synchronised recordings, so that the tape is paused when the arm lifts. The moving bits are conceptually like the other Aiwa turntables, but the automation extends to record speed/size sensing, and the platter especially is rather better built than you might expect. The way the deck behaves suggests a high arm/cartridge resonant frequency, which controls feedback and handling problems at some expense of bass quality.

TX-770 Tuner/Timer

Apart from incorporating high blend (partial mono-ing of stereo FM signals to give some relief from noise when tuning weak stereo FM transmissions), the *TX-770* offers facilities identical to the tuner in the other Aiwa systems, notably presets for 8 FM stations and 8 for MW and LW, and a 5 event daily/weekly timer. Off-air performance, however, is improved, especially on MW and LW.

FX-A770 Cassette Deck

This deck is something else . . . The right hand transport has auto tape sensing, Dolby B and C, manual record level (good) and synchronised recording capabilities from the other source components. It also has full auto-reverse, and can record continuously for 90 minutes on a C-90. Synchronised dubbings are permissible, at normal or high speed, the latter at a considerable sound quality penalty. The left hand transport, which also has an auto-reverse capability, accepts up to five cassettes in a loading box (two of which are supplied with the system), and has a 15-track memory. If you're not thoroughly fazed by now, it will also record up to five separate timed sequences (such as radio programmes) automatically, one per tape, which makes some sense of the sophisticated timer facilities in the tuner.

Other features on the single-tape transport include blank skip (yes that's right . . .) and track search.

Operation is complex, but not unnecessarily so in context. The deck works smoothly but slowly when shuffling tapes in the cartridge loader. Measured performance is good, allowing for a touch of (probably designed-in) brightness in the record/playback response. Pre-recorded cassettes, on the other hand, showed considerable treble loss.

DX-770 CD Player

This compact player is conventionally equipped with a 16-track random order memory, track, programme or disc repeat modes, and the usual range of search modes, all of which worked smoothly and satisfactorily. Unlike an early Aiwa CD player, discs loaded the 'right' way up. The only problem — and it was important in practice — was severely limited tracking ability, leading to quite frequent locked grooves. The player was also shock prone.

SX-E77 Loudspeakers

For the most part, the *SX-E77* loudspeakers are straightforward three-way, sealed-box designs. The bass and midrange units employ quite well built flat diaphragm drive units, whilst the tweeter is a much less sophisticated large cone. The enclosure is quite strong and the unit has a proper crossover network. Main criticisms of the speaker in this basic form relate to the resonant and gaudy plastic trims around the drivers, and some lack of enclosure control in the form of bracing or damping.

The gimmick (I use the word advisedly) is a microphone in front of the bass driver which monitors its output, and feeds the information back to the power amplifier input *via* some kind of comparator which generates a 'correction' signal. The idea is that the speaker will be forced to do the comparator circuit's bidding. A vaguely similar system was designed many years ago by Philips under the Motional Feedback banner to extract lots of bass from small boxes, which is the main claim for the Aiwa too. The problem then and now though is that the system only works properly for steady state signals, and that music is composed largely of transients.

The loudspeakers' in-room plots tell the story of a very uneven design through the midrange and treble. Used adjacent to or away from walls, the speaker is also extremely peaky in the bass. Switching AFBS on extends the bass and reduces the peak.

GX/BX770 Amplifiers

Facilities available on the *GX-770* pre-amplifier differ very little from those of the integrated amplifiers on the other Aiwa systems tested, apart from those power amplifier features already discussed. The main features list illustrates this well: 7-band equaliser, surround sound (more like a stereo wide switch which requires two extra loudspeakers), DSL bass boost (rather like loudness), microphone input, automatic source selection, and remote control. However, the power amp has a spectrum analyser to complement the pre-amp's graphic equaliser. Note also the electronic volume control: although unusually fast acting, the controls are small and easily overlooked.

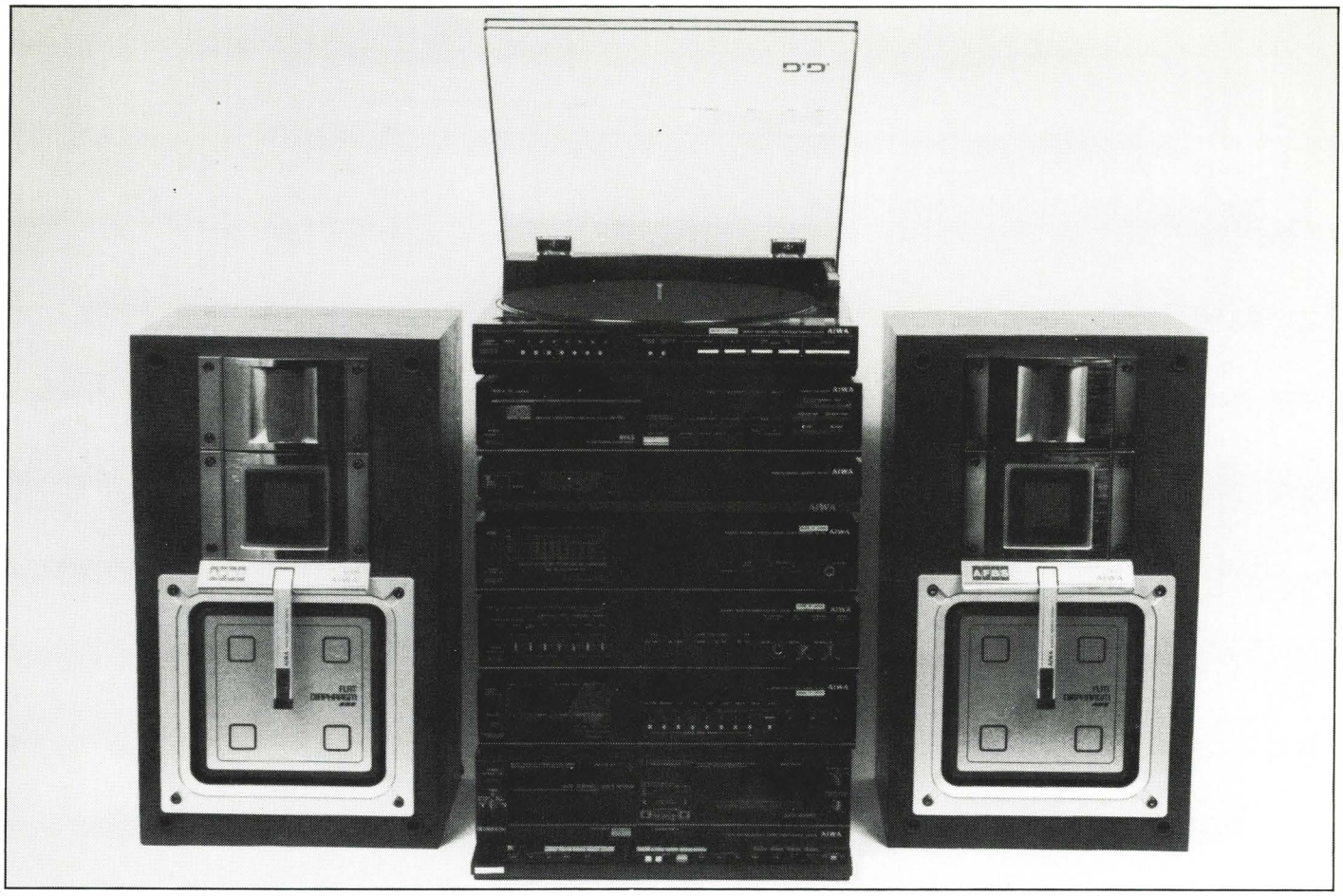
The *BX-770* power amplifier, which delivered a substantial 80 watts/channel on test, can drive two pairs of loudspeakers plus a pair for the surround option. However, it is not well equipped to drive more than one pair of loudspeakers.

How It Sounds

The tuner on FM was the most satisfying part of this system. It sounded clear and clean, and did so consistently with well repressed noise levels almost regardless of signal strength. The tape deck also worked well, once I had worked out how to drive it. It turned out to have fine stability and precision, the sound 'thinning' in the mid and expanding in the bass a little at high levels. The sonic improvements without noise reduction like the other Aiwa systems was apparent here too, but to a much lesser extent, which implies better designed or aligned noise reduction circuitry.

Records reproduced little better and in some respects worse than with the cheaper Aiwa systems. Intriguingly, there was a more explicit sense of image placement, in depth especially, than was the case with the rather hard and ungraceful sounding CD player. But the sound was a bit 'tight' and 'dry', with quite good detail in the upper midband but not higher up.

CD reproduction was tidy enough and certainly impressive in many ways. But again the



sound seemed 'laboured', rather uninviting, and ultimately wanting in detail. The deck was also a poor tracker.

As implied earlier, the loudspeakers were no more nor less than a shambles with the AFBS feedback circuit switched on. Much of the subtle ambient information was stripped from the sound, with losses of depth, image scale and high end delicacy as well. The effect was something like the 'crispening' circuits of a video recorder — the feedback circuit adds an artificial reinforcement to the more obvious transient leading edges, whilst riding roughshod over the smaller scale, more subtle nuances. It also lifted the upper bass unmercifully.

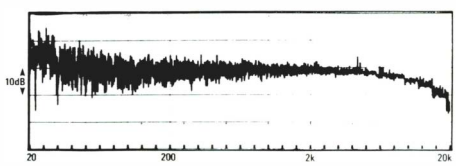
Adding AFBS (it can be switched out) also makes the sound richer, and pushes it even more forward. Its musical relevance is hard to determine as some fine single instrument recordings became a travesty that would have been funny if it hadn't so exposed the designers' insensitivity. Switching AFBS out made the speaker sound leaner, cleaner and faster, but with a rather crude, 'forward' quality that still lagged a long way behind the reference B&W *DM110*s. Nevertheless this is the only way to use them.

Verdict

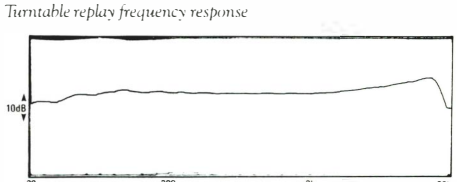
The multi-tape capability will certainly come in handy if your hobby happens to be radio station logging. In all respects the equipment level of this system is impressive, but sound quality in certain key areas is inferior to the cheaper Aiwa systems, added to which the cost is higher than the ease of use. While it is certainly worth considering, a formal Recommended flash must be omitted.

Test Results

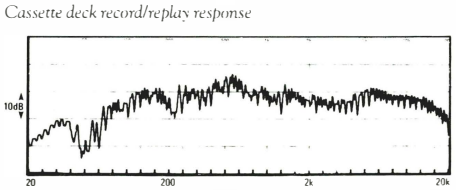
Cost complete	£1500
Options?	DX-770 CD player
Size main unit - lid open, w/o projections	83×33×38cm (h×w×d)
Size loudspeakers	49×27×22cm (h×w×d)
Turntable	
Wow & flutter wtd	0.09%
Drift	good
Speed accuracy	+0.3%
Arm/cartridge resonance	16Hz, too high
(<10kHz too low, OK, >14Hz too high)	
Cartridge channel balance	0.7dB
Cartridge channel separation	–30dB
Cartridge tracking ability	79uM
Tuner	
Sensitivity	good
Signal/noise	good
Cassette Deck	
No tape recommendations given	
Wow & flutter (wtd)	0.08%
Signal/noise ref 0dB Type II	48dB
Distortion 0dB Type II	1.4%
Compact Disc Player	
Weighted signal/noise (measured at amp Tape Out)	108dB
Amplifier	
Power output/channel (8ohms)	80 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	medium



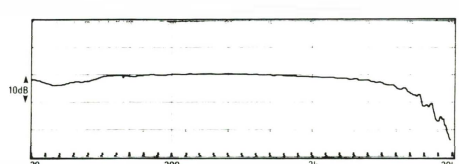
Turntable replay frequency response



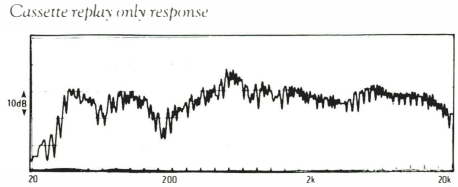
Cassette deck record/replay response



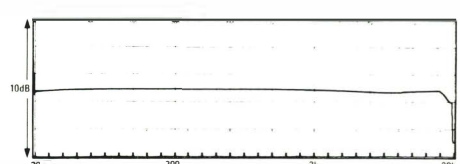
Loudspeaker in-room response (wall site)



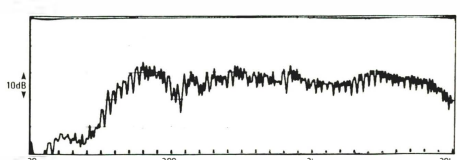
Cassette replay only response



Loudspeaker in-room response (open site)



CD player replay frequency response



Loudspeaker in-room response AFBS off (open site)

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AKAI SYSTEM 313W

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Most of Akai's recent systems have had about them an air of uncompromising — almost self-conscious — *joi de technologie*. The *313W* illustrates this peculiarly Japanese syndrome perfectly, but it's also a little more elegant than many of its peers. And except where the gadget department really went over the top, it's an unusually pleasant system to use.

The basic system reviewed here consists of a so-called control centre, which in reality is a tuner/amplifier, plus a twin transport cassette deck, a CD player, a record deck, and a pair of loudspeakers; the CD player is an option. Amongst other options, but not included with the review hardware, is a programme timer, so that recordings can be made whilst you're out shooting pheasant or whatever. The control centre and the lower part of the cassette deck are angled slightly upwards, giving the system an accessible, friendly wrap-around feel.

AP-M313 Turntable

Unusually, the early RIAA amplification/equalisation stage of the amplifier needed for the magnetic cartridge, is built into the turntable housing. This is actually no bad idea, but the claimed advantage, that the cartridge 'sees' a more consistently specified electrical load, is largely spurious. A bit like saying that parallel tracking arms are designed to emulate cutter heads and give more accurate tracking geometry. (Where the truth is that the errors required to make such arms work totally swamp the essentially meaningless errors in a pivoted arm.)

The deck itself is quite heavily built, but the platter is light in weight and its bearing weak, allowing a lot of flexure in the system. The arm is one of those technology-gone-riot jobs. It's built into the lid, presumably so that it cannot be operated by hand whatever happens, and you're forced to use the tedious shuttle keys to find a desired spot on a record with the lid closed — by which time both arm and record are all but invisible. Operation is automatic, but unusually in this class of player it is possible to lower the stylus on the bare rubber mat, with unfortunate consequences.

The response shape produced by the player was respectable, and so was speed stability, but the deck proved easily upset by feedback, reproduction quality becoming badly coloured as volume levels were increased. Several of the normal tests couldn't be run in the absence of a normal output to the amplifier. But from more empirical testing it became obvious that the player had very limited tracking margins, and the cartridge was badly upset by 'hot' pressings.

Cassette Deck

The cassette deck is a lot less tricky than the turntable. It's the kind of product you'll certainly be able to pick up by Braille, even though it has all the mod cons to confuse you, like high as well as normal speed dubbing and continuous play. Other facilities include Dolby B noise reduction and a very useful automatic tape selection device.

The deck also has an auto record level facility, but it works without the usual high level of volume pumping — more like a single preset level in fact. Nevertheless, it was felt unwise to attempt to reproduce noise and distortion figures in this case. The record/playback response shape (Type II) was smooth and even, rising gently into the treble. The playback response showed relatively small high frequency losses.

CD Player

The CD player is as visually uncluttered as the cassette deck, and provides a perfectly normal range of simple facilities, like track search (audible) and skip, a 36-step programme memory, A-B repeat (repeat between two randomly set points), index search (useful, and still quite uncommon on budget players), and a subcode output (for TV signals which will at some point accompany music programmes). The display is clear and attractive — it's an unusual back-lit LCD — but it cannot show track numbers and time information simultaneously.

AV-M313L Control Centre

Strip away all the fancy front panel graphics, which in any case are less useful than they seem, and you're left with a fairly ordinary but powerful 50 watt/channel (measured) amplifier with a 5 band equaliser, and a 16-preset tuner (all of which can be used on any band).

The amplifier differs from normal practice in being able to route video and audio signals from a VCR and, say, a videodisc player as well as the normal range of audio only inputs. A rudimentary surround sound system is fitted, a variation on the Hafler system (an inferior variation, with phase shifting to give bigger, but more confused surround signals). The other feature is the display of power levels (no differentiation between left and right hand channels is shown), volume control setting (in five steps only!) and selected input. An 'off' switch is the obvious omission.

The tuner worked well, though some annoying whistles crept into the FM feed at low signal levels. A remote control for the main tuner and amplifier facilities only is included.

SR-UM313, AE-S90

Loudspeakers

Finally, the *SR-UM313* main loudspeakers are best used away from the wall to avoid the high-Q resonance at 100Hz. Note that extreme bass and treble are both missing. The speakers, which are made in this country, have false painted-on flat square styling trim on conventional drivers, a subterfuge that reflects no credit on Akai.

Also included with the review system was a pair of small plasticky speakers (type *AE-S90*) for the surround role. They're broadly in the portable radio quality league.

How It Sounds

The loudspeakers were something of a let down. Scoring about five out of ten, they have a rather coarse, dull top end and sounded boxy, but the all important midband was clear and open.

The amplifier is good — one of the best tested in fact. It goes satisfyingly loud without distress, and within its generous working ceiling has a clear, relatively unprocessed quality that makes it a simple pleasure to sit down and listen. I exempt from this, however, the rather peculiar surround sound option. The loudspeakers that were supplied for this purpose were shambolic, sticking out like a sore thumb regardless of the volume setting. In fact the level of the surround speakers was always too high when they were

on at all, and the effect was anomalous, smearing cymbals all round the room and adding nothing to an impression of solid space or instrumental positioning.

The CD player and tape recorder are of intrinsically good quality too. The CD player simply sounded like a very acceptable budget player, no more and no less, but with a softer, more laid back midband presentation than usual.

The tape deck was even more impressive, however. Despite the lack of manual record level setting, it still retained reasonably taut bass and well resolved treble. This applied with or without Dolby B noise reduction, and with different tape types. But as usual I wouldn't wish high speed dubbed tapes on my worst enemy, and nor should you.

All too predictably, records fared rather less well through this system. The sounds they made were peculiarly coloured, with a thin, prominent top, a soggy, shallow bass, and a lack of midrange presence. It's the kind of sound that will confirm many people's worst prejudices about black vinyl in this digital era, and of course the impression is undeserved and false. Even a cursory glance through this publication will show that Akai are hardly alone in these sins, but it's doubly disappointing to have to report them when the rest of the equipment is so sound.

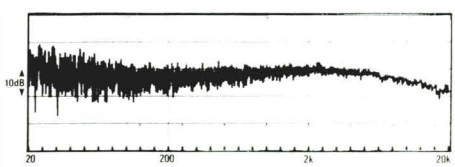
Finally, the tuner performed well, as long as it wasn't required to deal with very weak FM stations, where the nature of the noise buildup was less than pleasant. AM sound quality proved quite reasonable, though lacking some top end 'air'.

Verdict

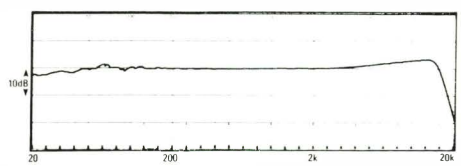
Forget this system if you're into records, and it also seems prudent to think in terms of replacement loudspeakers, if not immediately then in the foreseeable future. Most decent budget speakers will work well with this system, which from tape, radio and CD souces sounded surprisingly good. Aesthetics are unusual, but not all bad.

Test Results

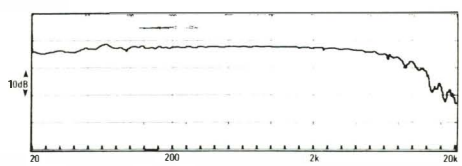
Cost complete	£679.80
Options?	CD-M515 CD player, DT-M515 timer
	S90 surround speakers
Size main unit	66×35×36cm (h×w×d)
Size loudspeakers	36×23×17cm (h×w×d)
Turntable	
Wow & flutter wtd	0.07%
Drift	average
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
(<10kHz too low, OK, >14Hz too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*
[*]turntable could not be interfaced with test equipment	
Tuner	
Sensitivity	good
Signal/noise	fair
Cassette Deck	
Wow & flutter (wtd)	0.18%
Signal/noise ref 0dB Type II	n/a*
Distortion 0dB Type II	n/a*
[**]auto record level	
Compact Disc Player	
Signal/noise (measured at amp Tape Out)	92dB
Amplifier	
Power output/channel (8ohms)	50 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	very high



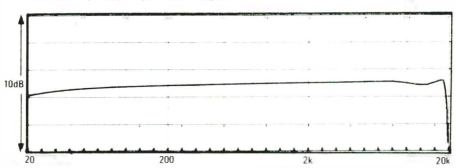
Turntable replay frequency response



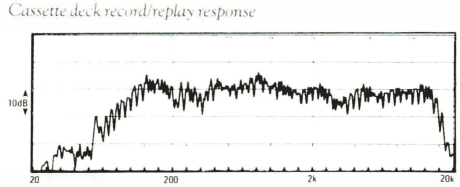
Cassette deck record/replay response



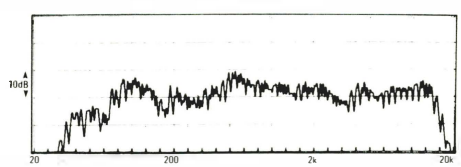
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

AKAI SYSTEM 990

AKAI (UK) LTD, 12 HASLEMERE HEATHROW ESTATE, SILVER JUBILEE WAY, HOUNSLOW, MIDDLESEX. TEL: 01-897 6388

Akai have had a good and largely successful bash at creating a system for all reasons — one that will fulfil any reasonable requirement, and quite a few unreasonable ones too. But the entry price to the gates of Valhalla is high — and even then the 990 shows some noticeable shortcomings compared to a carefully chosen separates system. And another thing: this system is a very, very long way from being granny-proof. In fact it is one of the most obscure pieces of ergonomic design I've come across in a very long time, made all the more remarkable by the fact that it is avowedly straightforward to use.

But practice makes perfect, as the saying goes. And those who persevere may even come to make sense of the London Underground-like LED status display maps all over the front panels. There is better reason to appreciate the full function remote control, and powerful interactive circuitry like auto source selection — with its inverse, the ability to initiate play or start any source merely by pressing the appropriate input selector on the amplifier front panel.

AP-M77T TURNTABLE

This belt driven *AP-M77T* is one of the most technology-intensive turntables the author has come across to date. Merely to list and adequately explain all its features would take up more space than is available. Highlights include a platter that slides half-way out to accept the record: the advantage here is that the deck may then be used at the bottom of the equipment stack, where it should be less affected by any mechanical shocks. To play a record the drawer then slides gracefully half-way in, and a lid then covers the remaining exposed section. The logic here is that the deck can be shallower than an LP, but a disadvantage is that the record doesn't have a full-size platter support. The arm is optically guided and parallel tracking.

Further to the usual range of automation, the arm is prevented from lowering onto an uncovered platter. Up to 15 tracks can be programmed into memory, and recorded with necessary pauses applied automatically onto cassette. An intro-scan feature is also fitted. A final warning: beware of the internal transit screw, and be careful not to scratch records (this may prove difficult) when placing them on the vestigial platter.

AT-M77L TUNER

For those who want to turn an expensive audio system into an overgrown alarm clock, the ten preset digital FM/MW/LW tuner includes a sophisticated 4 event 7 day timer, each event including on and off times and the option of being repeated daily. There's also a snooze mode, just like your bedside clock/radio.

HX-M88W CASSETTE DECK

The all-singing twin transport *HX-M88* records on both decks, and both have auto-reverse too. Record level adjustment mercifully is manual, and a luxury touch is the illuminated cassette wells, so you can see how much tape is remaining. The switchable options include both sides or one side only uninterrupted recording, sequential recording and playback (three hours continuous recording using C90s — imagine!), and parallel recording (the pirate mode). Dolby C noise reduction is another extra, and well laid out light touch pads control the transports.

Wow and flutter was high but also varied, which suggests a sample fault. The frequency response plots show that the deck was misaligned for chrome (Type II) tapes; metal tapes also sounded rather 'thin' and 'bright'.

The frequency response plots cannot be reproduced, because the blank-skip feature refused to believe that a gliding tone at −20dB wasn't pure silence! However both playback and record/playback responses are well tailored, though the Type II record/playback response rises around 3.5dB by 18kHz.

Almost uniquely, that blank-skip device cannot be switched off, so prolonged very quiet musical passages of the kind particularly found in the classical field could cause the deck to wind past the offending passage. I admit I couldn't induce it without recording at absurdly low levels, but I still worry that it could happen with certain material.

CD-M88T PLAYER

This is a fairly expensive CD player in its own right, but having been available for something like two years, it is now beginning to look rather dated. It works well enough, and includes some quite sophisticated facilities: a comprehensive memory, A-B and other repeat modes, and remote control *via* its own full function remote handset, or *via* a subset of the controls on the system handset. But the operating logic is unnecessarily obscure, and the display is of the budget type — time or track and index numbers, but not together. Tracking problems were betrayed by the familiar muted 'click - click' even on some visually unblemished discs. The response shape indicates a lifted high frequency response.

AM-M77 AMPLIFIER

Further to the automatic features already discussed, the amplifier delivers 50 watts/channel, and is fitted with an electronic strip volume control. This is inconvenient to use, but the circuitry topology facilitates remote control. Two loudspeaker sets may be driven, and there are microphone and auxiliary inputs.

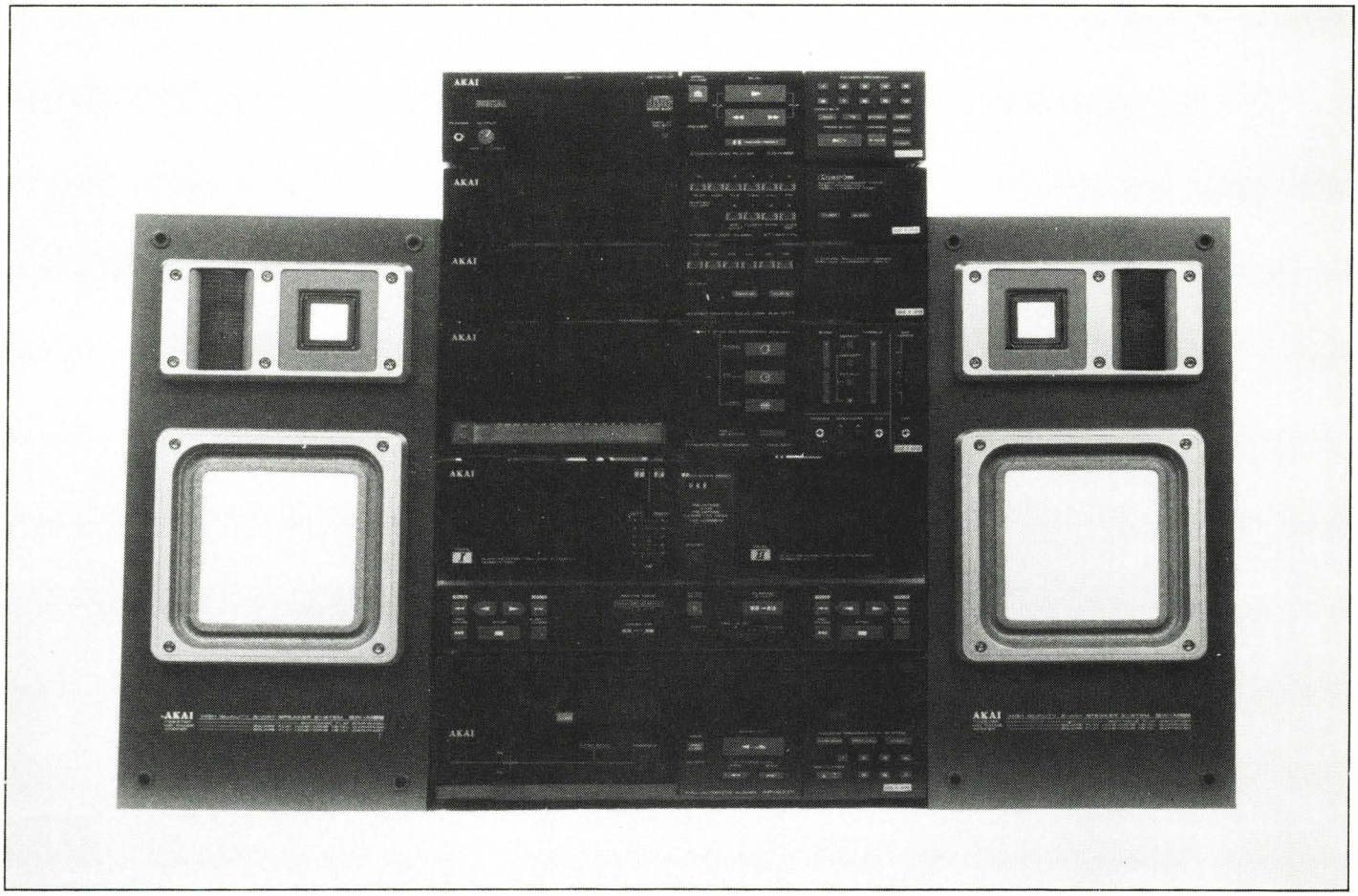
SW-M88 LOUDSPEAKERS

Build quality of the 3-way Japanese made loudspeakers was surprisingly good. The enclosures were solid and quite well sealed, with some internal wadding. The crossover and drive units appear to be well made, but I was amused to discover that the 'flat square' bass panel was mounted on an ordinary pulp cone, which cannot do much for the cone mass figure (this should be as light as possible, though it isn't the only important factor)..

HOW IT SOUNDS

Cassette deck sound quality seemed somehow 'caricatured', with a falsely sibilant vocal edge and rather 'splattery' top. However, resolution of fine detail was of a high order. The timbre of bass instruments also changed somewhat, but this was not unpleasant — just different.

The kind of electronics responsible for all the turntable magic has never been a very successful



recipe for good sound. For all the slickness and despite a favoured position at the bottom of the equipment stack, it proved even more violently microphonic than usual. Sonically it all sounded reasonably tidy, helped by a quite good cartridge, but the low frequencies were under poor control. Stereo images lacked depth and definition, whilst loud, foreground instruments tended to swamp minor detail in a way that didn't happen with the CD player, to give just one example.

In contrast, compact discs worked very well. The *CD-M88* is widely acknowledged as a good sounding player, despite a slightly aggressive quality, and some hardness that became apparent during the loudest passages.

The tuner, however, had problems. As well as being rather noisy in most conditions of use, the optimum tuning point varied with aerial input strength, so it is possible to lose either stereo or the station itself as the signal varies between very weak and just weak, or strong and very strong. However, selectivity was good. The sound on the FM band was rather 'edgy' at the best of times, but the AM bands weren't bad.

The best kept surprise of the system was the performance of those rather strange loudspeakers. They're a bit mongrel-like it's true, but they have a certain quality in the bass and midband that should win them many friends. The bass itself is under better control than usual, and its level and weight is in good proportion to balance the rest of the system. The midband was clear, detailed, and reasonably uncoloured aided by the 'dry' but 'punchy' sounding amplifier. However, the speakers very nearly came to grief where the upper midband meets the treble; here there was a hard, 'emphatic' quality. For all that, it remains one of the better system loudspeakers tested.

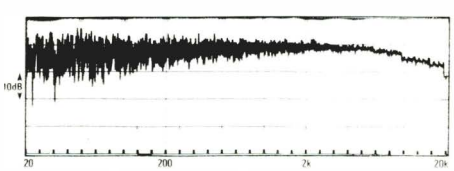
Verdict

A heavy emphasis on gadgetry has produced a system that is much less user friendly than lower cost systems from the same manufacturer, while the sonics are nondescript at best. Value for money doesn't really enter this question.

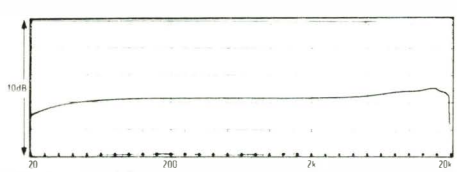
Test Results

Cost complete	£1400
Options?	Equaliser EA-M20 £99.90
Size main unit	55×35×25cm (h×w×d)
Size loudspeakers	44×22×22.5cm (h×w×d)
Turntable	
Wow & flutter wtd	0.11%
Drift	poor
Speed accuracy	+0.6%
Arm/cartridge resonance	unmeasurable
(<10kHz too low, OK,> too high)	
Cartridge channel balance	1.0dB
Cartridge channel separation	–27dB
Cartridge tracking ability	77μm
Tuner	
Sensitivity	fair
Signal/noise	poor
Cassette Deck	
Wow & flutter (wtd)	0.7%
Signal/noise ref 0dB Type II	55dB
Distortion 0dB Type II	3.0%
Compact Disc Player	
Weighted signal/noise (measured at Amp Tape Out)	92dB
Amplifier	
Power output/channel (8ohms)	50 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	medium

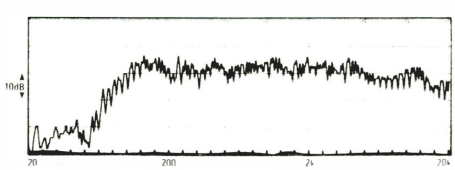
Note: This system is pictured with the EA-M77 equaliser (3rd item from top) which has since been replaced by the EA-M20 equaliser, which is optional



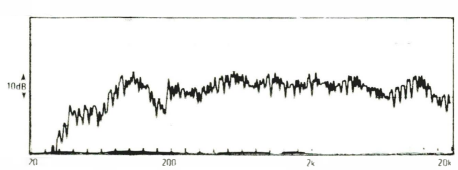
Turntable replay frequency response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

ALBA MS700CD

ALBA RADIO LTD, HARVARD HOUSE, 14-16 THAMES ROAD, BARKING, ESSEX IG11 0HX.
TEL: 01-594 5533

The Alba name may be familiar to many older readers, but this product does not come from the original company, which has been defunct for years. Alba is now more a flag of convenience for a system which is actually made in Taiwan for its importer, Harvard Electronics.

The *MS700CD* was designed to exploit the recently developed market for complete, integrated systems at the £300 level or below. Although the specific combination of features and the controls layout is unique to Alba, the package actually offers a very similar blend of vices and virtues to the similarly priced products from Binatone and Amstrad, also reviewed in this issue of *Hi-fi Choice*.

In common with its peers, and perhaps inevitably at the price, the Alba is poorly built. For example major controls like the function selection switches feel floppy, weak and also vulnerable. On the other hand the CD player, a refugee from the Euroduty-protected Philips stable, is entirely adequate. And apart from the silly (and totally meaningless) power level display amidships, styling is a good deal less crass than someone could name. Even the loudspeakers look smart and restrained, apart from the (inaccurate) frequency response printed onto the trim.

Main Unit

The facilities provided by Alba are really very straightforward, and for the most part sensible.

Starting at the top, the record deck is made from the usual range of plastic mouldings, even the platter — which probably explains why record reproduction is always accompanied by hum. I should add here that record handling is abysmal. There was no proper mat to protect the record, and the arm, which descends onto the record with a meaty plonk, is almost impossible to control using the undamped cueing platform. It's all or nothing . . . And as for microphony, frankly it's best to draw a veil over such things. The cartridge response is very bumpy, with an odd discontinuity at 250Hz (probably an arm structural resonance), and a peak near 5kHz. But speed stability wasn't too bad.

The radio covers the usual FM, MW and LW, manually tuned by a very stiff edgeways tuning knob, but with a long, clear tuning scale. The next row of controls down flank the already mentioned output level display, and is concerned with the various amplifier facilities. On one side there is the 5-band graphic equaliser, whilst those on the other side select sources, change wavebands, switch between mono and stereo, and adjust volume and balance. These controls are very readily confused with one another. Power output checked out at 6 watts/channel.

The cassette section has the usual twin transports, one of which is for playback use. The controls are mechanical, but quite well designed as mechanical controls go. There are also high speed dubbing and continuous play features, and microphone inputs. But only standard Type I ferric tapes can be used, and record levels are set automatically, with the usual advantages in operator ease and disadvantages in sound quality. Autostop operates only on play and record modes. The record and playback only responses are well shaped but are rolled off above 5kHz, which appears to be a system characteristic.

Finally, the CD player will be familiar to Philips *afficionados*. It includes a 20-track programme memory, index-search, track-skip and audible scan, plus an either/or time and track/index number display. Clearly the CD player is the stand-out item here, but the amplifier (monitored *via* the heaphone socket) rolls the top end response away sharply above 5kHz, so the end result isn't in the same league as similar CD players from other systems

Loudspeakers

Apart from looking fairly restrained, not much can be said about these louspeakers since they were clearly never meant to be opened (surely this isn't good news for the service department?). However, what can be told is that there are two very rough and ready drive units, mounted from behind the baffle, and that the enclosure is compact, attractive — yet far too lightly built to do its job effectively. The measured response shape looks very uneven. Output is quite strongly bandlimited and very peaky, almost regardless of loudspeaker position relative to the room boundaries.

How It Sounds

There were some curious and largely inexplicable differences in the sound of the record player from one disc to another. Sometimes it would reproduce known records as a messy and almost incomprehensible blurr, while at others it sounded much better, though even then this meant no more than that the sound was heavy and opaque, with a hard coarseness and no real treble. Additionally, and as a constant aside with all the records tried, the system produced undesirable by-products like excessive record surface noise and significant levels of hum. With an integrated system like this, how do you approach the task of reducing hum levels, which generally implies at least a rewiring exercise, without riding roughshod over the terms of the guarantee?

Both the tuner and CD player worked quite adequately. The Philips CD player is of course governed by Philips internal standards, and by the system amplifier and loudspeakers. Auditioned *via* the headphone socket, the sound of little silver disc was rather dull but still pretty good.

The tuner also sounded pretty good. (In fact it sounded very similar indeed to the Binatone one, and not that different from the Amstrad circuit.) There was some muzziness and a lack of body and 'balls', but this apart only excessive noise at low signal levels caused any reservations. AM sound quality was really quite good, but depends on how the system is positioned since there is no other way of orienting the aerial. However, these comments only held when listening was done *via* the heaphone output: through the main amplifier, even with decent third-party loudspeakers, the rot set in.

Cassette deck performance is something of a joke. Any time one of the controls on the unused deck was used whilst a tape was playing, that transport does a 'blip,' varying speed momentarily. Much more important than this was the absurdly high basic hiss level off this deck, both when replaying pre-recorded tapes and when recording and playing back. The lack of Dolby isn't the only explanation for a level of noise that was perfectly audible during *fortissimi*, and which threatened to engulf the music at other times.

Adding high speed dubbing to this mess — I use my words advisedly — is specmanship of the most cynical order. There can be no reasonable pretence that it provides a feature that the public wants when the results provided are so patently absurd. Auditioning recordings made by this process is rather like listening to one of those original Thomas Edison phonograph recordings where the sound is almost drowned in

a sea of noise. It's true that speed stability was not offensively poor most of the time, and tape-to-head contact seemed relatively good judging by the stability of high frequency output. But an awful lot needs to be done to raise the performance of the deck even to that of a decent portable.

Then we come to the amplifier and loudspeakers, which in many ways are the keynote items in any integrated system. Listening notes describe the Alba as producing one of the blandest outputs heard during the preparation for this issue. But this applied only at low and moderate volume levels. The amplifier and loudspeakers alike are quite incapable of handling level, so the music screams as soon as the volume is raised, which is sufficient inducement to turn it back down. Treble is non-existent apart from a phasey, screwed up effect at the top of the passband of the tweeter, probably a symptom of loss of control. There was no bass whatsoever. The entire bottom octave normally available with speakers this size was absent. Whole sections of orchestras — bass and cellos especially — just disappeared.

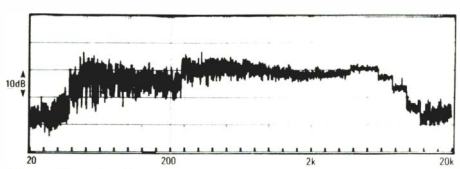
Verdict

The key question is not how good can a £300 system sound, but whether £300 is enough to buy even a half-way decent package that would do credit, for example, to a reasonable portable radio or cassette. The answer, clearly, is no. Readers are strongly advised to ignore the evidence of the eyes, which shows a product with a well filled fascia and bags of perceived value, in favour of the evidence of the ears, which will hear an equally persuasive but for most people contradictory message.

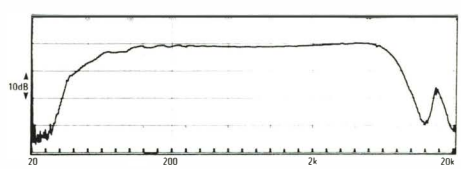
Around £60 more will buy a similarly packaged system that is built far better and that performs much better. Such a system could well end up a less costly purchase in the long run. Best of all, at the same price there are some truly fine one source systems (usually based on records) which can be expanded to take in other sources as funds permits.

Test Results

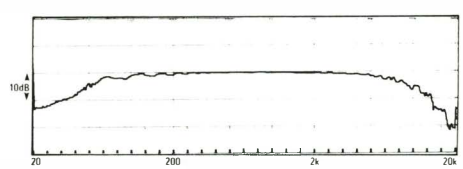
Cost with speakers	£330
Options?	none
Size main unit - lid open, W/O projections	67×34×40cm (h×w×d)
Size loudspeakers	35.5×20×15cm (h×w×d)
Turntable	
Wow & flutter wtd	0.17%
Drift	poor
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
(<10kHz too low, OK,> 14Hz too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*
[*] turntable could not be connected to test equipment	
Tuner	
Sensitivity	fair
Signal/noise	poor
Cassette Deck	
Wow & flutter (wtd)	0.42%
Signal/noise ref 0dB Type II	n/a**
Distortion 0dB Type II	n/a**
[**]auto recorded level	
Compact Disc Player	
Weighted signal/noise (measured at amp Tape Out)	82dB
Amplifier	
Power output/channel (8ohms)	6 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	high



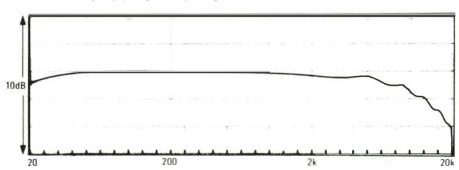
Turntable replay frequency response



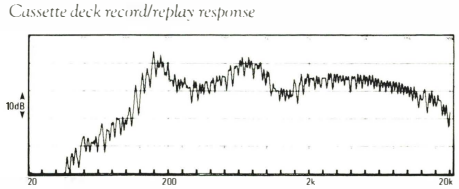
Cassette deck record/replay response



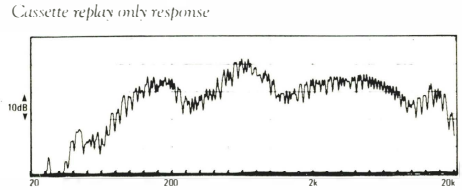
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

AMSTRAD CD-1000

AMSTRAD CONSUMER ELECTRONICS PLC, BRENTWOOD HOUSE, 169 KINGS ROAD, BRENTWOOD, ESSEX CM14 4EF. TEL: (0277) 228888

For some years, Amstrad have been leaders in the very low cost end of the audio systems market, having established themselves as a force to be reckoned with by popularising the budget 'tower system' concept.

With the advent of cheap compact disc audio systems, Amstrad might have been expected to continue their market leadership, but it seems that the title has been grabbed by Philips, despite their similarly equipped model costing about £50 more. There were signs just before going to press that the Amstrad's price was being cut in some outlets, even though the system has only been on sale for a very short time. The price printed in the specifications section (£299.95) may therefore not be representative by the time this publication reaches the bookstalls.

There are more similarities to others in Amstrad's peer group than differences, both in physical construction and in matters more directly connected with performance. Build quality is low, judged on the amount of spit and polish evident from the outside. Styling is on the tacky side, and the controls generally feel poor. Some of them — the source switches particularly — caused odd impulsive noises through the loudspeakers when used.

Main Unit

The system is built around an amplifier with a 9 watt/channel output (the specifications say 10 watts RMS, so exaggerate only mildly), and a 5-band equaliser. There are no spare in- or outputs unless you count a pair of microphone sockets.

The other hardware is much as expected, starting with a highly microphonic and hum-prone plastic, belt-driven turntable, thankfully fitted with a magnetic not ceramic cartridge. A platter edge stroboscope tripped the Amstrad up: it indicated that the deck was running fast — which it was, with no obvious way of correcting the error. Another petty annoyance was the shut off mechanism, which doesn't lift off at end-of-side, but simply cuts the power to the motor. Furthermore the turntable cover is not spring-loaded and has no 'stop,' It simply flops unceremoniously around.

The FM/MW/LW tuner is a manual or analogue type with a clear tuning scale, an illuminated pointer, and a mono switch. The cassette deck is a no-frills device with auto record level, no noise reduction, and options of normal speed dubbing and continuous play. The Philips-based CD player offered sequential track skip in the forward direction only, by holding the play button down and waiting. Audible track search is also included, but no programme memory, no time displays, and no repeat mode.

The cartridge measures better than others at this price level. Similarly, the playback performance of the cassette deck (using prerecorded material) and the CD response shape were perfectly satisfactory, though neither could be described as anything like neutral or accurate.

One cause of real annoyance, however, was the so-called metal and chrome tape compatibility, announced by a 'Metal' flash and a 'normal' or 'metal/CrO2' selector switch. It is a sham. The instructions clearly suggest that metal and chrome tape can be used for recordings, yet different bias setting apply with metal and chrome, so one switch position (which is all the Amstrad has for both types) cannot allow compatibility with both. Worse still, the tape selection button has no effect on playback, which it should have to give compatibility with either chrome or metal replay. Our tests demonstrated that the only tape that could be described as compatible on recording or playback was standard ferric (Type I) tape. Even then, output increased with increasing frequency across the band, but upper treble is very severely truncated, and bass non-existent.

Loudspeakers

Within their chubby dimensions, the sealed Amstrad speakers include two low grade drive units. The enclosure is not as shoddy as some, but it's hardly promising stuff. The in-room frequency responses are inherently uneven, but favour use well away from the walls of the listening room (on tall stands if possible). This is how they were used.

How It Sounds

As you'll read, the overall performance of this system is broadly like other similarly priced systems. But it is a little less uncouth in certain areas. However, the system displayed one very serious problem which was noticeable only when playing loud, densely recorded passages — from compact disc, radio, tape or records alike, but especially compact discs. With this type of material a kind of 'halo' of very gross distortion completely ruined the listenability of the sound, robbing it of any fine detail; the probable cause is overload of the internal amplifiers at the input end.

Best case sound quality with this system is when listening through headphones. Used this way, the record deck sounds better than others of similar ilk, but is still not as good as it needs to be. True, the sound has reasonable range at both ends of the frequency spectrum. It sounds easier and more relaxed than its immediate competition in this publication, and record surface noise is less of a problem. But the other noises, especially hum harmonics, are even more obvious during quiet passages, so in the end the Amstrad player has no greater focus and little more resolution than those very close competitors.

For reasons that were not easy to ascertain, the Amstrad compact disc player mechanism proved extremely fussy about the condition of the discs it was offered. If it didn't like the one inserted, it promptly rejected it. There was no use trying to point out that the previous 30-odd players played the same disc without problem: it remained resolutely deaf to all such entreaties. This mechanism also proved more susceptible than usual to the effects of shock and vibration, but whether these limitations were sample or typical is hard to say.

As with the other low cost systems, the tuner front end is more or less satisfactory. However, low sensitivity is a drawback and FM was far from immune from the hiss and hum problems that afflicted the system when playing other sources. Still, the basic sonic character on FM was clear and reasonably articulate, albeit with almost exactly the same rather dried up mid and bass characteristic noted in other similarly priced systems. Likewise, the AM bands provided quite good reception and sounds quality, but the aerial can only be turned the right way by rotating the entire system, as there is no external AM aerial input.

At first the main recording cassette deck made the most peculiar harsh, 'edgy' noises, with a constantly varying treble/bass balance as though the tape was weaving its way past the heads — perhaps because it was not being constrained properly by the tape guides. However, the situation improved somewhat during the course of the review, so may not have been typical, and could have just been down to running in.

The loudspeakers are far from the kind that a serious music lover would want to listen to for

long, but they did at least avoid the more overtly nasty characteristics of some of their peers. Nevertheless they have an oddly 'pinched' quality in the midband. Obviously the designer had been briefed to make them sound 'bassy.' The bass is there all right, but it's mostly upper bass: it sounds bloated and lacking in power. But this is undoubtedly preferable to the thin, 'screechy' noises that came packaged for free and *gratis* with some other budget systems.

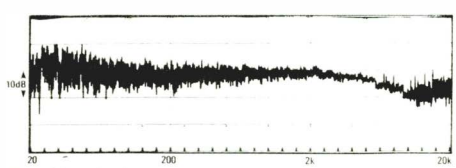
Verdict

The best that can be said of the Amstrad CD-1000 is that it's arguably the best performing sub £300 midi system, but this amounts to damning it with faint praise. Such a system makes a comparative nonsense of the technology it represents. In making compact discs sound so inadequate, it undermines the foundations on which the medium has been promoted, which is all the more ironic as its CD section is based on one of the best on the market (the Philips). It also makes the cost of the discs themselves quite insupportable, as their *raison d'etre* is effectively undermined by the hardware.

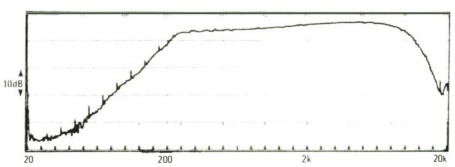
The same arguments apply with the other sources too. Insofar as the Amstrad looks like credible hi-fi (which it does), it damages the qualitive aspirations that make real high fidelity what it is. Readers are advised either to spend at least £50 more for a system that works better, or to buy a simple one-source system, perhaps a component system, which can be expanded later. The fact that the Amstrad isn't as bad as it could have been should not be misunderstood as a positive endorsement.

Test Results

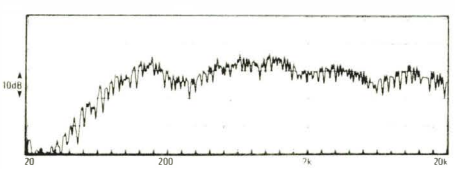
Cost complete	£299.95
Options?	none
Size main unit - lid open, W/O projections	68.5×36×38cm (h×w×d)
Size loudspeakers	35×25×21cm (h×w×d)
Turntable	
Wow & flutter wtd	0.17%
Drift	very poor
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
(<10kHz too low, OK,> 14Hz too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*
*[*not possible to connect test equipment*	
Tuner	
Sensitivity	very poor
Signal/noise	very poor
Cassette Deck	
Wow & flutter (wtd)	0.20%
Signal/noise ref 0dB Type II	n/a**
Distortion 0dB Type II	n/a**
[**]auto record level	
Compact Disc Player	
Weighted signal/noise (measured at amp Headphone Out)	79dB
no tape output fitted	
Amplifier	
Power output/channel (8ohms)	9 watts
(1kHz both channels driven)	
test signal from CD	
Loudspeakers	
Efficiency	fairly high



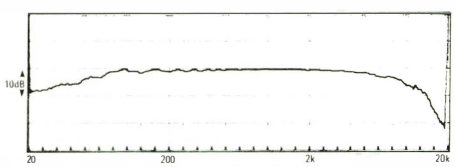
Turntable replay frequency response



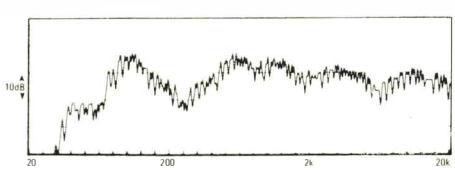
Cassette deck record/replay response



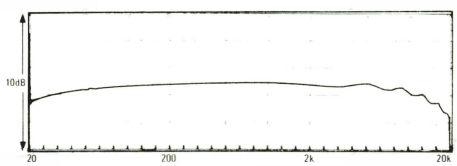
Loudspeaker in-room response (wall site)



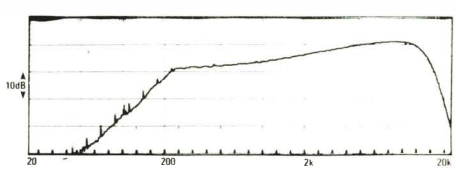
Cassette replay only response



Loudspeaker in-room response (open site)



CD player replay frequency response



Cassette record/replay response metal tape position

BINATONE LASER CD SYSTEM 2000

BINATONE INTERNATIONAL LTD, BINATONE HOUSE, 1 BERESFORD AVENUE, WEMBLEY, MIDDLESEX, HA0 1YX. TEL: 01-903 5211

This is one of a small handful of £300 CD-equipped midi systems to have made it to the shops so far. For some time, £300 has been a price point towards which many have been working, on the basis that once breached, an avalanche style sales uptake would be triggered. Like its direct competitors (Amstrad, Alba, Philips, and others announced but not ready in time for this book), the Binatone was built to be sold in massive quantities. However the current information to hand is that although large numbers of such systems have indeed been sold, better built models at the next price point up have sold much better than expected. One prominent industry figure recently suggested that the Philips £350 system had 'wiped the floor' with the competition.

Pernicious EEC protectionist policies have enabled Philips to corner the market for low cost OEM compact disc mechanisms, and it was no surprise to discover that the Binatone system is constructed around a Philips sourced player. According to the information printed on the back of the unit, the Binatone is 'assembled' in England, from which we can infer that it's made somewhere else — probably Taiwan.

Readers are free as always to make their own minds up about aesthetics. However finish and control feel are without doubt amongst the worst on the market. And as a personal opinion, the styling of this unit leaves a great deal to be desired.

Main Unit

Let's get some major criticisms out of the way. A prominent front panel switch adjacent to the tape section is labelled 'noise reduction'. It is nothing of the kind, but merely a low pass filter that removes noise and music high frequencies alike. By common consent, a noise reduction circuit is one that reduces noise whilst leaving the basic sound unaltered in frequency balance and level. The proof that the circuit here is not real noise reduction is that the output signal remained identical whether the circuit was active or not when recording — that is, it had no effect when recording, though it cuts the treble on playback. By definition then it is a simple filter.

On two samples of the Binatone examined prior to going to press, the channels were reversed on the CD player only. Luckily the internal signal connections are accessible on the rear panel.

Power level meters are fitted, and are scaled in decibels. The indications given, however, are quite meaningless. They bear no relationship to recording level (which they're supposed to), and they're not even scaled meaningfully for power level metering. Also, the so-called 'power boost' switch is merely what other companies describe as a muting switch. The term power boost is misleading: it is the gain that is varied; available power remains as before. One further point concerns the so-called graphic equaliser. Again, this demonstrates a rather cavalier attitude towards labelling features. What is actually fitted are three tone controls — one each for bass, mid and treble.

On the positive side, I have no quibble with the nature and scope of the remaining facilities on offer, except for the lack of Dolby B noise reduction. It would be unreasonable to expect a high features content at this price level.

The roll call goes like this. The manually operated record deck has a plastic moulded platter, and is fitted with a ceramic cartridge which tracks at a high downforce. The platter motor just dies at the end of side, leaving the stylus sitting in the runout area. The FM/MW/LW tuner is manually tuned, and is complemented by a mono switch, but there are no other tuning aids whatsoever. The dual cassette deck combines the usual playback only mechanism with a record/replay one. A tape counter is fitted and microphones can be connected. Normal speed dubbing and continuous play complete the features list. Only ferric (Type I) tapes can be used — no provision has been made for chrome or metal tapes — and recording level adjustment is automatic, which as ever means more tape hiss and reduced dynamics.

Finally, the CD player is actually very fully equipped in line with its Philips origin. It offered full audible cueing, track-skip, a 20-track memory, index-search and a choice of track and index or time displays. It had many of the good qualities of the generic Philips design, but tracking performance was well below the standards of that normally exemplary tracker. Perhaps the quality control standards are less rigid?

Power output of the system was barely 3 watts/channel. Note the intriguing frequency response runs with the CD player, which makes a nonsense of the normal linearity of this source, and coincidentally of the printed specifications in the instruction leaflet. The tape deck has a not altogether dissimilar response shape, and likewise the record deck. The latter also has a very spiky mid/treble peak before the response dies away, and low frequency uneveness characteristic of low grade ceramic cartridges. Bench tests on the tuner gave results typical of the breed. Listeners close to transmitter sites will find the programmes splattered all over the FM waveband except where they belong, but on normal strength signals the Binatone worked fine.

Loudspeakers

In character with the rest of the system, the in-room response run looks very shaky, with absolutely no apparent attempt at engineering with any sensitivity to the usual audio criteria. Specific shortcomings include an over-prominent midband, a rough, unextended treble, and a peaky bass with boomy, one-note effects well above the true bass area. Proper, deep bass is non-existent.

The shallow, lightweight enclosure was fitted with two drive units, a 150mm bass driver and a 50mm tweeter, but neither even approaches high fidelity standards. The 4ohm impedance of the speakers allows the amplifier to deliver a little more than its 8ohm measured power, probably 4.5-5 watts.

Quite severe buzzing occurred at certain discrete low frequencies, because it transpired, the bass unit cone wasn't properly centred.

How It Sounds

For the specific task of playing records, this is easily the worst sounding system tested for this publication. Records reproduced with an impossibly thin, 'tizzy' sound, and no sign of low frequency fundamentals whatsoever — even when using the B&W *DM110* benchmark loudspeakers! After due consideration, I think this is very probably the worst sounding record player I've ever used, rivalling some faulty ones in my experience. At the very least the player is no less than appallingly bad. It seems strange that the 1980s can bring us such an item that sounds worse than equivalent hardware from near the start of the LP era! I shudder to think this might be called progress . . .

The best that can be said of the tape decks is that they are better than the equivalent Amstrad ones. However, they still sound very poor, and only partly because there is no means of accurately replaying pre-recorded musicassettes, which are invariably Dolby encoded. The sound is somewhat unstable, but more severe problems are to be found in the high noise levels, the mid and treble coarseness, and the high frequency dropout — the latter an erratically serious problem.

FM was a little hamstrung by background noise, but qualitively was only criticised for sounding constricted and dry. The AM bands sounded fine, but reception is at the mercy of the system's orientation since the aerial is built in, cannot be rotated, and there is no external AM aerial input.

Compact disc sound quality is dominated by the performance of the amplifier. This is even true *via* the headphone socket, which added just enough hiss and 'roundness' to the sound (see frequency response trace) to make it sound like a fairly poor cassette mechanism, albeit one with good pitch stability. Naturally compact discs sounded much better than any of the other sources, but the amplifier simply wasn't up to the standard required to make much of the medium.

If anything, the Binatone loudspeakers have a more natural balance than the equivalent Amstrad ones, but they have less bass, and sound tonally 'colder' and more abrasive. The high frequency end is impossibly coarse. Transducers like these cannot be taken seriously.

There are some practical problems with this system, and potentially one of the most serious concerns headphone users. The Binatone has quite high levels of DC offset at the loudspeaker terminals and also at the headphone socket. Inserting or removing the headphone plug can result in loud transient clicks through the earpieces, regardless of the position of the volume control. Furthermore, these clicks were sometimes apparent when changing inputs.

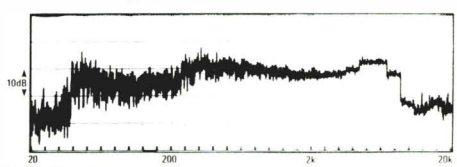
Less damaging, but in normal use even more annoying, the Binatone's electronics are always noisy. Regardless of the source selected, there is always quite a lot of hiss and nearly always some hum and intermittent crackles.

Verdict

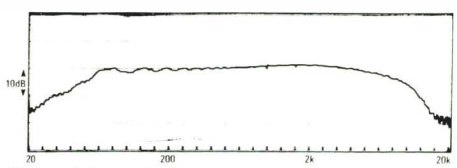
One of the least satisfying audio designs tested in a long time, Binatone have no cause to feel complacent with the shoddy performance of this unit, and it is perhaps appropriate that the company trades extensively through mail order catalogues. With the best will in the world, it proved very difficult to find much positive to say. Even given the low cost, value for money rates poorly, since in the author's view the system simply doesn't do a job worth doing. Not recommended at all.

Test Results

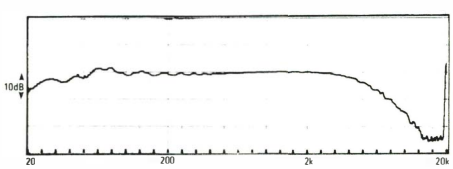
Cost complete	£300
Options?	none
Size main unit - lid open, W/O projection	74×35×42cm (h×w×d)
Size loudspeakers	42×22×15cm (h×w×d)
Turntable	
Wow & flutter wtd	0.12%
Drift	poor
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
(<10kHz too low, OK, >14Hz too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*
[*]turntable could not be connected with test equipment	
Tuner	
Sensitivity	fair
Signal/noise	poor
Cassette Deck	
Wow & flutter (wtd)	0.26%
Signal/noise ref 0dB Type II	n/a**
Distortion 0dB Type II	n/a**
[**]auto record level	
Compact Disc Player	
Signal/noise (measured at amp Tape Out)	89dB
Amplifier	
Power output/channel (8ohms)	3 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	high



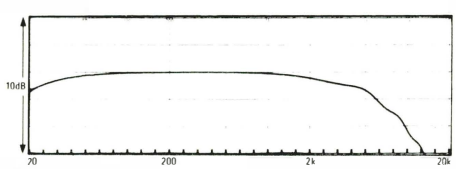
Turntable replay frequency response



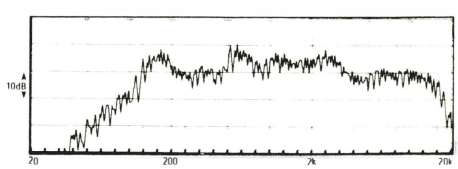
Cassette deck record/replay response



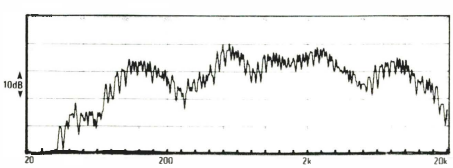
Cassette replay only response



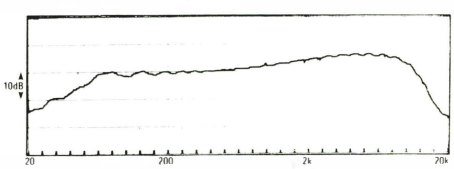
CD player replay frequency response



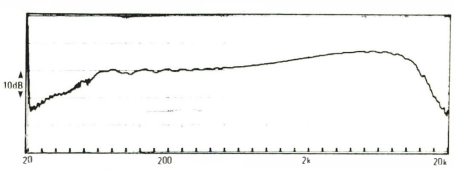
Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)



Cassette record/replay response noise reduction out



Cassette record/replay response noise reduction recording/replay out

BEST BUY

FERGUSON HF03

THORN EMI FERGUSON, CAMBRIDGE HOUSE, CAMBRIDGE ROAD, ENFIELD, MIDDLESEX EN1 1UL
TEL: 01-363 5353

Despite its rather stark appearance and sombre finish alternating grey with black perspex, the good side of what passes for conservatism characterises this system best. It is low in price, but has been built to quite a high standard. Best of all, it exercises restraint where that quality is needed most — and is most rarely found. There is, for example, no graphic equaliser, an almost universal fitting elsewhere despite the fact that such circuits almost never do what is often claimed for them, and in fact invariably screw up the sound simply by their presence in circuit.

One or two minor operational difficulties aside, this is also easy enough to use to justify the 'granny proof' euphemism. The system is also well made and well finished. Note that despite the English manufacturer's name it is imported from Japan, and in fact it appears to come from the Mitsubishi stable. (The loudspeakers are exceptions, being made in this country.)

HF0A/6 Turntable

A very ordinary belt driven auto-return player with pivoted arm and magnetic cartridge, the sole distinguishing feature of this deck is that it is found on a system this low in price. Poor as it may be compared to serious high fidelity equipment, it is the kind of deck that is more commonly found in more expensive £500 — £600 systems, perhaps with the addition of fully automatic working.

The deck ran slow and the cartridge behaved rather differently on the two channels. As it was correctly mounted from the geometry angle, this suggests a simple sample fault.

HF03/0 Main Unit

CD players don't come simpler than the one fitted to the Ferguson. It has control buttons to open and close the loading drawer, to start and stop play mode, and to skip the beginning of the tracks. There are no track or index search facilities, no memory facility and — taking the cost of the system into account — no cause for complaint.

This operational simplicity is echoed elsewhere, the sole concessions to luxury being the twin Dolby B equipped cassette mechanisms (only one of which records), and the digital tuner with its provision for seven preset stations each on FM, MW and LW. The display shows the preset number and frequency, but the band is assumed, or must be inferred.

The display switches over a numeric scale for a slow acting electronic volume control. A little bit of cheating was noted here: the scale runs between 0 and 99, but volume levels only change at every other count, and then only until it has reached 78. On test the amplifier gave 35 watts/channel exactly as claimed.

The CD player was rather too ready to skip tracks for comfort, even on discs that appeared to be totally pristine and which gave no problems with other players. Paradoxically though, marked discs were handled rather better than had been anticipated given the problems with unmarked ones. The deck obviously suffers from selective problems with disc errors, but this is not uncommon.

One deceptively innocuous characteristic of the tuner is that it is possible to tune transmissions in over a much wider than normal bandwidth — typically up to +/−100kHz providing perfectly adequate reception. This generally means that when correctly tuned, low distortion levels on peak can be expected. But the characteristic will not stand the tuner in such good stead in areas where a lot of transmissions are crowded close together — the overlap zone between the coverage areas of two major transmitter sites for example — where there may be mutual interference.

Other bench tests have good results. In the case of the cassette section, the record playback responses were remarkably well optimised. Had speed stability been to the same standard, the deck would have been exceptional.

HF03/7 Loudspeakers

The comment that was made of the turntable applies here too: this is a product which only surprises because it is found in a system so inexpensive. Based on a reasonably solid sealed enclosure, the active elements are a long-throw flat square drive unit coupled to what appears to be a metallised version of the Audax small dome tweeter — which I would judge sounds no better than the standard article. Nevertheless the *HF03/7* is about an order of magnitude better than other cheap system loudspeakers. Efficiency is not high, but the amplifier has power in abundance. The speakers sound better near a wall, but satisfactory in free space — on stands of course, and preferably with the baffle covers pulled off.

How It Sounds

One of the more impressive features of the Ferguson was the loudspeakers. On material that lacked treble energy they sounded smooth, full and detailed, with very good projection of the stereo soundstage and a believable musical character. The sound deteriorated noticeably on music with a lot of treble energy, at which point everything tended to become rather frenzied and 'metallic hued'. Some compression was also apparent under some circumstances, and it was always possible to find records and discs that made the speakers sound as though they were lacking in low frequency extension — which in absolute terms was the case.

But I was impressed that a relatively modest, low cost system loudspeaker could so successfully impersonate proper high fidelity standards so much of the time. Furthermore, the amplifier helped by fighting its own corner so well too: it sounded lean, clean and in control, was capable of going quite loud, and remained consistent in character whilst doing so. There was just a hint of temperament in the form of an abrasive edginess at times, and it is interesting (if fruitless) to speculate whether having a mechanical volume control in place of the electronic one would have helped. (Previous experience with other designs suggest it certainly would).

Cassette recordings were hampered by a record level meter that under-read peaks wildly, so anything in the least vigorous or dynamic and allowed to peak at the 0VU point on the meters is likely to sound grossly distorted. Happily a few practice trials will soon get over this difficulty.

What's left is very nearly a good cassette deck. It sounds unusually detailed and clear, with an impressive sense of precision in the treble (again with a little of that rawness that so characterises the system as a whole), and well repressed noise levels. There is one snag, however, in the amount of audible 'fluttery' effects, leading to some very odd sounding cymbals and other treble rich notes. Slightly higher mechanical transport standards would cement an otherwise

solid performance.

The turntable was pretty fair too. Not surprisingly it was far too microphonic for its own comfort, and if it could be made to sound a little less fierce when reproducing scratches and other surface marks, that would be icing on an otherwise quite appetising cake.

The tuner also worked well. Background hiss levels on FM were well suppressed and sensitivity was good too, though the Ferguson fell into the common trap of being unwilling to switch to mono, however weak the signal being received at the aerial socket. Fortunately the mono transition can be forced using a switch provided. The tuner sounded pretty good. A little bright and lean certainly, but no more than a little. However, AM technical performance and sound quality were disappointingly dull (in both senses) and interference prone, even making due allowances for the limitations of AM as a medium.

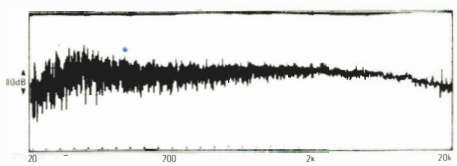
Which leaves the CD player. I thought this was a relatively weak performer, but paradoxically I believe this is an encouraging sign. The problem with most low cost CD-inclusive systems is that too much trouble is taken over the CD player, to the exclusion of everything else. This one is a little rough and ready sounding. It doesn't have the resolving power or transparancy of a really good player, and the treble quality was definitely 'edgy'. But the rest of the system has not been under-engineered because of its presence. The only improvement that would have been valued is less of that annoying mistracking.

Verdict

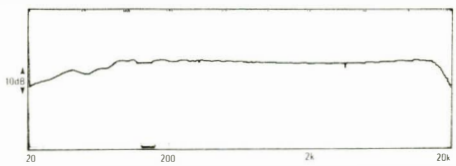
I've not made light of the limitation and discrepancies that became apparent whilst testing this unit. There were plenty of them in various areas. But the impressive feature of this system was the way in which it withstood this detailed examination without looking totally full of holes. Taking the cost into account — it's just under £400 all in, remember — I don't think this system can be seen as anything other than exceptional value for money. Definitely Best Buy material!

Test Results

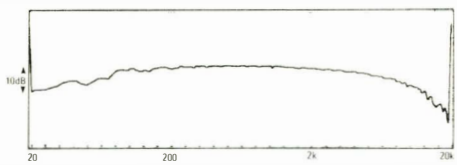
Cost complete	£399.99
Options?	none
Size main unit - lid open, W/O projections	65 × 33.5 × 37cm (h × w × d)
Size loudspeakers	30 × 20 × 18cm (h × w × d)
Turntable	
Wow & flutter wtd	0.9%
Drift	poor
Speed accuracy	−0.9%
Arm/cartridge resonance	too high
(<10kHz too low, OK,> 14Hz too high)	
Cartridge channel balance	0.2dB
Cartridge channel separation	−23dB
Cartridge tracking ability	80uM
Tuner	
Sensitivity	good
Signal/noise	good
Cassette Deck	
Wow & flutter (wtd)	0.25%
Signal/noise ref 0dB Type II	56dB
Distortion 0dB Type II	3.0%
Compact Disc Player	
Weighted signal/noise (measured at amp Tape Out)	>105dB
Amplifier	
Power output/channel (8ohms)	35 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	fairly low



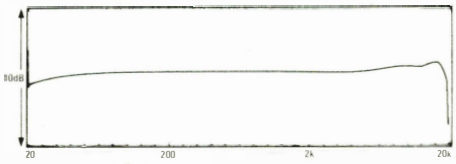
Turntable replay frequency response



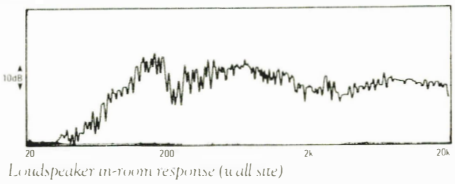
Cassette deck record/replay response



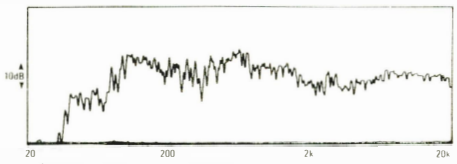
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

FISHER MIDI SYSTEM M46

FISHER SALES (UK) LTD, FISHER HOUSE, 113 BUSHEY MILL LANE, WATFORD, HERTS WD2 4XN
TEL: (0923) 31974

Once upon a time, Fisher was an independent US manufacturer of high grade high fidelity equipment. They made components of every kind including that very practical but underrated US speciality, the receiver (or tuner amplifier). But times move on and the Fisher name has been integrated lock, stock and barrel into the Sanyo machine, where it has come to fulfil a slightly up-market role.

On the scale of CD inclusive systems, the *M46* is relatively modest in cost — and for that matter specifications and performance. It is however decently made, with only the mildest touch of the visual excess that has been a Fisher trademark for some years, and with better operational feel than has been available in the past.

One of the obvious things about this system is that it doesn't have a great deal of flashy showroom appeal. There's very little in the way of fascia illumination, and unfavourable panel graphics often made reading control legends rather difficult. But the system is easy enough to set up, and isn't over-burdened with unnecessary gadgets

MT-M46 Turntable

The ingredients are standard fare. Quite nicely but simply made, the *MT-M46* is an automatic belt driven deck with metal platter, rubber mat and pivoted arm. The cartridge is not interchangeable, but the stylus is. The deck is easily disturbed when knocked. It behaved equally straightforwardly on the lab bench. The cartridge has a smoothly falling top end, but a very low arm/cartridge resonance, accounting for some of the system's susceptibility to shock. Speed stability, both short and long term, was fine.

TAC-M46 Main Unit

The twin transport cassette deck has some clumsy features. Although automatic tape type selection is fitted for the playback only mechanism (for which only two settings — ferric and chrome/metal — are required), manual switching is the order of the day on the record capable deck. A much more serious sin, however, is the fact that the deck won't record on chrome Type II tapes (see plot). Metal tape compatiblity, which is included, is far less useful than chrome compatibility partly because the latter will give something like 90% of the performance of the former for around half the price. Under the circumstances, Fisher's decision can only be seen as an act of pure specmanship.

And then — this came as a surprise — the switch provided for selecting tape types also switches between FM stereo and FM mono! It's scarcely beyond the bounds of reason that you might want to record a radio programme on normal tape that requires a forced switchover to mono because reception quality is poor — and then you're sunk. Surely such a possibility isn't that remote? You get Dolby B as part of the package, and the usual 'don't touch with a bargepole' double speed dubbing mode. You can of course dub in real time, which means 45 minutes to record three quarters of an hour's worth of tape, instead of 22 and a bit.

Build quality and reliability of Fisher tape transports has been a longstanding weakness, but happily it's one the company has been addressing recently. In all respects the deck fitted here gave as much confidence as any other comparably priced unit throughout the test programme, though speed stability, itself dependent on sound engineering, was below average.

The tuner, which gave consistently excessive background noise levels, is a three band analogue model, with a long tuning scale and a rather low geared edgeways tuning knob. The amplifier has no features other than source switching and three tone controls. On test it gave 15 watts per channel.

AD-M24 CD Player

This CD player has an arthritic drawer mechanism and a display that will tell you what track number you're on, and even the index number where available, but doesn't run to a time display. Except that for reasons best known to itself it will show seconds (not minutes) when the audible track search feature is employed. Index search is also available, plus a 16-track memory and repeat mode. The frequency response plot, done *via* the heaphone socket of the amplifier, shows some response shaping below 500Hz.

STE-M46 Loudspeakers

The *STE-M46* loudspeaker is in full keeping with the ancient and honourable tradition that any effort and expense necessary to help a loudspeaker deliver the goods shall be ruthlessly and completely eradicated, exorcised and banished. The enclosure is nominally sealed, but the screwed on hardboard backing detracts from this end. The tweeter is a largish cone unit hidden away behind a 'venetian blind' deflector which can serve no conceivably useful purpose, but which certainly does detract from whatever modest level of performance might be available before this piece of trim is added. Finally the front cover is secured in place: removing it might improve the sound a little.

As the measured frequency response plot shows, the *STE-M46* has an underdamped bass, leading to a peak around 150Hz, and another peak in the critical 500Hz — 1 kHz region. The treble looks uneven too, a reflection of the poor quality tweeter.

How It Sounds

The amplifier really isn't too bad, but it's definitely not neutral or transparent. The most striking quality is stridency, but this is more a characteristic than a fault. Trouble is, it's one that colours the performance of the system as a whole, and can be heard as a kind of overlay that affects the sound of all the system components. On balance the *M46* was felt to be quite a snappy performer, but it certainly is not a classy one.

The tape deck sounded rather brash on ferric tape, and to a lesser extent on metal tape too. Speed stability was satisfactory, and the deck made some pretty good tapes during the course of the tests.

Off-air MW and LW radio reception quality was not a strong point. Interference levels were above average, and the sound itself tended to be rather anaemic and thin. FM of course was a lot better, but high hum and hiss levels (also

found with the more up-market M56 system by the way) didn't do much to help. Clearly noticeable loss of detail and 'body' scarcely helped.

The record deck and CD player are both also included in the M56 system, and performed here as they did there. Given that the M46 amplifier and loudspeakers don't measure up to those in the dearer system, the CD player and turntable are even less of a block to total system performance.

But let's not undermine the fairly satisfactory nature of the turntable, especially when sat alongside rather than on top of the other equipment, and the CD player, which is adequate in any reasonable surroundings. The CD player simply sounded clean and concise. It lacked that little spark of magic of the very best, but it is a long way from being at the root of the M46's problems. For that, you need look no further than the loudspeakers . . .

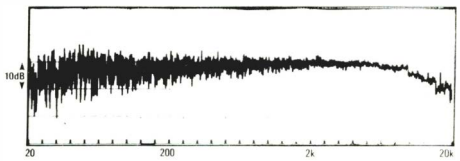
The loudspeakers are real no-hopers, I'm afraid. There are poorer ones in this project it's true, and it's true that some very simple, early music CDs and records sounded fairly satisfactory, allowing for a rather hollow bass (that LF peak) and some midband coarseness (the other peak?). But on anything with more body and richness, the speaker was exposed for what it was — a coarse cold-sounding transducer that lacked tonal depth and variety, that squashed dynamics, and that sounded curiously phasey with certain types of music. Clearly something wasn't quite right . . .

Verdict

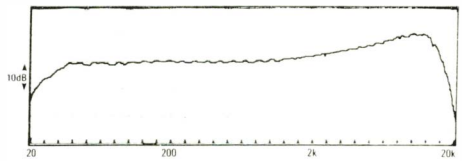
There are too many minor and some not so minor shortcomings with this system. Although it might have proved acceptable for a very low cost system, the price of the M46 isn't really at the very low cost end of the market. The conclusion must be that it is just not sufficiently competitive. But if you can convince your dealer to let you have the system without loudspeakers, it would make a much more reasonable proposition.

Test Results

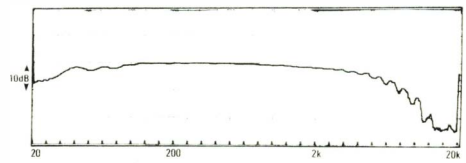
Cost complete	£449.99
Options?	CD player AD-M24
Size main unit	66.5×33.5×38.5cm (h×w×d)
Size loudspeakers	32.5×21.5×16.5cm (h×w×d)
Turntable	
Wow & flutter wtd	0.10%
Drift	average
Speed accuracy	correct
Arm/cartridge resonance	7Hz too low (<10kHz too low, OK,> 14Hz too high)
Cartridge channel balance	1.1dB
Cartridge channel separation	22dB
Cartridge tracking ability	76uM
Tuner	
Sensitivity	fair
Signal/noise	very poor
Cassette Deck	
Wow & flutter (wtd)	0.21%
Signal/noise ref 2dB Type II	n/a*
Distortion 2dB Type II	n/a*
[*]auto record level	
Compact Disc Player	
Weighted signal/noise (measured at amp Headphone Out) not tape output fitted	82dB
Amplifier	
Power output channel (8ohms)	15 watts
Loudspeakers	
Efficiency	fairly high



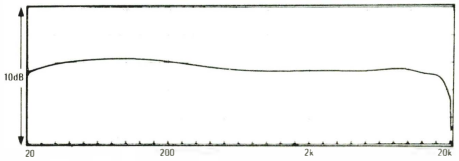
Turntable replay frequency response



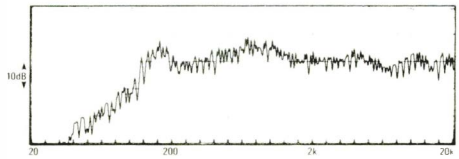
Cassette deck record/replay response



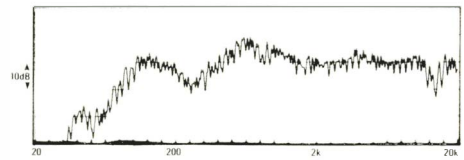
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

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Queen	Works, The	£9.99
Pink Floyd	Meddle	£9.99
Pink Floyd	Wish You Were Here	£9.99
Paul McCartney	Band On The Run	£9.99
Tina Turner	Break Every Rule	£9.99
Tom Robinson	Still Loving You	£9.99
Bob Segar	Against The Wind	£9.99
Talk Talk	It's My Life	£9.99
Talking Head	Stop Making Sense	£9.99
Kate Bush	Lion Heart	£9.99
Talking Heads	Little Creatures	£9.99
Talk Talk	Colour Of Spring, The	£9.99
Queen	Greatest Hits	£9.99
Queen	News Of The World	£9.99
Madonna	Like A Virgin	£9.49
Paul Simon	Grace Land	£9.99
Madonna	First Album	£9.49
Wham	Make It Big	£9.49
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Compared to the less costly M46 system, the M56 is rather more straightforward, lacking idiosyncrasies such as the inability to record on chrome bias tapes. In any case, the M56 has a higher basic level of musical competence, and is actually a more user-friendly system to the ears as well as the eyes.

MT-M46 TURNTABLE

The record playing hardware is identical to that of the M46 system — and incidentally one or two other turntables from other manufacturers. It's safe to assume that it's an off the shelf OEM design, with Fisher badges.

The arm is pivoted and of moderate structural integrity, and is fitted with a fixed magnetic cartridge. The platter is belt driven and operation is fully automatic. There's no record sensor though, so the stylus is not averse to descending onto bare rubber mats. Measured performance of this component was quite good (see Fisher M46 review), apart from a gently declining top end response and a very low arm/cartridge resonance of the order of 7Hz. This gives rise to some microphony.

FM-M66 TUNER

A typical digital tuner implementation, what we have here is an attractively styled FM/MW/LW tuner, with a waveband and frequency display and a row of eight preset keys, each of which will store the frequencies of two stations on any waveband. On test, the *FM-M66* was both noisy and also prone to mains hum on the FM band, though sensitivity was perfectly satisfactory. The AM bands, however, were nearly interference free, apart from the odd whistle.

PD-M56 CASSETTE/AMPLIFIER

The *PD-M56* is styled to look like separate components, a minor subterfuge that many manufacturers indulge in, presumably because there is more prestige in separates. Functionally, however, it is a fully integrated item, which cuts down on the amount of wiring needed to make the system work. It also differs from normal separates in not having any low output of the kind that might be used to drive an external tape deck or sound processor.

As an amplifier it couldn't be simpler. Power output is 20 watts/channel. A row of source selector switches (tape, phono, tuner and CD — but no spare, please note) is complemented by a 5-band graphic equaliser, volume and balance controls, and a headphone socket. And that's it, end of story.

The cassette deck is rather more fully equipped, allowing for the fact that the two items are hardly comparable. In the now standard configuration, one deck records and plays back, whilst the other just plays back. The playback only unit has automatic tape sensing, but the record deck hasn't. But at least all three main tape types can be accommodated.

Record level control is manual, and is assisted by a meter. Dolby B noise reduction is available, dubbing is at normal or double speed, and the standard power assisted transport keys, which have a very good operational feel, are supplemented by a single dubbing start switch. The deck is very well adjusted for Maxell Type II tape — note the flat response shape which falls sharply into the multiplex filtering slot at 19kHz to prevent the tuner pilot tone interfering with the Dolby circuits. Speed stability (wow and flutter) rates fairly poorly.

AD-M24 CD PLAYER

This CD player, which is shared with the M46 system, looks like a genuine system component, and not a stand alone player pressed into extra duties, though it could fulfil that function too. It is a very simple design to operate, and has very little that could be called superfluous.

Disc handling is very slow, and track skip commands were obeyed rather erratically, sometimes not at all. Standard track search and audible scan operations are available, along with a 16-track programme memory and a repeat mode which will repeat individual tracks, programmed sequences, or the entire contents of the current disc. The deck worked adequately with the standard marked test disc.

STE-M56 LOUDSPEAKERS

Access to the business end of the drive units has been blocked by fixing the baffle cover on permanently, which is a pity since one very simple and effective possibility for improving sound quality — removing said covers — has been blocked at a stroke.

However, enough can be seen to tell the basic story. This is another case of a loudspeaker that is designed for the eye rather than the ear. The tweeter is actually better suited for use at lower frequencies; it is too large to act as a good tweeter, which by definition needs to be small and responsive. Additional problems include the 'venetian blind' deflector over the tweeter which is pure gimmickry, and the lightweight, resonant enclosure.

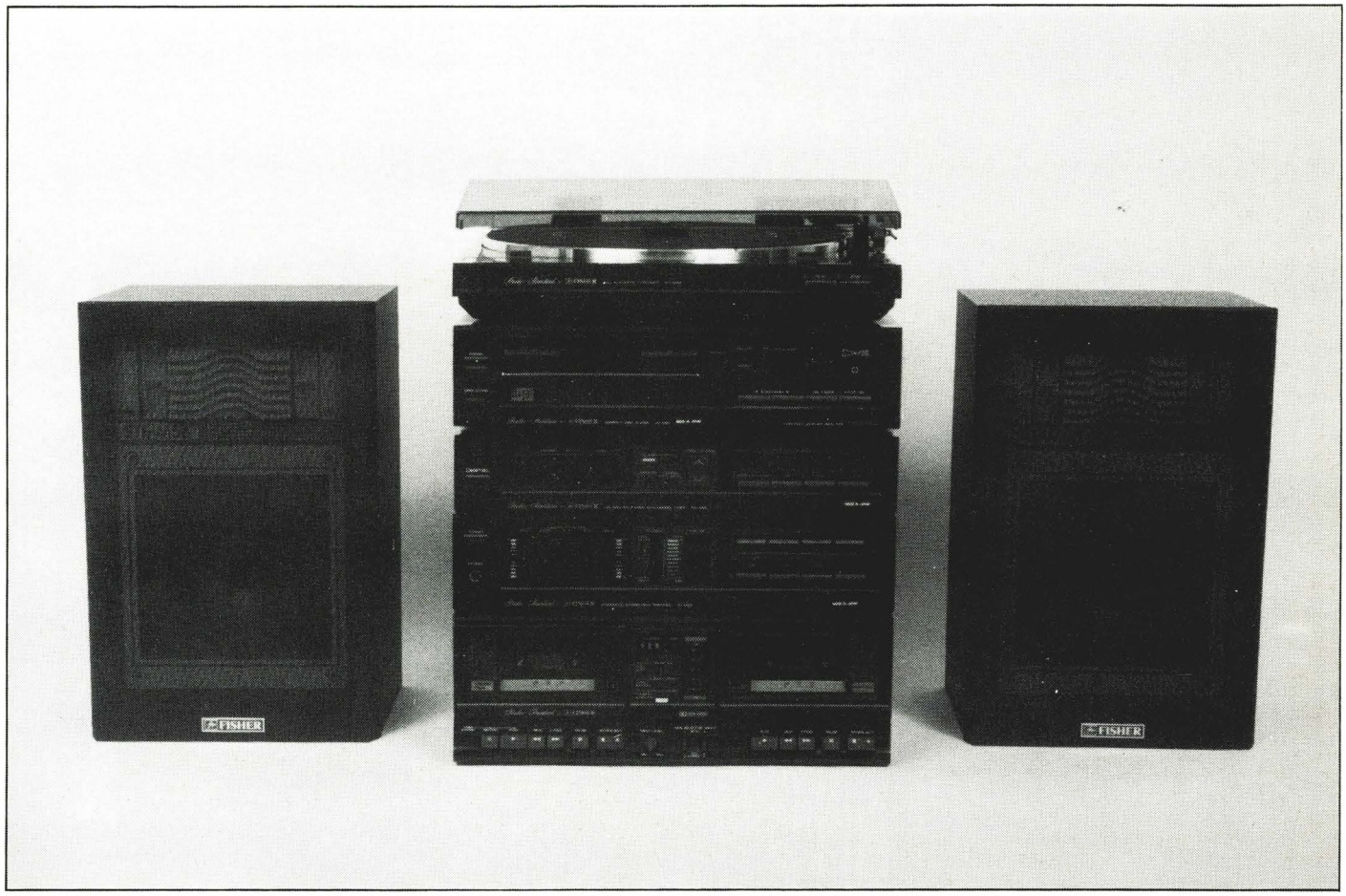
On paper if not in practice, the *STE-M56* loudspeakers look better than their cheaper counterparts in the M46 system. But there is still a measured prominence above 500Hz, and the bass still looks underdamped. Finally, the tweeter response still doesn't look like that of a lightweight tweeter.

HOW IT SOUNDS

The amplifier has quite a lot of muscle at its disposal, but doesn't flaunt it needlessly. It is an amplifier that can work with some delicacy, and even grace when necessary. The bass is full and potent without being over the top, and the treble is clean and detailed without that common cold, mechanical quality. For once here is an articulate amplifier that acts as a keynote feature for the system as a whole.

Moreover, the tuner and the compact disc player lived up to the good impression made by the amplifier. Despite the hum and noise, FM radio sounded quite satisfactory, as did AM radio within its strict limitations, though the higher frequency response was quite severely curtailed on MW and LW alike. The CD player simply sounded like a very ordinary CD player. Its qualities were not dominating in this system, but by default compact discs sounded better than any of the other music sources.

The cassette deck impressed too, at least doing



a reasonably good facsimile job of copying discs and records. But as usual copying tapes — even at normal speed — doubles all the problems of cassettes, and does not produce wonderful recordings. All tape types were exploited quite successfully.

Records were catered for rather less well. The record deck itself was highly microphonic across a wide range of frequencies — even through to the midband, which made the deck sound erratically coloured. Stereo information was poorly presented, and recorded ambience seemed to shut off too quickly as notes died away, giving music an unnatural 'clipped' presentation. Finally, as if all this wasn't enough, the cartridge had a peculiar 'masked' quality that filtered a lot of detail from the sound before it embarked on its high speed dash through the system.

The cartridge wasn't all bad news though. It had a degree of refinement and subtlety that the previous description doesn't hint at, and the deck, for all its faults, did at least impose a modicum of discipline on the sound. The bass was under reasonable control, and speed stability was subjectively quite good. Finally, record surface noise was adequately suppressed, which is a trick that quite a few low cost turntables are utterly unable to emulate.

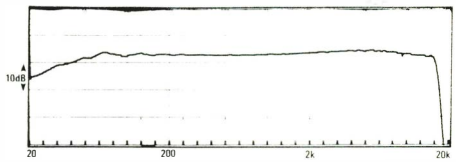
What lets this system down worst of all, regrettably, was the loudspeakers. They had the same basic characteristics as the speakers supplied with the other Fisher system. Singers sang as though they didn't know how to open their mouths, and vowel shapes were badly formed. The top end of the speakers sounded as though the sound was oozing through a cheese grater, which in a sense wasn't far from the truth. The mid and treble alike were highly congested and 'grainy' sounding. The bass, which didn't suffer this problem, merely sounded nondescript.

VERDICT

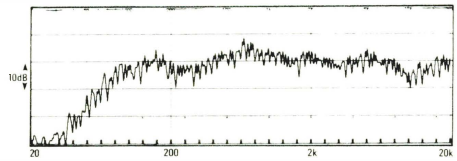
Your best bet is to offer to relieve your dealer of the system on the condition that he gets rid of the loudspeakers another way. The rest of the system is really pretty good.

TEST RESULTS

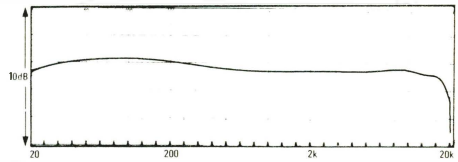
Cost complete	£580
Options?	CD player AD-M24
Size main unit - lid open, W/O projections	70×33.5×37cm (h×w×d)
Size loudspeakers	36×23×18cm (h×w×d)
Turntable	
Wow & flutter wtd	0.10%
Drift	average
Speed accuracy	correct
Arm/cartridge resonance	7Hz too low (<10kHz too low; OK.> 14Hz too high)
Cartridge channel balance	1.1dB
Cartridge channel separation	22dB
Cartridge tracking ability	76uM
Tuner	
Sensitivity	good
Signal/noise	very poor
Cassette Deck	
Wow & flutter (wtd)	0.18%
Signal/noise ref 0dB Type II	−53dB
Distortion 0dB Type II	3.2%
Compact Disc Player	
Weighted signal/noise (measured at amp Headphone Out) no tape socket fitted	86dB
Amplifier	
Power output/channel (8ohms) (1kHz both channels driven)	20 watts
Loudspeakers	
Efficiency	fairly high



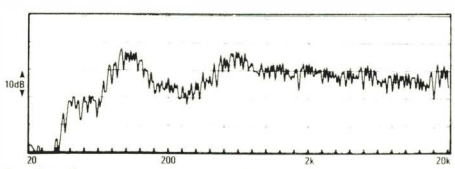
Cassette deck record/replay response



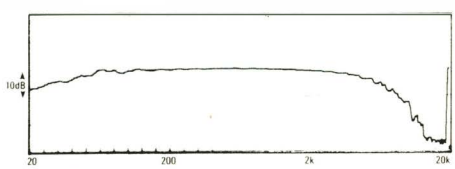
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

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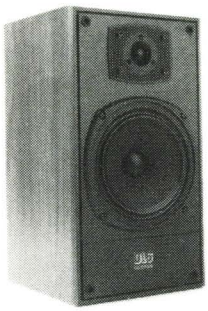

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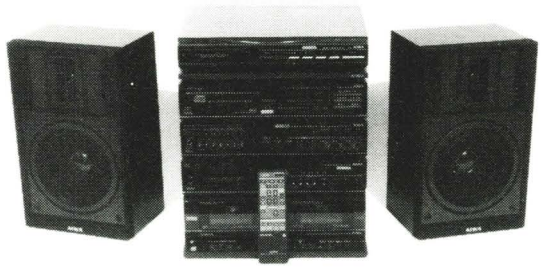

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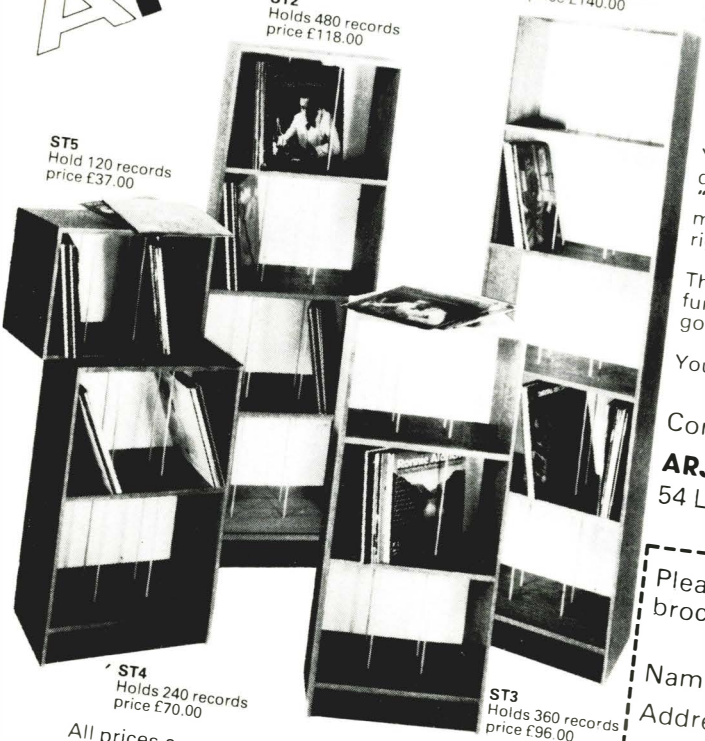

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BALANCED DESIGN CONCEPT

Design Philosophy

This is the first of a series of technical notes planned to give you an insight into Rotel's UK design philosophy.

The design of Hi-Fi products is a combination of science and art. Scientific knowledge, for example, enables us to predict accurately a variety of factors:– power output into a specified load, distortion, slew rate etc. What it cannot do is accurately predict the quality of sound which will be achieved by a Hi-Fi product in a domestic Hi-Fi system. In the last analysis this is the most important factor, the raison d'etre of the Hi-Fi system, does it help you enjoy music in your home?

Unfortunately, in recent years this objective seems to have been forgotten and to have been replaced by the quest for ever improving specifications usually claimed to have been achieved by the latest wonder circuit featuring 'Super triple class AAA' or changes to the negative feedback loop which feeds this way and that. Such panaceas, in our view, tend to have a short life cycle and generally add little to our industry's overall understanding of music reproduction.

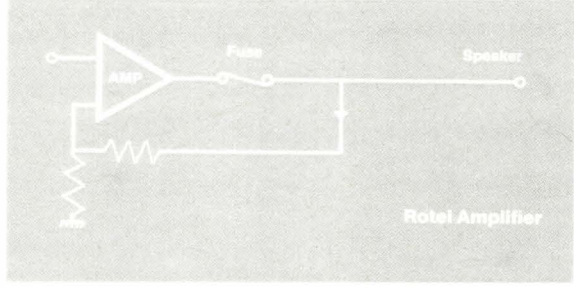
We however, have very strong views on many aspects of performance design such as high output current, limited bandwidth, large power supplies, direct signal paths, phono stage design, protection circuit distortion, belt driven turntables and the importance of high quality components etc. We look at specific product design, in terms of achieving a sensible balance of objectives. Not surprisingly, we call this approach 'The Balanced Design Concept'. The Rotel approach is to ensure that within the resources available, each aspect of the technical design has been optimised to provide the most effective musical result.

Direct Signal Path

Component selection and the use of high quality close tolerance components, has we believe, made the greatest contribution to improved sound quality in affordable Hi-Fi products. Such components, when coupled with effective circuit design, not only bring the benefit of improved product reliability but also the ability of the product to maintain its high peformance over many years.

In all Rotel amplifiers, emphasis has been placed upon direct signal paths, since the transition through any less-than-perfect conductor will inevitably degrade the signal. With moving magnet cartridge inputs, much of the ambient detail will typically be at the microvolt level and perhaps ten times lower in level with a moving coil cartridge. Care must therefore be taken in routing of low-level signals within all circuit stages using a minimum number of components in the signal path. At the output the loudspeaker connections are made directly with heavy gauge cable without any switches, relays etc in the signal path as any such contacts, unless achieving a homogenious metal to metal contact, will ineveitably degrade the signal. Furthermore, any unnecessary resistive losses will cause compression of the signal during high level music passages.

The comparison with the conventional amplifier above and Rotel below details clearly the difference in approach. Such a conventional amplifier would suffer degradation in music quality over a period of time as the contacts in the main signal path oxidise. In Rotel amplifiers, the speaker fuse contacts are the only remaining source of non linearity. To minimise their effects, the fuse is included in the negative feedback loop. As a result, the contact distortion will be reduced by a factor equivalent to the amount of feedback used. On some Rotel models, both speaker switching and headphone switching facilities are available by adding a speaker 'B' output in addition to the direct wired speaker 'A'.



One of Rotel's design objectives therefore, is to produce products which not only offer high performance, but are reliable and have the ability to maintain their performance over many years.

For your nearest Rotel dealer phone Rotel (0908) 317707.

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FISHER 2400

FISHER SALES (UK) LTD, FISHER HOUSE, 113 BUSHEY MILL LANE, WATFORD, HERTS WD2 4XN.
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This is a system in the traditional sense: a collection of components that share major styling features, overall component width, and of course the manufacturer's name. There has been no attempt at any wider integration of the components, so source switching for example is totally manual. This will inevitably reduce its appeal to those who expect all mod cons from a modern system, but in Fisher's defence, there are advantages to doing it this way. The main ones are that the package works in a much more intuitively obvious way than many such systems, and also that any future upgrading is eased considerably.

MT-225 TURNTABLE

There's not much of a story to tell here. The deck is of a kind that has been offered by Japanese companies for years; there is little or nothing to distinguish it from many others, apart from a variable speed adjustment. Operation is auto return but with a manual start, assisted by a hydraulically damped cueing platform.

The deck works just adequately, with quite good wow and flutter levels, reasonably low long-term drift, and a fairly smooth cartridge frequency response. Parameters like channel separation (the figure given is an average, the cartridge actually behaves very asymmetrically) and tracking ability are curiously nondescript or worse. Any kind of hands-on with the volume left up also showed that the deck was a quite effective seismograph.

FM-225 TUNER

Another no-frills item, mono/stereo switching and automatic self seek tuning complement the 16 available presets, all of which can store a frequency on any of the three available wavebands, FM, MW and LW as usual. Eight buttons store two preset frequencies apiece, with a shift key to select.

The orange LED display does not display the preset number — just the waveband, and whether a transmission is tuned in. Bench tests confirmed what was also obvious from use off-air; that the *FM-225* works very effectively. On FM, background noise levels were low and sensitivity high, though the nature of the noise residual was rather more harsh and spiky than might have been expected.

CR-W225 CASSETTE DECK

Fisher's *CRW225* has just about all the gadgetry that any self-respecting system buyer is supposed to want these days — no more and no less. It will accept two tapes at a time with one of the two transports being record capable, the other for playback purposes only. Tapes can be dubbed at both normal and high speed. For playback purposes, continuous play is available, but it must be said that this function is better and more naturally served by an auto-reverse transport, even a single one.

A simple record level meter is provided and recording levels are set manually, which will come as a relief to anyone who has ever struggled to get good sound from a recorder with automatic level recording circuitry. Measured performance is good, though the record/playback measurement shows that the deck, which sounds slightly bright when new, is probably designed to wear down to a reasonably accurate response shape. Wow and flutter is a little high.

AD-922 CD PLAYER

The *AD-922* is very like the *MD-M24* midi-width player that comes with other Fisher systems: it's just wider. Facilities are very simple but there are no serious omissions. Audible track search is there, so is track-skip, a programming feature for up to 16 tracks in random sequence, and a repeat mode. Even with this very limited range of facilities, I thought the control layout rather unhelpful, largely because the two keys reponsible for audible scanning, which double as index search keys, bear symbols that have become standardised for the track-skip role. Naughty!

The player has rather slow reflexes, and occasionally seemed rather reluctant to skip tracks. In its favour, however, it was quite adept at tracking even quite badly mauled discs. This at least implies some real under-the-skin sophistication.

CA-224 AMPLIFIER

Fisher obviously mean you to take their power output claims seriously. Written across the front like a banner headline it says: '35 watts per channel minimum RMS power into 8 ohms with no more than 0.5% total harmonic distortion.' Quite why we should wish to be reminded of the fact every day is not made clear, but on test it actually exceeded the claim, with 40 watts a side. No spare inputs are provided other than those needed for the other system components. User controls are limited to a 5 band equaliser.

ST2400 LOUDSPEAKERS

The loudspeakers are largish, but poorly constructed. The main limitations are the use of a cheap and nasty high frequency unit, and in mounting the drive units behind the baffle, which in effect means they speak to the world through shallow tubes. If you want to know the significance of this, ask someone to speak to you through a pair of hands tightly cupped over the mouth. Or take a look at the midrange unevenness and the spiky top, as revealed in the response plots.

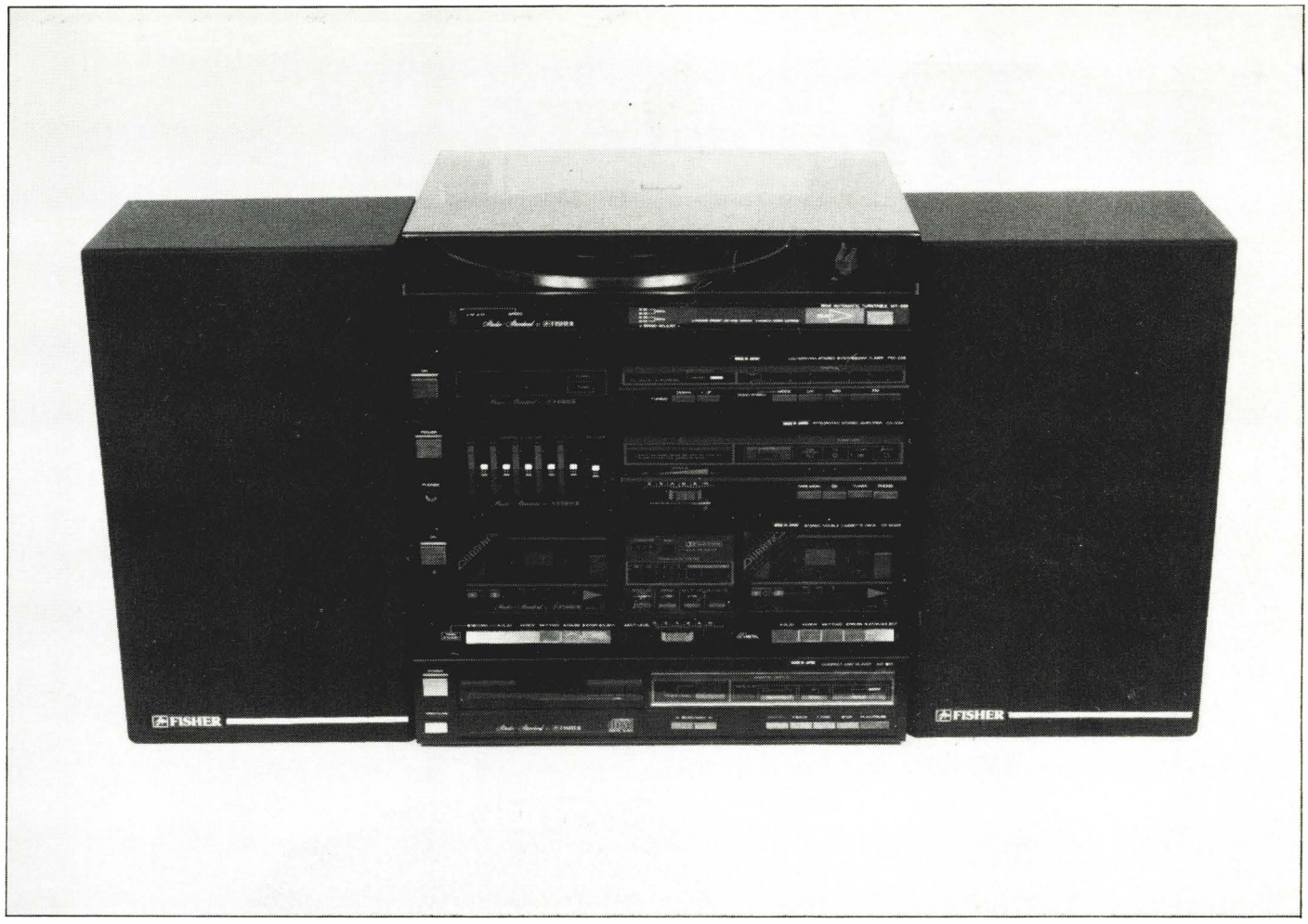
HOW IT SOUNDS

From the first notes it is apparent that this system means business. First impressions — and we're talking here about the sound of the system with the benchmark B&W *DM110* loudspeakers — are of an ambitious quality, almost as though the various components are at least making a serious, concerted attempt at making music, and not just taking the easy way out.

The midrange and the top end quality of the system as a whole, and the amplifier and CD player in particular, are both detailed and relaxed, and there was a real feeling that here was a system whose designers knew, for example, what a stereo image could sound like when reproduced in a home. Only one feature jarred at this point: the bass end, whilst sounding pretty good and clean was also rather over-full, bordering on being over the top. There was an unmistakeable feeling that some behind the scenes engineering had gone into making the system sound that bit more impressively bassy than it otherwise would.

The cassette deck sounded a little shut-in compared to the CD player when using metal tape, but this in itself isn't as serious as the Dolby mistracking (symptoms are odd changes in level of background instruments, summed up perhaps as audible confusion). Also, the deck was a little unstable in running speed. However, the overall quality really wasn't that bad, and it held up well using cheaper ferric and chrome bias tape formulations, which is a good sign.

The record deck in turn sounded much like system decks sound. The cartridge wasn't bad, and this element lent the reproduction some-



thing useful. The cartridge had a fairly smooth, even response with a rather restrained top end, which is how records sounded too. However, there was a contribution from the turntable itself, that seemed responsible for a reduced sense of solidity and general sonic stability. All in all, not a disastrous performance, but not one you'd really want to write home about either.

Tuners rarely seem to be a make or break issue with midi systems. It's a fair guess that there is more variablity in practice due to inadequate aerial installations than to genuine differences between tuners, and there are still people who believe that MW and LW should sound as good as FM, and carry on with these bands when they could be using FM. In fact, few should have cause for complaint in the Fisher case, largely because sound quality on FM is very good when fed a decent signal but also because the Fisher behaves in quite a civilised fashion when the signal it is trying to capture is very weak. The AM bands suffered rather more than was probably strictly necessary: the sound was really quite 'squashed' and limited, which affected speech intelligibility quite a lot.

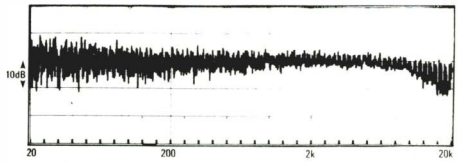
And then there are the louspeakers, which is where the whole pack of cards comes tumbling down. If you're suffering from a sense of *deja vu*, it's because you've been reading the other Fisher system reviews. The *ST2400*s sound much as their construction suggest: aggressive, forward, coarse and extremely 'lossy'. A lot of information simply doesn't get through, and what does get through emerges quite badly mauled. The bass booms too, though it doesn't go down very far. But nothing more should be expected of loudspeakers where all the rules of loudspeaker design have been flouted so thoroughly, as here.

Verdict

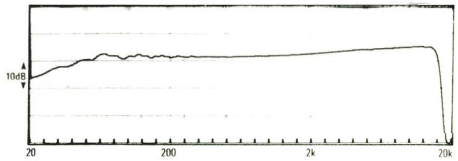
This starts out as a neat but conventional separates style system most of which performed in a way that does credit to the manufacturer's name. Although bass quality isn't wonderful, mid and treble are much better. This isn't an inspired package, but it is a relatively ambitious and competent one that is spoiled only by those awful loudspeakers.

Test Results

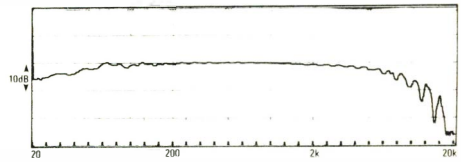
Cost with speakers	£500.00
Options?	none
Size main unit	69×40×36cm (h×w×d)
Size loudspeakers	43×24×17cm (h×w×d)
Turntable	
Wow & flutter wtd	0.10%
Drift	average
Speed accuracy	variable speed control
Arm/cartridge resonance	15Hz, too high
(<10kHz too low, OK,> 14 Hz too high)	
Cartridge channel balance	0.5dB
Cartridge channel separation	−23dB
Cartridge tracking ability	59uM
Tuner	
Sensitivity	good
Signal/noise	good
Cassette Deck	
Wow & flutter (wtd)	0.19%
Signal/noise ref 0dB Type II	54dB
Distortion 0dB Type II	3.0%
Compact Disc Player	
Weighted signal/noise (measured at amp Tape Out)	103dB
Amplifier	
Power output/channel (8ohms)	40 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	fairly high



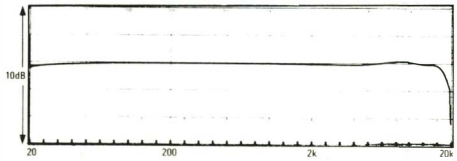
Turntable replay frequency response



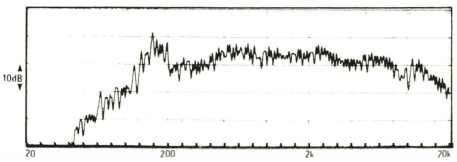
Cassette deck record/replay response



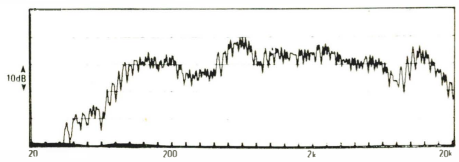
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

BEST BUY

GOODMANS MIDI 5200

GOODMANS LTD, 2 MARPLES WAY, KINGSCROFT CENTRE, HAVANT, HANTS PO9 1JS.
TEL: 0705 486344

The Goodmans name may be new to the systems business, but the company is well known in two related fields: they distribute the Japanese Onkyo brand in the UK, and they are major loudspeaker manufacturers in their own right. From the Onkyo link they have learned much about how to distribute electronics, and with their loudspeaker making skills ought to be in a position to make a somewhat better flavoured mousetrap. And this is what they've done. There's little remarkable about the electronics, but the loudspeakers, simple as they are, are way above class average.

The hardware offers generally adequate but not wonderful standards of finish, which looks best when examined from a fair distance. A trained eye can detect a variety of styling influences, including Aiwa and Fisher, but this does not apply to the CD player whose styling is at odds with the rest of the system.

You might like to know that only the CD player is made in Japan. The rest of the electronics comes from Korea, whilst the speakers are made in the UK.

This system does not offer the linked automation possibilities of centralised power switching, automatic source selection, synchronised recordings etc: instead it is essentially a group of separates in the traditional mould. Included in the package is a graphic equaliser (a unit of such limited sonic value should have been optional) and loudspeakers, but the CD player is optional. In addition to the *GCD500S* CD player tested here, a slightly more upmarket version is available — the *GCD510*.

GSP-308 TURNTABLE

The turntable demonstrates perfectly why separates are better than systems. It has obviously not been designed by anyone who cared deeply about the sound of records. About the only positive thing that can be said is that it isn't the only one . . .

The motor switches on as the arm is moved over the record, and an arm cueing lever is dropped to give a damped stylus descent. Arm return at side end is automatic. The arm is pivoted and the cartridge can be replaced with any ½" mounting model — but beware, there is no ready means of adjusting tracking force!

The deck is lightly built and highly microphonic. Ideally it should be used alongside rather than on top of the other electronics. Note the poor measured results: the speed drift, the inadequate channel balance, the limited tracking ability, and the sharply rolled off high frequencies.

GST-5200 TUNER

A modern looking 3-band (FM/MW/LW) digital tuner, the *GST-5200* is fully equipped for preset operation. Seven FM and seven AM (random mix MW and LW) stations can be selected this way. The fluorescent display is clearly legible, but note the absence of almost all non-essential information, including signal strength. The mono switch facility is available on the amplifier.

No provision appears to have been made for varying the AM tuning steps, presently 9kHz, when the spacing changes to 10kHz in 1987. This could leave AM listeners high and dry, able only to tune in very roughly to some of the stations they use.

FM sensitivity was reasonable, but background noise levels — and more damagingly a coarse grating background buzz, evidently grown by the synthesiser circuitry before being injected into the audio — were always high.

GSW-5200 CASSETTE DECK

This is a twin transport unit of conventional design, with just one of the transports able to record. Tape type setting is manual (cheapskates!), but manual record level setting is possible, which is a blessing, and control feel is extremely good. Tape dubbing is at normal or high speed, and Dolby B noise reduction is available. Additional features include continuous play of two cassettes (one side each only), and sockets for headphones and microphones.

Wow and flutter measured a little high, and other tests showed the presence of an unnecessarily abrupt MPX filter, truncating the frequency response about 11-12kHz.

GCD-500S CD PLAYER

This player offers a very restricted range of facilities. Headphones can only be connected *via* the partnering amplifier, whilst the display shows elapsed track time or track number, but not at once. The controls are awkwardly stiff, and annoyingly play cannot be invoked directly with the drawer open. Disc handling is slow; but in contrast to earlier samples tracking performance on marked discs is much improved, and now rates as satisfactory. The deck is also well isolated from knocks.

GSA-5200 AMPLIFIER, GSQ-5200 EQUALISER & 5200 LOUDSPEAKERS

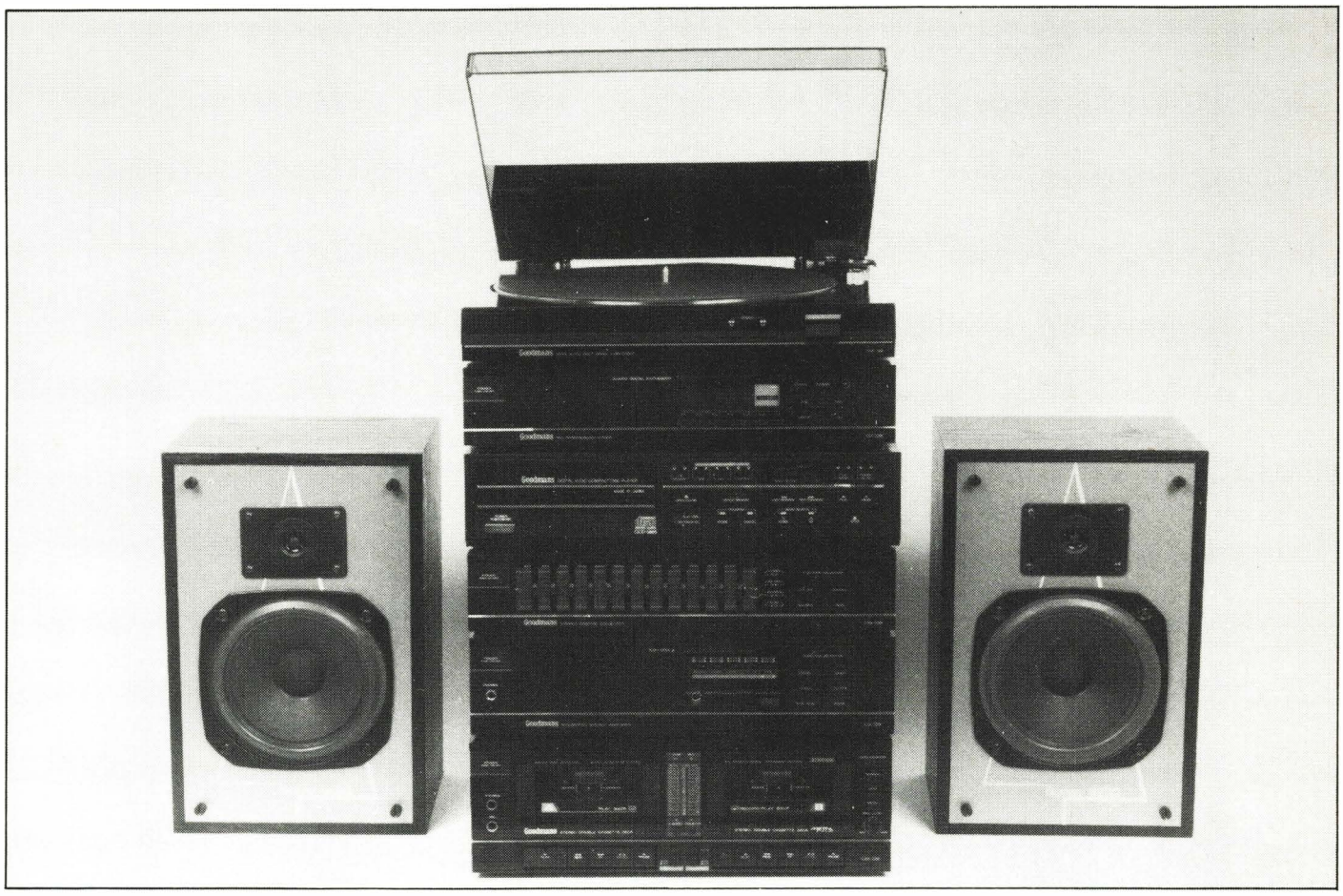
Tone, loudness, mike mixing and other minor controls are hidden behind a flap on the amplifier, which presents a very clean face to the world with the flap closed. Power is a respectable 42 watts/channel on test — better than specification. With tape monitor selected, the graphic equaliser can be brought into play, the active state denoted by glowing LEDs on each boost/cut control. This equalised signal can be sent to the cassette deck.

The loudspeakers are small, lightly constructed, and are fitted with a paper cone bass unit and Audax tweeter. Side panels are finished black vinyl wrap, and the front, visible with the cover detached, is painted grey and white.

HOW IT SOUNDS

By system standards the speakers are pretty hot stuff, but by stricter standards they're open to criticism on two counts. First, treble quality always seems to escape only just from sounding seriously harsh and distorted. Secondly, the lower midrange has a 'bloated' balance, intended presumably to make them sound bigger than they are. And at times, especially with simple recordings having a limited number of instruments and voices, it works just that way. At other times the effect is exaggerated, boxy sounding and unnatural. But they only lose a couple of brownie points for these sins, and are really much better than many system speakers.

The cassette deck was a pleasant surprise as tape recordings sounded quite good. It's true that they seemed a little brighter and coarser than the real thing, and there was also a tendency towards unevenness, as though tape-to-head contact was varying, but also partly a matter of poor speed stability. However, the latter effect,



though potentially serious, tended to recede in a matter of moments, and what was left was fairly clean, with a quite detailed and satisfying sound. Surprisingly, high speed dubbed tapes lost less of the quality of the source than usual, though this procedure is certainly not recommended.

The turntable was less good at its job. The cartridge was probably responsible for some of the effects — the coloured, flattened midband, and the limited tracking abilities, while the sound of loud peaks was obviously cluttered and distorted. But the whole deck must be blamed for giving a rather 'listless' overall feel. As expected the stereo presentation was slack — there was stereo all right, but it tended to be poorly focused and all over the place — and the deck proved very microphonic, imparting a characteristic plasticky 'quack' to the sound when provoked. The bass just sounded 'flat'.

On radio, LW and MW interference was well suppressed, but the high frequencies on these bands was restricted to telephone bandwidth or worse, and some people might consider the cure worse than the disease. FM sound quality was basically fair to average, the nature of the background noises referred to earlier setting the upper limits on performance in this case. Sensitive listeners may find the tuner not to their tastes for this reason.

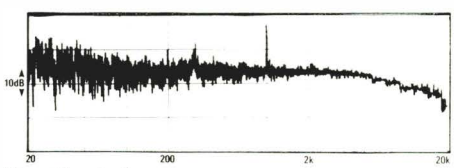
Standards of CD players are improving fast. Only a matter of months ago, the Goodmans CD player was a reasonably strong offering. Now it sounds little better than mediocre, with a rather 'grubby', 'congested' character and significant loss of information at frequency extremes. In these characteristics, it was aided and abetted by the amplifier, which was nevertheless capable of quite high and unstressed maximum volume levels. As expected, though, the sound opened up and came to life significantly with the graphic equaliser out of circuit. That device really doesn't do the system many favours.

Verdict

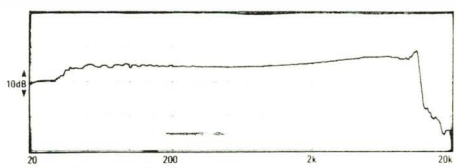
The Goodmans' *pièce de resistance* of course is its price. On the whole the system works adequately, and it's cheap, cheap, cheap.

Test Results

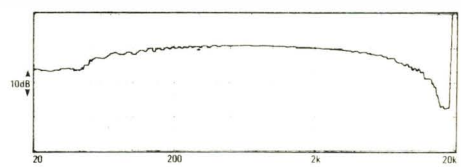
Cost complete	£549.80
Options'	CD player
Size main unit - lid open, W/O projections	78.5 × 35 × 36cm (h × w × d)
Size loudspeakers	35 × 22 × 19cm (h × w × d)
Turntable	
Wow & flutter wtd	0.08%
Drift	poor
Speed accuracy	+0.6%
Arm/cartridge resonance	15Hz—too high
(<10Hz too low, OK, >14Hz too high)	
Cartridge channel balance	1.8dB
Cartridge channel separation	−52dB
Cartridge tracking ability	64uM
Tuner	
Sensitivity	fair
Signal/noise	very poor
Cassette Deck	
Wow & flutter (wtd)	0.22%
Signal/noise ref 0dB Type II	52dB
Distortion 0dB Type II	3%
Compact Disc Player	
Signal/noise (measured at Amp Tape Out)	94dB
Amplifier	
Power output/channel (5ohms)	42 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	very low



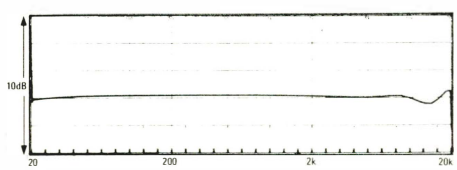
Turntable replay frequency response



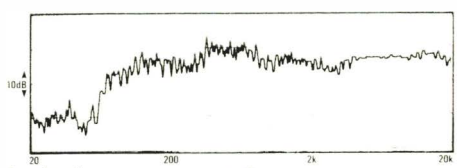
Cassette deck record/replay response



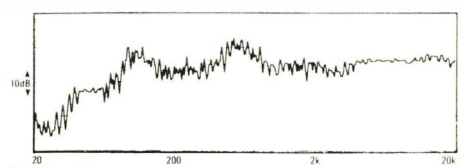
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

HITACHI MD16

HITACHI SALES (UK) LTD, HITACHI HOUSE, STATION ROAD, HAYES, MIDDLESEX UB3 4DR.
TEL: 01-848 8787

The *MD16* is Hitachi's answer to the requirements for an ultra-low-cost CD midi system. Although the styling might seem a little mannered for some tastes, this is a clean enough job overall. Taking price into account the *MD16* is built no better than it needs to be, but the important bits seem to be sound.

As with most systems of this type, there is only limited scope for future improvements, other than the loudspeakers which can be changed at will. The CD player and turntable are separate items which plug in at the back of the main system unit. Apart from a microphone socket, there are no spare inputs, and there are no low level outputs which would allow, for example, an outboard tape deck to be used.

HT-MD26 TURNTABLE

Very much a 'me too' design, the turntable has a thin, lightweight platter and rubber mat, plus a very flimsy pivoted arm with magnetic cartridge. Structural integrity has clearly not been a driving force behind the design. Although described on its front panel as an automatic turntable (quote unquote), don't be misled — it isn't: the arm does return to its rest automatically at the end of side, but that's as far as things go, and the deck is properly described as a semi-automatic. What is useful is that all the controls — sorry, both of the controls — are positioned on the front of the deck facing forward, which helps make the player easier to drive. One control changes speed, and the other operates a damped cueing platform. The cartridge has a respectable enough response shape, which was confirmed in the auditioning.

HRD-MD16 MAIN UNIT

The analogue tuning scale is long and clear, and the pointer is illuminated, but the large, edgewise tuning knob rather stiff and very low geared. Linked up to the laboratory generator, the FM circuitry showed sensitivity seriously below par, and noise levels a little high too. At low input signal levels, the noise deteriorated in a rush of whistles and other disconcerting noises. However, the AM bands behaved about right for sensitivity and interference alike, whilst sound quality on these bands was acceptable.

The cassette deck is distinguished as one of the very few ultra low-cost units to have put sound quality ahead of removing one more complication, *viz* record level metering and a record level control. The Hitachi happily has both. Note that 0dB should not be exceeded on the meters: they are set high, well into the bottom reaches of the distortion curve. Noise reduction is by Dolby B, while tape type selection is manual and restricted to ferric and chrome bias types — not metal tapes, except of course for replay, where metal behaves like chrome.

The deck performed quite well on test, though pre-recorded tapes were replayed with fairly strong treble losses, probably due to head azimuth (alignment) errors. One area of weakness that the manufacturer could probably easily cure is the high level of hum on recordings, which was perfectly audible when the music wasn't too loud. Wow and flutter figures were poor on test, but variable in practice. Quite a lot of the time speed instability was not a problem, and there was a suggestion that performance was improving towards the end of the test period.

Amplifier controls include the usual range of inputs, a loudness switch, and a three-band so-called graphic equaliser — with only three bands of adjustment, the term is hard to justify. The amplifier proved capable of a useful 15 watts/channel on test, which is quite a bit better than class average.

DA-6000 CD PLAYER

The *DA-6000* is a smart, low cost CD player that is used in a number of Hitachi systems. To suit its role in more expensive systems than this, the level of build quality and finish is better than the rest of the system.

In the middle of the dashboard is an unusual orange LED readout panel which gives both track number and elapsed track timings, along with a running indicator. With a surprisingly small number of controls (which still manages to include dedicated index search keys) the Hitachi will store programmes of up to 15 tracks in length, search (audibly), skip tracks and repeat memory contents — the entire disc or between two randomly set points.

The *DA-6000* had a little trouble with some of the discs that were used. It was rather sensitive to marks and scratches, and become trapped in a locked groove quite readily — just like a misbehaving record player!

SS-16 LOUDSPEAKERS

You're unlikely to mistake the *SS-16* loudspeakers for garden gnomes or a pair of woolly gloves because right across their waist is a large strip of aluminium emblazoned with the manufacturers name and model number. I'm not convinced they were right to boast, but make out better than many such low cost designs. Used on tall stands a foot or so into the listening room, the *SS-16* offered a fairly smooth response through the midband. Bass extension was not that great, but the most obvious limitation was the roughness apparent in the extreme treble.

HOW IT SOUNDS

The number of low cost systems with loudspeakers that are even just bearable can be

counted on the fingers of one hand, but the *SS-16s* supplied with this system are creditable. The tweeter is clearly not a high quality item, and, on many types of music gave an 'edge of the seat' kind of sound, as though some quite gross distortion-causing mechanism was somewhere in the system. Bass performance was naturally limited by the size of the enclosures, but was not so limited that music seemed seriously lacking. The midband, which determines the basic character of the speaker, is best described as explicit and reasonably detailed, which helped offset a tendency to coarseness.

The rest of the system fell into place quite nicely. Whilst not to be confused with real high fidelity designs, the amplifier was man enough for the job, sounding satisfactorily clean and unobtrusive at high and low volumes alike. Of the sources, the compact disc player worked best of all, much as you'd expect from a system of this type. But both the cassette deck and the turntable made quite satisfying noises after their own fashion.

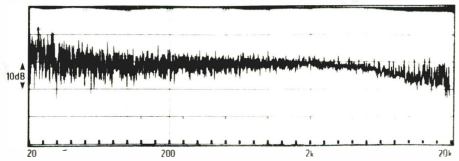
Apart from specific problems noted earlier (*eg* the hum picked up by the tape deck), the *MD16* could be described as a little coloured and coarse. It didn't offer tremendous dynamic range or much in the way of activity at the frequency extremes. But for all that the system sounded couth enough for the most part, with a quite well projected midband and enough of what matters where it matters to make listening a genuine pleasure. The tuner would have been counted into these remarks, but the hiss and sensitivity problems make this a fair weather model, best suited for use with good aerials in strong reception areas.

Verdict

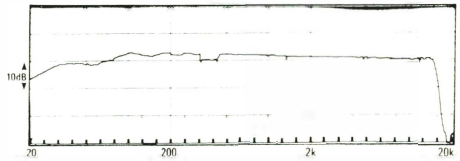
Here is a thoroughly competent and professional response by a major company to the requirement for cheap CD-based audio. At the price, what more can you ask — except perhaps a more sensitive tuner?

Test Results

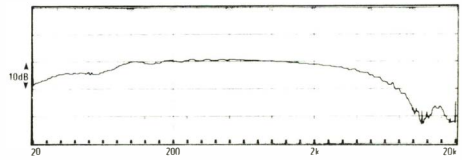
Cost complete	£369
Options?	DA-6000 CD player
Size main unit - lid open, w/o projections	70×37×34.5cm (h×w×d)
Size loudspeakers	31.5×18.5×24cm (h×w×d)
Turntable	
Wow & flutter wtd	0.12%
Drift	poor
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
(<10kHz too low, OK,>14Hz too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*
*[*Turntable could not be connected to test instruments*	
Tuner	
Sensitivity	very poor
Signal/noise	very poor
Cassette Deck	
Wow & flutter (wtd)	0.40%
Signal/noise ref 0dB Type II	61dB
Distortion 0dB Type II	3.5%
Compact Disc Player	
Signal/noise (measured at amp Headphone Out)	81dB
no record output sockets fitted	
Amplifier	
Power output/channel (8ohms)	15 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	medium



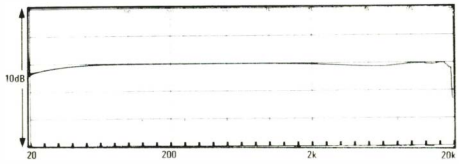
Turntable replay frequency response



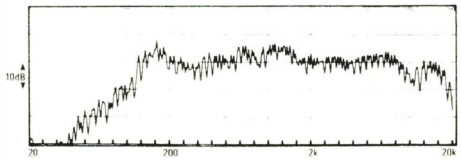
Cassette deck record/replay response



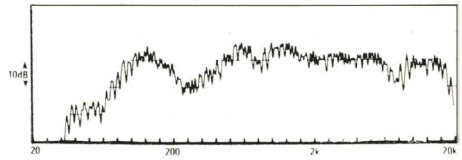
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

JVC MIDI W12

JVC (UK) LTD, JVC HOUSE, 12 PRIESTLEY WAY, ELDONWALL TRADING ESTATE, STAPLES CORNER,
LONDON NW2 7AF. TEL: 01-450 3280

A typical mid-priced system, the JVC *Midi-W12* is based around what would at one time have been described as a 'cassiever' — an amplifier with tuner and cassette deck sharing a single main power supply and housing — styled in this case as though it was made from separate units. The turntable, however, is a completely separate unit, and so is the CD player. The latter is available for sale in its own right, but the turntable receives DC power *via* the main unit, and clearly would be lost on its own. The system comes complete with loudspeakers, but may be purchased without the compact disc player if so required.

System set-up is very simple. There are very few connections to be made, and the turntable can be sited alongside the electronics, or on top, using extension pieces that can be attached to the back of the electronics package.

AL-E11 TURNTABLE

Whilst the turntable that JVC supply with this system is no great shakes — and is in no sense a contribution to the turntable maker's art — I found it preferable in some respects to the super-intelligent automated monsters that come with some of the systems tested. The one that comes packaged with the JVC *Midi-W77* system, for example, was a little too clever for its own good; for all its special facilities, the arm-in-lid construction is far from ideal from an acoustic or ergonomic point of view.

The *AL-E11* is belt-driven and has a pivoted arm with a magnetic cartridge. The platter is an undisguised plastic moulding. Construction is light, flimsy and microphonic. The deck is described as fully automatic, though the test sample failed to work as advertised. But it can also be used as a true manual deck with the benefit of auto liftoff and return at the end of side. I was able to open the lid, grab the arm and plonk the stylus down on the required band in a fraction of the time the automatics on other models need to make their minds up what day it is.

Measured speed stability tests gave poor results, and although other parameters were reasonable, the deck falls a long way short of hi-fi practice, even at the low end.

DR-E11L MAIN UNIT

The tuner section of the system is well endowed: digital synthesiser tuning (using a smart orange back-lit display) offers 16 presets on FM, and a further 16 which can be divided up at random between MW and LW (these last two are organised as a single continuous waveband). Mono reception mode is available for weak transmissions, and a 'preset scan' feature plays each preset frequency for a few seconds.

Tests indicate reasonable FM but poor AM sensitivity. Noise was unusually high, especially on FM.

The cheaper the system, the more it seems likely to have a double cassette deck, and this system is no exception. One of the decks will record and replay, the other is strictly for playback purposes. Just about everything is automatic, including record level and tape type setting. Dolby B noise reduction (also labelled ANRS) and the usual transport keys complete the control tally of what apart from the twin transports remains a very rudimentary design. There isn't even a tape counter, and the non-illuminated cassette well makes it quite difficult to know where you are along the length of a tape.

It wasn't possible to run response checks by the usual method because there is no line level output. The frequency responses shown were therefore measured at the headphone socket, but it became quickly apparent that this ruse wasn't giving realistic numbers. TDK SA, a representative Type II (chrome bias) tape, gave incredibly dull sounding recordings, though other tapes types sounded tonally near neutral — neither bright nor dull. It therefore appears that the most popular high quality tape type — Type II — is not compatible with this recorder — and indeed the list of tape recommendations is restricted to Type I (ferric) and Type IV (metal) only. This is an extraordinary example of cost paring.

Noise and distortion checks could not be made due to the action of the automatic record level circuits, but wow and flutter was at least twice the normal level, and subjective speed stability was poor.

The 2×60 watt maximum output power specifications of the amplifier section sound impressive, but should be tempered by the reality of a more modest 15 watts/channel to the clipping threshold. The design is a simple one, with a five band graphic equaliser the only facility of note. There are no spare line inputs other than those required by the system components, and there is no microphone socket either, though one is provided for headphones.

XL-V20 CD PLAYER

This system uses the same CD player as the one supplied with the *Midi-W77* system, but the *Midi-W12* should be available with the newer *XL-V22* (not tested) by the time this review appears.

The *XL-V20* supplied at present is a simple unit offering a programme memory with a capacity for up to 15 tracks, plus the usual disc/track search facilities.

SP-E11 LOUDSPEAKERS

The loudspeakers are shoddily built, with an unusually flimsy sealed enclosure and pseudo-high-tech appearance (note the venetian blind slats over the tweeter) that is not justified by the cheap and nasty hardware from which it is made. The measured system response shape looks very poor, with severe peaks and dips from bass to treble.

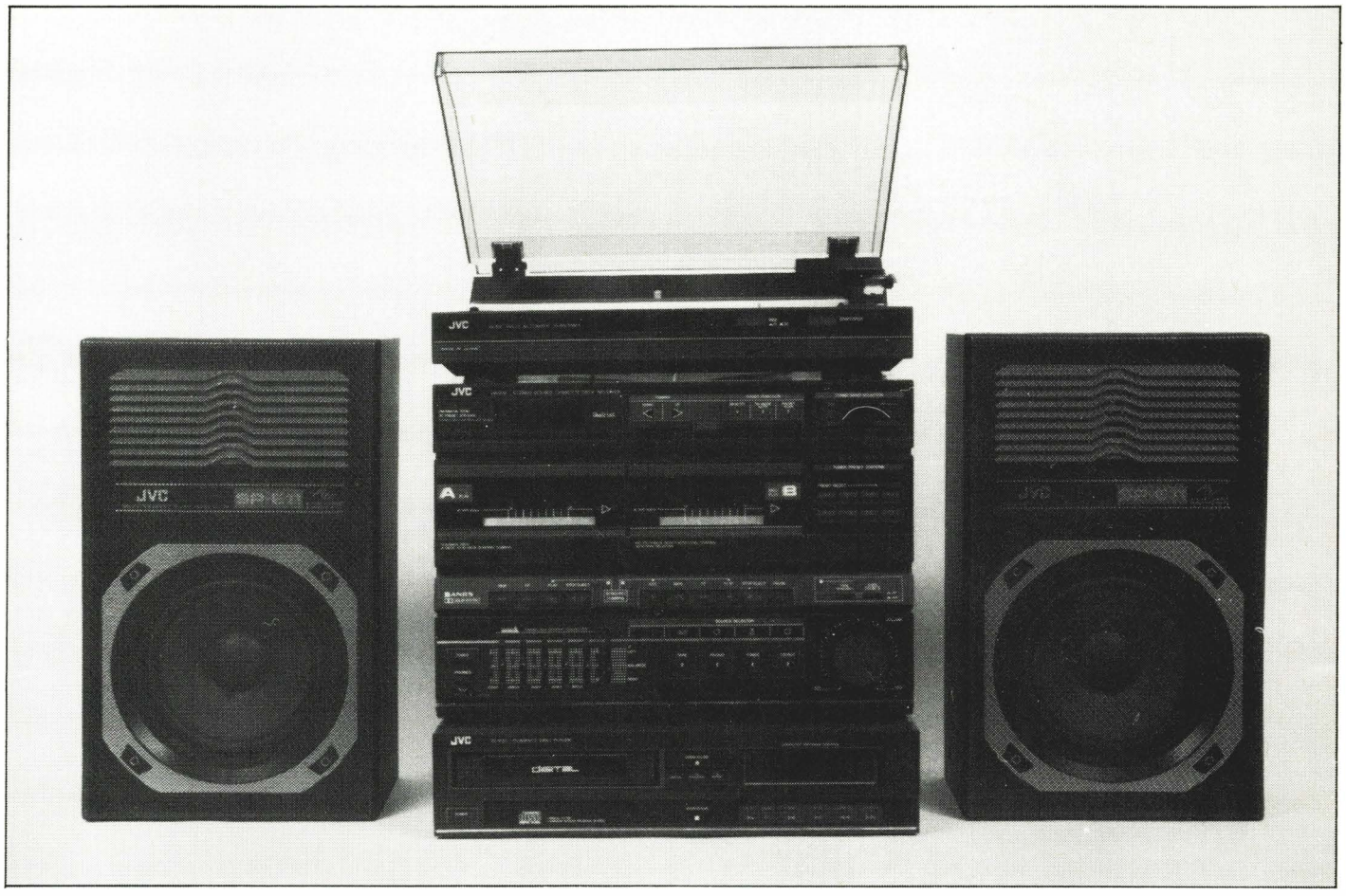
HOW IT SOUNDS

Records sounded thin and brash, and high level/high frequency passages were also distorted due to poor cartridge tracking. However, when not unduly stressed, the sound was quite detailed and clean. The only mistake is to get within the 500 yard exclusion zone when a record is playing. Foolishness of this sort is greeted by the sound effects from *Earthquake: The Movie!* Not recommended.

The cassette deck wasn't a great success. Apart from the inability to use Type II tapes, speed stability was audibly all over the place, and tape-to-head contact was clearly erratic, giving an unstable, drop-out prone result. Pre-recorded cassettes tended to sound slightly more satisfactory than home made ones.

This leaves the tuner and the CD player, the second of which you can read about in the *Midi-W77* review. On AM, the radio side sounded dull and compressed, though interference was moderately well suppressed. The FM section was a little bright and 'edgy', but the sound was basically OK. High noise levels and limited signal catching ability are likely to prove the main snags.

The amplifier is not just a simpler, lower powered version of the one in the bigger JVC system, it is also significantly less capable, lacking the distinguishing qualities of that model. Used with the reference B&W



loudspeakers and driven by the CD player the sound is a little 'veiled' and almost 'stripped down' in quality. Using identical records and discs, the effect is almost like listening from a much greater distance. Instrumental separation is relatively poor, making music sound more cluttered and dense, and the effect is therefore less distinctive and involving.

I didn't like the loudspeakers much, though it has to be said that they sounded less confused and more articulate than the ones in the more costly *Midi-W77* system! Presumably this is a direct consequence of their two-way construction. (With loudspeakers, the fewer units and the simpler, generally speaking, the better). Even so, the bass was an indistinct blurr, and there was little real bass depth, even taking into account the small size of the boxes.

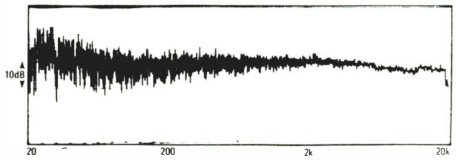
By far the most objectionable feature of the speakers however, is the upper midband, produced by the nasty little drive unit hidden behind the venetian blind. The measured sharp peak around 5kHz is probably responsible for a sound with a sharply coloured, tizzy characteristic. The whole system sounds bright, thin and raw — yet many systems are even worse in this department. It simply defies belief. Note that the low speaker efficiency together with low amplifier power mean very restricted maximum undistorted volume.

Verdict

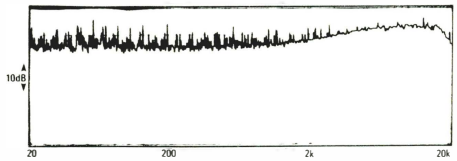
Strong points of the *Midi-W12* include the tuner, the CD player, and general ease of use. Unfortunately the weaker components dominate the mix here, and even at this price level the kudos of the name isn't enough to justify what by any standards is pretty mediocre performance.

Test Results

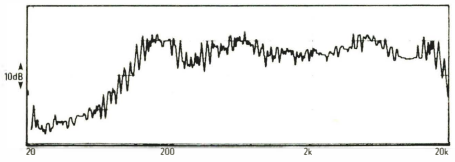
Cost complete	£499
Options?	CD player
Size main unit - lid open, w/o projections	61×34×34cm (h×w×d)
Size loudspeakers	36×21×17cm (h×w×d)
Turntable	
Wow & flutter wtd	0.7%
Drift	poor
Speed accuracy	no error
Arm/cartridge resonance	no resonance detected
(<10kHz too low, OK,>14Hz too high)	
Cartridge channel balance	0.8dB
Cartridge channel separation	-28dB
Cartridge tracking ability	80 uM
Tuner	
Sensitivity	fair
Signal/noise	very poor
Cassette Deck	
Wow & flutter (wtd)	0.20%
Signal/noise ref 0dB Type II	n/a
Distortion 0dB Type II	n/a
S/n & distortion not measured due to auto record level	
Compact Disc Player	
Signal/noise (measured at amp Tape Out)	80dB*
*Measured at headphone socket	
Amplifier	
Power output/channel (8ohms)	15 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	low



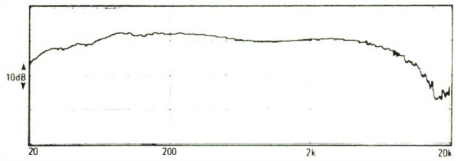
Turntable replay frequency response



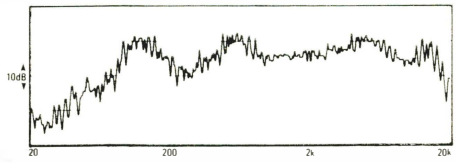
Cassette deck record/replay response



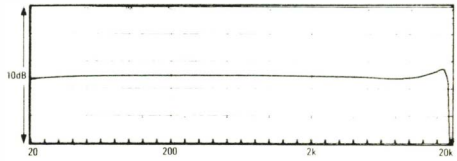
Loudspeaker in-room response (wall site)



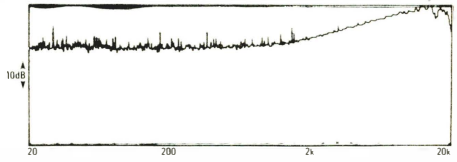
Cassette replay only response



Loudspeaker in-room response (open site)



CD player replay frequency response



Cassette record/replay response metal tape (TDK MA-XI)

RECOMMENDED

JVC MIDI W77 SYSTEM

JVC UK Ltd, JVC House, 12 Priestley Way, Eldonwall Trading Estate, Staples Corner,
London W12 7AF. Tel: 01-450 3280

The JVC *Midi-W77* is a conventional if costly system of stand-alone separates. It is supplied with a programmable system controller and remote control handset, and has some quite sophisticated co-operative features — such as auto start on any of the sources once that source has been selected at the amplifier. The system is well built and presented, though fitted with a daunting array of controls. Control feel is almost universally good. Loudspeakers — simple three way units of large bookshelf proportions (but don't take this as an invitation to use them this way!) — are included as standard.

In reality this is also one of those big midi systems which takes up quite a lot of room. Its 'footprint' is modest enough, but its height is greater than most enclosed shelves will accommodate. The accumulated compliances of all those building blocks also make a rather wobbly resting place for the turntable, which suffers predictably. But in fairness this system is no worse off than most others, and the JVC actually has some modest degree of musical talent, as we shall see. In any case, the configuration of the system allows the units to be placed other than in a vertical stack: ideally the turntable should be placed on its own alongside the rest.

AL-E77 Turntable

The turntable is belt-driven and has a lid-mounted parallel-tracking arm equipped with a magnetic cartridge. A wide range of automated facilities are offered, including the ability to pre-program up to 8 tracks into random sequences up to 15 instructions long.

The deck is singularly microphonic and record surfaces sounded 'active'. The whole deck had a somewhat 'seismic' feel. Even used on a stable surface, the deck's construction got it into trouble, the merest trace of movement resulting in protest or catastrophe.

There is another problem that simply doesn't arise with manual turntables. The automatics are crude, lacking native intelligence. Merely to search manually for a specific point on the disc means going through contortions and involves working in the dark. The lid, which neatly obscures everything that's going on, cannot be raised whilst it's all happening. On automatic, simply playing a record from the start involves a 20-second 'scan' to program track contents into memory. However, there are benefits too. Using the features to the full means it is possible to construct a programme which will record onto cassette with all stop/start and track changes handled automatically.

Measurements showed poor long term speed stability and limited tracking ability. The cartridge doesn't like very 'hot' cuts, but other parameters checked out OK.

FX-E77L Tuner

The tuner is a sophisticated three-band (FM/MW/LW) digital synthesiser affair with no less than 16 FM and 16 AM presets. There is a single key presetting option, and another key marked 'preset scan' which plays a few seconds of each preset in turn. Indicators are extensive, but exclude signal strength metering. FM noise levels are good, but a good, strong signal is required. AM was very prone to interference.

TD-W33 Cassette Deck

Like the turntable, the *TD-W33* cassette deck is lightly built, its flimsiness illustrated by the fact that it's necessary to press the correct (right hand) side of the cassette doors when closing, or they won't latch.

Although a twin mechanism, the deck is as simple as they come. Noise reduction is by Dolby B (also labelled ANRS, the JVC house system, now the same as Dolby), so there's a switch for that. The only other controls are the transport keys — actually high quality membrane switches (usually a contradiction in terms) — plus a couple of dubbing start keys, one for normal, the other for high speed dubbing. Everything else is conveniently automatic, including tape type sensing and record level setting.

The playback response shelves down above 2kHz by a dB or so, but normal Type II record/replay responses are very accurate and on paper the deck works well. But high speed dubbing is predictably disastrous sound-wise, and the auto-level recording facility was caught out (causing badly over-recorded tapes, hence severe distortion) on some rock material with heavy bass and treble emphasis.

XL-V20 CD Player

The *XL-V20* is due to be replaced by the time this appears in print by a new *XL-V22* model. The *XL-V20* supplied is a simple unit offering a programme memory with a capacity for up to 15 tracks, plus the usual disc/track search facilities.

AX-E77 Amplifier

Whilst maintaining the simple lines of the other system components, the *AX-E77* has an unusually comprehensive 7-band equaliser and the usual range of source selectors, which can be operated manually or automatically as previously described. One extra set of inputs and outputs is provided for an external tape recorder or other item. The only headphone and microphone sockets available on this system are fitted to the amplifier. The volume control is suitably prominent, but has a poor, uneven feel. Hopefully this isn't an omen.

SP-E77 Loudspeakers

The loudspeakers are formula products, and demand little comment. They're fairly big and have pulp cone bass and midrange units, the latter covered by mesh. The system is completed by a crude, metallised tweeter. Construction quality of the vented enclosure is light: too light. In-room frequency responses were 'lumpy' and limited in treble extension. The only real shame is that they're not optional.

RM-E77 Programmable Remote Controller

If the amplifier is the muscle of a system, the *RM-77* controller is its brain. *Via* rear panel links and from instructions set on its front panel, the controller provides up to two sets of programmable on and off times over the following week, and an everyday on/off timed sequence, all of which can be associated with an instruction to switch on any of the sources (the alarm function) or to record a radio broadcast (the unattended recording function). The *RM-E77* also acts as the receiver for a system remote control.

The unit has a 'sleep' facility, programmable for up to 120 minutes. Remote controllable functions include volume, power, source/radio preset selection, and the ability to record. The handset uses membrane pressure operated keys rather lacking in feel, and can be stored in a slot provided in the *RM-E77*.

How It Sounds

My first attempts to stoke this little beauty into life were greeted by — silence. It took some time

to find out that the *RM-E77* programmable system remote controller has its own volume control that works in series with the one on the amplifier. Both taps must be open before anything happens — don't be caught out like yrs trly.

Having mastered the complex 'user interface', the sound off records was pleasingly — almost surprisingly — reasonable, except when playing passages cut at high levels, which caused the cartridge to baulk and the sound to become coarse and aggressive.

The other sources also worked well, all except AM radio providing a degree of clarity, resolution, and a lack of 'nasties' that speaks well of the basic design work. There's little to get excited about, but conversely none of the sources really lets JVC down, though the cassette deck can sound a little 'ragged', and high speed dubbed recordings should be avoided at all costs — as usual.

I'm almost surprised to find that the loudspeakers aren't too bad either. But this remark must be qualified by saying that the sound is tonally neutral and the bass dry but 'lean' in feel. Although not very muscular it is in good control: in contrast, all too many system loudspeakers sound 'fat', 'bloated' and eventually end up sounding annoying.

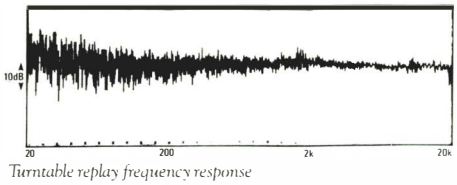
However, the mid/top frequencies are messy and inarticulate. It's actually difficult to hear what's going on in these areas, and as a result the power, range and subtlety of musical expression is curtailed. Accurate top end information is necessary (for example) if pianos are to reproduce with the characteristic 'ring' of a Steinway (as on one of the test CDs) and so many other things.

Verdict

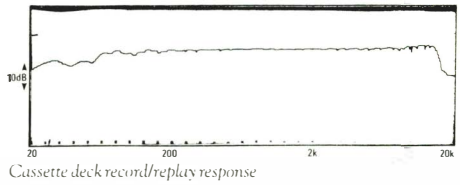
The bottom line is that the JVC goes a long way to answering the criticisms that midi systems just sound uncouth, crude or ill-behaved. This one sounds good natured in most respects. There are few if any musical nasties, yet the system undermines the small scale subtleties that make good music out of good music reproduction.

Test Results

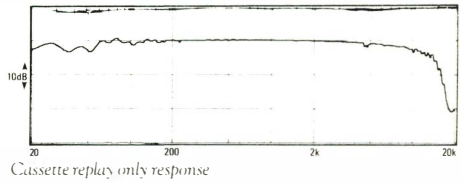
Cost complete	£1199
Options?	CD player
Size main unit - lid open, W/O projections	77×34×35cm (h×w×d)
Size loudspeakers	49.5×27×22cm (h×w×d)
*price with XLV22 CD player — not available at the time of test	
Turntable	
Wow & flutter wtd	0.6%
Drift	poor
Speed accuracy	no error
Arm/cartridge resonance	12Hz OK
(<10kHz too low, OK, >=8Hz too high)	
Cartridge channel balance	0.2dB
Cartridge channel separation	−28dB
Cartridge tracking ability	60uM
Tuner	
Sensitivity	poor
Signal/noise	good
Cassette Deck	
Wow & flutter (wtd)	0.13%
Signal/noise ref 0dB Type II	**
Distortion 0dB Type II	**
**auto-record level prevented measurements*	
Compact Disc Player	
Signal/noise (measured at Amp Tape Out)	98dB
Amplifier	
Power output/channel (8ohms)	60 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	very high



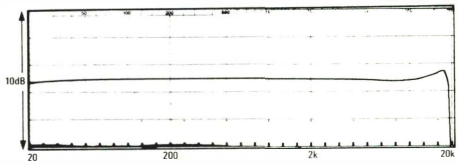
Turntable replay frequency response



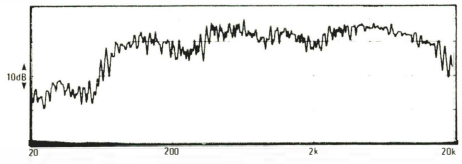
Cassette deck record/replay response



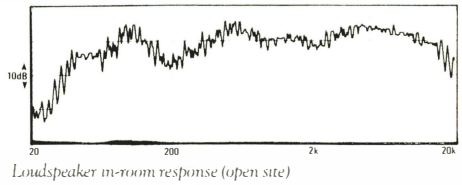
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

MARANTZ MX166CD

MARANTZ AUDIO (UK) LTD, 15-16 SAXON WAY INDUSTRIAL ESTATE, MOOR LANE,
HARMONDSWORTH, MIDDX UB7 0LW. TEL: 01-897 6633

This Marantz *MX166CD* doesn't correspond to the usual conventions for midi systems, the most important of which goes: 'midi systems shalt always be supplied in a complete form, ready to plug in and to play.' Verily 'tis sort of an unwritten law!

Instead it's usually supplied as tested here in three units — a combined tuner/amplifier, a twin cassette deck, and a compact disc player. The reason for not supplying a turntable is that in the view of the powers at Marantz HQ, many people buying CD systems do not want a record deck. And that those who do may well want something a little more than the rather trashy players usually supplied with integrated systems. Better than others will be willing to pay for, in other words.

The reasons for not supplying loudspeakers are equally sound. Marantz take a little — no, a lot more interest in loudspeaker design than many other system manufacturers, and invest a great deal in development of some fine drive units and complete loudspeakers. As a result they have a choice of loudspeakers on offer, and by leaving the midi system without speakers, the user has a free choice of what to buy. The buyer may also elect to use third party models, so for the purposes of this test, the B & W *DM110*s used as a reference yardstick throughout this project were pressed into service.

ST163L TUNER

Although labelled *ST163L* on the front panel as though it was a separate item (the amplifier is similarly labelled *PM163*) both tuner and amplifier are merely part of the *RX-163L*. The only way of splitting them is to have a sudden and violent accident. Expensive too . . .

This is a modern 3-band synthesiser design with 8 FM presets and 8 which can be shared randomly between MW and LW. Manual tuning is also available, either on a 50kHz step by step basis, using self-seek which halts as soon as it finds something receivable. Mono/stereo switching is included and so is a rudimentary 3 LED signal strength meter, which turned out to be quite sensibly calibrated for those, say, wanting to know whether the station they're tuned to is strong enough to give low noise stereo.

Performance-wise, however, the Marantz had a problem. Very strong signals (above 10mV) completely swamp the tuner, which may well matter to those who live near radio transmitters, but which can be cured if necessary with aerial attenuators. More important for the general listener is the strange 'crackly' background noises this tuner produced at all signal levels. Only mild traces of synthesiser generated hash were audible, but this noise which sounded like electronic 'flicker' noise could almost always be detected.

SD363 CASSETTE DECK

The design and execution of the *SD363* cassette deck was sadly at odds with the pretensions of the system as a whole. This is a twin transport deck, capable of high speed dubbing, though a normal speed option is available of course.

The *SD363* cannot be taken too seriously as a recording tool. Recording levels are only set automatically, which means that it will not be possible to exploit the noise and distortion characteristics of tapes to the full. It also means that compression is always taking place due to 'gain riding' — the propensity of the electronics to crank up the recording level during quiet passages, and to reduce them again during the louder ones.

The gadget checklist demonstrates that the *SD363* is quite well equipped. There's no readout of recording levels, but neither is one necessary under the circumstances. The deck does have Dolby B, continuous play (tape 1 followed by 2), a tape counter (for one transport only), and a circuit called QMS on one transport only looks for the start of the current or next track.

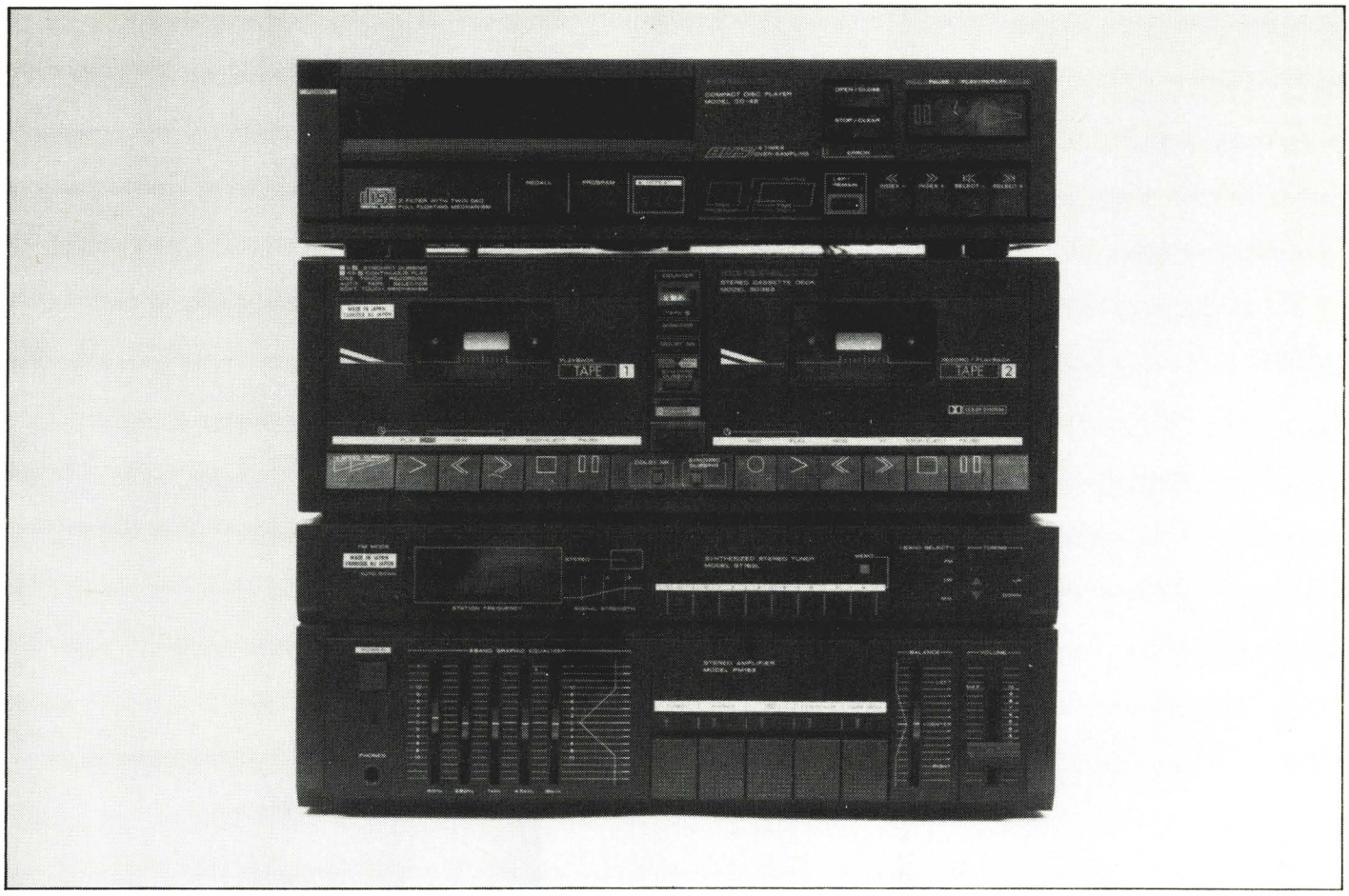
Performance of this deck is no better than it needs to be. Note the highish wow and flutter figure, and note also that automatic level controls by their nature reduce signal/noise. The frequency response trace looks good though, but remember that the upwards tilt could be partly or wholly caused by the way the ALC circuit is reading the incoming signal. However a very fast sweep (not reproduced) not allowing the ALC circuit much time to think gave almost identical results, which suggests that the one printed may be typical after all.

CD45 CD PLAYER

This very well known player is the direct equivalent of the Philips *CD150*, and indeed was made by Philips (the parent company of Marantz) on the same production lines in Belgium. In Philips guise especially it is often used as a yardstick against which others are judged, and frequently found wanting. However, its days are numbered, as are those of the technology it uses, now that both Philips and Marantz have introduced 16 bit/4× oversampling players. This one of course is 14×4.

The *CD150* and *CD45* normally sell at the same price, the Marantz differing in providing various remote control connections which are not exploited in this system, and in having superior ergonomics, plus a couple of minor but useful features. The most notable of these is the display which can show time and track numbers simultaneously.

The player provides full support for disc index numbers, and can be programmed to play a random selection of up to 20 tracks. There is no headphone socket, but all normal disc search modes are available. The player withstands knocks well, and will play back without hiccup



discs that other machines won't even look at.

PM 163 Amplifier

The amplifier section of the system tested out at 31 watts/channel with both channels driven. Marantz have fitted a 5-band graphic equaliser (it's a moot point whether an equaliser with only five operating bands can justifiably be called *graphic*), five inputs (including phono MM and CD), and a headphone socket — the only one in the system.

Sockets on the rear, normally shorted across, mean that devices like Dolby Surround Sound processors can be patched in with ease.

How It Sounds

The amplifier really isn't all that hot. It has a sharply constrained, tight mid/high frequency area that lacked detail and made listening somewhat uncomfortable. The bass, meanwhile, sounded 'thin' and 'tubby', some material exciting 'one-note' effects. Bass depth was severely curtailed, which will be noticeable even with quite small loudspeakers. The hardness and constriction will always be noticeable of course, so I was pleasantly surprised to find that tightening the noose by using more complex difficult music failed to provoke the Marantz, which treated this with a fair measure of aplomb.

The CD player proved excellent. The player extracts a lot of information off disc, and reassembles it into a believable whole with good soundstage presence, albeit with some slight harshness and unevenness. The tuner too was excellent, albeit a little warm and dull on MW. But it proved insensitive on LW and only broadly satisfactory on FM within the limits already outlined, and allowing for mild flattening of stereo perspectives and a slightly sharper than normal presentation.

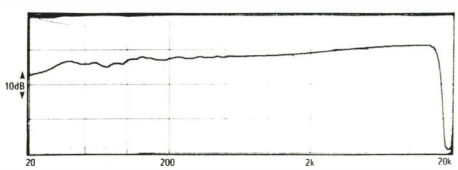
The tape deck sounded a little wobbly at times, whilst high speed dubbed tapes were thin and very noisy. The auto record level circuit was quite easy to catch out on dynamic material, causing severe distortion at times when recording ordinary commercial software — even from cassette. Pre-recorded tapes reproduced quite well, a little rolled off at the top end, but home made recordings sounded 'soft' and 'furry' in the bass, and 'edgy' at the top, especially with ferric (Type I) tapes.

Verdict

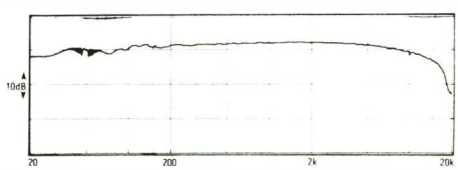
Clearly the CD player is the outstanding item here. The others for various reasons have a hard time justifying their existence, though the idea of omitting speakers and turntable and allowing the customer the choice is at least intellectually satisfying. Overall verdict — half baked, I'm afraid.

Test Results

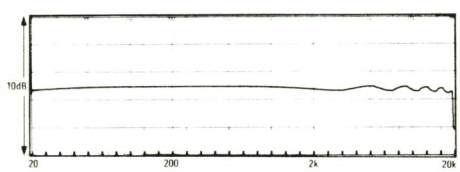
Cost complete	See Introduction £530
Options?	TT153 Turntable, HD180 or LD20DMS loudspeakers
Size main unit	33×32×31cm(h×w×d)
Size loudspeakers	n/a
Turntable	not supplied
Tuner	
Sensitivity	poor
Signal/noise	poor
Cassette Deck	
Wow & flutter (wtd)	0.20%
Signal/noise ref 0dB Type II	n/a**
Distortion 0dB Type II	n/a**
[**]auto record level	
Compact Disc Player	
Signal/noise (measured at amp Tape Out)	>108dB
Amplifier	
Power output/channel (8ohms) (1kHz both channels driven)	31 watts
Loudspeakers	not supplied



Cassette deck record/replay response



Cassette replay only response



CD player replay frequency response

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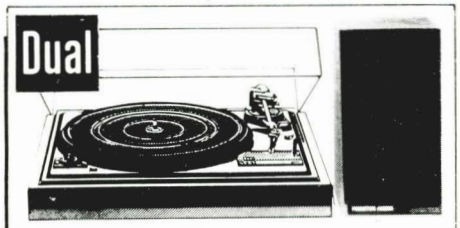

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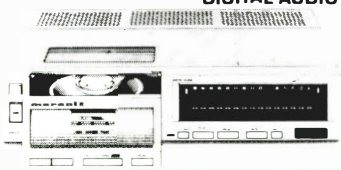

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MITSUBISHI E-CD51

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Very few of the so-called one-piece systems include a compact disc player as a genuinely integrated part of the main package. The Mitsubishi *E-CD51* is an exception. One of the few outside the true budget end of the market, it represents the next step up the ladder above the very inexpensive models from Philips, Amstrad, Binatone and others.

The *E-CD51* has an infra-red remote control option, whose functions are limited to selecting the waveband and tuning the radio, track find and play/stop on the CD player, and adjustment of volume; there are no remote facilities for the cassette deck (despite what the leaflet supplied says!), or the turntable. Other facilities are limited too. Although one spare input is available, the only outputs are for loudspeakers (1 pair) and headphones.

Finish, in a distinctive but rather gaudy mixture of mirror-like strips and black Formica-like laminate, is commensurate with the price.

LT-603 TURNTABLE

There are turntables with worse platters and mats than in this belt drive model, but the arm, fitted with a non-interchangeable magnetic cartridge (the stylus can be changed, of course) is particularly poorly engineered. Operation is manual at start-up, with the usual end of record auto-return.

The unit offered acceptable speed stability, but very few other positive virtues. Feedback isn't too much of a problem; the springy feet have spring rates that are at a high enough frequency not to be badly affected by normal feedback. Of course this means the system shouldn't reproduce much bass either, a supposition that turns out to be correct.

Other problems: the Mitsubishi liked skipping tracks. Additionally, record surfaces sounded over-active, though at the same time curiously muted — one of the symptoms of a very limited working dynamic range.

DA-51R MAIN UNIT

This unit has a high-tech volume control, which consists of a rocker switch and an illuminated scale marked 0-99, implying 100 steps of control action. Not so. My sample ran out of control range at a count of 78 — that is, settings at 78 or higher were all at the same volume. Worse, the control only racked up a notch every time two were counted off on the scale. The result is that the system has a volume control working in 38 fairly coarse steps instead of 100 narrow ones. The steps are about 2dB wide, which is too large for a high quality system. And as a clincher the volume control worked far too slowly.

Like most low cost systems, sources selection is manual. It's all pretty simple elsewhere too, partly because most of the superfluous facilities have been omitted. Thus the CD player offers a track location feature, and reportedly a scan function, but no instructions were available at the time of the test, and I couldn't find the latter. The tuner is quartz synthesiser driven, and provides a useful 7 presets on each of the three wavebands. Then there's the cassette deck, a twin transport model (one is for playback purposes only) with Dolby B, manual recording level (good!) with a record level meter and the level control on the rear, and the ability to dub at normal or high speed.

Aside from these basic facilities, the unit offers a very useful 35 watts/channel (achieved, but offset a little by low loudspeaker efficiency). There are also the usual tone controls, plus a 'super bass' switch which is just bass boost by another name.

Ergonomically, the operational logic of the system could prove a little confusing, but the lack of controls helps see it through. But I did find the lack of a pause control on the CD player a nuisance, and the track finding control circuits were none too bright either, sometimes finding a point as much as 10 seconds before the correct start time, near the end of the previous track. Also, placing the cassette deck input level control on the back will prove inconvenient for some, instantly forgettable for others: it should be repositioned.

The measurements don't need a lot of comment. On the whole they tell the story of a simple, low cost system that excels nowhere, but is not let down in too many areas either. But take a look at the rising CD response . . .

SS-50 LOUDSPEAKERS

Overdressed or just plain ugly . . . but the SS-50 isn't as badly underspecified as usual. Two flat diaphragm units are used, plus a shuttered (why?) port. The system is built into a tolerably solid box. Bass alignment is a compromise, allowing both near wall or open space positioning with reasonable results. The response shape looks reasonably even through the midband, but less so in the extreme treble.

HOW IT SOUNDS

On occasions I've been presented with a record deck that looked fairly grotty, but which nevertheless managed to overcome prejudices and confound preconceptions by doing at least a reasonably good job. Against the odds you might say.

Well this wasn't the case here. Any real sonic presence was lacking. The sound was dull, 'heavy' and 'opaque'. Scratches and other surface noises were quite effectively dulled, but they were always there just below the level of the music, reducing dynamics to a level of flatness unusual even with the least LP-oriented midi systems. The declining response of the cartridge/amplifier combination can readily be seen in the frequency plots, and even more readily heard in practice. Boosting treble with a touch of right hand on the relevant tone control helps, but reveals that the top is rather coarse and aggressive, which means it isn't a proper solution.

There was one surprising item in this system: the loudspeakers. They have a kind of rude integrity, though I'm reluctant to phrase this in

any way that might be misconstrued as praise. They're not good enough for that, but a certain amount of craft is apparent in the way the speaker side-steps potential difficulties — for example reducing the extreme treble just enough so that its rough edges are not too apparent.

The cassette user has at least some reason to be happy with his lot. Tapes recorded on the machine sounded more stable than usual, and although the system didn't really act as a complete answer to all the problems of inexpensive cassette deck design, its failings were in relatively innocuous areas, like a degree of added 'softness' on tapes made from CD, record or radio. The deck actually made quite good recordings from compact discs, for example, and even gave above average quality when using the high speed dubbing process.

The tuner was a little weak. FM performance was acceptable in many ways, but there was a constant synthesiser 'drone' that could be heard when not masked by music or speech regardless of the signal input level. FM sound quality monitored at the system headphone socket was warm and attractive, if lacking in detail and dynamics, but these are partly amplifier characteristics. The two AM bands were definitely weak performers.

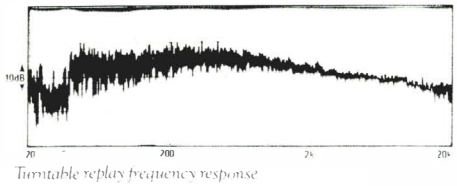
The CD player sounded much better than the other sources. Here the soft sounding amplifier and the even softer sounding loudspeakers were offset by the brightness of the digital player, making the sound seem a little livelier and faster on its feet than the rest of the system. Overall though I quite admired the designers' skills in achieving what I took to be the intended aim from the beginning — a safe, gentle balance that will neither offend nor excite.

Verdict

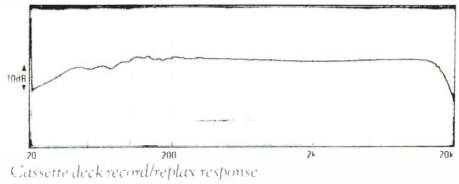
This is a safe buy if you want a system for occasional or background use, but more demanding listeners will find it wanting. The problem can be illustrated by its tendency to make Mahler sound like Mantovani, an anathema to any true music lover. But a muted recommendation is in order provided black vinyl records are not the primary music source.

Test Results

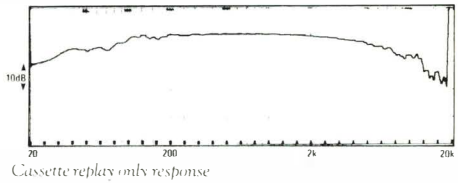
Cost complete	£429
Options?	Remote control (see text)
Size main unit + lid open, w/o projections	64 × 33.5 × 38cm (h × w × d)
Size loudspeakers	42 × 22 × 18.5cm (h × w × d)
Turntable	
Wow & flutter wtd	n/a
Drift	average
Speed accuracy	+0.3%
Arm/cartridge resonance	no resonance shown on test (<10kHz too low, OK, >14Hz too high)
Cartridge channel balance	0dB
Cartridge channel separation	−21dB
Cartridge tracking ability	80uM
Tuner	
Sensitivity	good
Signal/noise	poor
Cassette Deck	
Wow & flutter (wtd)	0.22%
Signal/noise ref 0dB Type II	55dB
Distortion 0dB Type II	1.1%
Compact Disc Player	
Weighted signal/noise (measured at amp Tape Out)	100dB
Amplifier	
Power output/channel (8ohms) (1kHz both channels driven)	35 watts
Loudspeakers	
Efficiency	low



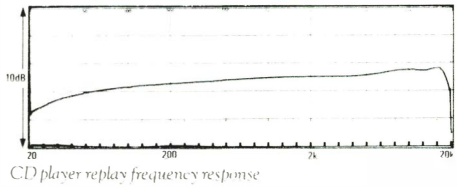
Turntable replay frequency response



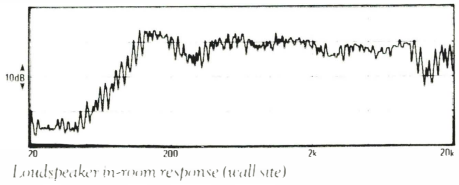
Cassette deck record/replay response



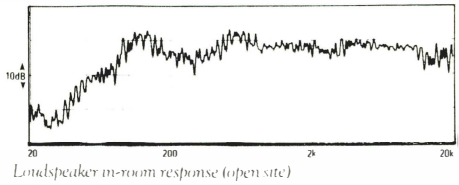
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

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MITSUBISHI E-CD100R

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This system, supplied in preproduction form for the test, has an imposing appearance and substantial dimensions. Almost an all-in-one box affair, just the turntable — and, of course, the loudspeakers — are housed separately. Appearance is highly unusual, with acres of silvered plastics and black perspex, but the controls are aesthetically and ergonomically messy, spoiling what could otherwise have been quite an attractive design.

However, it remains one of the more distinctive systems to look at, and is equally distinctive from the functional point of view, especially so in the case of the compact disc player which accepts a five disc magazine instead of the usual single disc drawer. A (reasonably) full function remote control handset is also supplied.

LT-100 TURNTABLE

The turntable is a massive affair, with a parallel tracking arm and full automation that stopped short of recognising whether a record was present on the platter (though problems are normally avoided because the platter is undersize). Ergonomics are very poor. Not only is it almost impossible to see where the arm is because of the dark smoked cover, but raising the lid to look results in the arm hot-footing back to the rest position.

The fitted cartridge appears to be a good one, with a smooth response and abundant (but not excessive) top-end energy. The deck measured well all round in fact, but was highly microphonic as usual.

DA-100 MAIN UNIT

The tuner section of this system is digitally operated, and equipped with 7 presets on each of the three wavebands, FM, MW and LW. Bench-tested FM parameters were gratifyingly sound, and quite weak FM signals will prove perfectly usable.

The twin transport cassette deck is much as you'd expect. One deck only is record capable, and Dolby B noise reduction is fitted. Tape type selection is automatic, but does not extend to metal types, and Dolby B noise reduction is available. One attractive feature is a manual record level control with a centre detent, but fitted on the rear, where it can be preset and ignored. Record level metering is also provided.

The *pièce de resistance* of this system is the CD player, Mitsubishi's comparatively clumsily executed answer to Pioneer's six-pack D player. This one takes five discs in a rather larger magazine, but there is no conventional single disc drawer option as Pioneer provide.

If the aim is to hear just one disc, the Mitsubishi is rather tedious and longwinded to use, but it's a joy otherwise. A powerful memory feature allows you to programme up to 30 tracks from a mixture of discs into memory. All the other expected search, scan and random track access features are also provided (though the random access keypad didn't work on our preproduction sample). The only problem encountered with this player was below average ability to cope with marked or scratched discs, so keep those CDs clean!

Functionally the amplifier is a good one, with plenty of civilised power on tap, and a simple, no-nonsense set of controls (but see below). There are no useless equalisers or senseless displays. Auxiliary input and record outputs are provided on the rear and headphones can be connected, though microphones can't. However, in my opinion, Mitsubishi have missed an opportunity by not fitting automatic source selection circuitry. Additionally, visual confirmation of source selection is poorly executed and the electronic volume control was absurdly slow acting.

One more thing. the amplifier has a switch and associated control labelled 'synthesised bass'. It produces a sound modelled on gross distortion, making an arthritic, grumbling noise for all the world as though the amplifier was just about to self destruct. It's also likely to cause considerable annoyance to unfortunate neighbours.

SS-100 LOUDSPEAKERS

The loudspeakers are sadly little more than a joke. Apart from some of the most dreadfully fussy styling I have come across of late, they are scrappily put together. Treble appears quite well extended, and the drive units are good enough to work well in certain specific frequency bands with the volume kept low, but bass was simply absent, and coloration levels were high.

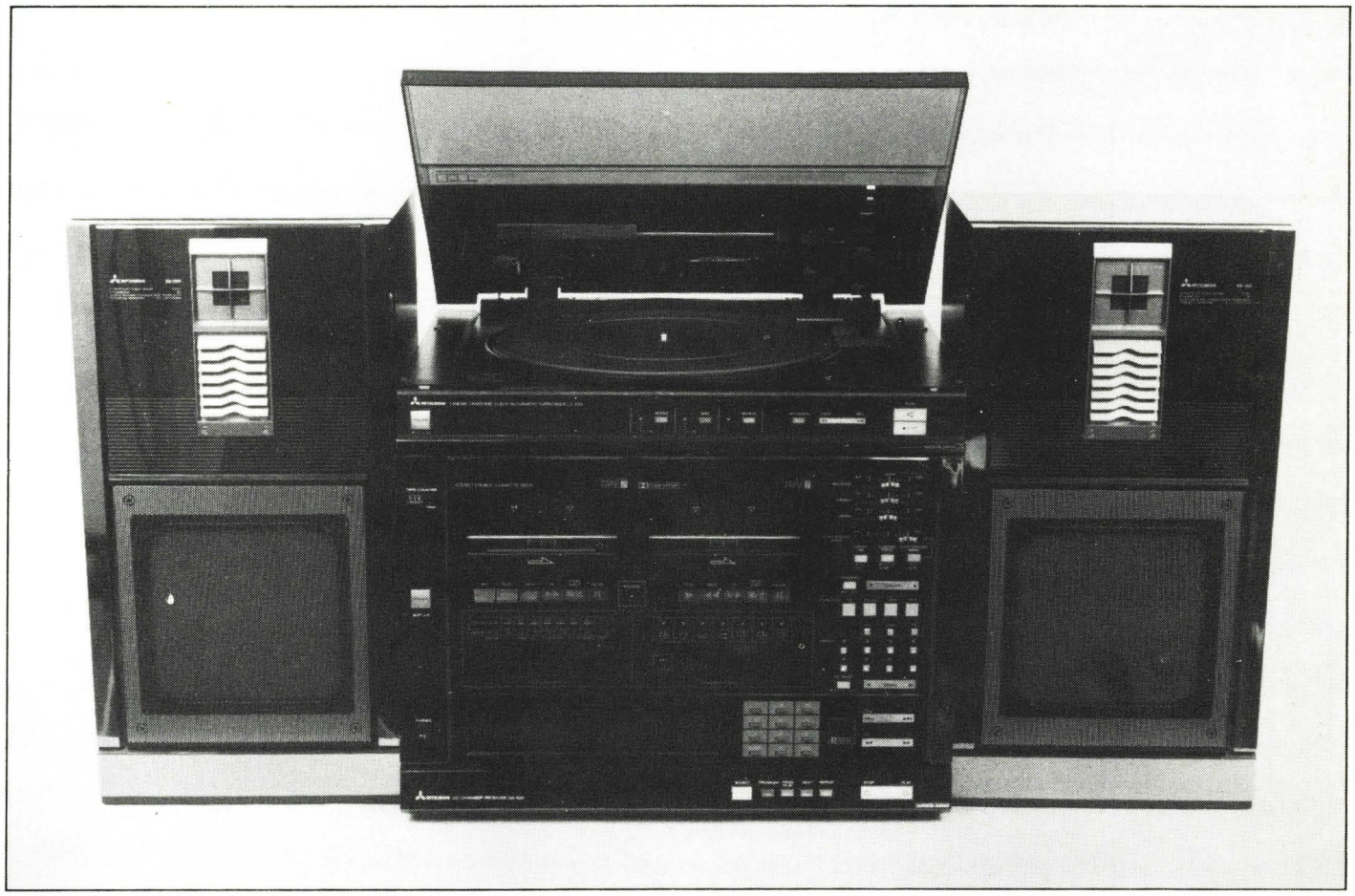
HOW IT SOUNDS

On sound quality, it looks as though different teams were responsible for the main electronics and for the loudspeakers.

As far as the latter are concerned, it's difficult to escape the conclusion that someone — regretfully — just didn't care. The basic, underlying quality with all the sources was strangely muted, even listless. Music didn't display much of what could be called animation; it was simply soft or loud. When loud it was also hard and pushy, so the temptation was to tame the sound by turning the volume down.

Notwithstanding the apparently smooth, even treble in the loudspeaker frequency response plots, the reality is that treble information was almost totally smeared. This doesn't mean the system sounds tonally dull; it doesn't. But bland and colourless are adjectives that do spring to mind. The really major failing is the almost total lack of structural integrity, so anything that demands any power from the loudspeakers merely shakes them up, and the energy is dissipated doing the wrong job.

Eliminating the loudspeakers from the system led to a remarkable improvement. The sound



suddenly sprang to life, acquiring a degree of sparkle and vigour along the way. Record reproduction was surprisingly reasonable, especially for an arm-in-lid design. There was plenty of detail, a pleasant enough bass quality, and reasonable control, let down only a little at high levels.

The CD player also worked well, conveying a feeling of sharp incisiveness that trod the uneasy dividing line between that wholly desirable quality and a less desirable sharpness and aggression.

The cassette deck didn't like metal tape, and wasn't equipped with the correct equalisation settings for this tape type. However, ferric or chrome tapes both work satisfactorily. Chrome bias tapes (Type II) were considerably better than ferric, and unlike metal tapes are available at reasonable prices. The Mitsubishi has a marginally rising response with this tape, which is not unusual. The normal reasoning is that high frequency losses build up during a deck's lifetime as the heads wear, so some treble boost will offset the losses as old age creeps up. Anyway the deck works fine. Just steer clear of the high speed dubbing feature.

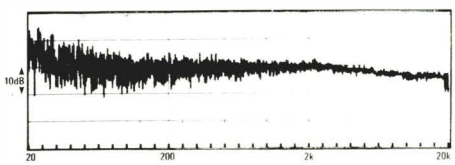
The tuner also worked well. FM sensitivity and selectivity were well up to par, and noise was practically never a problem. Soundwise it more than held its own, with a natural, clear quality. Even the AM bands haven't been skimped as badly as usual, though they remain convenience bands and have nothing to do with high fidelity. Some mildly 'hashy' noises spill over from the digital tuning circuitry when receiving very weak FM signals.

Verdict

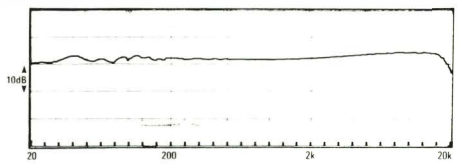
Recommended as a good all-rounder, with adequate or better audio standards from all the sources, even vinyl. But the loudspeakers impede good music making even more effectively than usual, and should be ditched. Mitsubishi should make them optional or replace them ASAP — and should also remove that absurd bass synthesiser circuit.

Test Results

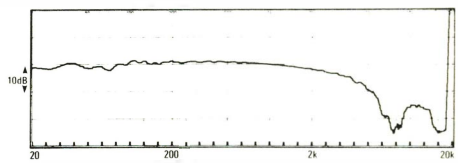
Cost complete	£649.95
Options?	extra 5 disc magazines
Size main unit - lid open.	62×42.5×35.5cm (h×w×d)
Size loudspeakers	48×24×18.5cm (h×w×d)
Turntable	
Wow & flutter wtd	0.06%
Drift	average
Speed accuracy	+0.3%
Arm/cartridge resonance	No resonance measured (<10kHz too low, OK,> 14 Hz too high)
Cartridge channel balance	0.5dB
Cartridge channel separation	25dB
Cartridge tracking ability	80uM
Tuner	
Sensitivity	good
Signal/noise	fair
Cassette Deck	
Wow & flutter (wtd)	0.28%
Signal/noise ref 0dB Type II	56dB
Distortion 0dB Type II	3.0%
Compact Disc Player	
Signal/noise (measured at Amp Tape Out)	92dB
Amplifier	
Power output/channel (8ohms) (1kHz both channels driven)	60 watts
Loudspeakers	
Efficiency	high



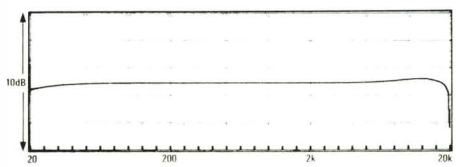
Turntable replay frequency response



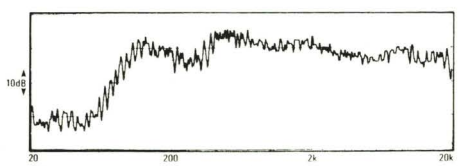
Cassette deck record/replay response



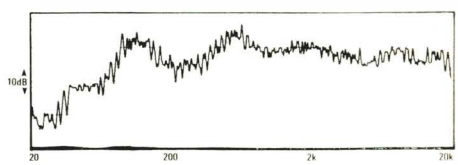
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

PANASONIC RX-CD70 PORTABLE

PANASONIC (UK) LTD, 300-318 BATH ROAD, SLOUGH, BERKS SL1 6JB.
TEL: SLOUGH 34522

As this is written, a bare handful of CD/radio/cassette/loudspeaker portables have gone on sale. With each succeeding introduction, the units are becoming smaller, more portable and therefore more viable and attractive to the buying public. Tested here is a Panasonic unit that is neither one of the earliest, nor one of the most recent. It is of about average size — it's neither as large as some, nor is it as compact as others. But nobody can doubt its performance in one area — it's an impressive three-quarters of a meter long!

To be frank, it's difficult to perceive of this system as a true portable. Transportable, yes, but taking it onto a bus or out on the street is likely to end in arrest for carrying an offensive weapon. Note the main control panel on the lower front edge of the main unit. Given its orientation, it's obviously peculiarly vulnerable in the event of rain or accidental spillage. But it could suit someone living in digs or other accommodation where space is at a premium, perhaps as a surrogate for a fully fledged hi-fi system.

The Hardware

Given that we're talking about a portable, the equipment itself has an astonishing egg-like versatility. In addition to the CD player, there's a manually tuned FM/AM radio, and twin auto-reverse cassette decks, one for record/replay and the other for playback only. The only obvious omission is Long Wave from the radio, which could affect *Radio 4* junkies.

The amplifier is built in, and a very simple plastic-cased two-way loudspeaker is clipped to each end of the main unit. They can be unclipped and pulled away from the system, which naturally enlarges the stereo soundstage and improves the sound generally.

The Panasonic can use AC mains or 10 HP2/MN1300 size batteries, but current and therefore battery consumption is high, especially when the CD player is being used. High volume levels and lots of fast winding on the cassette decks will also tend to chew up batteries in a hurry.

Unusually for a portable, the *RX-CD70* has a full 'grown up' set of controls. All the main functions are logic controlled, the buttons requiring only a fairly low operating pressure. As far as possible, unnecessary manual adjustments have been ditched in favour of automatic ones, which include tape type selection and recording level.

Available recording modes are comprehensive. You can record on one or both sides of a tape, without intervention. You can record from a compact disc, with the tape pause mode released as play starts, and invoked again as play stops. Cleverest of all, it's possible to set up a programme of up to 15 tracks on a compact disc, and have that dumped onto tape, all neatly and automatically edited. Dolby B, the noise reduction system, is available and additional features include blank-skip, which skips long blank tape passages as the name suggests.

The CD player also offers a full range of user controls, including track-skip and an audible track search facility. There is an unusually comprehensive status display, showing simultaneous track numbers and time, plus a calendar style display showing all track numbers available (or programmed) up to a maximum of fifteen on a disc.

Remaining system facilities include bass, treble, balance, stereo/mono switching for FM only, and a set of phono in and out sockets so that the system can be interfaced with the outside world.

The Measurements

The cassette deck frequency response is intrinsically fairly flat through the midband, but shows some high frequency losses due to azimuth errors on the playback cycle. Speed stability isn't too wonderful either, but is fairly good by portable standards. What is intriguing is the sharply tailored frequency response of the CD player, the main feature being the rolloff at the frequency extremes — at the low end because the rest of the system simply doesn't work below about 150Hz, and at the top to give the player a 'soft', easy-on-the-ear style of musical presentation.

Power output measured a mere 2.5 'proper' watts RMS per channel, though to be fair, the system's 2.7ohm speakers should increase system power to about 4 watts a side. But it's still a far cry from the claims which start at a totally unqualified 30 watts on the front of the colour leaflet, and come down to a still unrealistic 12.5 watt/channel in much smaller print on the rear pages of the same leaflet. What price the spec sheets for other portables?

The loudspeaker frequency response plot was run and is reproduced for completeness. The uneven performance was expected from a unit of this nature, and is not necessarily as disadvantageous as might be assumed.

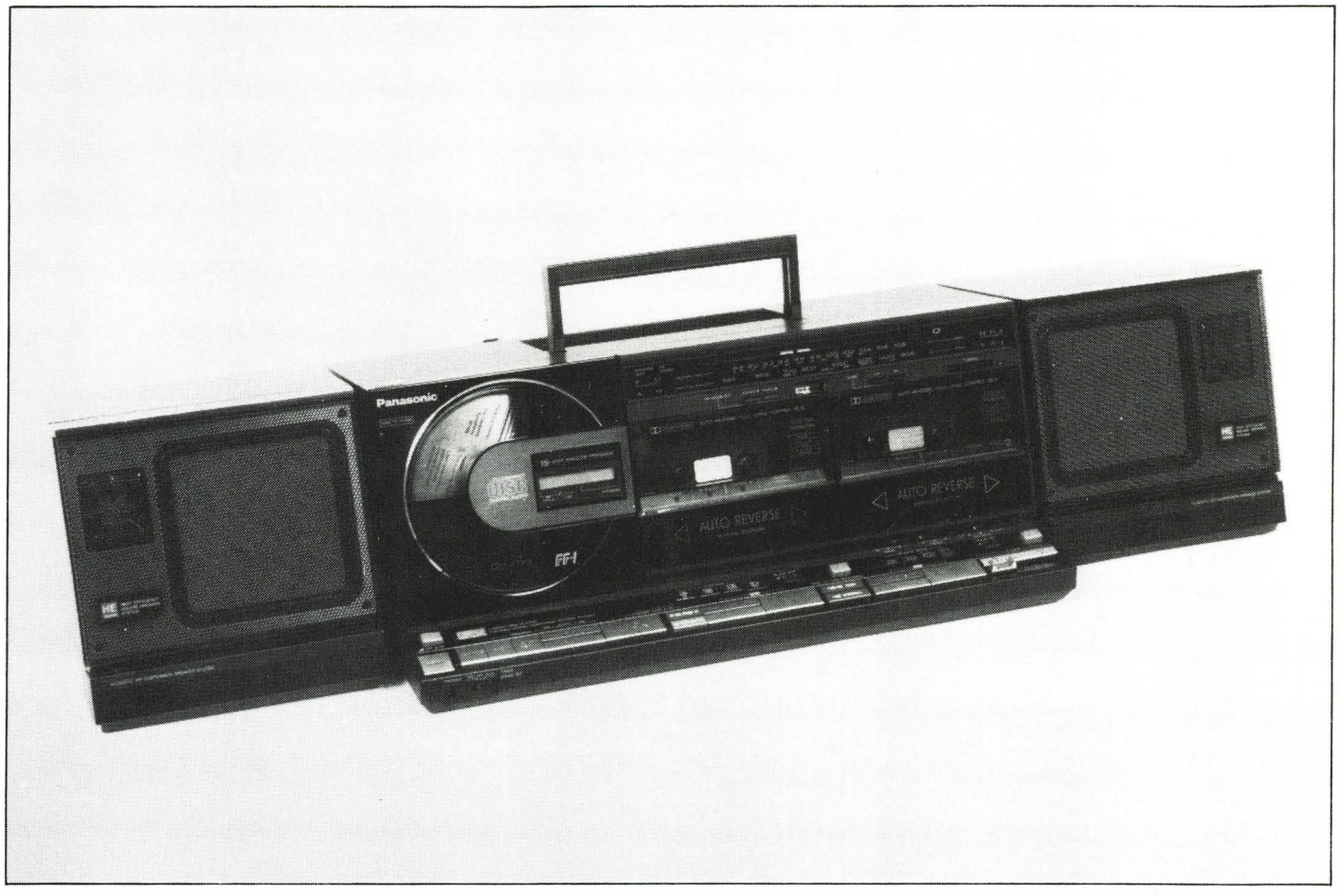
How It Works and Sounds

One of the most important questions to be answered is what CD adds to a portable like this. The facile answer is that it adds weight, bulk and cost. Guessing heavily, the CD player probably accounts for something like 20 per cent of the physical bulk of the main system, perhaps 1.5kg out of the 7kg total ex-battery weight, and at least half the price. But what I was most interested in determining was what the compact disc facility adds by way of convenience and sound quality.

Convenience isn't a strong suit, and in many ways CD shows its worst side with systems like this. Where cassette tapes can be slung around with relative abandon, compact discs need a quite different level of care. In a word, they really need to be stored in their plastic 'jewel box' outers, which is not always easy in a round and about environment. If they aren't cared for, scratches very quickly accumulate. After all, compact discs are made from one of the softest grade of plastics yet invented.

The problem with badly marked or dirty discs is inevitable and catastrophic mistracking. The most common kind of error response is the 'locked groove' — an exact analogue of what happens with ordinary badly behaved record players where a very short passage of music simply repeats itself *ad infinitum*. Unfortunately this is precisely what the Panasonic did, to the point where it was impossible to rely on any disc playing right through without some kind of interruption. The *RX-CD70* was far more affected by marked or damaged discs than most players, even allowing for the fact that portables as a breed tend to be more affected than domestic non-portable equipment.

The result of all this is that compact disc *RX-CD70* style simply lacks the spontaneity that characterises cassette tape, and of course radio. The cost of CDs is another factor that militates against the kind of cavalier handling that cassettes are regularly asked to endure. The only respect in which compact disc genuinely is a



convenience feature is that it takes the same software as any existing home based set-up.

Even on pure sound quality grounds, the compact disc player section proved a little disappointing. The player itself was less to blame than the rest of the system, which put the lid firmly on available sound quality. There's no way to escape the influence of the tiny, wretched amplifier, or the flimsy, resonant loudspeakers. In practice the best CD sound was virtually indistinguishable from FM radio, and not very different from metal cassette tape recordings. Only closer listening using headphones shows up the slightly 'furry' edges around the sound from cassette, and the additional background hiss contribution from radio and (especially) tape. But to all intents and purposes, when listening through loudspeakers, the three sources might as well have been one and the same.

In no sense does compact disc advance the state of the portable art on this showing, though I exclude Discman type headphone 'personals' from this observation. But as a portable unit evaluated like any other portable unit, the *RX-CD70* is quite successful.

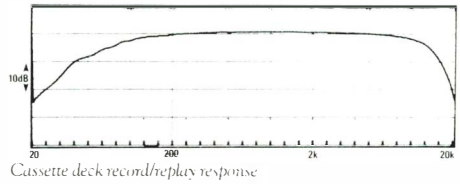
There has been no attempt by the manufacturer to make the sound as unrealistically bassy as some people seem to demand, but I'd guess the majority of potential users will find this an advantage rather than a disadvantage. The sound of the Panasonic isn't for show, it makes a clean, usable, comfortable-as-an-old-glove kind of noise. Cassettes sounded fair, some material showing up the speed instability noted in the measurements. The FM section has reasonable sensitivity using the rod aerial, and sounded as good as CD with the right kind of broadcast material. MW by comparison sounded rather dull and soft, which is not unusual.

Verdict

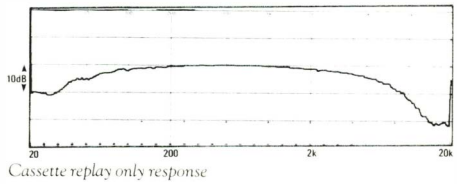
This system is more of a grown up portable than a miniaturised hi-fi, but it's beautifully built, sensibly packaged and a lot of fun to use. Accepting that it falls short of high fidelity standards in all respects, there are few complaints, except perhaps that it isn't as portable as it appears.

Test Results

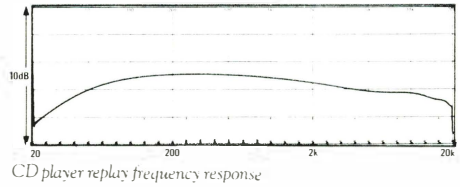
Cost complete	£449.95
Options?	none
Size main unit	17.5×42×24cm (h×w×d)
Size main unit with loudspeakers	17.5×76.5×24cm (h×w×d)
Tuner	
Sensitivity	fair
Signal/noise	poor
Cassette Deck	
Wow & flutter (wtd)	0.26%
Signal/noise ref 0dB Type II	n/a*
Distortion 0dB Type II	n/a*
[*]auto record level	
Compact Disc Player	
Signal/noise (measured at amp Tape Out)	103dB
Amplifier	
Power output/channel (8ohms) (1kHz both channels driven)	2.5 watts
Loudspeakers	
Efficiency	very high



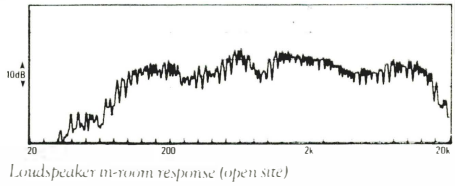
Cassette deck record/replay response



Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (open site)

PHILIPS FCD560

PHILIPS ELECTRICAL LTD, CITY HOUSE, 420-430 LONDON ROAD, CROYDON, SURREY CR9 3QR
TEL: 01-689 2166

The *FCD560* makes few concessions to luxury, but is, however, a very practical system, especially in constructional integrity. The controls, for example, are all perfectly ordinary press buttons, but unlike those in many other low cost systems they don't flop aimlessly around. Even the cassette deck transport keys (usually the first place to look for problems) engage positively and give every indication that they will last for years. A number of other systems in this price category are not as well finished or built, and may also not be as well supported when things go wrong.

Apart from these basic considerations, however, there is one other: are systems like this one worth having at all? Specifically, is the thinning of resources inherent in adding compact disc to such cheap systems so great as to make a nonsense of the whole idea — or does the magic of the new digital medium make a silk purse out of a sow's ear? Now read on . . .

FCD560 Main System Unit

Everything bar the loudspeakers has been shoehorned into one sturdy plastic moulded box, with the record player under a hinged cover on top. As indicated, the system is well built, and it is also well finished, but the aesthetics are derivative and ergonomics highly suspect. The ergonomic problems derive from the main bank of input and other function switches on the top right hand corner of the unit, whose operating logic is all but indescribable, and from the fact that even simple tasks like extracting a disc from the CD player cannot be done when any other source has been selected. In addition, the CD player controls are badly disposed so that operation is far from obvious. Despite the relative paucity of controls, this system is not even granny-resistant, still less granny-proof.

The record player is sprung but at an unusually high frequency; this limits susceptibility to knocks and so on, but is also likely to limit low frequency extension and 'air'. The player offers end of side auto-return, and stylus set down is aided by a very abrupt undamped cueing device. Construction is very poor: the turntable platter, for example, is a moulded plastic item, with no mat; the cartridge is ceramic, not magnetic. Once upon a time, there used to be such a thing as a good ceramic cartridge, but that was long, long ago . . .

The manual analogue tuner covers FM, MW and LW, and is equipped with a long, clear tuning scale, a low geared and stiff edgewise tuning knob, a mono switch, and two awkwardly configured switches to change between the three wavebands.

The cassette deck is as simple as they come. It has firm, positive transport controls, manual tape type selection for ferric and chrome only (metal can be replayed, but not recorded), automatic level control, but no Dolby B.

The final source is the CD player, which is well equipped with such niceties as 20-track programmability, 3-speed track search (audible at the lower two speeds), and so on. Somehow it seems just a little out of place.

The amplifier section has an auxiliary input at the rear, but no corresponding output other than headphone and loudspeaker connections. A 5-band equaliser section is fitted. Power output of this supposedly 40 watt system actually works out to 6 watts per channel. The system has a built-in loudness effect, which boosts bass at low volumes. The effect is progressively reduced at higher volumes, as shown in the two CD response runs through the amplifier, one with the volume full, the other with it set exactly half way.

70FB250 Loudspeakers

Despite the visual suggestion of three square drive units, the enclosure, with its wafer-thin featherlight construction (the back incidentally is perforated over its entire surface), is actually equipped with two cone drivers. The shoddiness of the design is implicit in the bumpy mid and top end of the response curve. The speakers are optimised for placing with their backs close to a rear wall.

How It Sounds

We'll start with the best bits. The CD player has particularly good tracking ability. It was quite startling to discover that the mechanism in a £300 complete system like this could play through a disc that would have certain well regarded £500 stand alone players (never mind £500 systems) skipping tracks and generally misbehaving all over the place. Resistance to knocks and feedback similarly runs rings around the competition, and it's a safe bet that the raw audio feed to the rest of the system is pretty good too, since the player appears to be little more than a mildly revamped version of the basic Philips CD machinery.

But there's no way to be sure of this. The sound is totally screwed up by the time it reaches the loudspeakers. It's half way to being mutilated even at the headphone socket. The facts are that compact discs sounded quite a lot better than any of the other sources apart from the FM tuner, but this still left the medium sounding very compressed and coloured. The frequency response of the CD player, measured at the headphone socket, shows just how much response tailoring has taken place. Bypassing the loudspeakers helped, of course, but not enough to set these basic objections to rights.

The tuner also worked well on FM, the only notable shortcomings being high background hiss levels and excessive 'graunching' noises when receiving very weak signals. Very strong signals resulted in some hum and other effects, indicating that attenuation of strong aerial signals could be beneficial. AM sound quality was a little below average, but none of these results is out of line with the low system price.

On to the cassette deck, the automatic record level control is very heavy-handed, suddenly and viciously chopping the volume level when a cymbal or bass drum is hit with any feeling. Pre-recorded tape compatibility is hit by the lack of Dolby B, but not as badly as you might expect, perhaps because there is a kind of tradeoff between the treble losses due to head alignment errors shown in the replay plot, and the excessive treble due to the lack of Dolby decoding. Even so the sound from tape is thin and raw, with an unstable quality that affected pitch resolution and stereo reproduction alike. Home made recordings suffered similarly, and also tended to be very hissy, partly because there's no Dolby, and partly because increased tape noise is one side-effect of automatic level controls, naturally tending to increase the input level and hence the noise during quiet passages.

Records worked about as successfully as tapes — that is, they sounded fairly unpleasant. The blame here lies partly with an unusually cheap and cheerful cartridge. The response plots show a rise at 5kHz followed by a reduction in output at higher frequencies, and this suggests a tip mass/vinyl resonance a couple of octaves below the normal 18-20kHz, with much poorer control than usual (though there may be other factors at play). The deck was somewhat shock-prone,

and very susceptible to feedback at high volumes; record scratches and surface noise generally were wildly exaggerated. All in all, listening to records was not the most edifying experience.

But it was nothing like the ordeal of listening to the loudspeakers, which showed a degree of coarseness and grittiness that few other system loudspeakers sank to. Treble was almost absent apart from a gritty, coarse effect that once noticed became difficult to ignore, I found. The bass end wasn't merely limited by the small physical size of the loudspeakers. It was miserably puny even taking size into account, and the reason quite plainly was the lack of structural integrity in the way they have been put together.

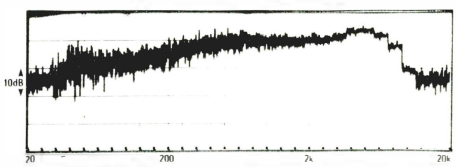
The system amplifier is pretty rough and ready too, not to mention low in power. But it was no worse than you might expect at the price, and was scarcely a dominating influence most of the time.

Verdict

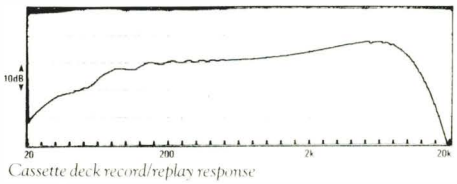
On the basis of the evidence presented above, the answer to the semi-rhetorical question posed in the introduction is that if quality of sound has any meaning to the buyer, low-cost CD-inclusive systems of this kind — and from experience this one is as good as any — should be avoided. The system is not without its good points — the tuner and the CD player mainly — and it is also quite well made. But the other sources sound very poor, and the amplifier and loudspeakers sound even poorer still. Finally, the control layout is surprisingly unhelpful to the uninitiated. Surprisingly because the system doesn't actually have a surfeit of unnecessary knobs and buttons. Philips have obviously tried hard and avoided some of the more obvious traps, but the system remains an unsettling uneven mixture.

Test Results

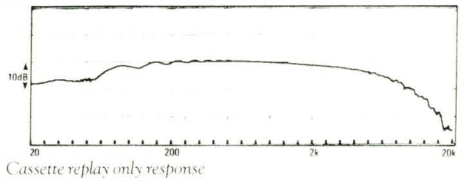
Cost complete	£320
Options?	none
Size main unit - lid open, w/o projections 60×36×35cm (h×w×d)	
Size loudspeakers	32.5×18.5×16cm (h×w×d)
Turntable	
Wow & flutter wtd	0.13%
Drift	very poor
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
(<10kHz too low, OK, >14Hz too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*
[*]turntable could not be connected to test equipment	
Tuner	
Sensitivity	poor
Signal/noise	very poor
Cassette Deck	
Wow & flutter (wtd)	0.20%
Signal/noise ref 0dB Type II	n/a**
Distortion 0dB Type II	n/a**
[**]automatic record level control	
Compact Disc Player	
Signal/noise (measured at amp headphone socket)	45dB
NB: volume set to max	
Amplifier	
Power output/channel (8ohms)	6 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	high



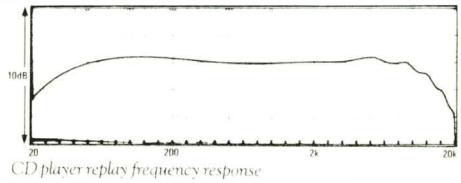
Turntable replay frequency response



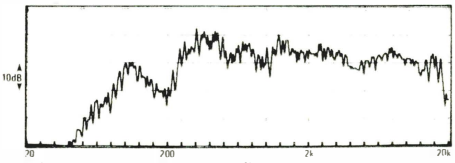
Cassette deck record/replay response



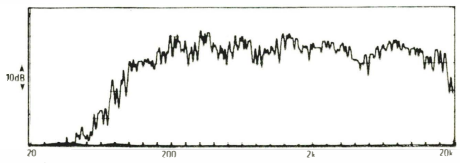
Cassette replay only response



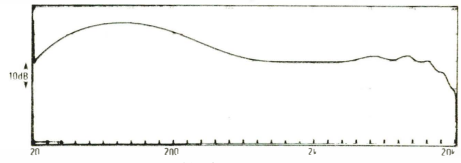
CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)



CD player response at half volume (see text)

PHILIPS FCD 565 SYSTEM

PHILIPS ELECTRICAL LTD, CITY HOUSE, 420-430 LONDON ROAD, CROYDEN, SURREY CR9 3QR.
TEL: 01-689 2166

The criteria for judgement with £400 systems like this are different from those that apply with more expensive systems. You wouldn't expect to see a Lada judged by the standards that Mercedes use. Or maybe you would . . .

Merely adding another component to an audio system may not have too drastic an effect on the rest of the system, but when that component is a compact disc player things tend to be different. Ex-factory CD player prices are becoming lower all the time, but they still account for a very hefty proportion of the cost of a system of this kind. So compromises that have had to be made with the amplifier and loudspeakers (to say nothing of the other sources) are very severe indeed. Given the present state of the art, this is an inevitable fact that must be kept in mind.

FCD565 MAIN UNIT

Low costs inevitably mean extra compromises, which places the potential user very much at the mercy of the designer's sense of priorities — or those of the marketing department he serves. In this case these priorities include supplying a twin cassette deck, but no Dolby noise reduction; and fitting a digital synthesiser tuner along with a set of controls so mean that two press buttons must suffice for selecting between CD, phono, tuner and tape. This means that both buttons must be set correctly for any source to be selected. Just above them are four press buttons that are used to select the type of tape inserted on each of the two transports and start dubbing, plus a mono switch, which is primarily associated with the tuner.

The controls are a mess, but some more sensible decisions have been built in. The manufacturer has not been tempted to fit high speed tape dubbing, which is a feature that simply cannot be expected to work, even half way well, without quite a lot of money and precision engineering. The absence of metal tape compatibility (except for playback or course, where metal emulates chrome type tape on any tape deck) is also very sensible, for similar reasons.

As far as the user is concerned, the *FCD565* presents a rather confused fascia, one that hasn't got its act together. There were also annoying features, such as the fact that the power is cut to some components when they are not in use. This means, for example, that it's impossible to remove a compact disc unless CD is the currently selected source. Plainly, the *FCD565* is not ideal for the person who simply wants the easiest to use system available. But the difficulties shouldn't prove insuperable for the rest of us.

The turntable that comes fitted in this system is the same as that in the *FCD560*, which is reviewed separately. It is a sprung unit with a one piece moulded platter, excessively light in weight and bereft of a mat. The arm is about as crude as they come too, but unquestionably the least satisfactory aspect of the design is the very poorly designed ceramic cartridge, which produces a frequency response at the high frequency end that bears more than a passing resemblance to a cross-section through the Swiss Alps.

The cassette deck is also very similar to the one in the cheaper Philips system, except that it has been joined by a second playback-only mechanism which adds dubbing and continuous play to the roll call of things you can use it for. The list of things you can't do is longer, however, and extends from the relatively minor inability to use metal tape to the much more important inability to decode pre-recorded cassettes properly, due to the lack of Dolby B noise reduction. This particular omission is especially important when recording on a deck like this, since Dolby drowns some of the tape hiss that is exaggerated by the action of the automatic record level circuit.

The amplifier is also very similar to the one in the smaller Philips system, except that the official power rating has increased from 40 to 50 watts total peak music power: in our tests, the real watts rating shot up from 6 to 7 watts. Per channel of course. In practice the two amplifiers sounded about the same. Both ran out of steam very quickly when asked to drive better loudspeakers, though both could manage low to moderate levels with the test B&W *DM110*s.

The CD player looks quite different to the one in the other Philips system, but in practice has a very similar (and full) range of facilities, which includes programming for up to 20 tracks, index-search support, full cueing, track-skip controls and so on. And it worked with characteristic Philips sure-footedness almost regardless of the condition of the disc — I think it would have tracked an ice rink, given half a chance.

The last of the sources is the tuner, and it's also the most impressive. Digitally tuned, there are presets for no less than 12 FM stations, plus six each on MW and LW. The well-designed displays shows the waveband, tuned frequency and the preset number. This is easily the neatest and most functional part of the system, rivalled only by the CD player.

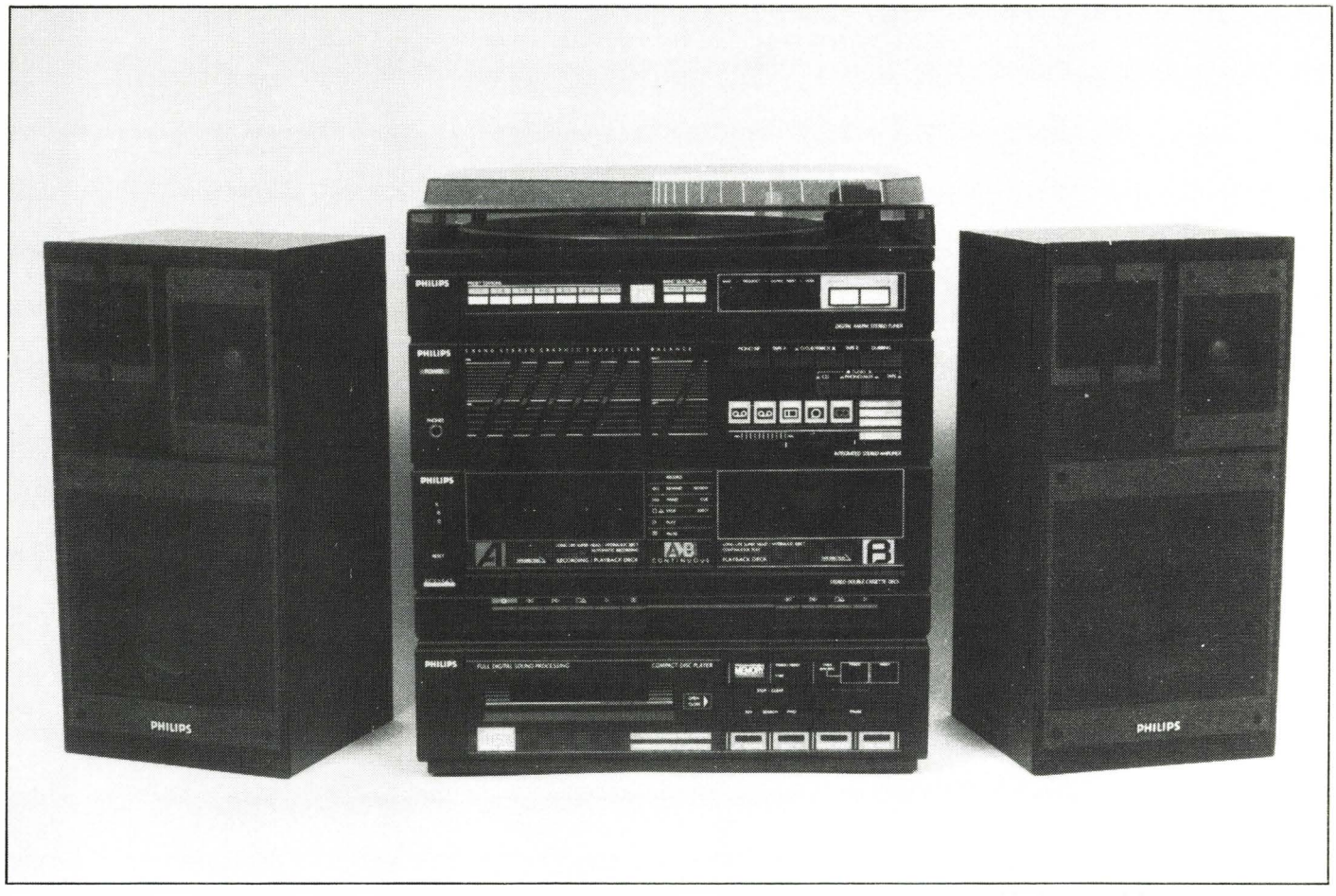
70FB260 LOUDSPEAKERS

Subterfuge is evident here — as it is with the *FCD560*'s loudspeakers. A peek through the fixed grille cloth clearly suggests the presence of three square drive units. In fact there are two very rough and ready round ones. This little bit of dishonesty leaves a bitter taste, considering we are dealing here with a massive and highly respectable company with world-wide interests.

The memorably named *70FB260* loudspeakers are unfortunately shoddily built throughout. Structural integrity, which is a prerequisite of any loudspeaker system, seems to have come off third best. The in-room frequency response trace is much like the one produced by the *FCD560*'s speakers but with slightly more bass. They sound better up against a wall (don't anyone say it . . .).

HOW IT SOUNDS

Unaccountably, the cassette deck sounded even worse than the one on the other Philips system. It shared with that model the thin, 'squashed' quality, with the music unmistakably 'flattened' dynamically and spatially. It also suffered from pitch instability — sustained notes were something to be avoided at all costs — and both transports showed evidence of what was probably very poor and variable tape tensioning across the heads leading to frequent and severe fluctuations in output and, of course, dropouts.



Naturally, only high quality tapes were used, (primarily from Maxell and TDK), while a BASF tape with 'Special Mechanics' guide tusks tried out of interest, exaggerated the problem (and BASF are not to blame here).

The turntable sounded even more miserable, with practically no dynamic range, a high degree of mechanical excitability, very high record surface noise (you're in for a shock if you think that only the condition of the record is to blame for such things), and a severely smeared, coloured and bass-shy sound.

The tuner and CD Player were better, but they were limited by the loudspeakers which again sounded coarse, flat and uneven (it was very difficult in practice to distinguish the loudspeakers from the two Philips systems) — and the amplifier. Philips have engineered in a loudness contour to the amplifier, which adds bass progressively as the volume is turned down. Nevertheless, real bass power was foreign to this system.

However, the CD player did work as well as the rest of the system would allow, and ditto the tuner, which on FM sounded clean and lively, albeit rather hiss-bound, The AM bands sounded quite good too, if somewhat rich tonally due to the loudness contour and the usual lack of treble on these bands.

Endemic with all sources was a splattery, distorted top end, the cause of which appears to be buried deep inside the system since it was apparent whenever high frequencies were present, whether listening on loudspeakers (any loudspeakers) or headphones.

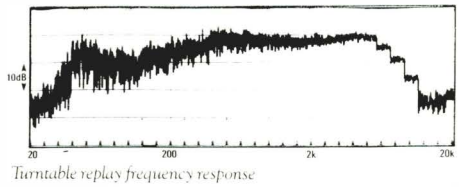
Verdict

Even the CD player, which is easily the best of the sources included here, sounds substantially worse than a genuine high fidelity source. Fundamentally this isn't a sensibly chosen system, being rather closer (to use the example suggested earlier) to a Mercedes body with engine and running gear courtesy of Lada.

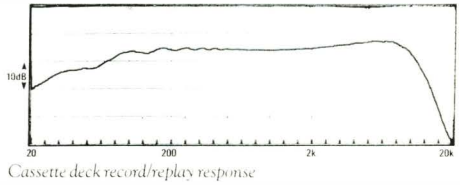
If you really want a cheap CD inclusive system, buying this one at least means you'll get an acceptably built and serviceable product. But I can't see it being music to many people's ears.

Test Results

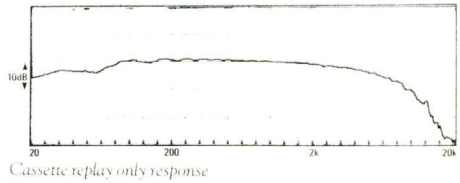
Cost complete	£370
Options?	none
Size main unit - lid open, W/O projections	69×36×38cm (h×w×d)
Size loudspeakers	38×18.5×16.5cm (h×w×d)
Turntable	
Wow & flutter wtd	0.23%
Drift	poor
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
(<10kHz too low, OK,> 14Hz too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*
[*] turntable could not be connected to test equipment	
Tuner	
Sensitivity	poor
Signal/noise	poor
Cassette Deck	
Wow & flutter (wtd)	0.25%
Signal/noise ref 0dB Type II	n/a**
Distortion 0dB Type II	n/a**
[**]auto record level control	
Compact Disc Player	
Signal/noise (measured at Amp Tape Out)	82dB
Amplifier	
Power output/channel (8ohms)	7 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	high



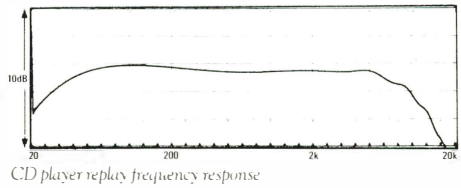
Turntable replay frequency response



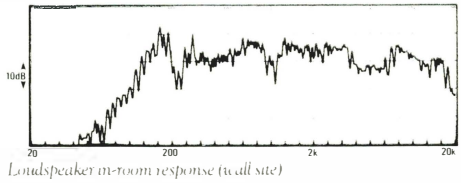
Cassette deck record/replay response



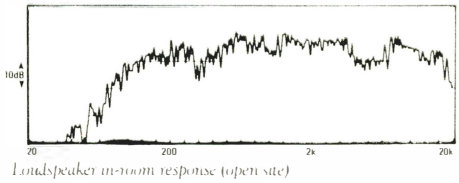
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

SANSUI HG550

SANSUI (UK) LTD, UNIT 10A, LYON INDUSTRIAL ESTATE, ROCKWARE AVENUE, GREENFORD, MIDDLESEX. TEL: 01-575 1133

The *HG550* system is sandwiched in the middle of three recently introduced systems, and is distinguished in a number of small ways. Being 380mm wide, it stretches the meaning of the term midi somewhat. It also looks rather different for another reason: the cassette deck with its Aiwa-style horizontal ledge control surface sits on top of the compact disc player, giving the system an unusual 'stepped' profile.

Note that the all but ubiquitous graphic equaliser has mercifully been banished onto the optional extras list, at a price just short of the psychologically important three-figure mark. The loudspeakers are optional too. In this case the premium is a mere £50 or so, which amounts to a hefty inducement to the dealer to stock the system with speakers after all.

The system is fully remote controllable. It has automatic source switching, and the converse of this feature, which means that when (say) the record deck is selected on the amplifier, the record starts to play — ditto with the CD player, cassette deck and (of course) tuner. Build and finish quality of the main electronics items are excellent, in common with most Sansui equipment.

P-E350 Turntable

Styling apart, this parallel-tracking deck is nothing special designwise. It is quite quick-acting when responding to commands, which makes a nice change, and offers the usual range of automatic record size and speed selection. 'Manual' operation is only possible using a pair of keys to shuttle the arm around, and another for lift/lower operation.

The deck is belt driven and although the (early) sample received had a nasty plastic platter, later shipments will have metal ones (still nasty, probably). The cartridge has a smooth and quite well extended response, but the other measurements were all over the place. Note the very high wow and flutter, the fast running speed, and the poor cartridge channel balance which necessitated a balance control 'tweak'. Still it was an early sample . . .

T-E550L Tuner

The ergonomics of this digital tuner are very good indeed. It is well endowed with presets — 8 on FM and 8 which can be shared between MW and LW — and the status display shows tuned frequency and preset number together.

D-E750 Cassette

The all-singing, all-dancing *D-E750* has two deck mechanisms, only one of which is suitable for recording. But both offer auto-reverse, automatic tape type selection, and a choice of Dolby B and C type noise reduction. Naturally you can dub at normal or high (2×) speed, but with the usual performance penalties.

Unfortunately, there is no record level meter, and record level controls have been ditched in favour of an automatic record level setting circuit, which has the usual effect of compressing the available dynamic range (the record level turns itself down during peaks, which are therefore reproduced quieter), and adding to noise reproduction (the same circuits rack up the gain during quiet moments when hiss is most obvious). Why are we treated like idiots? Why not at least provide the option of doing the job properly?

Measured wow and flutter was 0.13% weighted, and the effects could clearly be heard on test. Pre-recorded tape reproduction suffered obvious high frequency losses, whereas the record/replay responses were bright, though to an extent that is often said to allow for the running-in process. The deck generally seemed happiest with Type II or IV tapes, rather than Type I (ferric).

CD-E750 CD Player

The display shows track numbers or time, but not together, and track cueing is only available with the output muted. This should have suggested to you that the player is very simply equipped. The only special features are an 8-track memory and disc repeat modes. However disc handling was smooth and clean, and it coped with marked 'difficult' discs quite well.

A-E550 Amplifier

The amplifier contains the remote control sensor, but is otherwise a straightforward, purposeful product that features a nice big volume control — which also determines the operating ceiling of the remote control volume adjustment range — and a nice, big 70 watt/channel power output. An equaliser or other sound processor (Dolby Stereo processor?) can be patched in, and a button labelled 'CD optimizer' adds bass to the CD feed only. Why, I cannot imagine. Microphone mixing is available and two pairs of loudspeakers can be connected.

S-U7000 Loudspeakers

No expense has been spent on the loudspeakers (the ugly grill probably cost more than the whole of the rest of the speaker, which is ironic considering how much damage it does to the sound). But there are signs of careful tweaking of the very simple components in this three-way design, which includes a button size metallised dome tweeter. The frequency response traces certainly could have been even less couth, and suggest that near wall positioning will be most suitable.

How It Sounds

The CD player worked best of all the system components, and with the system amplifier sounded a mite 'close' and 'dry', the full weight and magic of really hot music-making not fully realised. For all that, the Sansui system sounded clear and quite potent. The amplifier itself has an easy, unstinting quality and goes loud — very loud as it happens — without fatiguing effects.

The record deck was aided and abetted by what turned out to be an excellent cartridge, given the cost constraints that apply, investing record reproduction with a clarity and projection denied some system turntables. However, the bass end, though decently controlled, lacked any real guts or depth whilst both image and pitch stability were on the wrong side of the line.

The cassette deck was definitely a slight weakness, though this may not concern those who look on it in its most natural role, as a medium offering the convenience of being able to make tapes for your Walkman or record radio programmes for time shift purposes.

But there's no denying it suffered from noticeable hum in this system. The lack of any means of setting recording levels may be a boon to the operator — it's one less thing to forget — but it also sets a ceiling on the performance. Another was the speed stability. To give just one example, violin notes had an uncertain wavering quality due to rapid pitch fluctuations, though the phenomenon varied in severity, and was not a constant factor. Pre-recorded cassettes also sounded quite dull, but the basic quality of recordings made on the deck itself was reasonable,

leaving pitch questions aside. For once the noise reduction circuits seemed well sorted.

The tuner suffered a problem, presumably a sample fault, that muted output in the stereo mode even with quite strong signals (*circa* 1mV or more). Mono sensitivity and noise levels were very good, with the merest trace of digital tuner background nasties, hovering along with the inevitable background hiss. AM sound quality was less satisfactory. Both LW and MW sounded coloured and 'squashed', with limited extension at the frequency extremes.

We had to get there sometime, but let's not spend too long on them having done so. The loudspeakers were obviously bright, with a thin, unextended and boxy-sounding bass. Piano tone was compressed and dull at the extreme top (despite the bright overall balance), and compression was high too. On small scale music — I'm thinking of certain baroque and chamber/recital discs which were used to evaluate the system — the speaker mid and top was exposed most. And although the results weren't bad, they were rather forward, explicit and without any real sense of space. Dynamics didn't really happen either.

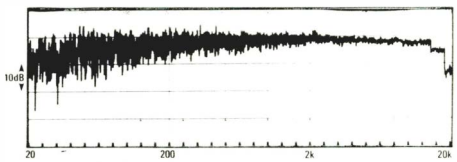
I am bound to say that Sansui could have done a lot worse with the speakers, but I do so without much enthusiasm. You don't have to buy them, and my advice is that you insist on your right to insist that you don't, however hard the dealer tries to twist your arm (he will too!).

Verdict

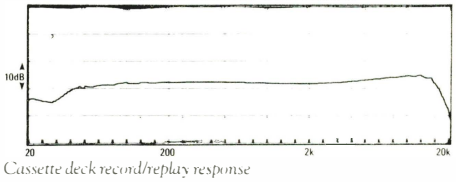
Like a curate's egg, this system is good in parts. As so often in the project, it isn't really for the record lover, and tape enthusiasts could do better too, even though the cassette deck is so well equipped. The best points are compact disc and tuner reproduction and the powerful amplifier — plus intangibles like good build quality and ease of use.

Test Results

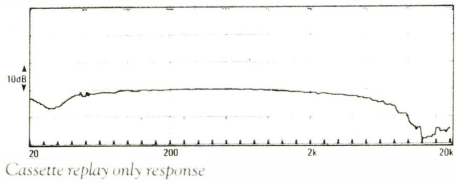
Cost complete	£840
Options?	G-E750 equaliser/analyser (extra), S-U7000 loudspeakers
Size main unit - t/t lid open, w/o projections	72 × 38 × 40cm (h × w × d)
Size loudspeakers	38 × 24 × 20cm (h × w × d)
Turntable	
Wow & flutter wtd	1.4%
Drift	poor
Speed accuracy	+1.2%
Arm/cartridge resonance	15kHz too high (<10kHz too low, OK, > 14kHz too high)
Cartridge channel balance	1.0dB
Cartridge channel separation	26dB
Cartridge tracking ability	75uM
Tuner	
Sensitivity	good
Signal/noise	good
Cassette Deck	
Wow & flutter (wtd)	0.13%
Signal/noise ref 0dB Type II	n/a*
Distortion 0dB Type II	n/a*
[*]auto record level	
Compact Disc Player	
Weighted signal/noise (measured at amp Tape Out)	>101dB
measured at amp Tape out	
Amplifier	
Power output/channel (8ohms)	70 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	high



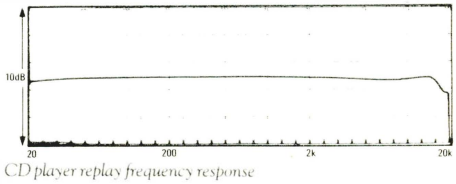
Turntable replay frequency response



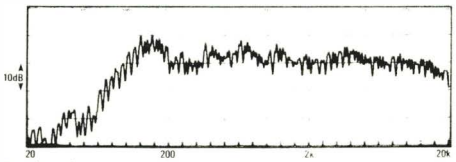
Cassette deck record/replay response



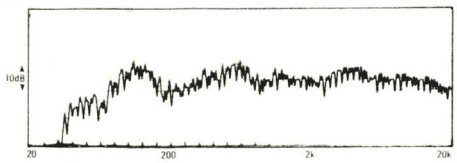
Cassette replay only response



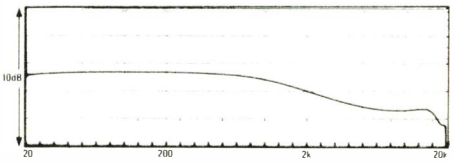
CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)



CD player response, amp CD optimiser switch 'on'

BEST BUY

SANYO W36

SANYO MARUBENI (UK) LTD, SANYO HOUSE, OTTERSPOOL WAY, WATFORD, HERTS.
TEL: (0923) 46363

Sanyo's prime stalking ground has always been the budget end of the market, where they constitute a comprehensive and effective challenge to allcomers. In the past, their audio systems have tended to be rather tacky, but this one shows at least a modicum of restraint — allowing for the company's traditional love of black Perspex, little dabs of colour, and a design brief that must have included the instruction to make the front panels nice 'n busy looking. By contrast, the loudspeakers have been treated almost with restraint, though the usual square drivers glint from beneath the dark mesh covers, promising more of what we've come to expect from midi-system loudspeakers. As usual, however, things aren't all they seem.

There has been no attempt whatever at integrating the control systems of the various components. In effect, it's built exactly like a component hi-fi system. But there isn't quite the freedom you'd expect from component systems: once everything has been lashed together around the back, there isn't a spare input available, and although there are two headphone sockets at the front (one on the CD player with a volume control associated so that it can be used as a stand alone unit), microphones cannot be used at all. What the Sanyo configuration does allow is the ability to upgrade fairly painlessly in the future.

The system came supplied with a neat, semi-open wood effect housing. As well as providing a better base for the turntable, it adds a welcome dash of visual distinction. Despite — or perhaps because of — the lack of smart automatic features, microchip based or otherwise, the Sanyo W36 is really remarkably easy to get to grips with. Instructions are hardly necessary.

P36 Turntable

This unit is about as simple as you can make a turntable and reasonably expect it to work at all. It is an automatic design, belt driven and ultra-compact. It even has a 'proper' pivoted arm, and replaceable cartridge, using the standard T4P system for which various alternatives are available from several manufacturers. Although the deck is no great shakes, there could be some benefit in upgrading the cartridge, perhaps to one in the £15 to £20 range. There is even one concession to luxury — a mechanical feeler sensor that detects the presence or otherwise of a record, so you won't stub out your precious diamond on the rubber mat.

The deck makes quite an effective seismograph, with virtually zero environmental isolation — I'm afraid this factor comes with the territory at the low cost end of the market. On the test bench the Sanyo proved typical of low cost players generally. It ran fast (+1.8%), a little unevenly (0.11% wow and flutter) and the cartridge performed poorly in the tracking tests, though the aural evidence of this tended to be lost in the overwhelmingly rather 'grubby' sound of the player.

T26L Tuner

There is a tendency these days to pass over tuners that are not digital synthesiser driven and don't have presets. However Sanyo's decision to go the old fashioned scale-and-pointer route is sensible, given that low cost digital tuners are usually bad news.

The *T26L*, with its rather stiff edgewise tuning knob and its long, clear tuning scale, covers FM, MW and LW as usual — and in the case of FM, in some style. It isn't a wonderfully sensitive tuner, but that was the only significant failing. The two AM bands on the other hand sounded very dull and compressed.

DW36 Cassette Deck

No surprises here, only disappointments that Sanyo didn't eschew the twin deck mechanisms in favour of a single, better one. The features hit list includes high and normal speed dubbing (normal speed dubbing merely sounds poor; high speed dubbed tapes sound foul), Dolby B noise reduction, manual recording level adjustment (thankfully), and an awkwardly configured set of manual tape type selectors. The deck is otherwise straightforward to use, but the fascia layout lacks the exemplary clarity of some other twin decks.

Measured performance was good on the whole, but speed instability was clearly audible, even though the test result was only moderately poor.

CP08 CD Player

The Sanyo *W36* is one of several systems whose CD player is built to altogether higher standards than the rest of the system. The *CP08* has its own quite individual aesthetics and standards of finish, and also works rather well, with disc tracking notably better than average.

One unusual feature is a 'disc spinning' indicator. In addition, a window let into the loading drawer front looks onto an illuminated interior. The player is equipped with a headphone socket with adjustable output, a 16-track programme memory, audible track search, track skip and a repeat switch.

A36 Amplifier

The *A36* amplifier has inputs for the components supplied with the system, but no more. The only concessions to luxury are a 5-band equaliser and a −20dB muting switch (colloquially known as the telephone switch). The power output was measured at 40 watts/channel, which is highly respectable for a system of this kind.

HF-W36 Loudspeakers

The loudspeakers — made in this country incidentally, probably to a design brief drawn up by Sanyo's UK offices, using the Sanyo parts bin perhaps? — are compact, sturdily built and well finished. The two drivers include a rather unpromising looking large cone tweeter, but in the event Sanyo have produced a surprisingly fine performer that comes close to meeting full high fidelity requirements.

How It Sounds

In a field dominated by mediocrity and worse, it's easy to get carried away when something that is just that little bit better comes along.

However, take one W36 system and one London Symphony Orchestra, and you have a no-contest situation. Yet for all its nondescript appearance and utter simplicity, this apparently modest system does deliver the goods.

By far the most impressive components are the loudspeakers and the compact disc player, in that order. The loudspeakers are at least an order of magnitude less coloured than most of the other system speakers, especially at mid and higher frequencies. The bass end is good too, taking the small size of the enclosures into account. The crucial factor here is the relatively solid enclosure which imposes more control than usual on the bass driver.

The compact disc player also sounded good, but there were some signs of a 'brash' extreme treble and a flattening of stereo perspectives.

It was the amplifier that did the most damage here though, and did so also with the other sources. This appears to have been designed with more of an eye on the amount of power that can be produced than the quality thereof, and the result was a certain 'scrappiness' and lack of class. The limitations seem to affect the frequency extremes most; the treble sounded 'thin' and 'edgy', and the bass lacked impact and depth. It was also slightly coloured.

Luckily the shortcomings were not drastic, and both the tuner and the record deck (this last aided and abetted by a reasonable but slightly 'edgy' sounding cartridge) also made music.

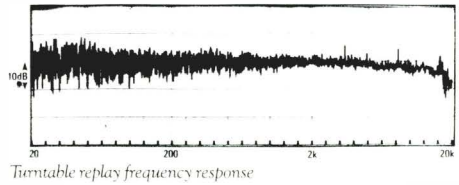
The least acceptable of the sources was the cassette deck, which suffered above all else from a sonic instability that probably arises through a combination of simple wow and flutter (mostly flutter), and perhaps poor tape-to-head contact.

Verdict

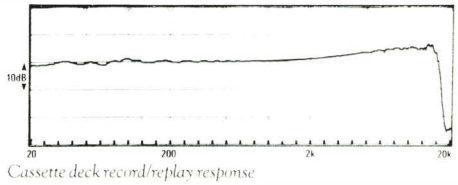
The record deck is a weakness, and both the amplifier and cassette deck are a little rough around the edges. But the other components are good, especially the loudspeakers and the compact disc player.

Test Results

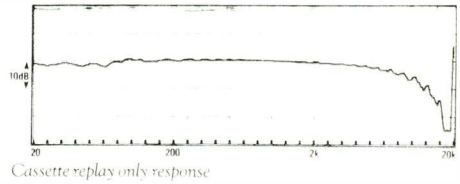
Cost complete	£549.98
Options?	CP08 CD player
Size main unit	75×36.5×32cm (h×w×d)
Size loudspeakers	37×20×17.5cm (h×w×d)
Turntable	
Wow & flutter wtd	0.11%
Drift	poor
Speed accuracy	+1.8%
Arm/cartridge resonance	14Hz, OK (<10kHz too low, OK, >14Hz too high)
Cartridge channel balance	0.3dB
Cartridge channel separation	21.5dB
Cartridge tracking ability	40gM
Tuner	
Sensitivity	poor
Signal/noise	fair
Cassette Deck	
Wow & flutter (wtd)	0.11%
Signal/noise ref 0dB Type II	48dB
Distortion 0dB Type II	2.5%
Compact Disc Player	
Signal/noise (measured at amp Tape Out)	>106dB
Amplifier	
Power output/channel (8ohms) (1kHz both channels driven)	40 watts
Loudspeakers	
Efficiency	fairly low



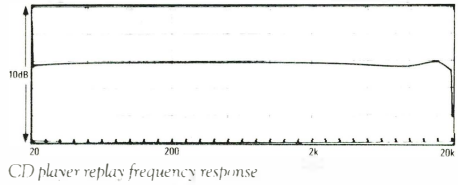
Turntable replay frequency response



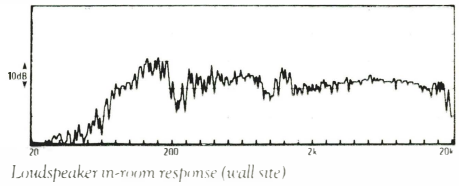
Cassette deck record/replay response



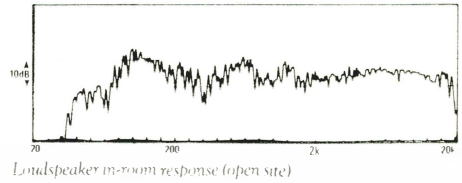
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

SHARP CD VZ-1560

SHARP ELECTRONICS (UK) LTD, SHARP HOUSE, THORP ROAD, MANCHESTER.
TEL: (061) 205 2333

In one very important respect, this is one of the most unusual systems in this survey. It has a record deck capable of playing both sides of a record, not by having an arm and a cartridge on each side of the disc as on some previous Sharp models, but by using a single arm that changes sides. Previous Sharp 'both sides' record players had come in for criticism for making life difficult for the owner. When one stylus was to be replaced, should the other be done at the same time? Anyway, how was the 'hidden' cartridge to be reached?.

The *CD VZ-1560* is slightly unusual in other respects too. All the electronics bar the CD player come as an integrated one piece item, based on complex plastic mouldings, giving the unit something of the appearance and feel of the very low cost Philips CD midi systems (and clones) — which is no bad thing as structural integrity is very good. The CD player, however, is an altogether higher quality looking piece of kit (though no stronger than the rest) which is actually narrower than the rest of the equipment. The apparent inconsistency is taken care of by designing a black finished wood plinth with sits over the CD player, increasing its width and acting as a platform. The result is attractive even if the system does look as though it comes from two different sources.

The *DX-110* CD player is optional, but there are no other options, and the system cannot be bought without loudspeakers.

VZ-1560 Main Unit

The *VZ-1560* is the multi-function main component in the system, and consists of a turntable, tuner, cassette deck (twin naturally) and amplifier.

The turntable appears ordinary enough, apart from the innocuous looking buttons labelled 'Side A/B' and 'Both Sides.' Opening the lid reveals what appears to be a conventional parallel tracking arm (fitted with a fixed magnetic cartridge, but with interchangeable stylus of course), until you notice the tiny, vestigial platter for the record to sit on — it's no bigger than a record centre label. Of course the whole playing surface must remain free so that the 'underneath' of the record can be played.

If you really want to make your flesh crawl, select side 'B' and watch the arm slowly traverse to the far side of the record, before doing a slow half cartwheel and disappearing out of sight. This all takes place with amazing deliberation — the whole process can take well over 20 seconds, and it seems longer.

Other features of the deck include the normal range of automation, including two keys to do the shuffling around bit, but there is no automatic track search feature. It should be pointed out that the absence of a normal full width platter represents a degree of compromise on sound quality, as recorded reproduction depends in part on a stable mechanical relationship between record and stylus, and the control of resonances within the record itself. In this Sharp system, the record is all but unrestrained.

The cassette deck is less unusual. Given the 'both sides' record deck, I was half expecting the twin cassette decks to be bi-directional. They're not, and we should all be suitably grateful. There's a limit to what can be done properly at any price level.

What you do get is Dolby B noise reduction and two very simple deck transports, one suitable for recording and replay, the other for playback only with simple (and rather floppy) mechanical controls. Continuous play is available, and so is tape dubbing, but Sharp have done the sensible thing and ignored high speed dubbing and metal tape compatibility. The decks will accept chrome and ferric tapes, but metal tapes are an expensive luxury, inconsistent with the aims of a system like this, and furthermore inexpensive cassette decks don't make good use of the stuff. Tape type selection is manual, but record levels are set automatically, which is a common but unfortunate choice given the compression that inevitably results from such circuits.

The tuner is about as simple as they come, with its three wavebands (FM/MW/LW), far from free-running edgewise tuning knob, and a switch position to defeat the stereo decoder for marginal reception conditions.

The amplifier continues the simplicity theme. The only controls are the five graphic equaliser sliders, plus balance, volume and selector switches. The system is ill-equipped with sockets. A set of input sockets for the external CD player, and outputs to headphones and loudspeakers (using DIN plugs) complete the roll call. This is not a system that is readily interfaced with the outside world.

The measurements — insofar as they could be carried out — tell the expected story of a very simple low-tech unit. The record player has a sharply falling high end response, which incidentally also sounds rather peaky. The cassette deck is quite good at recording and playing back, but showed a very severe treble loss when playing back pre-recorded material, as is documented in the abysmal playback response plot. Even the CD player showed significant high frequency losses, in this case probably more a function of the amplifier than the CD player itself.

Lastly, take note of the 7 watt/channel measured output power, and then check out Sharp's 50 watt MPO claim (whatever that means), which is plastered all over the front panel of the unit as it comes out of the box. At the very least, this is very misleading.

DX-110 CD Player

Despite the high quality of finish, the *DX-110* is a very simple player, which like the rest of the unit has a very easy to grasp set of controls. Apart from a nice big 'play' control, plus stop, pause and so on, there's just a pair of buttons which act as track skip keys, or audible track search from pause mode. There is no programme memory, and the player will not accept commands like 'play from track 2' until the disc has been loaded and its TOC (table of contents) read, which is boring.

CP-1550E Loudspeakers

The loudspeaker curve shows that the speakers don't really work below 100Hz or above 10kHz, the latter an indicator of a poorly designed tweeter. These unpromising results come as no surprise having examined the loudspeaker itself, which is really no better designed than its lightweight construction suggests. Two very simple drive units are used in a 4 ohm configuration that probably draws about 50 per cent more than

the standard 8 ohm power from the amplifier — around 10 watts each side.

How It Sounds

The amplifier was the main limiting factor in this system. Not only is it low in absolute power output, as the figures show, it also sounds extremely dull, compressed and slow. Dynamics have a heavy, 'leaden' feel and lack the openness and lightness of touch that other, better amplifiers provide as a matter of course. The crude, brash loudspeakers were hardly helpful in this regard.

As the amplifier acts as a conduit for the output of all the sources, and can hardly be bypassed or substituted, its influence is all-pervading and ultimately crucial. Thus the tuner gave every indication of being perfectly reasonable on FM especially, and much the same can be said of the CD player (though when used on its own, it did give a rather grainy and uncommunicative account of itself). In both cases though, it was the amplifier that could be heard most clearly, as a kind of grey filter through which everything had to pass. The turntable sounded even greyer, the measured high frequency shyness of the unit clearly being largely to blame. The turntable suffered other problems too, most obviously a very 'washy' and unstable sense of stereo. It simply didn't seem to have much of a grip on the music.

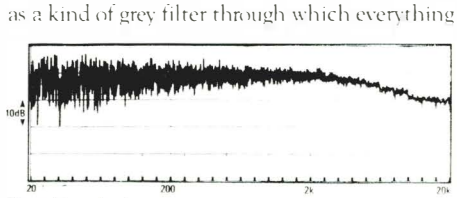
In addition to the qualitive shortcomings outlined, the cassette deck was clearly unstable — not so much in speed or wow and flutter terms, but in image placement, tonal quality and bass attack, apparently because tape/head contact was none too wonderful and also because the auto level control led to qualitive differences as the volume levels hunted around. I have no firm idea why this was happening, but the observation was clear enough. Finally, the CD player had severe tracking problems with almost all the discs tried.

Verdict

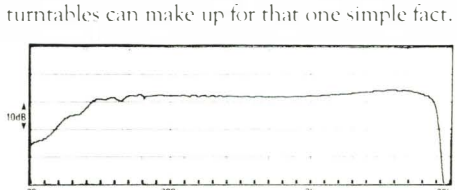
Cheap yes; well presented certainly, but sonically this system simply isn't good enough. No amount of fancy gadgetry like both sides turntables can make up for that one simple fact.

Test Results

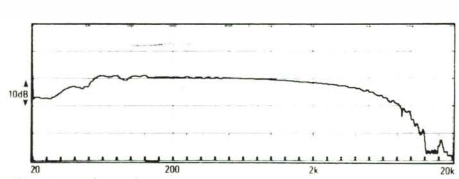
Cost with speakers	£440
Options?	CD player
Size main unit - lid open, w/o projections	64 × 36.5 × 40cm (h×w×d)
Size loudspeakers	34 × 19 × 17.5cm (h×w×d)
Turntable	
Wow & flutter wtd	0.17%
Drift	poor
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
(<10kHz too low, OK, > too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*
[*]test instruments could not be used with this system	
Tuner	
Sensitivity	fair
Signal/noise	poor
Cassette Deck	
Wow & flutter (wtd)	0.30%
Signal/noise ref 0dB Type II	n/a**
Distortion 0dB Type II	n/a**
[**]auto record level	
Compact Disc Player	
Weighted signal/noise (measured at amp Tape Out)	82dB
measured at amplifier headphone socket	
Amplifier	
Power output/channel (8ohms)	7 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	very high



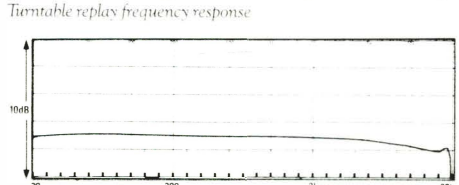
Turntable replay frequency response



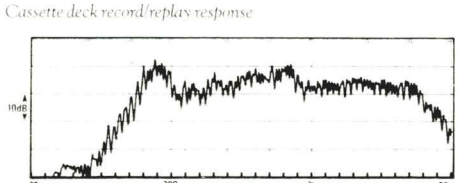
Cassette deck record/replay response



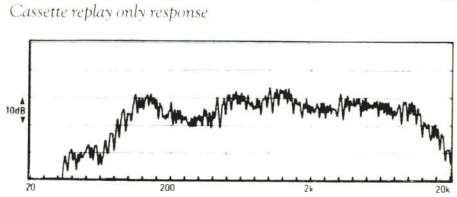
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

SHARP 207E

SHARP ELECTRONICS (UK) LTD, SHARP HOUSE, THORP ROAD, MANCHESTER
TEL: (061) 205 2333

A little less than £1000 is enough to buy this attractive system which packs a lot of 1980s style technology into a compact and good looking set of clothes. The CD player, which from its styling was not originally designed to match, is the only option listed by the manufacturer.

The system has been designed to provide automatic source selection, so that starting the cassette deck will select the appropriate input on the amplifier and so on. However, the CD player does not link up in this way, so auto source selection breaks down at this point. Just to confuse matters further, the CD player does come with its own remote control handset, which even provides some facilities missing from the player itself, notably direct track selection using a numeric keypad. The handset I had worked only erratically, but this is undoubtedly a sample fault, as I have not previously come across the problem with this model.

RP-207 Turntable

The specifications of this deck look more like an up-market cassette deck than a turntable. Look at the features list: introscan (which plays the first few seconds of each track), programmability (plays up to seven tracks on each side of the disc, but each track is playable only once), track search, the equivalent of auto-reverse (the 'both sides' feature, operated by two arm and cartridge assemblies, one each side of the record), and auto repeat. Another useful feature is the automatically synchronised recording feature, which operates the cassette pause control on the user's behalf.

Not all that many years ago, producing a functional track search feature for records was a high technology task, virtually impossible to get right. But no longer. The Sharp found its alloted place nine times out of ten, and only missed a track lead-in by seconds when it did go wrong. The player didn't take too long performing these miracles either. But what inevitably does suffer, especially on a 'both sides' player without a proper platter, is sound quality . . .

The player was extremely microphonic, and produced high levels of low frequency noise triggered by record surface effects. The cartridge/amplifier combination has a sharply curtailed high frequency response.

ST-207 Tuner

The most straightforward of all the sources, the slimline *ST-207* tuner is digital synthesiser driven, and will store the frequencies of 6 FM and 6 LW + MW programmes. Ergonomics are good, and there's even a signal strength meter, but it's calibrated to show a strong signal even when it's struggling with one that's too weak even for good mono — and the stereo decoder was reluctant to switch to mono under the same conditions.

RT-207 Cassette Deck

Definitely for the gadget freak with traditional Japanese style mini-fingers, this player had facilities not dissimilar to those of the turntable described earlier. They include track search, ten track programmability, repeat mode, continuous playback of two tapes, and intro-scan. You can even programme the intro-scan feature, and I suppose we ought to run a competition to see if anyone can come up with a reason to do so.

DX-120 CD Player

Strangely, the CD player in this system is less gadget laden than the turntable or cassette deck. However, it is capable of memorising random sequences of up to nine tracks, various repeat modes, and audible track search from pause mode only. All the controls are contained in what Sharp calls a 'sealing pocket' (actually an opening flap). It looks nice, but is at odds with the rest of the system.

In addition to very poor tracking over blemishes (sometimes even over clean discs), there were severe output losses in the treble especially, reducing the clarity and 'air' of many recordings.

SM-207 Amplifier

As well as coping with the other system components, the amplifier has an auxiliary input and a microphone input with mixing control. The amplifier is usefully powerful, and has a 5-band equaliser, plus loudness and muting circuits.

CP-207E Loudspeakers

The two-way vented loudspeakers are not built to high standards. Shortcomings include the lightweight, resonant enclosure and the so-called tweeter — actually more like a midrange unit, chosen presumably on the grounds of price. Loudspeaker alignment encourages the bass to 'boom' around 100-120Hz (depending on positioning), and as expected the output dies away in the treble. The speakers sound best used well away from walls.

How It Sounds

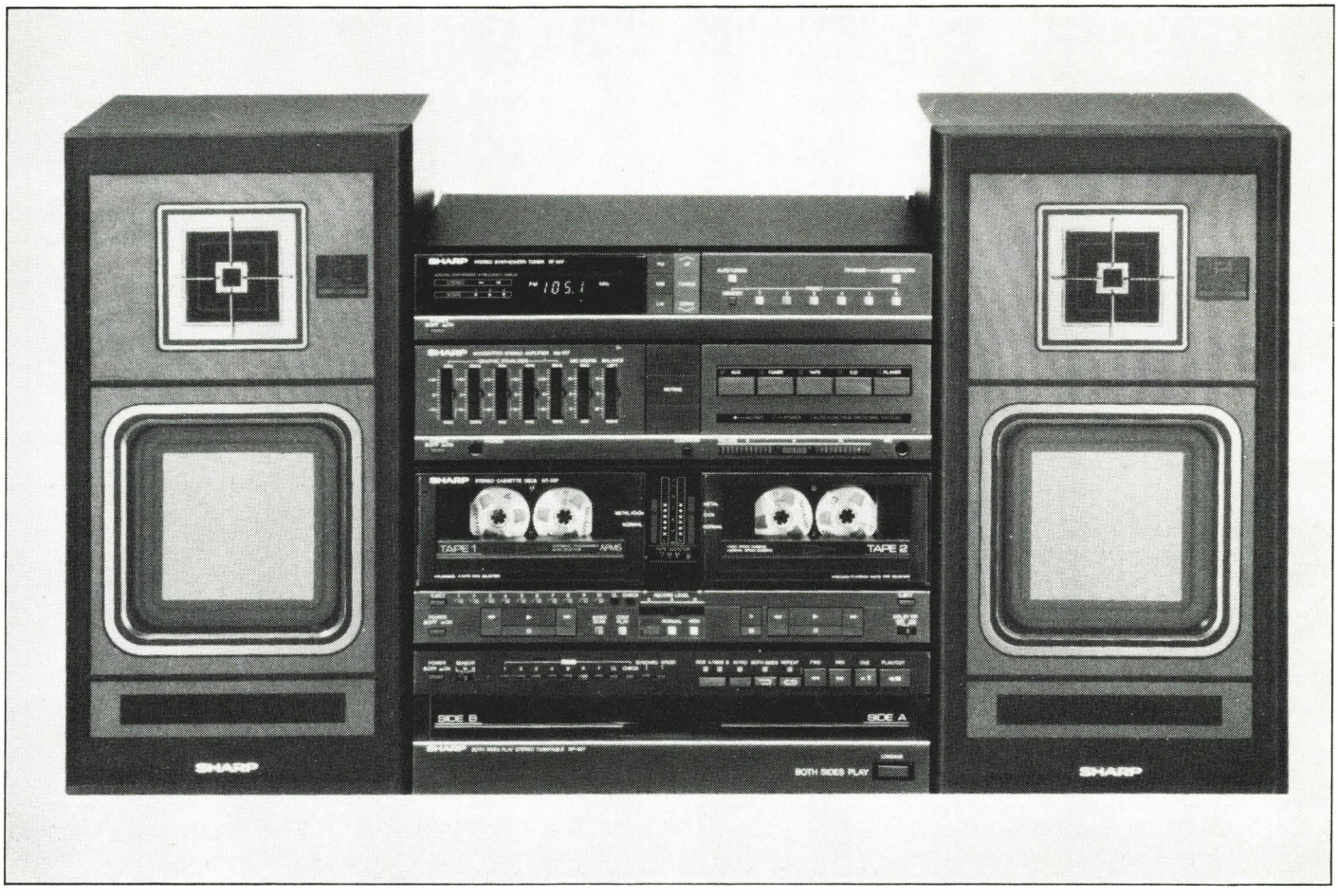
The sound of this system is totally dominated by the loudspeakers. Even if we ignore the fact that this isn't a beer budget system, their coarseness at the top end is quite unacceptable, though I accept that in milder form this characteristic seems to have reached epidemic proportions with system loudspeakers. The measured bass 'hump' was also audible, as an overhanging warmth that lingered well after the note to which it belonged had died away. The speakers also detracted severely from recorded dynamics. They simply sounded sat upon.

So I discarded them, and continued the tests using the B&W *DM110* speakers, used as the benchmark throughout this project. However, this wasn't an end to the shortcomings, and I don't think even the most impressionable could sit down to any of the sources and fool themselves they're listening to high quality sound. The whole system sounded coarse and threadbare.

Substituting components quickly demonstrated that next to the loudspeakers the amplifier was causing the greatest sonic bottleneck. It sounded hard, it sounded graceless. It obscured information and made the bass sound thin and shallow, which was helped but hardly cured even by carefully tweaked graphic equaliser settings of the bottom two sliders.

There was a kind of fortuitous coincidence of failings here: the shallow amplifier bass offsetting a perceived excess in the loudspeakers. But of course the 'correction' was far from perfect, and all the other problems afflicting both components remained.

Turning to the four sources of music:



turntable, CD player, cassette deck and radio tuner, it was the last of these that provided the greatest musical satisfaction. The only real weakness — I'm talking about the FM band here — was when dealing with very weak off-air signals, where spurious noises induced by the digital control section impinged on the audio. But with all normal signals the tuner had quite an attractive quality that was not readily criticised. LW and MW were subject to the usual vagaries of these bands, but to no greater extent than with many other systems.

The cassette deck also made perfectly acceptable noises, though the poor measured wow and flutter figure was reflected in a nondescript treble quality which was not helped by switching to metal tape. The greater the treble content of the music, the rougher the sound. The deck never really sounded better than it needed to, though it never got out of hand.

In absolute terms, the CD player sounded better than the tape deck, but the margin was much narrower than usual partly because the player frequently tripped up over marks and gaps. Its error correction abilities were definitely weak. In addition, the player sounded coarse — seemingly a system trademark — and grainy. In practice though, disc tracking performance will prove the greatest limitation. I also noticed that the deck would occasionally take up to half a minute to find a selected track.

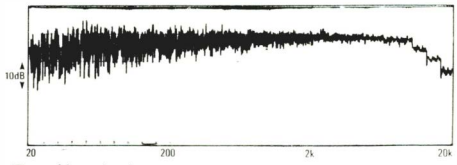
The record deck is better not examined in great depth. Suffice it to say that as the worst sounding of all the sources — by a respectable margin — it will not greatly interest the vinyl junkie. It is the kind of deck that lends credence to the false but widespread idea that CD offers perfect sound.

Verdict

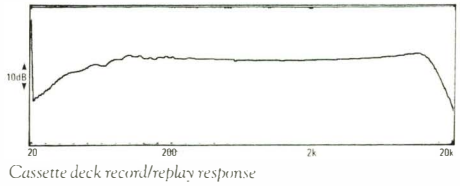
With its vaguely Aiwa-like front panel and some intriguing features — not least the both sides turntable — the Sharp *207E* system appears to offer the potential buyer plenty. Unfortunately, severe sonic shortcomings in vital areas (amplifier, loudspeakers, CD player, turntable) preclude recommendation.

Test Results

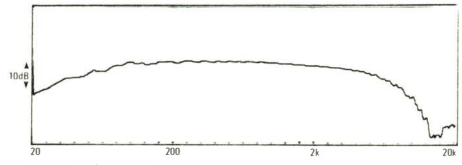
Cost complete	approx £920
Options?	CD player
Size main unit	44×33×34cm (h×w×d)
Size loudspeakers	44×23×22cm (h×w×d)
Turntable	
Wow & flutter wtd	0.09%
Drift	poor
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
(<10kHz too low, OK, >14Hz too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*
[*]non-standard connections meant deck couldn't be interfaced with test equipment	
Tuner	
Sensitivity	good
Signal/noise	fair
Cassette Deck	
Wow & flutter (wtd)	0.14%
Signal/noise ref 0dB Type II	57dB
Distortion 0dB Type II	2.2%
Compact Disc Player	
Signal/noise (measured at amp Tape Out)	50dB**
[**]measured at amplifier headphone socket	
Amplifier	
Power output/channel (8ohms)	40 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	low



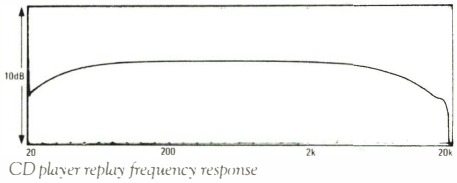
Turntable replay frequency response



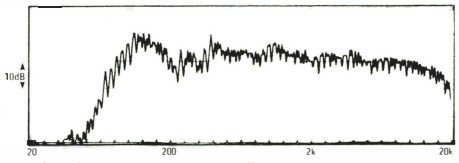
Cassette deck record/replay response



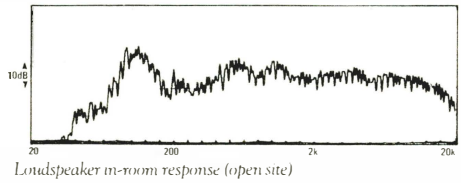
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

SONY COMPACT 76

SONY HOUSE, SOUTH STREET, STAINES, MIDDLESEX TW18 4PF
TEL: STAINES 61688

Sony have never been keen on marketing low cost CD based systems, and have given the impression in the past — not without justification — that very low cost systems simply squander the special attributes that compact disc can bring to the reproduction of music. The author agrees, but it should be pointed out that the same argument can and should be applied with equal force to other sources. Records for example.

There is no mistaking the *Compact 76* for any other manufacturer's product. It has a combination of attributes that even Sony only seem able to achieve sometimes. It is not over-endowed with facilities, especially the more useless gimmicky ones (the CD player is a partial exception to this), yet it is immaculately turned out and very nearly granny-proof. The displays, as so often with Sony equipment, are amongst the best available almost regardless of price, and it only takes a minute or so twiddling with the controls to learn something of the subtle alchemy that system design really is. And how thoroughly Sony have mastered the art. This doesn't necessarily mean the stuff actually sounds any good though . . .

PS-LX35P TURNTABLE

The design is entirely standard for this class of product. The low inertia aluminium platter — which ran about 1.2% fast — is driven by belt and offers automatic operation, but with manual record speed and size switching.

The cartridge has a rather bumpy response, with a loss of energy at the top end and a knee in the curve above 20Hz, due to a low frequency instability of some kind combined with an excessively high arm/cartridge resonance. In addition, even the mildest physical touch was echoed by a grumbling through the loudspeakers. This is not a well built deck, impressive though it appears.

XO-750W MAIN UNIT

This is very much the mixture as always, but with a concentration on essentials and sensible design, albeit with popular but less useful devices like a power level display tacked on as well.

The only important omission is a mono switch, without which the FM tuner can flounder with weak stations near the automatically controlled mono switchover. For a pleasant change, however, this point is set at a sensible level and otherwise the tuner is a model of straightforward common sense. There are five presets per band, a superbly clear backlit LCD display, and the best laid out set of controls you could ask for. The only jarring feature was the electrically and mechanically weak spring terminals that act as aerial sockets (incidentally Sony's own AM aerial doesn't fit without removing the spade terminals!). LW and MW sensitivity was poor and interference high. FM was also a little weak in sensitivity, and hiss levels are unlikely to pass unnoticed.

The cassette deck has twin unidirectional transports, only one of which is record capable. Tape selection is manual, and in a misjudged attempt to keep things as simple as possible, recording levels are automatically controlled. This is a pity since the player 'gain rides' recordings quite badly, so that loud passages are reduced in impact, and noise during quieter periods is emphasised. As elsewhere, this kind of compromise is too expensive sonically. Noise reduction is by Dolby B as usual, and high speed dubbing completes the bells and whistles tally. The deck performed well except for the wow and flutter figures. Not shown in the figures is an erratic but overall rather high level of dropout.

This is quite a powerful system. The amplifier gave a very reasonable 40 watts per channel on the test bench, and enough volume into the Sony loudspeakers to drive a saint crazy. It also sufficed with more conventional loudspeakers, but the sound did change character with level, becoming rather aggressive *in extremis*.

Sony haven't needlessly cluttered the fascia with unnecessary amplifier controls. There is the ubiquitous 5-band graphic equaliser, of course, but this apart there are only the source selector switches, volume and balance controls — and a switch to turn the equaliser off, the most useful extra Sony could have provided. Finally, there's a microphone socket but no other spare inputs.

CDP-35 CD PLAYER

The CD player looks a bit out of place. It clearly wasn't produced with this system specifically in mind, because both appearance and the range and scope of the facilities are at odds with what the system boasts elsewhere.

In fact the CD facilities are quite extensive. They stretch from index search using dedicated control keys (in addition to the usual track search and skip), to shuffle play, which reorganises the seasons of Vivaldi's masterpiece into something on the English pattern — unpredictable. There are all sorts of extras like repeat and auto space — the latter designed to leave gaps between tracks when making those illegal recordings from CD.

You can programme up to 20 tracks for replay in random order, but the *pièce de resistance* without a shadow of doubt was the calendar-style display of track numbers up to 20, which graphically shows the current state of play, and tells you which tracks remain programmed into memory. As if this wasn't enough, track and index numbers and a choice of time indications is simultaneously shown alongside. Great stuff!

Like other recent Sony players, this one is an excellent tracker, and its disc handling speed is amongst the slickest on the market. In fact its main competition comes from other models in the Sony compact disc player range. Note that some response tailoring takes place within the amplifier.

SS-A750 LOUDSPEAKERS

The *SS-A750* breaks the pattern. The rest of the system meets certain basic criteria that reflect decent performance within the cost and other limitations that apply. The loudspeakers, however, are lightweight and shoddy. The only part of the design that appears to have received much attention is the visible baffle area. What doesn't show is the inadequate enclosure and drive unit design. The frequency response provides an indication that all is not right. Note especially the uneven mid and top, and the sharp peak just above 100Hz.

HOW IT SOUNDS

The record deck was no great shakes musically. Scratches and dust on record surfaces were inclined to upset it quite violently, which is a classic symptom of excessive microphony — or rather the lack of structural integrity which leads to microphony. The actual music making was undistinguished — it lacked resolution and didn't project itself or create a tangible stereo soundstage. The whole effect was unedifying and lacking in distinctiveness, whilst tonal colours were vaguely presented. A soft, 'woolly', but thankfully not excessive bass was also an important element in the picture.

The cassette deck showed promise and some-

times sounded quite effective. In the end though it was hamstrung by the auto level record feature, and by the lack of stability which arose for the reasons given earlier.

The tuner wasn't a lot better, but the CD player helped put things to rights. The tuner actually sounded quite good, but it proved impossible to get the background noise levels down to a reasonable level, and those infernal aerial terminals didn't help.

But compact discs sounded fine. The CD player on its own is very good in fact, but the amplifier takes things down a notch or two. There isn't the richness and variation when listening *via* this amplifier that was apparent with the same CD player and the QED benchmark amplifier. But when used with the B&W test loudspeakers, the CD player gave a crisp, lively and detailed account of itself.

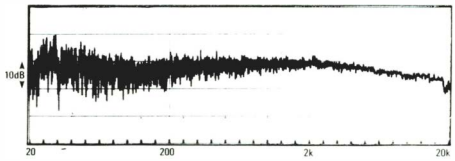
It was the loudspeakers that really spoiled this system. I was quite shocked how bad they were. I had expected something usable but perhaps a little adventurous or limited in some ways, but not that the *SS-A750* would sound so positively coarse and aggressive, yet distant and lossy at the same time. It was like listening to the music bouncing off a brick wall far away and then making its way to the listener through a hollow tube. Price is no excuse here. Sony can do much better, and they ought to.

Verdict

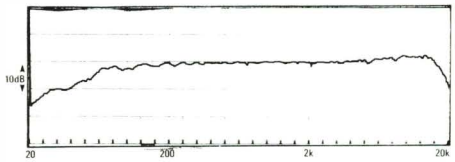
Without loudspeakers this would have been an acceptable system, with a reasonable amplifier, a good tuner and CD player, and a tape deck and record deck that were no worse than average. With these loudspeakers, however, all bets are off. Sony should replace the loudspeakers, or make them optional, as on their more costly systems.

Test Results

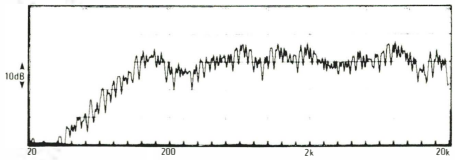
Cost complete	£530
Options?	none
Size main unit - lid open, w/o projections	60.5×35.5×36.5cm (h×w×d)
Size loudspeakers	33.5×21×20cm (h×w×d)
Turntable	
Wow & flutter wtd	0.10%
Drift	poor
Speed accuracy	+1.2%
Arm/cartridge resonance	21Hz, too high (<10kHz too low, OK.> 14 Hz too high)
Cartridge channel balance	1.2dB
Cartridge channel separation	–30dB
Cartridge tracking ability	74uM
Tuner	
Sensitivity	poor
Signal/noise	very poor
Cassette Deck	
Wow & flutter (wtd)	0.21%
Signal/noise ref 0dB Type II	n/a*
Distortion 0dB Type II	n/a*
**Auto record level*	
Compact Disc Player	
signal/noise (measured at amp Tape Out)	85dB
Amplifier	
Power output/channel (8ohms) (1kHz both channels driven)	40 watts
Efficiency	medium



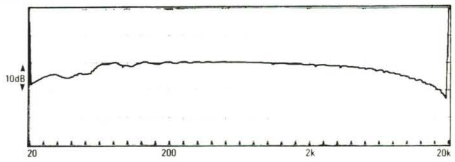
Turntable replay frequency response



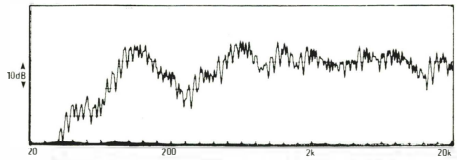
Cassette deck record/replay response



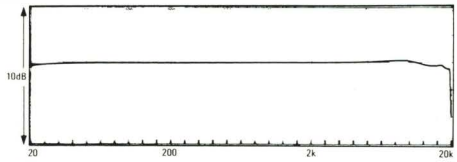
Loudspeaker in-room response (u ull site)



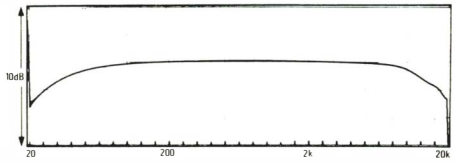
Cassette replay only response



Loudspeaker in-room response (open site)



CD player replay frequency response



CD player response via amp headphone outlet

RECOMMENDED

SONY COMPACT 58S

SONY UK LTD, SONY HOUSE, SOUTH STREET, STAINES, MIDDLESEX TW18 4PF.
TEL: STAINES 61688

The Compact 58S is a Sony CD system assembled entirely from separates. There is no real technical relevance to this fact, but separates do act as a kind of insurance policy for the owner. For example, peripheral elements can be dispatched for service if necessary, without putting the rest of the system out of action.

On the face of it, separates also provide a ready upgrade path in the future. If you get fed up with, let's say, the *PS-LX50* turntable, it can be retired to that special place in the sky reserved for clapped out record players. There is no reason to replace it with a Sony one either, though Sony would sincerely prefer that you do. However, only the turntable, the CD player and of course the loudspeakers can be so replaced. All the other components are linked using special flat ribbon interconnects, which makes interfacing other components very difficult. The turntable and CD player use conventional phono leads, and the amplifier is thoughtfully provided with one spare set of phono input sockets, so you could replace the tuner too. But you can't connect any other cassette deck, and the amplifier itself can't be replaced without also changing the tuner and cassette deck.

Two points about the Compact 58S system stand out even to the casual observer. One is the obviously meticulous standard of design and construction. Second is the largely unspoiled purposefulness of the product. There are elements of this system that are closer to the mainstream systems world than the hi-fi one, but they are limited to the amplifier (specifically the graphic equaliser, which can be switched out of circuit), and of course that one essential component without which no self-respecting audio system can consider itself properly dressed — a twin cassette deck.

PS-LX50 Turntable

In marked and welcome contrast to some turntables in similarly priced systems, the *PS-LX50* doesn't boast too many useless mod cons. It's automatic of course; the simplest kind where you tell the player the size and speed of the record. There's a repeat switch too, but the rest of the money has gone into under-the-skin engineering.

The *PS-LX50* is no heavyweight — either literally or figuratively — but it does achieve a reasonable standard, all things considered. The cartridge has an accurate tonal balance and remains sweet well up into the extreme treble. Technical performance was good too, except for two points. The first is that the arm cartridge resonant frequency was rather high, which helps reduce susceptibility to shocks and feedback at the expense of deep bass performance. Secondly, speed drift was poor, which reflected in the occasional symptoms of what scientists describe as the collywobbles.

STV50L Tuner

If an inanimate object like a tuner can possess a human quality like panache, this one does. A telephone style keypad 'dials up' the preset number, using the keys in combination up to number 20 (the highest preset number available); each preset accommodates one frequency on any of the three wavebands. On the left of the fascia, a large display shows the preset number, frequency and waveband, using a back-lit orange display. The tuner is very easy on the eye.

The only feature missing is a mono switch. There isn't one on the amplifier either, and consequently fringe area reception quality is impaired. On the other hand, Sony have fitted a much less useful memory scan feature, which samples each preset for a short while.

The tuner is noise and hiss free with a good signal, but very much less satisfactory as the signal level drops. AM sound and reception quality, however, are excellent.

TC-V50W Cassette Deck

Here is one of those cassette decks that knows automatically what kind of cassette has been loaded in the replay mechanism, but needs to be told which when a tape is inserted in the record mechanism. Otherwise the deck could hardly have been easier to operate, without losing the advantages of, say, controllable record levels.

Record level meters supplement the record level controls, and Dolby B and C noise reduction systems are both fitted. The deck will also perform track searches (next or repeat), and high speed dubs can be done for those in a tearing hurry. The wow and flutter figure was surprisingly poor, but that was the only measured anomaly.

CDP-35 CD Player

Like other recent Sony CD players, the small but beautifully put together *CDP-35* is no slouch in the things it can do stakes. The most impressive feature is the 'month at a glance' view of up to 20 track numbers (few discs have more), which complements the track, index and time displays alongside. The deck also has dedicated index keys, a superbly engineered audible search feature, shuffle play (which randomises the play order of a disc), and a whole variety of memory, repeat and other special play functions. The deck responds extremely rapidly to commands, and tracking performance is exemplary even on quite badly marked discs.

TA-V50 Amplifier

The amplifier is a little less tastefully designed than the rest of the system. The rather fussy function display and the way the input selectors are almost hidden away see to that. On the positive side, the equaliser has seven operating bands, and for critical listening can be switched out of circuit entirely. One spare input is available, and microphone and headphone socketry complete the features count. Measured power output was 50 watts/channel.

APM-A70E Loudspeakers

The *TA-V50*s role in life is to drive the *APM-A70E* loudspeakers, which are junior members of Sony's APM (Accurate Pistonic Motion) family of flat diaphragm loudspeakers. Like the other APMs, this model is well made and finished in an attractive vinyl wrap. The enclosure is vented at the rear, and performs best a foot or so away from walls. It is not designed to be used undressed, as the baffle is unfinished beneath the acoustically obstructive cover. The frequency response is peaky, though the overall energy response trend looks good. Electrical efficiency is reasonably high.

How It Sounds

Records sounded pretty impressive. Compared to the benchmark system (the Sony was closely compared to it, because of its obvious pretensions) it sounded slightly more 'forced', especially at higher volumes, and high frequency vinyl noise was rather more apparent. But the level of detail was good, and dynamics and stereo space were properly preserved. The enveloping suggestion of scale and reality found with really good records came over well. Only very complex recordings made the system sound rather jittery, apparently due to a combination of amplifier limitations and incipient cartridge mistracking.

Compact disc sound wasn't quite as good as expected. Individually the compact disc player sounded very good, but when constrained by the matching amplifier — even with the benchmark B&W loudspeakers — the sound seemed constricted, dry, brittle and lacking in space and depth. It may well be that the signal being produced by the CD player was rather too hot for the amplifier to handle. And specifically, the sound was also bass light. The Sony appears to be gently band-limited at the bass end, and what's left, although just about adequate

quantitively, is really not up to the job qualitively.

The amplifier did not show shortcomings to anything like the same extent with any of the other components. It seems only the CD player really stretched its abilities, which is unusual; more commonly the record player gives amplifiers the hardest time.

The tuner was well in keeping with the rest of the system. Providing it was getting enough electricity from the ether, it sounded crisp (a bit too crisp in fact) and vital.

The cassette deck was impressive, even with low bias Type I tape), but especially with metal tape. At best the cassette deck sounded powerful and explicit, with good resolution of detail and a nice, comfortable balance. Dolby C has been quite well implemented, for once, and avoids the usual deadening effect.

Some recordings made from compact disc sounded better than the original discs — not because the recordings were inherently better (which after all would be impossible), but because the deck rounds off the edges of the sound in just the way that suits the amplifier best. It even adds a false warmth that offsets some of the acidity of the direct CD feed.

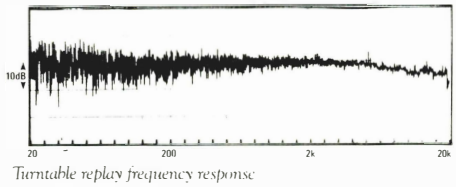
Finally, and unfortunately, the loudspeakers sound thin, raw and phasey. They also have an edgy quality that is only ameliorated by the fact that the treble is relatively repressed, while that in itself works against the speaker too: the top end dullness tends to make everything sound rather distant and 'slow'. And so, as all too usual, the system trips up on the last fence.

Verdict

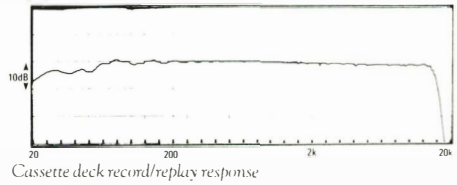
This is a system of no mean potential. It includes some fine components — the CD player, the cassette deck and the tuner — and one reasonable one — the record deck. Plus a not so good amplifier and a near unspeakable pair of loudspeakers. But the unspeakable can be booted out, and the merely adequate will suffice when the unspoken is replaced by those trained in good diction. An interesting package then, not to be spoken of badly, and a magnificently built one to boot.

Test Results

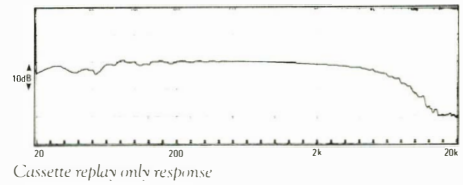
Cost complete	£749
Options?	none
Size main unit - lid open, w/o projections	75×35.5×33cm (h×w×d)
Size loudspeakers	36.5×21.5×21.5cm (h×w×d)
Turntable	
Wow & flutter wtd	0.07%
Drift	poor
Speed accuracy	+0.3%
Arm/cartridge resonance	19Hz, too high (<10kHz too low, OK.>14Hz too high)
Cartridge channel balance	0dB
Cartridge channel separation	−25dB
Cartridge tracking ability	76uM
Tuner	
Sensitivity	fair
Signal/noise	very good
Cassette Deck	
Wow & flutter (wtd)	0.17%
Signal/noise ref 0dB Type II	60dB
Distortion 0dB Type II	1.6%
Compact Disc Player	
Signal/noise (measured at amp Tape Out) no tape output fitted	88dB
Amplifier	
Power output/channel (8ohms) (1kHz both channels driven)	50 watts
Loudspeakers	
Efficiency	fairly high



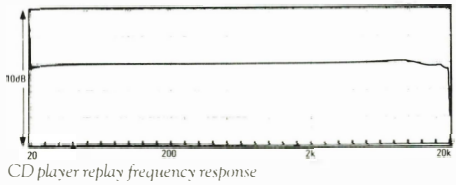
Turntable replay frequency response



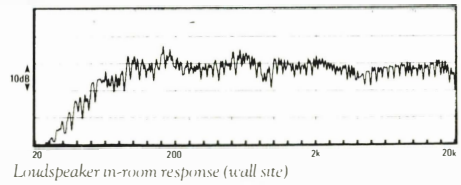
Cassette deck record/replay response



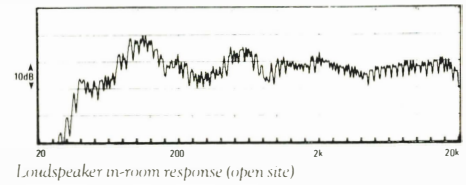
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

BEST BUY

SONY COMPACT 91

SONY (UK) LTD, SONY HOUSE, SOUTH STREET, STAINES, MIDDLESEX TW18 4PF.
TEL: STAINES 61688

Viewed from any angle (except the sides) the Sony *Compact 91* is an imposing and extremely complicated looking system. Unless you're Bang & Olufsen or a very few others, this tends to be regarded as a desirable property.

To use an expression that Sony themselves have used in the past, the system has an awful lot of spaghetti around the back. Each of the components has a mains lead, most of which plug into the AC outlets of other components. Then there are the audio connecting leads, and finally a smattering of wiring to perform various message-passing tasks to make the automatic systems (such as they are) tick. Wiring up this rat's nest won't be a problem though, no matter how ham fisted you think you are. When a system costs as much as this you can insist that the dealer gets it working for you . . .

Around the front, the system really is well filled. In every sense this is a full features product, and no attempt has been made to buffer that fact from the user. But there are automatic features too, the most useful of which is a common mains power switch which switches the entire system on and off if all the other components are left 'on.'

A number of options are available. One is the SEQ-910 9 band/channel graphic equaliser, which was included with the review system, but which can be omitted if desired — and should be if the decision is made strictly on audio grounds. Not only does it cost you an extra £119, it also helps spoil the sound, merely by its presence in the signal path.

What is supplied with the system as it stands, however, is a remote control for the CD player only, and this adds to the features of the player itself. Additionally, the turntable and loudspeakers are entirely optional, as are additional loudspeakers for the simple, surround sound role available with the amplifier.

The most elaborate system option is the £350 AVH910 audio/video control unit, though it was not available in time for the review. This uses SIRCS protocol to provide full system remote control, adds extra video and audio inputs surround sound capability, timer, and synchronisation of sources and cassette recorder.

All this flexibility makes the Sony a useful mix'n match product, that can be configured according to a range of requirements. You can even stack the equipment with Sony's 8mm video recorder, which itself can double as a digital audio recorder (albeit using a relatively low grade digital encoding system).

PS-LX910 TURNTABLE

The deck itself is compact, has a parallel tracking arm and is operable with the lid open or closed, but only by using the very slow acting powered shuttle keys. Fully automatic operation includes detecting whether a record is present, its size, and inferring its speed. Measured performance is right on the button.

STV710L TIMER/TUNER

The tuner is surprisingly large in these days of slimline designs, but does double as a timer. In total, the *STV710* will remember up to four sets of on and off times, and the tuner channels to go with them, over a seven day period (a sleep timer is included). The times may be one-offs or repeated weekly. As you'd expect the tuner also functions as a clock in its off duty hours, and also switches the other system components on and off. In the timer role, it would typically be used to rouse the cassette deck, which will then record a preselected radio programme in the owner's absence.

The tuner itself works on the usual three bands, FM, MW and LW, and will handle 20 presets, which can be allocated at random across the three bands. Sensitivity seemed low and noise levels abnormally high, but they varied as the aerial input wires were jiggled around because feeble spring clamps were fitted instead of a proper socket. LW wasn't too hot either, but MW was received well and sounded fine.

TCV-710WR CASSETTE DECK

There are two decks, one for record/replay the other replay only, but both have auto-reverse. There is a choice of Dolby B or the more powerful Dolby C noise reduction sytems, record level setting is thankfully manual, and some decent record level meters are provided for the purpose. Tape type selection is only automatic for the playback deck, being manual on the record capable deck. Dubbing is possible at normal and high speed, and so is something called RMS play and dubbing, which allows you to shuffle the pack — play back or dub tapes in the track order you specify, using a numeric keypad provided for the purpose. (The cassette being recorded pauses whilst the other deck is finding its way between tracks.)

The lab bench tests have good results apart from a rising record/replay response with Type II tape. (Manufacturers often justify rising responses on the grounds that head wear will gradually put matters to rights.)

CDP-103 CD PLAYER

This player is equipped with a 16-track programme memory, track/index skip, audible track scanning, a combined track/time/index display, and a remote control that provides direct track access using a numeric keypad, calculator style. The most impressive feature, however, is the amazingly fast and sure disc handling. Drawer movements are rapid, and track-find commands are as near instantaneous as any player available outside Sony's own separate CD player range. Disc tracking of this 2× oversampling player was exemplary — it is a very slick and accomplished performer.

TA-V710 AMPLIFIER

The amplifier gives a very useful 70 watts/channel and is conventionally equipped, with a well rationalised and presented set of controls, not the least of which was a massive volume control. Sources catered for include an extra tape deck and one other item *via* the auxiliary socket. Two pairs of loudspeakers can be connected.

APM-22ES LOUDSPEAKERS

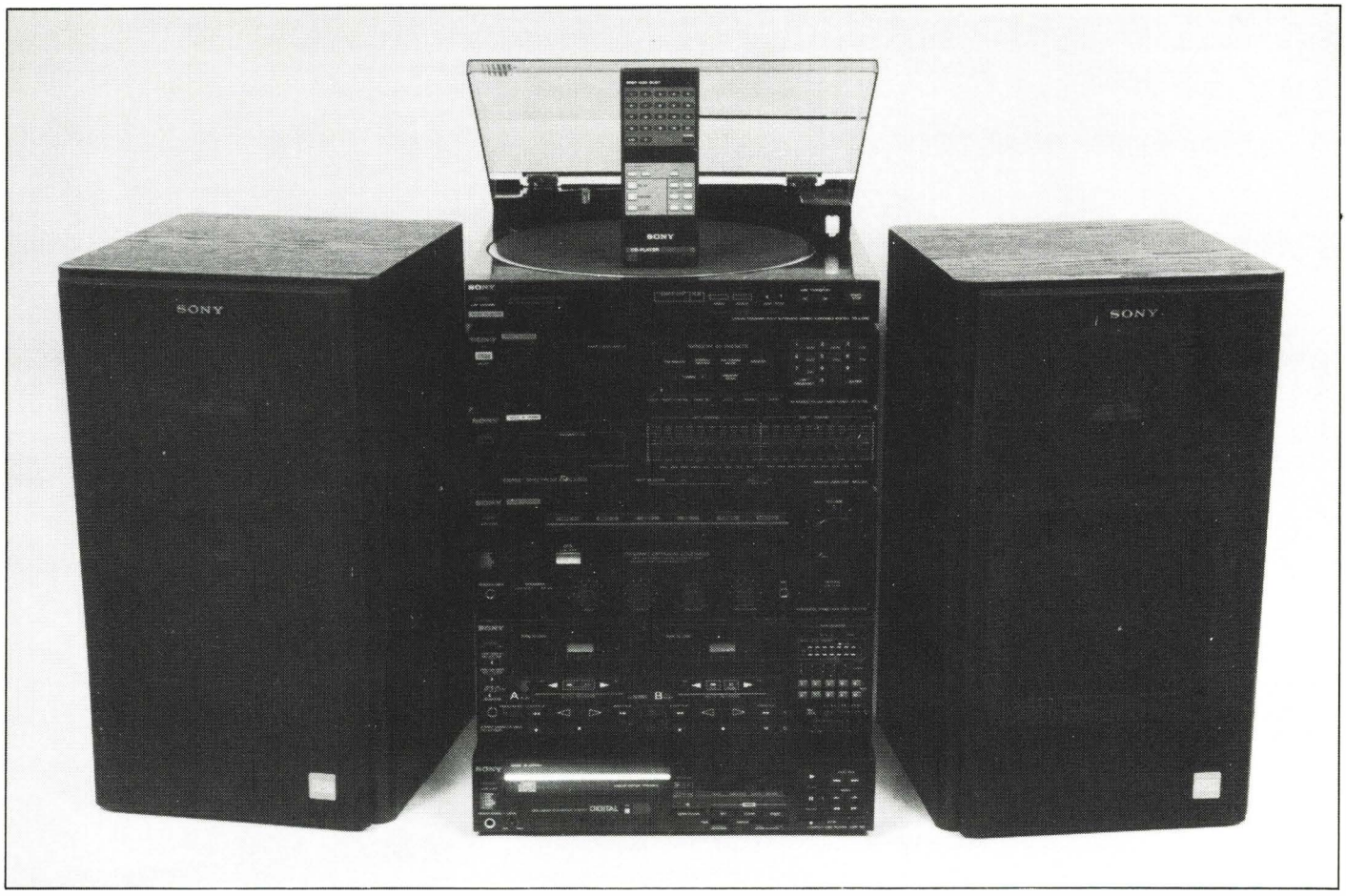
The loudspeakers, which as mentioned earlier are optional, were designed in the UK using the Japanese parts bin, and are built in a Sony-owned factory in Germany. Build quality is very high, featuring softly rounded edges on the very sturdily built reflex-loaded enclosures (note the size!), and two beautifully made high technology flat honeycomb drivers.

The *APM-22ES* is nothing less than a *tour de force* in the midi system arena. The frequency response is clearly one that belongs to a high performance loudspeaker.

HOW IT SOUNDS

This system sounds very good, with well balanced abilities from all the main components, and considerable musical presence and panache into the bargain.

The loudspeakers are considerably better controlled and more neutral than early samples of this speaker, dating from about three years ago, though the B&W *DM110*s used as a reference in this project still beat the Sonys in certain areas, notably midrange punch and projection. The *22*s suffer from a touch of reticence in the midband, but redress the balance with their consummate and explicit sense of detail. In the end my only complaint is a negative one: it seems that Sony have put a tremendous effort into an elaborate design that fails to improve convincingly on the cheaper, simpler and more



conventional B&Ws. Quality of build and materials makes it a bargain; soundwise, it's only just good value. The optional *APM20ES* speakers (see 124) offer comparable sound quality in a smaller less distinctively styled package, but at a significantly lower cost.

The rest of the system is solid in most departments, but as with other Sony systems the FM noise figure effectively sets the limit on what otherwise would have been a very fine sounding tuner.

It's difficult to get too enthusiastic about the turntable either. It seemed quite microphonic when touched gently, but got no worse when knocked quite heavily, indicating a level of mechanical damping that is probably quite substantial. That at any rate was the impression it made when playing music, but despite the lack of real aural interest, records were not badly catered for.

There are no such complaints about the cassette deck, CD player or the amplifier. The latter is hardly an outstanding success story, and there are quite modest high fidelity amplifiers around that sound considerably better. But the combination of the amplifier and the excellent sounding CD player made for serious music making. I found a level of involvement and discovery with suitable discs that simply wasn't on offer from the majority of systems tested.

The cassette deck worked well too. It made some excellent recordings off records and CDs alike, with a standard of bass to treble resolution and even-tempered clarity at all recorded levels not usual with this medium.

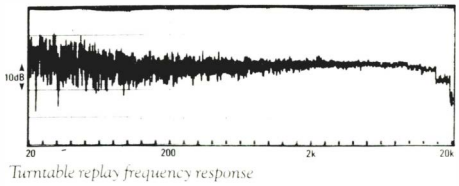
At worst, the system tended to sound a little thin and bright, but the standards of clarity, depth and stereo focus achieved were impressive, and bass reproduction too was surprisingly potent and articulate.

Verdict

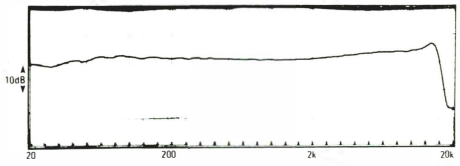
There are some annoying inconsistencies (like the tuner), and the test system wasn't exactly fault free. But the Sony *Compact 91* has considerable under-the-skin competence, and is unusually 'future-ready' in terms of extensive options which can link and automate audio and video together.

Test Results

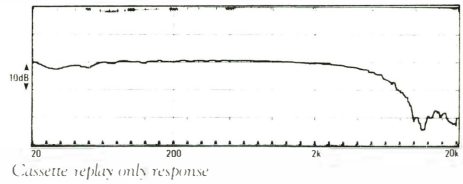
Cost complete	£1500
Options?	loudspeakers, equaliser, turntable (all included above) A/V controller and 8mm audio/video recorder (extra)
Size main unit - lid open, W/O projections	87×35.5×36cm (h×w×d)
Size loudspeakers	51.5×29×29cm (h×w×d)
Turntable	
Wow & flutter wtd	0.10%
Drift	good
Speed accuracy	correct
Arm/cartridge resonance	11Hz, OK (<10kHz too low, OK,> 14Hz too high)
Cartridge channel balance	0.6dB
Cartridge channel separation	–26dB
Cartridge tracking ability	80uM
Tuner	
Sensitivity	fair
Signal/noise	poor
Cassette Deck	
Wow & flutter (wtd)	0.09%
Signal/noise ref 0dB Type II	55dB
Distortion 0dB Type II	3.0%
Compact Disc Player	
Signal/noise (measured at CD player out)	>107dB (amplifier fault prevented normal test method)
Amplifier	
Power output/channel (8ohms)	70 watts (1kHz both channels driven)
Loudspeakers	
Efficiency	medium



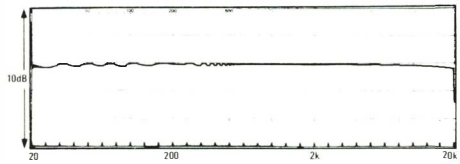
Turntable replay frequency response



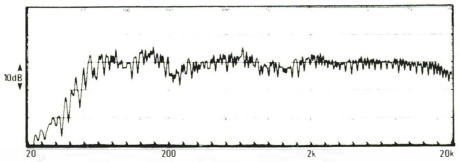
Cassette deck record/replay response



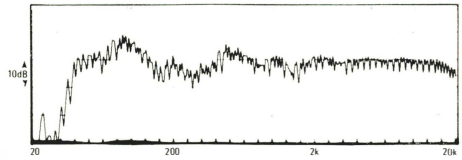
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

TECHNICS TYPE 12A

PANASONIC (UK) LTD, 300-318 BATH ROAD, SLOUGH, BERKS.
TEL: (0753) 34522

System *Type 12A* is one of two Technics CD midi systems reviewed in this issue that come without a record deck as standard. Obviously as compact disc begins to exert its influence on the market, many people will find the switch of emphasis entirely natural. But there will be others who welcome the idea because they like the midi system concept, but would prefer to use a properly sited higher quality turntable than those that come standard with such systems. If so they are in for an unwelcome surprise . . .

In common with the other Technics systems, the *Type 12A* is superbly finished, and represents functional design at its best. A bare minimum of controls are fitted — excepting the 5-band graphic equaliser, without which low to medium price systems find it very difficult to attract customers if the manufacturers are to be believed. Overall though, few less obtrusive or easier to use systems are available at the present time.

SAX-W11L MAIN UNIT

The design of the tuner is a model of clarity and simplicity. The usual three bands are provided: FM, for good quality sound and stereo, plus MW and LW, the utility bands, for longer distance reception, but in mono and without much pretence to quality.

The rotary tuning mechanism feels well oiled, but isn't flywheel weighted and free running like the better tuners of some years back. This is known as progress. A stereo indicator is fitted, as is a mono switch.

Compact cassettes can be made and played with the simple twin transport cassette mechanism. Both decks are unidirectional, with one for playback only, and the other for recording as well. Ferric and chrome tape types only can be used (Types I and II); metal (Type IV) is excluded, as it is with many less expensive systems.

Apart from the twin mechanisms, the deck is astonishingly sparsely equipped. Tape selection is performed automatically so there's no need for controls to do that job. There's no control for setting record levels either (or accompanying record level meters for that matter) because that job is also done automatically. There are only two variables for the user to control: a switch for the Dolby B noise reduction circuit, and a reset button for the tape counter. What's left is the two sets of transport controls, arranged neatly in a row beneath the tape loading doors.

The *SAX-W11L* amplifier is also very much a bare bones design. It pushes out a handy 20 watts per channel, and you get a 5-band equaliser — and not much more. As with the cassette deck though, very little of consequence is missing.

There are few terrors in this little bundle of circuitry even for the least 'technohappy' in our midst — but that is a recurring theme with this Technics system. There is one powerful snag however. I referred earlier to the options that omitting the turntable opens up, amongst which is that the buyer can make his own choice of record deck. Well he should be able to, but can't because the manufacturer in his wisdom has decided to block that option by fitting a special plug and socket arrangement that only works with a specific Technics turntable. Of course modifying the socket — or the turntable lead — could get over this difficulty, but not without some aggravation, and may also cost the guarantee cover.

SL-PJ20 CD PLAYER

Those familiar with recent Technics CD players will realise what's missing straight away: the superb back-lit LCD display with calendar style track numbers that was fitted, for example, to the *SL-PJ20*'s immediate predecessor, the *SL-PJ11*. Still, the player is compact and stylish with gem-like standards of finish. Disc handling is also good. The drawer operates swiftly and silently, whilst track access times are class beatingly fast. Only Sony provide real competition in these very specific areas. Furthermore, the Technics coped happily with marked discs, though it could be caught out with some that were still playable on one or two other players (notably Philips).

All the controls are in a short row under the display, which shows one of a variety of time modes and track numbers simultaneously. Track-skip is augmented with the usual cueing facility, but this can only be invoked from 'pause' using the track-skip controls. The memory handles up to 20 tracks in random order, and a repeat (disc or programme) switch is also fitted.

SB-F333 LOUDSPEAKERS

The loudspeakers, as also supplied with the *X33* system, are not exactly over-engineered. They are thin-walled and light in weight, with the result that the whole enclosure tends to become quite energetic when the music gets going. The usual two drive units are used, but they're cheaply built and look tacky. The response check was uneven, especially at the frequency extremes. Bass output was noticeable mainly by its absence.

HOW IT SOUNDS

Without the loudspeakers (that is, using the B&W *DM110*s instead), the system sounds on the whole satisfactory, but also a little jangly and insistent. Further substitution by the QED benchmark amplifier quickly demonstrated the Technics amplifier was to blame. But that's about it for insults. Generally, the system sounded clear and articulate, with the additional benefit that music sounded warm and alive in a way that evaded most cheap systems.

That was with compact disc as source. Tapes worked rather less well, not surprisingly. Cassette sound quality seemed stable enough, but dynamics were flattened and the top end softened. The automatic record level circuitry helped ensure that all the really powerful passages were underplayed, and that background

hiss was made more obvious when the music was at its quietest.

Off-air FM radio quality was also very good. The Technics tuner section sounded very nearly as crisp and as vivid as compact disc, and arguably even more subtly detailed. A couple of live *Radio 3* broadcasts were enjoyed using this tuner during the review period, and they sounded remarkably tactile and spacious — the hallmark of a good tuner.

What let the system down, inevitably, was the rough and ready standard of the loudspeakers. The shortcomings were to be found in the acidic treble and the hollow, cardboard-like bass. The midband was quite crisp and detailed, but the system sounded coloured as well, and the speakers are clearly out of place in this combination.

Verdict

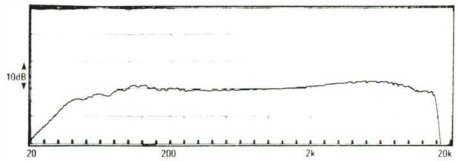
At first sight this system appears to offer an excellent alternative route for those buying a low cost CD system, and not wishing to price themselves out of all the benefits that more expensive systems can offer. As we've seen, the excellent CD player will stand up in almost any company, and the amplifier also performs quite adequately within certain limits. Team them with a respectable pair of loudspeakers, it seems reasonable to assume, and you'd be almost home and dry even without taking the tuner and tape deck into account.

The thought of being able to buy a neat little package like this, perhaps even throwing the speakers away or relegating them to some peripheral role, and adding a Dual 505 or some other low-cost but good-sounding record deck is sure to be attractive to many. But of course this can't be done easily, despite the presence of a phono input, because of the custom connectors. For this Technics must be censured.

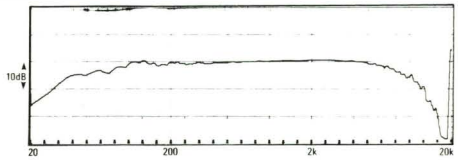
It's still a very reasonable system, or at least the electronics are, and a recommendation is in order. But it misses being Best Buy material simply because in the end it must be seen as a dead-end purchase. If it's not good enough, you can change the loudspeakers, but alternative options are pretty limited.

Test Results

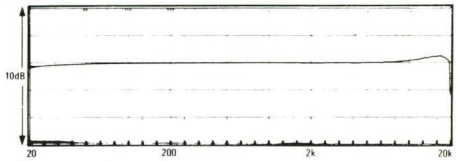
Cost complete	£380
Options?	none
Size main unit	28.5×31.5×28cm (h×w×d)
Size loudspeakers	29.5×18.5×19cm (h×w×d)
Tuner	
Sensitivity	very good
Signal/noise	very good
Cassette Deck	
Wow & flutter (wtd)	0.25%
Signal/noise ref 0dB Type II	n/a*
Distortion 0dB Type II	n/a*
[*]auto record level	
Compact Disc Player	
Signal/noise (measured at amp Headphone Out)	82dB
no tape output available	
Amplifier	
Power output/channel (8ohms)	20 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	high



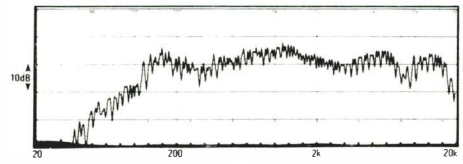
Cassette deck record/replay response



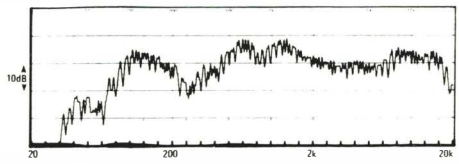
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (u all site)



Loudspeaker in-room response (open site)

BEST BUY

TECHNICS T-290 SYSTEM

PANASONIC (UK) LTD, 300-318 BATH ROAD, SLOUGH, BERKS.
TEL: (0753) 34522

Marantz may have been the first major company to take the idea of marketing a CD-equipped turntable-less system seriously, but Technics are probably number two, and they certainly won't be the last.

The T-290 system marries one of those much neglected creatures, a receiver, with a compact disc player, a twin cassette deck and a pair of loudspeakers. No turntable is included but one can be added at any time in the future. Indeed this freedom can allow buyers to opt for a high quality turntable from one of the specialist manufacturers. Truly worthwhile turntables in one-make systems are even less common than hen's teeth.

A feature of the system is the excellence of the cabinet work. Although the coverings are vinyl rather than real veneer, they are good imitations and the rounded-off edges give the system a 'softened,' 'friendlier' appearance than most such systems.

RS-T10 CASSETTE DECK

For a twin transport cassette deck, the *TS-T10* is delightfully and surprisingly uncomplicated, yet it omits little of substance. Like many modern systems, microphones cannot be attached to either the cassette deck or its partnering receiver; headphones can be used with both, though, which almost seems wasteful.

Detection of the three main tape types is automatic, but sensibly record level setting is left to the user, aided by a record level LED strip meter for each channel. Logically, you'd expect a record level control for each channel too, but there's just a single, stereo control. Noise reduction is by Dolby B, and the transport controls have a light but firm latching action. Full cue and review facilities are available on the playback only deck (why?). Finally, the deck will automatically insert timed gaps between tracks, though there is no track search feature to make sense of this facility.

The deck checked out quite well on the test bench, but with the usual treble lift, perhaps to allow for future wear. Pre-recorded tapes tended to sound rather dull and lifeless.

SL-P110 CD PLAYER

Compact discs were well handled by the *SL-P100*, which is one of the lowest cost implementations of Technics' new generation, based on some recent in-house technology developed originally for portable players, (albeit with some ideas borrowed from Philips.) The laser carriage, supported on wires, has very low inertia, which means it can be moved across the disc surface very quickly. Combined with a single beam laser, this gives very rapid track access and sure tracking ability even with discs that are less than 100%.

The fluorescent status display provides simultaneous readout of track numbers and elapsed track timings, with accumulated playing time, and time-to-go as options. There are additional facilities such as a 20-step memory, disc or programme repeat, and something unusual called 'preset edit play.' This will put the player into 'pause' mode after a specified time has elapsed, the idea being to make tape dubs of compact discs easier.

Finally, the deck has track-skip facilities, but track search is non-audible, and can only be accessed from pause. For a pleasant change, the frequency response was ruler-flat.

SA-290L RECEIVER

The initially daunting array of controls soon neatly resolve themselves into logical functional groups, so using quickly becomes almost intuitive. The central area of the panel covers various displays, including space-wasting power metering which is annoying in a darkened room. Then there are the various bits associated with the tuner, such as the 3-LED signal strength meter and an unusual but attractive white-on-wine back-lit LCD display of the tuned frequency along with the preset number (this being a digital synthesiser tuner).

There are 16 of these presets, and they can be used for any combination of frequencies on the three wavebands, FM, MW and LW. Eight keys take care of the 16 presets in pairs: briefly touch a button and you get the first chosen channel; hold it even a fraction longer to get the other of the pair.

In additon, the *SA-290* has the usual amplifier controls, including a phono (moving magnet) input, standard bass and treble controls, switching for two pairs of loudspeakers (there's a rear switch for loudspeaker impedance, but the unit always sounds best left on the low impedance setting), plus other less important controls. The AM tuning steps can be altered to correspond to the new frequency allocations, which will become operative in the UK soon. Measured power output was 30 watts/channel.

SB-C250 LOUDSPEAKERS

The *SB-C250*, also used in the *X77* system, is a very well built sealed-box design. The box is heavy and solid, and the drive units too are properly engineered. The bass unit has an embossed plastic cone and an unusual double suspension, probably to give better control at high levels, and the tweeter is a 1 inch doped fabric dome. It's important to use the loudspeakers well away from walls, under which circumstances they measure similar to the B&W *DM110s*.

HOW IT SOUNDS

The sound of the amplifier, which sets the tone for the rest of the system, is very distinctive. It's also good; this is a genuine high fidelity product, not to be confused with the sort of amplification that normally populates rack or midi systems.

But it is still far from being beyond criticism. The sound can become rather cluttered and 'loud,' occasionally even aggressive, but has class levels of control and tunefulness. By comparison, the QED amplifier used as a benchmark throughout this book sounded more spacious and relaxed, whereas the Technics has a rather forward, insistent character, and a kind of 'glazed' quality that emphasises the upper midband and downplays both image scale and any sense of repose in the music. Turn the volume control an iota too high, and the chances are you'll be reaching for the quiet pedal very quickly indeed; other amplifiers often demonstrate a greater degree of tolerance towards inappropriate volume levels.

On to the source components. The thumbnail version is that they're all excellent. The cassette deck was particularly successful and well liked, given that it is a member of the inferior twin transport species. The only facility that may cause some misgivings is tape-to-tape dubbing: even though it only operates at normal speed, audible Dolby pumping can result even where

the original encoding was done by the same recorder (*ie* on tapes copied from compact discs made with the hardware reviewed here). This apart, the listening notes describe a very detailed and 'tactile' sound, with a light, dry bass character and only a suggestion of muddle and confusion at the lowest frequencies. This last seems to be a property of all but the tuner in this system, though it is hardly excessive even using the components in combination. Just as well, really.

The tuner sounded lively, clear and detailed on FM, with an excellent sense of stereo spread and depth. By comparison the amplifier and CD sound rather forward and flattened, and the cassette deck seemed forward also, and vaguer besides. However, with weak off-air signals the tuner started behaving like an earlier synthesiser tuner, before the breed had been properly tamed by the engineers. Spelt out more explicitly, background hiss acquired a rather gritty edge and some sharp whistles, probably induced by the tuning circuits themselves. An all but complete cure was wrought by simply increasing the aerial input signal (this test was conveniently done by adjusting the output of a laboratory FM generator).

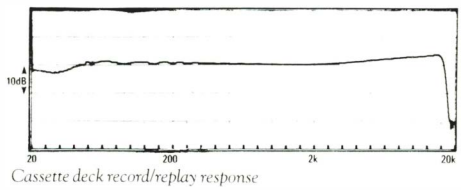
Finally, the *SB-C250* loudspeakers can sound subtle and surprisingly atmospheric. As reported in the *X77* review, they have a mild tendency to emphasise the frequency extremes at the expense of the midband, which is quite a common Japanese interpretation of what a European sound is about. But this detracts surprisingly little from the well controlled and explicitly detailed transducers. They set the seal on a fine system.

Verdict

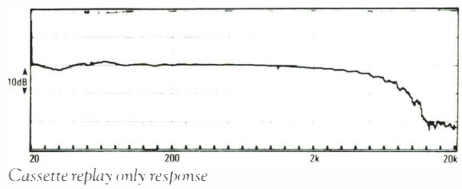
Whatever criticisms may be made, they only arise because the performance of this unusual Technics system genuinely invites comparison with separates high fidelity. The *T-290* transcends normal system limitations with ease and style.

Test Results

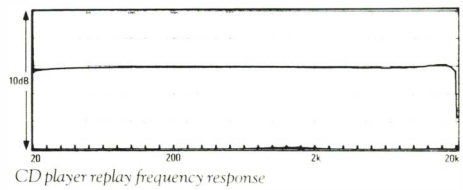
Cost complete	£599.95
Options?	none
Size main unit - in wooden housing	33.5×47×30.5cm (h×w×d)
Size loudspeakers	36.5×23.5×20.5cm (h×w×d)
Tuner	
Sensitivity	very good
Signal/noise	good
Cassette Deck	
Wow & flutter (wtd)	0.12%
Signal/noise ret DdB Type II	51dB
Distortion DdB Type II	1.9%
Compact Disc Player	
Signal/noise (measured at amp Tape Out)	107dB
Amplifier	
Power output/channel (8ohms) (1kHz both channels driven)	30 watts
Loudspeakers	
Efficiency	fairly low



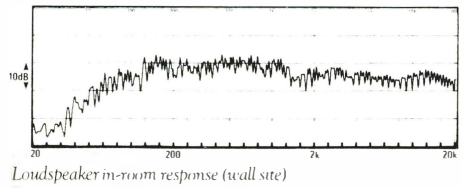
Cassette deck record/replay response



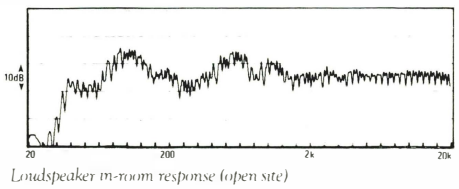
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

TECHNICS X33 SYSTEM

PANASONIC (UK) LTD, 300-318 BATH ROAD, SLOUGH, BERKS SL1 6JB.
·———TEL: SLOUGH 34522———·

Technics is the prestige hi-fi arm of Matsushita, whose mainstream products are normally sold under the Panasonic banner.

From the more upmarket Technics range, we look at two X-series systems, the *X33* and the *X77*, of which this *X33* is the cheaper. It's interesting that nearly every important feature of the more expensive *X77* is mirrored in this lower cost package in some form or other, and indeed there are significant extras too, notably a full function remote control. However, the manner in which these features are provided is another story entirely. All will become obvious as our story progresses.

Note that the *X33* shares the same tuner as the *X77*. And at the present time they also share the *SL-PJ11* CD player. In due course, however, a slightly different *SL-PJ33* CD player will be available for this system, and this appears to improve on the basic technology of the *SL-PJ11*, costing less and offering a 20 track random programme feature and remote control. The CD players are the only options available.

Finish is the dark brown livery that Technics have made their own: it gives the brand a touch of distinction without making it look dangerously individual (system buyers are nothing if not conservative). For the most part, Technics' attention to ergonomics has been rewarded by a system which manages to be comprehensively equipped, quite intelligently laid out, and attractive to the eye. Finish is first class.

SL-JS16R TURNTABLE

System turntables are pretty much a formula product these days, and this is no exception. It's built from the usual lightweight mouldings with a lightweight aluminium platter and lightweight rubber mat. (One day someone is going to explain this passion for making turntables so light in weight.) It also behaves in a lightweight way — it is very easily disturbed, with a *curriculum vitae* that lists groove-jumping as a major hobby — and provides (guess what?) a lightweight sound. Many of the technical tests had to be omitted due to the non-standard interconnections, but the cartridge gave a quite good account of itself.

ST-X33L TUNER

In contrast to the turntable, some thought has clearly gone into the tuner. Its circuits prowl the LW band as well as MW and FM, and a random selection of up to 16 frequencies can be stored using eight preset buttons, each of which can select two frequencies.

This is all pretty standard stuff of course, but the attention to detail sets it apart. For example, selecting the required frequency on individual presets is normally done using a 'shift' key, but Technics eschew such expedients in favour of a circuit that looks at how long the button is held. A quick touch invokes the lowest channel number available; anything longer selects the alternative. There is also a fully automatic one-touch memory presetting feature, though normal presetting is also available. And note the neat readout that shows the preset number as well as the frequency, waveband, etc.

This tuner works well too. AM sound quality is a little restricted and 'wooden', but intelligible enough and fairly interference free. The FM circuits are blessed with excellent sensitivity and noise performance.

RS-X33W CASSETTE DECK

The cassette deck is a double 'dubbing' unit, one of the transports being designed for playback purposes only. High or normal speed dubbing facilities are complemented by automatic tape type selection on both transports (sensible — but how many other decks are so blessed?), plus manual record level setting complete with simple level metering. The latter is important: it means an extra adjustment, but automatic level controls are great spoilers of sound quality. Other features include a 'music select' feature to locate track starts. Noise reduction is by Dolby B and the controls, though perhaps a little confusing to the uninitiated, feel like a million dollars. Measured results were satisfactory, bar rather high wow and flutter.

SL-PJ11 CD PLAYER

The most immediately impressive feature of this CD player is the calendar style track number display which shows current position, programmed selections and other such information. Alongside is a simultaneous readout of time, track and index numbers, with options a button push away. Drawer and disc handling are rapid, and the various operating features, which include a 15 step memory repeat mode, audible disc scan, track and index search and so on, were all easy and pleasing to use. The player proved unusually resistant to shocks, and coped with blemished and damaged discs better than most. However, I was a little worried by the high level of heat picked up by the discs during use.

SU-X33 AMPLIFIER

24 watts per channel was measured at the output terminals of the amplifier. Features include a simple 5-band equaliser and an electronic volume control, though the latter, needed for remote control operations, is less convenient than a conventional manual rotary control. Additional socketry includes an auxiliary input. The amplifier acts as the receiver for the infra-red remote control, which covers all normal system functions and provides automatic source selection.

SB-F333 LOUDSPEAKERS

The *SB-F333* loudspeaker is an ultra-lightweight affair with two drive units. The extremely gaudy aesthetics are completely out of sympathy with the rest of the system. Measurements show an absence of deep bass and a 'rough' treble, but the system looks competent elsewhere. Which just shows how the numbers game can deceive . . .

HOW IT SOUNDS

This system is a far cry from the *X77* system. Where that behaved as though desgined to meet an engineering brief, this looks simply designed to sell at a price point — incorporating as many gadgets as possible consistent with Technics' house standards of build and finish.

The loudspeakers are nasty. They 'spit' and 'crackle' and sound oddly 'phasey' in the treble. The bass end is nonexistent, its place being taken by a rather 'fiery' lower midband. They don't make the happiest (or most musical) of noises, but the bottom line is that for all their lack of social graces they have a certain explicit quality, and go loud even on the meagre power available.

The record deck is a fairly cheap'n'nasty affair too, and again has an aggressively loud quality. It is excessively microphonic, and the stylus bounces every time it has a mind to. In common with many other low cost decks, the sound majors on stridency, on limited, thin-sounding bass, and overall on being severely shown up by the CD player — thus giving people a totally false idea of the real comparison between black vinyl and the miniature silver disc. Records can sound great. It's just that system manufacturers don't really want you to know it. Maybe they don't know it themselves . . .

After the flat-as-a-pancake sound from records, it comes almost as a surprise to put on a compact disc and discover that the amplifier isn't as bad as you'd given it credit for. The *SL-PJ11* CD player is the same one that serves with the more expensive Technics system, and the truth is (a) that this is a surprisingly good CD player by normal standards, and (b) that it really outclasses much of the rest of the system.

This player can provide a rich, powerful and vibrant sound. (I'm recalling in particular the glorious Peter Schreier: Mozart *Requiem*, which retained all these qualities after surviving the passage through the amplifier relatively unscathed.)

However, the speakers were a different matter — here I chickened out and used the reference B&W *DM110s*. The key point is that I would normally find it difficult to listen to a non-authentic instrument version of a work like this, but Peter Schreier's advocacy combined with the inherent quality of the Technics gear won the day. But you'll have to find an adoption agency for unloved system loudspeakers before you find out what at least some parts of the system are capable of musically.

The tuner is capable of excellent off-air stereo on FM. It readily transcends the abilities of most system tuners, though as mentioned the AM sound quality is a bit 'wooden' and coloured, with very limited high frequency response.

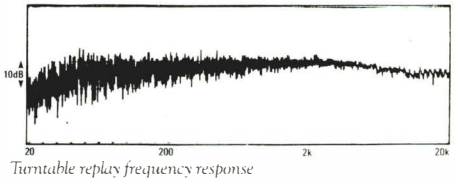
The cassette deck proved interesting. The less said about the high speed dubbing facility the better, and ordinary Dolby recordings sounded naff — dull and 'sat upon'. Non-Dolby recordings, however, sounded pretty good, especially those made using metal Type IV tapes, and this might suggest poor Dolby tracking. But by prevailing standards for systems at this price, the *RS-X33W* is an above average performer.

Verdict

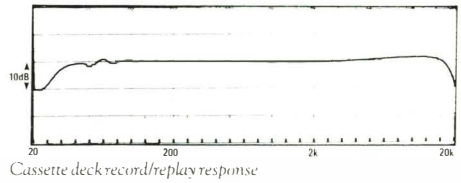
Only the throwaway turntable and — unfortunately — the throwaway speakers seriously let this system down. Given the price, recommendation is warranted to non-vinyl users if the speakers are replaced at the first possible opportunity.

Test Results

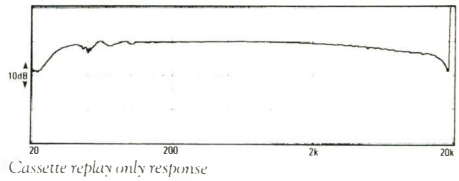
Cost complete	£700
Options?	CD Player
Size main unit - lid open, w/o projections	67×31.5×32cm (h×w×d)
Size loudspeakers	29×18.5×19cm (h×w×d)
Turntable	
Wow & flutter wtd	0.09%
Drift	average
Speed accuracy	n/a*
Arm/cartridge resonance	n/a*
(<10kHz too low, OK,>14Hz too high)	
Cartridge channel balance	n/a*
Cartridge channel separation	n/a*
Cartridge tracking ability	n/a*
[*]Custom turntable connections meant this model could not be interfaced with test equipment	
Tuner	
Sensitivity	very good
Signal/noise	fair
Cassette Deck	
Wow & flutter (wtd)	0.25%
Signal/noise ref 0dB Type II	54dB**
Distortion 0dB Type II	2.7%**
[**]Measured at amp headphone socket	
Amplifier	
Power output/channel (8ohms)	24 watts
(1kHz both channels driven)	
Loudspeakers	
Efficiency	high



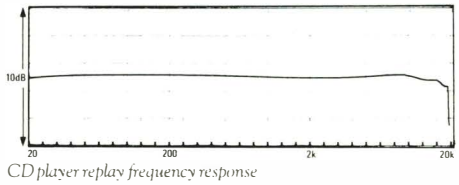
Turntable replay frequency response



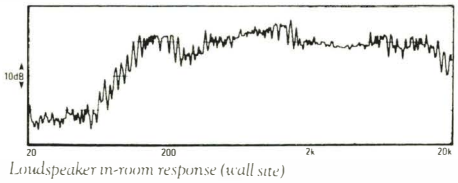
Cassette deck record/replay response



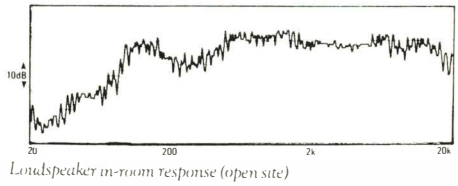
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

BEST BUY

TECHNICS X77 SYSTEM

PANASONIC (UK) LTD, 300-318 BATH ROAD, SLOUGH, BERKS SL1 6JB.
TEL: SLOUGH 34522

Here we look at one of the grown up Technics systems. In broad outline, it looks rather like the X33 system discussed previously but with one or two extra 'bells and whistles', of which the direct entry equaliser is the most impressive, visually at least. In fact the whole system is crawling with technology, from the linear tracking turntable to the auto-reverse twin-transport cassette deck. But it loses one very important facility to the cheaper system: there is no remote control.

There are important links between the two systems, however. One is the excellent *ST-X33L* tuner, which is shared by both systems and the other at the present time is the *SL-PJ11* CD player. A lower cost CD player is on the way for the cheaper system, but the *SL-PJ11* will continue as the preferred option for the *X77*.

The *X77* is equipped with one unusual extra: a decoder circuit called 'A/V Surround'. This is Technics' answer to Dolby Surround, the sound system used on many modern films which can be exploited by anyone with a Hi-Fi stereo video recorder. Dolby Surround decoders imitate the effect used in cinemas, allowing helicopters to overfly your chair, or for you to be immersed in the sounds of the place pictured on screen. The Technics system is not wholly compatible with the Dolby version, and to my ears gives an inferior sense of realism with the films I tried. But the decoder can provide a range of effects depending on how it is set up, and can even 'enhance' mono material (note the quotes). An extra pair of speakers will be required to use the A/V Surround facility.

SL-J11D TURNTABLE

This arm-in-lid parallel-tracking belt driven player, has automatic operation, with searches involving the fiddly use of search keys. The player is quite lightly constructed and quite microphonic. Speed drift and cartridge channel balance apart, measured performance is good.

ST-X33L TUNER

In contrast to the turntable, some thought has clearly gone into the tuner. Its circuits prowl the LW band as well as MW and FM, and a random selection of up to 16 frequencies can be stored using eight preset buttons, each of which can select two frequencies.

This is all pretty standard stuff of course, but the attention to detail sets it apart. For example, selecting the required frequency on individual presets is normally done using a 'shift' key, but Technics eschew such expedients in favour of a circuit that looks at how long the button is held. A quick touch invokes the lowest channel number available: anything longer selects the alternative. There is also a fully automatic one-touch memory presetting feature, though normal presetting is also available. And note the neat readout that shows the preset number as well as the frequency, waveband, etc.

RS-X77WR CASSETTE DECK

This deck is very similar in principle to the one supplied with the X33 system, with the addition of auto-reverse on both mechanisms. It is a slick and pleasant deck with excellent measured performance. The frequency responses (record/replay and replay only) are particularly accurate.

SL-PJ11 CD PLAYER

The most immediately impressive feature of this CD player is the calendar style track number display which shows current position, programmed selections and other such information. Alongside is a simultaneous readout of time, track and index numbers, with options a button push away. Drawer and disc handling are rapid, and the various operating features, which include a 15-step memory, repeat mode, audible disc scan, track and index search and so on, were all easy and pleasing to use. The player proved unusually resistant to shocks, and coped with blemished and damaged discs better than most. However, I was a little worried by the high level of heat picked up by the discs during use.

SU-X77 AMPLIFIER

Apart from the A/V Surround feature, the *SU-X77* is notable for its direct entry equaliser, in which a response shape may be traced out on a large sensitive touch pad, with confirmation on an adjacent spectrum display. The latter can also show the varying levels of different frequencies on whatever source is playing. In addition, there are three preset curves and a further four can be entered by the user — all of which can be manipulated in various ways as required.

Auto source selection is included. Additional features include a second tape input, mike mixing and an auxiliary input. Power output measured 50 watts.

SB-C250 LOUDSPEAKERS

The loudspeakers are something rare in the systems arena: proper hi-fi type designs, with well engineered drive units mounted in a solidly built box, which incidentally also makes very good furniture. They should be used on purpose made stands (ask your dealer), preferably without the baffle covers.

HOW IT SOUNDS

I have few complaints about the amplifier. The direct equaliser is no more nor less than an ordinary equaliser, and these have very limited real usefulness in a good system. But audio purism wasn't the point of the exercise. As it is, the direct EQ device means hours of harmless (that is harmless to everything except the music!) fun. It's beautifully made, and works the way that Technics intended.

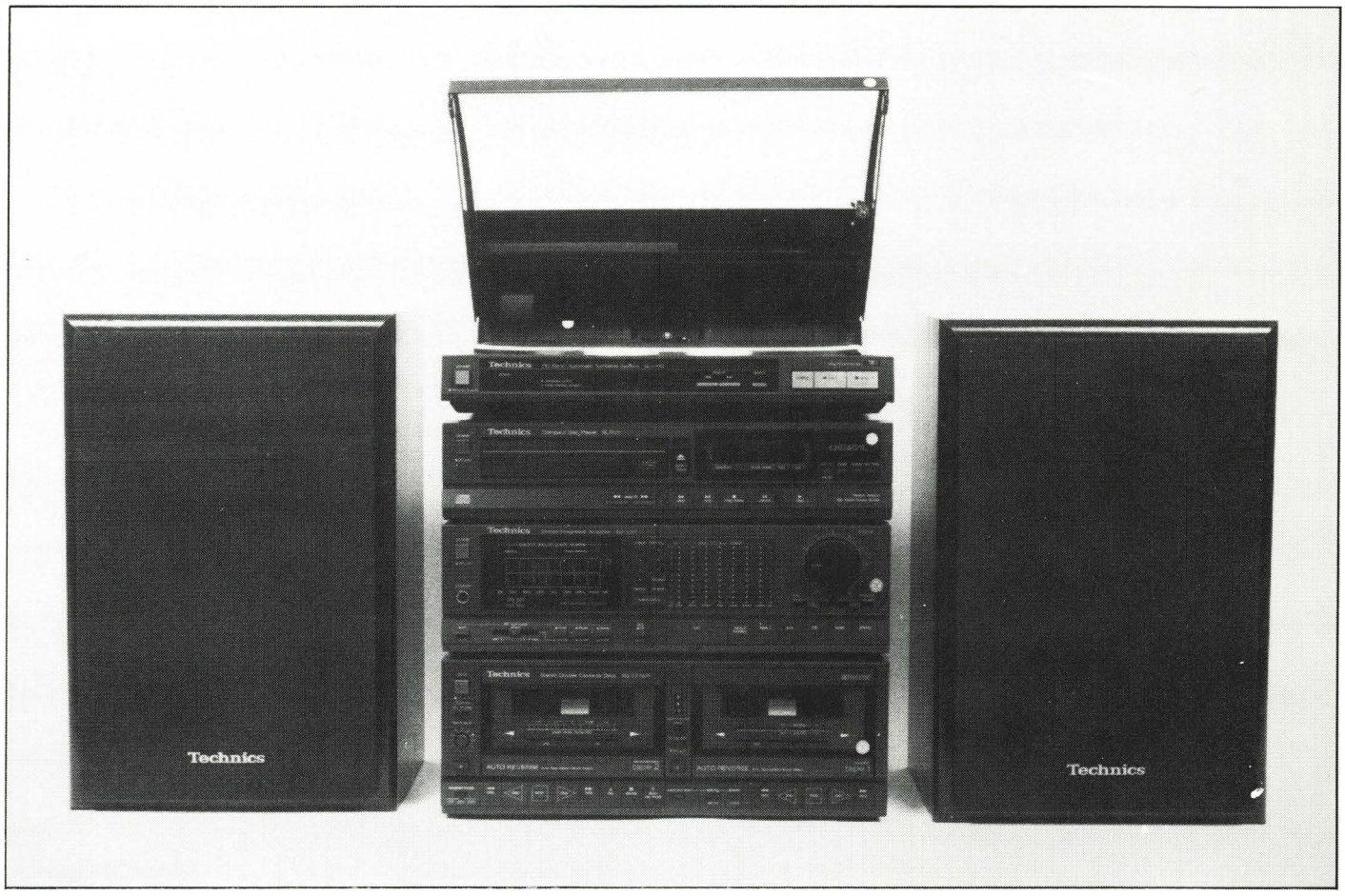
What impressed your hardbittenness most, however, were two related facts. One: with the equaliser switched out, the amplifier really sounded quite good, certainly good enough to be looked upon as a 'proper' high fidelity amp. It had a sense of power, clarity and explicitness in the way it presented a stereo soundstage. Just what the doctor ordered. The amount of sheer physical muscle available was also quite impressive, though there was a tendency for the sound to 'harden up' and 'shout' at really high levels — but you really do have to be shovelling on the coals...

Impressive feature number two should not require comment. In contrast to the majority of occasions when equalisers are switched into circuit, doing so on the *X77* was not sonically disastrous. The sound did 'dry out' somewhat, leaving the music sounding less voluptuous, more restricted and spatially 'flattened'. But I repeat the difference wasn't huge — and this isn't because the sound started out badly compromised.

This good start is continued by the *SL-PJ11* CD player, which proved to be one of the more satisfying modern CD players, and by your reporter's perhaps over-fussy standards one of the very few CD players that it is possible to sit down and listen to over a protracted period. The player is discussed also in the Technics *X33* system review, along with the *ST-X33L* tuner. Certainly the tuner too upholds the system standards.

The cassette deck goes quite a long way towards achieving the same broad goals. Though it injected a little hum into recordings, and speed stability was occasionally audibly suspect, on the whole it worked well. Even the high speed dub feature gave some reasonably clean tapes, albeit still light years behind anything recorded at normal speed.

It would have been too much to hope that



the entire system would sound wonderful, and as usual the record deck was below the standards for the system as a whole. However, even here where there are quite strong limitations, the story is far from disastrous. The record deck is a sinner alright, but for the most part, making due allowances for some rather spiteful sounding record surfaces (partly cartridge mistracking), the sins are primarily of omission. Thus the deck didn't mishandle the bass, as is common. There simply wasn't any — or not much. And it must be admitted that the sound still had quite a lot of vitality and punch, albeit a punch that lacked the visceral edge that a really good turntable can bring.

The loudspeakers are good, or pretty good. The only problem was one attributable to the designer trying to squeeze a little too much bass from a small box. Extracting quarts from pint pots is quite a trick, and the inevitable compromise is a fat, boomy bass. Not too fat though, and not too boomy.

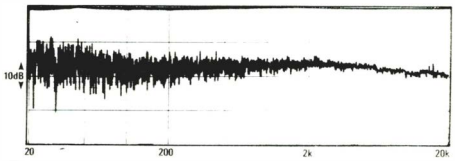
On balance, the Technics speakers are several light years better than yer average system loudspeakers. The top is also slightly prominent, so what you're left with has elements of tizz and boom about it, but for all that, it makes quite a sweet, and a surprisingly couth noise. The recessive midband sounds articulate — there just isn't enough of it — and the treble, whilst bright, is also undistorted and clear. Quite a lot of detail is reproduced one way or another, which is what it's all about.

Verdict

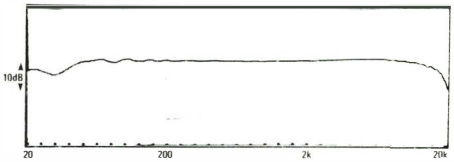
Technics X77 system combines good looks, good ergonomics, good (if slightly gimmicky) features, good build quality and more than acceptable sound qualities. Pricing is reasonable too, so a 'Best Buy' is mandatory.

Test Results

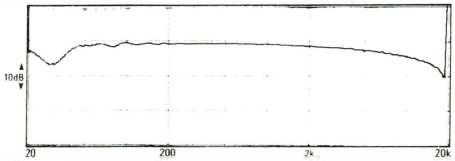
Cost complete	£910
Options?	SB-S30 Goltball style speakers for A/V surround sound
Size main unit - lid open, W/O projections	73×31.5×32cm (h×w×d)
Size loudspeakers	36.5×23.5×20.5cm (h×w×d)
Turntable	
Wow & flutter wtd	0.09%
Drift	poor
Speed accuracy	−0.3%
Arm/cartridge resonance	14Hz OK (<10kHz too low, OK,>14Hz too high)
Cartridge channel balance	1.2dB
Cartridge channel separation	−24dB
Cartridge tracking ability	80uM
Tuner	
Sensitivity	very good
Signal/noise	fair
Cassette Deck	
Wow & flutter (wtd)	0.16%
Signal/noise ref 0dB Type II	52dB
Distortion 0dB Type II	2.8%
Amplifier	
Power output/channel (8ohms) (1kHz both channels driven)	50 watts
Loudspeakers	
Efficiency	very low



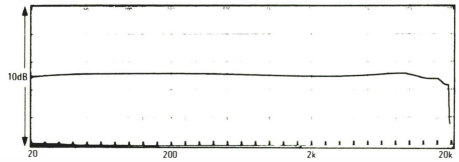
Turntable replay frequency response



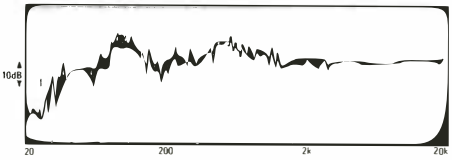
Cassette deck record/replay response



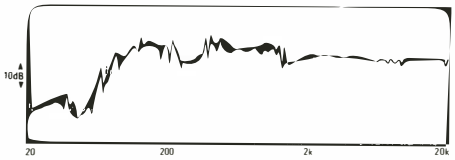
Cassette replay only response



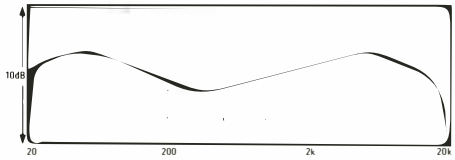
CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)



CD player response via amp headphone output

BEST BUY

TOSHIBA SYSTEM 155

TOSHIBA (UK) LTD, TOSHIBA HOUSE, FRIMLEY ROAD, CAMBERLEY, SURREY.
TEL: (0276) 62222

The most important feature of this attractive package is the price. To put it in perspective, the budget end of the market for systems with CD players and twin cassette mechanisms starts at around £300, or £50 less than this one costs. For many people the obvious question will be this: is there any point in buying a system like this when there are others which appear on the face of it to do much the same job for £50 less? The answer, as you'll see, is definitely yes.

Everything except the loudspeakers comes in one box, with a dust cover at the top which hinges open to reveal the turntable. Below decks you'll find the tuner, amplifier, twin cassette deck and compact disc player. The system is well built (in price context) and well finished, with the predominantly black fascia offset by subtle splashes of red and blue for some of the controls and displays.

Unfortunately, the production schedule didn't allow us to obtain a normal off the shelf sample of this system. The one supplied is described by Toshiba as a pre-production sample 'more travelled than David Frost!' It appeared to be OK in most respects, but did have one serious fault on the record side of the cassette mechanism. The erase circuitry wasn't doing its job, so all tests involving recording had to be conducted using virgin tape. The system also came without instructions, though few would have any difficulty setting it up and getting it running by themselves. Connect aerials and loudspeakers, make one connection to the AC mains, light yourself a glass of wine and pour a cigar — and you're away!

SL-55CD MAIN UNIT

Despite the metallised strip around the edge, the undersize platter used on the turntable is a one-piece plastic moulding. Even the 'mat' is moulded on. This sets the tone for a very simple record playing section with an arm assembly that has all the structural integrity of blancmange. The deck has an auto return mechanism, but lacks the usual switch to trigger this at the run-out of a record. Changing the position of the main source selector switch to 'tuner' whilst a record is playing results in the record grinding to a halt with the stylus on the record surface. Arm set down is accomplished manually, with the aid of an undamped cueing platform.

Where the turntable does differ from the run of the mill at this end of the market is in the fitting of what turns out to be an at least half-decent cartridge. It has a relatively smooth nature, despite the rather unhappy looking measured response, and is only spoiled by the poor arm design which necessitates a high tracking force, and consequently rather high levels of record wear.

All three of the wavebands needed for reception of domestic broadcasts are available on the radio section — FM, MW and LW. The budget doesn't stretch to digital tuning and presets (other systems at this price with such niceties suffer badly in other areas as a result), nor does it allow proper flywheel assistance for the tuning knob. The edgeways knob here is low geared and stiff, and the tuning scale is quite unnecessarily cramped. A stereo indicator tells you when a stereo broadcast is being received and a mono switch completes the control complement.

It is much needed. Not only does the tuner suffer the common ill of being reluctant to switch over to mono, however weak the signal, it is also very noisy at low signal levels, and very prone to interference. Even at high levels, the tuner is surprisingly hissy. RF performance is also suspect. Images (reflections) of strong transmissions were often found at as many as three extra positions up and down the frequency band, and in some areas this could result in reception problems that are difficult or impossible to resolve. Paradoxically, the surest way of avoiding problems may be through misaligning a good strong roof aerial (say four elements or more) which will reduce the signal level of unwanted stations, thus keeping the frequency scale clearer. An in-line attenuator may also help solve problems if they arise.

With twin cassette mechanisms (one record/playback, one playback only) but no onboard Dolby B noise reduction, someone clearly has their priorities reversed. There is no real compatibility with pre-recorded cassettes, which are Dolby encoded, and of course home made recordings will be hissy. Pre-recorded material is more of a problem since using such tapes will mean audible noise pumping by the music, and odd modulation effects where instruments come and go in the mix in unpredictable ways. Tonal quality will also tend to be bright — it is anyway because of poor setup, except when using pre-recorded material — and hands on testing showed that the deck objected by distorting badly when playing energetic material off tape, even at low volumes. Naturally tape to tape dubbing (at normal speed only) and continuous play are built in options. The controls are mechanical and adequately finished.

The final music source is the CD player, which as you'd expect is a no-frills product, but not so no-frills that it doesn't include audible track cueing, track-skip and programmability for up to 16 tracks. The default status display indicates track and index numbers, but this can be changed to read out elapsed time of the current track or time still to go on the disc. Tracking ability of this deck was strictly limited, and resistance to the effects of knocks and bumps was equally shaky. Note the curiously band-limited response shape from CD, which appears to be imposed by the amplifier rather than the player.

The amplifier is equipped with what a front panel legend fondly describes as a graphic equaliser, a description that smacks of hyperbole — like calling an iced bun a wedding cake. There are no other features of note — not even a spare in or output (but there is a microphone input). Power output was a modest 5 watts/channel.

SS-108 LOUDSPEAKERS

The frequency response shape of the loudspeakers is a little unpromising at the frequency extremes, but shows reasonable energy distribution elsewhere. They sound best (on tall rigid stands of course) used away from walls and other obstructions. The speakers themselves are lightly but adequately built, and less gaudily finished than some.

HOW IT SOUNDS

Surprisingly, although the system sounds a bit rough and ready, it's really not bad taking everything into account, at least when using the CD player or the record deck. The secret of this success is simple: a pair of loudspeakers that go quite a long way to delivering the goods, and an amplifier that doesn't let the loudspeakers down.

Auditioned without reference to price, the loudspeakers sound a little shabby at the top end, whilst the balance as a whole favours the

upper bass. The *SS108s* don't possess deep bass, and the end result is a rather heavy, 'gruff' balance. But things could be a lot worse, and on some material the faults of the speaker all but disappeared. The amplifier had a reasonable loudness capability, and sounded altogether more solid and composed than most cheap system amplifiers — a good result.

The turntable and CD player upheld the good standard of the amplifier and speakers. The turntable did have some quite serious shortcomings, notably in its susceptibility to shocks and its almost total absence of low frequency integrity. But luckily the loudspeakers almost totally ignored the frequency range affected, and the outcome was fortuitously acceptable at the price.

Compact Disc also made very acceptable noises. As so often the system dominated the sound of the player, not *vice versa*, but there was no mistaking the punchy and emphatic contribution of the silver discs. However, the player did sound a wee bit 'edgy' at the top end.

The tuner and cassette deck were rather less good. The cassette deck offended in the ways already suggested: it was responsible for some gross distortion effects on 'hot' tapes, and sounded hissy all the time. Pre-recorded Dolby tapes suffered all the expected vagaries when reproducing such tapes without Dolby, of which the most noticeable is the bright tonal balance. On a good day and with a favourable wind the FM section of the tuner sounded OK, and home made non-Dolby recordings also seemed reasonably fair. AM radio reached about average standards.

Verdict

Notwithstanding all the individual shortcomings this very low cost package has an essential balance of virtues that is common across all the source components — and also the amplifier and loudspeakers. It isn't as good as the similarly priced Ferguson *HF03* (The outstanding performer of those tested at this end of the market), but its busier fascia design may well make it the more appealing item in the showroom.

Test Results

Cost complete £379
Options? ..... none
Size main unit - lid open, W/O projections 57×38×36cm (h×w×d)
Size loudspeakers ..... 30.5×19.5×16.5cm (h×w×d)

Turntable

Wow & flutter wtd 0.19%
Drift ..... average
Speed accuracy ..... n/a*
Arm/cartridge resonance ..... n/a*
(<10kHz too low, OK,> 14Hz too high)
Cartridge channel balance ..... n/a*
Cartridge channel separation ..... n/a*
Cartridge tracking ability ..... n/a*
[*]no separate turntable output

Tuner

Sensitivity ..... very poor
Signal/noise ..... very poor

Cassette Deck

Wow & flutter (wtd) 0.20%
Signal/noise ref 0dB Type II ..... n/a**
Distortion 0dB Type II ..... n/a**
[**]auto record level

Compact Disc Player

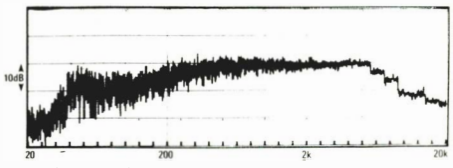
Weighted signal/noise (measured at amp Tape Out) 74dB
no tape output fitted

Amplifier

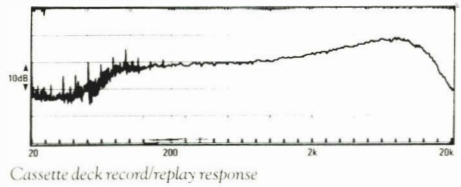
Power output/channel (8ohms) ..... 5 watts
(1kHz both channels driven)
test signal derived from CD since microphone input clipped prematurely

Loudspeakers

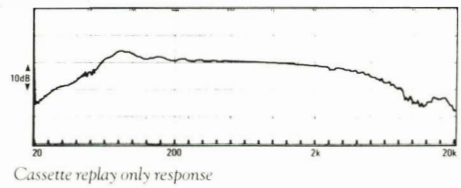
Efficiency ..... medium



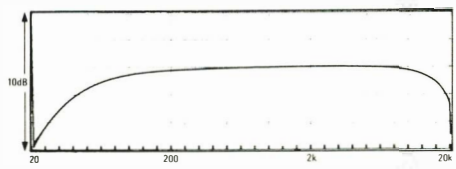
Turntable replay frequency response



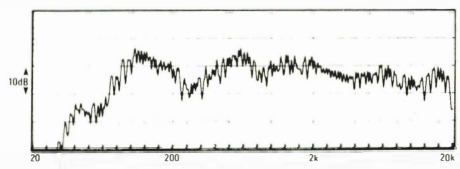
Cassette deck record/replay response



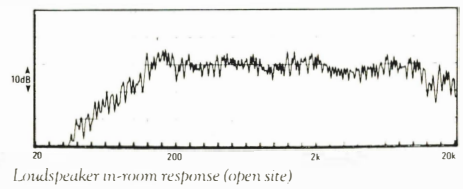
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

RECOMMENDED

TOSHIBA V32CD

TOSHIBA (UK) LTD, TOSHIBA HOUSE, FRIMLEY ROAD, CAMBERLEY, SURREY.
TEL: (0276) 62222

Toshiba's entry in the crowded mid market area is this well packaged and presented *V32CD* system. It is based around a one-piece central unit which incorporates a twin cassette deck and amplifier in one box. The CD player and tuner are separate items which normally sandwich the main unit with the CD player at the bottom. The turntable sits on top, but would benefit from being sited alongside the rest of the equipment if that can be arranged.

Note that the system acts as a collection of separates, in the sense that there are no linked features like automatic source selection or synchronised recording.

SR-V22 TURNTABLE

Here we have a typical low cost player that bears a more than coincidental resemblance to certain other players (for example units from Ferguson and Fisher). Cleanly designed, the *SR-V22* has a pivoted arm and a non-replaceable magnetic cartridge with an interchangeable stylus. Operation is automatic, but this is primitive automation that does not, for example, recognise the presence or absence of a record.

The deck measured fine. There was a marginal loss of high frequency linerarity, but most people will be able to live with it, and with the other measured parameters. Put another way, these are not the decisive characteristics that determine how good the deck sounds. For that you have to look at the kind of under-the-skin engineering involved. Or rather not involved . . .

ST-V22 TUNER

The only unusual feature of the tuner is the attractive back-lit LCD frequency display, which usefully also shows which preset has been selected. There are five of these for each waveband, which is less than is available on many other tuners.

XR-V12 CD PLAYER

For some reason, the *XR-V12* isn't blessed with as attractive a display as the tuner. It has instead a rather mean green LED display that cannot be read from much above the axis of the display. In default mode it shows track and index numbers, but can be switched to indicate time into a current track or time remaining on the disc. Audible cueing is available by using the track-skip keys when the play button is held down, a simple, logical arrangement that soon comes to seem intuitively right. Finally, there are the usual memory (16-track) and repeat facilities. Disc handling was not especially fast but it was accurate and predictable. Tracking performance was a little above average.

SJ-V32 CASSETTE DECK/AMPLIFIER

The amplifier story is very straightforward. You get a five pot graphic equaliser. You get four input selectors for the four sources included with the system. You get volume and balance controls, and you get a pair of extremely annoying power level meters that would have me reaching around inside with the tin snips if this unit was mine. (Don't — electricity can kill! Worse, you could invalidate the guarantee.) Power output checked out at 30 watts × 2.

The twin transport cassette deck is a little more exciting. It has automatic everything: auto reverse on both transports, auto tape type recognition, and, regrettably, auto record level adjustment. Dubbing (at normal and high speed) and continuous play are options, including the ability to record both sides of a tape without interruption. Finally, the transport keys have been very neatly rationalised into a bank on the right hand side of the unit. I found this arrangement highly logical and easy to get to grips with. These controls are all light in touch and fully logic-operated. A track search feature is also included, and noise reduction is provided by the ubiquitous Dolby B. The record/playback frequency response trace shows that a lot of high frequency energy is lost, and that speed stability is relatively naff.

SS-V32 LOUDSPEAKERS

The *SS-V32* is a genuine high fidelity design, manufactured in this country and based around a Philips 12mm tweeter and a 150mm Tonagen doped brass driver (Japan). It is a very attractive product with or without the grille cover, being covered in a well finished vinyl woodgrain. The enclosure for once is made the way loudspeaker enclosures are supposed to be made, which is a lesson Toshiba have put to good effect in the excellent *SS33*, a long standing and larger model supplied with certain other Toshiba systems.

It also measures like a proper loudspeaker, which doesn't tell you it isn't bad, such is the nature of these tests. These also suggest (confirmed by ear) that the speaker sounds better well clear of room boundaries and furniture. On tall, rigid stands of course.

HOW IT SOUNDS

Here we have an example of an amplifier that appears to be incapacitated through strangulation at birth. It clamps down on dynamic structure and reduces ambience and significantly depletes other low level subtleties. And the best available combination in this system, the CD player and the amplifier, auditioned *via* the benchmark B&W *DM110*s, tended to sound rather colourless and flavourless.

The tape deck was deceptive. Easily amongst the nicest cassette decks to use in the entire project, it impressed initially with its smooth, nicely integrated and relaxed quality, but was also plainly rather dull and lacking in sparkle. Meanwhile the loud parts were crushed by the auto level recording control. In fact the ALC was a little more subtle in action than some such circuits, and didn't make itself as obvious as sometimes happens. But there was still the usual moulding of the musical dynamic range to fit into what the machine considered a suitable dynamic envelope. Never trust a cassette deck to interpret how loud or quiet music should be; they are mechanical idiots, and should be kept in their place.

The *ST-V22* tuner was also rather noisy. With a good, strong input from the aerial socket, the noise remained high and 'grainy' sounding. As the signal level was reduced, the noise built up quite quickly, and the tuner also became wide open to some very sharp interference effects. Sound quality was marred to a degree by top end compression, but the overall conclusion is that

this is a fair weather tuner, happiest working in the primary service areas of the required transmitters.

Long and Medium Wave reception were perfectly satisfactory. They were subject to average levels of interference, but intelligibility was a strong point. The inherent microphony of the turntable was partly tamed by the lean, dry bass quality of the loudspeakers, and the cartridge has a clean and articulate quality.

The loudspeakers are not quite as good as the bigger *SS33*, not so much because they don't have the bass (they don't of course) but because the balance of the speakers is forward in the midband area which gives them a very explicit, dynamic character I don't think the rest of the system is capable of sustaining. Even so, prevailing standards in this part of the market are so abysmal that even mediocrity tends to shine.

The speakers are very detailed, and despite their balance essentially uncoloured and unexaggerated. The top end is clean and crisp, and the midband is really very good indeed. The bass is definitely rather dry and lean, even taking the small size of the enclosures into account. Hence that colourless and flavourless remark above.

The system does respond to a little boost of the 63Hz slider, and a drop of a division or two using the 4kHz slider on the graphic equaliser. This isn't a proper cure, but it helps if only because the loudspeakers are nearly right to begin with. On systems where the loudspeakers have not been designed as carefully, an equaliser can do no good whatsoever.

Verdict

Recommended, of course. The electronics are little more than competent sonically, and there are some quite strong reservations about the cassette deck and FM tuner section and the way the loudspeakers are matched (or rather not matched) to the characteristics of the rest of the system. But the rest works well, and the system has particularly strong ergonomics. The loudspeakers are simply an order of magnitude better than the class average, despite their dry, forward nature.

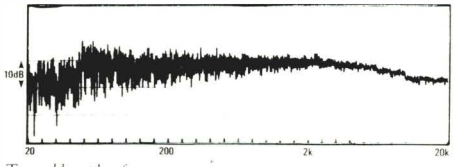
Test Results

Cost complete	£599.99
Options?	none
Size main unit	67×33.5×36.5cm (h×w×d)
Size loudspeakers	32.5×21×18.5cm (h×w×d)
Turntable	
Wow & flutter wtd	0.12%
Drift	average
Speed accuracy	−0.3%
Arm/cartridge resonance (<10kHz too low, OK,>14Hz too high)	15Hz, too high
Cartridge channel balance	0dB
Cartridge channel separation	−20dB
Cartridge tracking ability	75uM
Tuner	
Sensitivity	very poor
Signal/noise	very poor
Cassette Deck	
Wow & flutter (wrd)	0.35%
Signal/noise ref 0dB Type II	n/a*
Distortion 0dB Type II	n/a*
Compact Disc Player	
Signal/noise (measured at amp Headphone Out) no tape output fitted	80dB
Amplifier	
Power output/channel (8ohms) (1kHz both channels driven)	30 watts

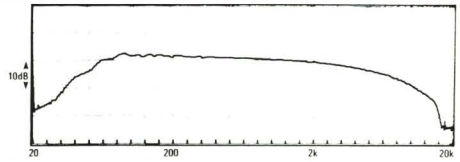
Test signal from Denon test CD. Mic socket clipped too early to generate full output before clipping

Loudspeakers

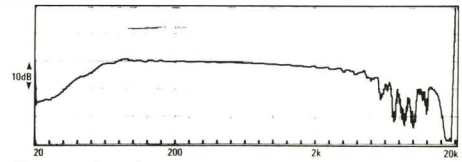
Efficiency	average



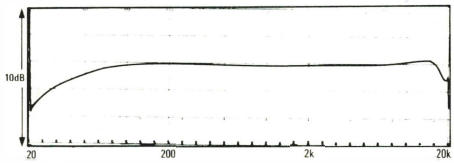
Turntable replay frequency response



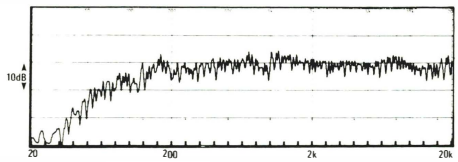
Cassette deck record/replay response



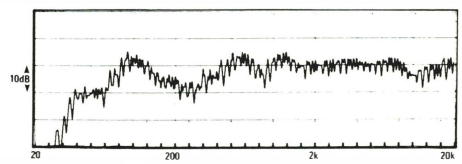
Cassette replay only response



CD player replay frequency response



Loudspeaker in-room response (wall site)



Loudspeaker in-room response (open site)

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Conclusions

This section looks briefly at the general points that emerged from the test programme, and at the conclusions that may be drawn. We also indulge in a little crystal ball gazing.

Compact Disc Players

Compact disc players were introduced in the last issue of *Choice: Complete Stereo Systems*, but at that time, three short years ago, only three manufacturers submitted suitably equipped products. Now times have changed — sufficiently to justify basing this entire volume around CD systems.

Not only did every one of the systems come supplied with a CD player, many of these had been purpose designed and engineered specifically for a systems application, though inevitably at this still early stage quite a number were stand-alone separates pressed into this role. Such players tend to be well equipped, but are also rather expensive, and the styling quite often clashed with the rest of the system.

Most of the players had audible track scanning and the ability to programme tracks in a random order; some even had remote control, even though the rest of the system didn't! But there were a number with very simple facilities, for example just play and track-skip. There will probably be more of this kind of player in the future as pressures increase to reduce the cost of the CD component in systems. Conversely, it's likely that more manufacturers will adopt the 5- or 6-pack CD cartridge, as exemplified in this project by Mitsubishi.

Compact discs generally made better noises than any other source components, and also tended to be the most consistent from system to system and disc to disc. But this is far from being the complete story.

Point one is that the discs should be clean and unblemished. A significant number of the players objected to even mildly handled discs, and occasionally the effects were catastrophic as the laser proceeded to do what poorly set up record players do — skip tracks or stay 'locked in the groove'. Ironically not one record deck, however modest, did anything like this on any of the records throughout these tests, so some of the CD players at least still have a way to go yet.

And another point of criticism too: for all their superficial clarity and consistency, many of the players simply sounded sterile — in the manner, for example, of a cheap and obviously 'transistory' amplifier. The author might venture to suggest that this may be because they actually contain cheap and obviously transistory amplifiers (or more correctly preamplifiers).

In a significant number of cases, records and/or radio broadcasts made for more enjoyable, natural and informative listening, despite the vagaries of these media. This is no reflection of the underlying attributes that compact disc can bring to the reproduction of music, but simply an indictment of poor audio engineering in the analogue sections of the players. But for users, cause is less important than the effects, and it is these that will give rise to complaint.

Turntables

As in the previous issue, the standards of system turntables remain disappointingly low. In fact they seem to be deteriorating, and very few manufacturers even make a pretence of caring about the sound of records. About the only record deck that showed any degree of engineering integrity was the Sony *PS-LX910* from the *Compact 91* system, and even this would have difficulty holding its head up on sound quality in the separates market. (It would hold its own on features with anybody of course.)

The sad truth is that just about all the manufacturers have seen the digital future and have consigned the analogue present to the past. This is more than simply a pity: it does a disservice to the industry, and indicates the cynical view that at least some manufacturers hold of the buying public. Records deserve much better. And for no more than the price of a Dual CS505 (around £120) they can have it, if the system is one of the few that has no record deck as standard.

The few trends that can be ascertained are not positive. If anything record decks are becoming even flimsier and more microphonic, so that the slightest touch threatens to start an earthquake, in glorious, full-colour stereo. The way that manufacturers have tackled this potential problem is interesting. They have increased the frequency at which the arm resonates around the cartridge cantilever — the so-called arm/cartridge resonant frequency.

For optimum bass performance this ought to be as low as possible, but it also has to be high enough to avoid being excited by the warps on a record. The accepted compromise figure is around 8-12Hz, but this year there has been a sharp swing to around 15 — 20Hz, partly because of short parallel tracking arms. Sure enough the deck becomes less shock-prone, but the effect on bass integrity is drastic. Low frequency reproduction becomes papery and coloured while pitch integrity suffers severely. This change has nothing to do with sound quality, but everything to do with expediency.

Another recent trend, pinpointed in the text where it occurs, is the use of fixed, low grade non-replaceable cartridges. A side effect is that the arm counterweight can be moulded in place, so obviously the assembly is easier and cheaper to make, but it also means that a possible upgrade path is cut off at a stroke. (Of course the stylus remains replaceable.)

Finally, mention must be made of a number of decks which feature thin flexible plastic platters. These take structural integrity down to new lows. Moreover several decks, notably those from Binatone and Philips, eschewed magnetic cartridge technology altogether in favour of the stone-age variety. Yes folks, we're talking about ceramic cartridges — of the cheapest and nastiest kind at that, and electrically loaded in such a way as to result in severe in-band resonant peaks. This gives drastic increases in record surface noise and in hum and other noise pickup. So as digital technology makes inroads and we rush headlong towards the 1990s, the partnering analogue technology becomes ever cruder. Seems someone's giving the consumer a none too gentle push.

Tuners

Happily there has been more progress with tuners than was apparent with turntables. Not one of the midi systems tested lacked Long Wave this time around, so each and every one is capable of receiving all the stations that God's own BBC broadcasts in this country. Sorry I meant *to* this country. BBC *World Service* listeners will find their programme (erratically) on 648kHz and 200 meters MW and LW respectively (excuse the plug). But for continuous reception you'll need short wave — and not one of the tuners was so equipped.

Indeed one of the most disappointing features of the tuner sections was their depressing uniformity. A few had perfunctory signal strength meters, but apart from this there was only one important variable. Either they were digital tuners and provided presets, or they were scale and pointer driven, and didn't. Few tuners of either type were disastrously bad, the exceptions being right at the bottom of the price scale. But not many of them were particularly wonderful either. This comment made in respect of FM performance applies with almost equal force to the AM bands also.

One slightly more promising feature was that the problems of early digital synthesiser tuners — the plague of whistles and other spurious noises — appears to be well on the way to being cured. Most of the digital tuners consequently sounded better than their counterparts of three years ago, when the previous edition of this title was published.

Readers are reminded that tuners are essentially a double act. A tuner needs an effective aerial just as much as an aerial needs a good quality tuner, before either can make the right kind of music. A good aerial is also the best possible protection against interference and other reception related ills.

Cassette Decks

Again, the last few years have seen massive progress — nearly all of it backwards. It seems that more is too readily confused with better when the latest generation of cassette decks sport two transports rather than one, and practically unusable features like high speed dubbing. This invariably reduces pitch integrity, increases noise levels, and severely cramps both detail and dynamics. What more indeed could one want?

There were other interesting oddities. I was particularly puzzled by those cassette decks that offered automatic tape type recognition on one of the two tape transports, but not on the other. ▷

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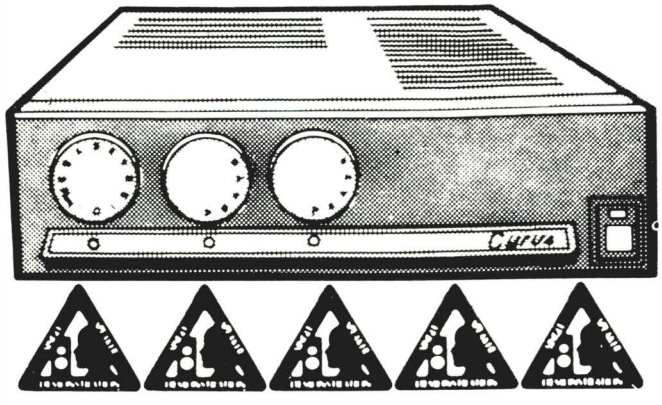

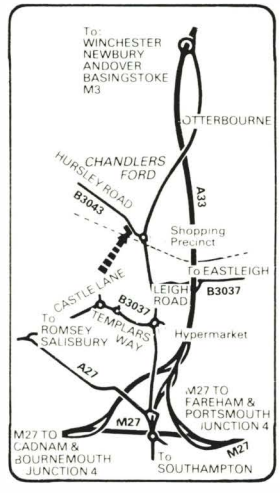

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◁ What were they thinking of? From the puzzling to the plain damn annoying some decks eschewed the use of Type II (chrome or pseudo-chrome) tape in favour of Type IV metal tape. The latter may be better under ideal conditions, but its extremely expensive, and in point of fact the machines concerned were not able to make good use of it.

One mild surprise was that the majority of decks which were Dolby B equipped did not have Dolby C, which is the more powerful noise reduction system that at one time looked likely to end up on just about every cassette machine out of Japan. But it has never been adopted for prerecorded material, and despite the manufacturers, suggestions to the contrary, the two Dolby systems are mutually incompatible with each other.

Finally, it was very disappointing to discover so many cassette decks fitted only with automatic record level controls.

Amplifiers

The almighty graphic equaliser (actually a misnomer in the original professional application of the term) has conquered all, or almost all. Curiously, equalisers are never found in specialist amplifiers, in recognition of the fact that to a great extent they are a side issue in the great issue of music reproduction in the home. The ills they purport to cure are real enough; unfortunately, the cure is almost invariably worse than the malaise.

But the supremacy of the equaliser has had one useful by product in clearing the amplifiers of almost all other superfluous gadgetry. In some cases — Sony being the best example — the equaliser can even be switched entirely out of circuit (which is not the same as setting the equaliser controls 'flat'), thus simplifying the signal path and cleaning up the sound.

As usual there is a great variation in power output, which extended from a very useful 80 watts or so per channel to a paltry 3 watts (actual measured) per channel in one case. There was as much variation in quality as quantity, and quite a number of them actually sounded very good. True sophistication was markedly absent but what was quite often apparent is even more important: a kind of unstinting energy and openness often missing from amplifiers in the past.

LOUDSPEAKERS

Sometimes it seems the more things change, the more they stay the same. There is progress to be seen in the group of loudspeakers tested here, but it's sporadic and unevenly spread. For example, we found better performance in the Sanyo system (see *W36* review) than in the upmarket brand that Sanyo operate under the Fisher title.

The encouraging signs are that where in previous years there was a tendency to build speakers as large as possible for a given price, which inevitably compounded the structural problems they possessed, this year most manufacturers seem content to keep things small. Simplicity also rules OK: three drive units used to be *de rigeur* for any self respecting upmarket system, but this no longer applies.

The trouble is that most manufacturers have ignored the opportunity to do things a little better that these changes have meant. Small enclosures can be made structurally sound quite inexpensively, but the archetypal system loudspeaker remains about as solid — and as sound-proofed — as an orange box. Then you find that firms like JVC with tremendous in-house design skills, have to mess up their speakers not only by using grotty drive units, but also by sticking stupid venetian blind type grilles over the tweeter. Sony and Technics are little better with their rather crass cheaper loudspeakers.

The danger of course is that when companies of this stature sell out so completely on audio quality, they effectively sell themselves short too, and leave the field open to downmarket competitors without their technological competence. Of course this is exactly what has happened in the last few years, and there isn't a major electronics company that hasn't suffered as a result.

Perhaps the greatest folly of the loudspeakers systems tested is Aiwa's feedback design incorporated in the *SX-E77* loudspeakers sold with the *V7700* system. A dressed up and (as far as I can tell) inferior version of the aeons old Philips Motional Feedback approach, the system patently doesn't work. It can be heard operating far too slowly, resulting in sound quality that is audibly smeared and otherwise inferior to the standard speaker with the feedback circuit disconnected. And that's saying something!

However there were a number of much better designs. Sony had the big, capable but perhaps over-complicated *APM-22ES* in the *Compact 91* system (with the cheaper, simpler *'20ES* option), and Technics offered the *SB-C250* in a couple of guises (see Technics *X77* and *T-290* reviews). There were other, less expected goodies too, including the simple but effective designs from Goodmans, Ferguson and Sanyo. There are lessons to be learnt from these designs.

The Future

It's intriguing to think that sound reproduction is subject to the subtle dictates of fashion, but of course it is, as the manufacturers of tribes of Walkmen were the first to discover.

In the three years since the last *Choice: Complete Stereo Systems*, the appearance of the average domestic audio system has changed dramatically. At one time they were referred to as rack systems, or in the case of the true low-end models, tower systems. Styling and the sheer physical bulk of the equipment was painful to put it mildly, so the term 'rack system' was hardly inappropriate, but 'tower system' summed them up much better. There they stood, dominating the field of view like up-ended glass-fronted coffins. It's hardly surprising that the breed has followed the stereogram into terminal decline.

What has come out of the revolution has hardly changed technically. But the equipment has lost a number of inches, especially from around the waist, and the rack housings have become fewer in number. Instead of being based on 440mm wide equipment housed in floor-standing lumps of pseudo-wood and glass, systems these days are nearly all narrower (330 - 410mm or close) and designed for plonking straight onto sideboards or shelves.

This is in line with changing social trends too. At one time, hi-fi or audio equipment was accorded centrepiece status, like television when it first emerged, partly because of the novelty. Now we're surround by gadgetry, so the equipment has had to shrink and become less demanding to use, and more adaptable to its surrounding.

So for this publication we have managed to assemble quite large number of exclusively midi-size systems, all of which will sit more or less happily on a standard waist high shelf. Clearly manufacturers still feel that the public wants lots of knobs to turn and buttons to push, so a well filled fascia is a prerequisite. But the very large number of controls commonly used is impeding progress elsewhere. If you have something in the region of 70 knobs, buttons and displays, you need a substantial amount of space to display them.

So how will systems develop over the years ahead? Obviously it's impossible to give totally unequivocal answers to this, but there are some clear trends in the making. The first that the number of controls will diminish, partly as more functions become automatic, and more of them come to be shared between components. This will allow the equipment itself to shrink and become more 'black box' like. The present artificial separation of one-piece electronics packages by horizontal styling lines, almost as though they were built as separate components inside, will die out totally. It is a fad, and a stupid one at that, because it is not based on the key concept of function.

The other obvious future trend will be towards systems controlled by remote control. Already quite a number of systems have remote control handsets, and the next stage will be to put many of the minor facilities on the remote control itself, and leave them off the main unit. After that, it's only a short step before the remote control becomes a communicating table-top item, with complete functional displays on the remote control unit, using low consumption LCD display elements. Only Bang & Olufsen have really explored this road thoroughly so far, but where they have led, others will surely follow in time.

Now we turn to the equipment itself. In this issue, nearly all the systems came with a record deck as standard. Only Technics and Marantz submitted turntable-less systems for test, and these will take record players as extras. But records don't fit in with Japan Inc's vision of the technological future — remember that technical trends are wholly dictated by the most powerful forces in the industry, and prior to compact disc they were exclusively Japanese.

Take one example. High quality record decks are engineering intensive, and at least as far as high fidelity is concerned, Japanese companies have spent the last 15 years systematically weeding out high precision engineering in favour of electronics. The introduction of developments like direct drive turntable motors should be seen in this light, and also as part of a last ditch effort to replace the engineering intensive precision of lathe turned equipment with the clinical efficiency of servo locked electronics. As history now demonstrates, the idea failed — surprisingly few direct drive turntables remain, and almost none are sold in the quality area. But compact disc has taken on the mantle as a parallel means to the all-electronic future.

Of course there are other problems with records. The most serious is that the diameter of an LP is a severe impediment to system designers, imposing serious constraints on the width and depth of the equipment.

The author estimates — and this is largely guesswork of course — that by the middle of 1987, the number of systems that come complete with a compact disc player will equal the number that come with a record deck as standard. Within two years, the line fit record deck will be unusual if not exactly rare. This event, or series of events, will mark the end of an era, and the beginning of a new one. But nobody should crow about the implications all this has for the future of reproduced music just yet.

And by the way — good listening!.

BEST BUYS &

In the last edition of *Hi-fi Choice — Systems,* we divided the Best Buys and Recommendations into groups of those that were only supplied with loudspeakers included, and those where the loudspeakers were optional. One of the more regrettable recent trends is that a number of systems where the loudspeakers are optional has declined significantly, and the majority of systems are now only supplied complete with loudspeakers.

But if you want to choose your own loudspeakers and the system you want is only listed with the manufacturer's own, it may still be worth having a word with your dealer. Some really on the ball dealers simply refuse to buy systems with the manufacturers' own loudspeakers, at least in selected cases, and under such duress suppliers have been known to acquiesce.

The following are in ascending price order:

BEST BUYS

Toshiba System 155 (£379.99)
Here is the lowest cost recommended system in this publication, handily undercutting the Ferguson *HF03* system. The Ferguson is better engineered, and is even better value for money, but the Toshiba has a long list of virtues to its credit. They start with a subtle and attractive styling job, include a set of controls and displays that is unusually easy to get to grips with, and continue with some good, solid under-the-skin engineering. The loudspeakers and amplifier are both good, which helps carry the remaining components. Weaknesses are found in the tuner, which is hiss prone, and more seriously in the cassette deck which lacks Dolby and which 'pumps' audibly.

Ferguson HF03, (£399.99)
The Ferguson *HF03*, which is manufactured on their behalf by Mitsubishi, is the clearest candidate for Best Buy status in this publication. Ergonomically the system is blessed by a low control count, that omits even the usually obligatory graphic equaliser. Ferguson have also done the unthinkable at this price level by supplying a pair of loudspeakers that sound very clean, couth and spacious except when driven hard at high frequencies. The amplifier is also unpretentiously good and none of the source components disappointed.

Goodmans GCD500S (£549.80)
Plenty of rough edges here in more than one sense, but the *GCD500S* offers solid value for money, and the incidental advantage of easy upgradability in the future. The system is attractive in a rather derivative sense, and comes complete with a pair of simple but musical loudspeakers, which are an object lesson to other system manufacturers. Only the turntable disappoints. The CD player is optional, and it would be a gesture in the right direction if the equaliser was to be made optional too.

Sanyo W36 (£549.98)
This is a moderately priced components system with simple facilities and none of the computer controlled paraphernalia that is used elsewhere. As a result, it has a blend of simplicity and purposefulness denied to many. It also has an unusually fine, if modestly specified pair of loudspeakers. The amplifier is not in the same league, but it did not seriously detract from the positive qualities of the rest of the system. Build quality and finish were as good as they needed to be, but no more.

Technics T-290 (£599.95)
Technics is only the second manufacturer to start selling CD systems without a turntable, though in this case one can be added at any time. The *T-290* consists of a receiver, a twin cassette deck and a CD player, and comes with loudspeakers — the same well built and excellent sounding designs that also come with the Technics *X77* system. The amplifier shows signs of brashness at times but all the source components work well and the system is a considerable success that can be upgraded readily as and when required.

Technics X77 (£910)
An imaginative and ambitious design, the *X77* is good from nearly every point of view. It's extremely well made and easy on the eye, and the features list is extensive, including a sophisticated equaliser section that is sure to give hours of fun. The turntable trailed the standards achieved by the rest of the system, but not too severely, and the other components proved a pleasure to use.

Sony Compact 91 (£1499.95)
Sony allow an unusual degree of flexibility with this design. It can be purchased with or without loudspeakers, turntable and equaliser. Other options can expand the scope of the equipment into a complete audio/visual system incorporating Sony's latest 8mm video recorder. The hardware is immaculately engineered and well specified, and together makes simply one of the finest sounding systems of its type on the market. Even the loudspeakers are hard to better elsewhere, unless you really know what you're doing though some money could be saved by choosing Sony's cheaper but no less good *APM20ES* model. As with some other Sony systems, FM performance is a little below par.

RECOMMENDATIONS

Hitatchi MD16 (£369)
A very low cost CD-based system, the Hitachi *MD16* holds few surprises. The cassette deck, tuner and amplifier are packaged together, with only the CD player, turntable and loudspeakers housed separately. System features include an auto-return turntable, analogue tuner, and a simple twin cassette deck that is grown up enough to include Dolby B noise reduction and manual record level adjustment. The tape deck picked up hum when recording, which ought to be easily curable but performance was otherwise good for the price. Even the loudspeakers were acceptable.

Technics Type 12A (£379)
This is the cheaper of the two Technics systems without turntables that were included in this project, and in all but one respect it is a very satisfactory system. The one important problem is the special non-standard socketry Technics have fitted for turntable use, which effectively locks the user into buying a Technics brand record deck if one is to be added later. The loudspeakers were rather aggressive too, but the rest of the equipment was very competently engineered and the price is low.

Toshiba V32CD (£599.99)
This system uses the new, smaller version of Toshiba's well known *SS33* loudspeakers. The SS-V32 is not as good as that design, even allowing for its smaller size and consequently reduced bass output, but it's still very considerably better than the majority of system speakers at the price. Some of the advantage this gives is squandered in the flat sounding cassette deck, noisy tuner and poor quality amplifier. Nevertheless a recommendation is in order for what after all is an attractive and easy to use package.

Mitsubishi E-CD100R (£649.95)
Black perspex and bright metal control knob fetishists will love this system for its aesthetics alone. Others will be impressed by the well integrated controls and by unusual features like the multi-disc CD player, which others are bound to follow in the future. Sonically the loudspeakers are a mess, but the rest of the system turned out to sound surprisingly couth, with a warm, pleasant and quite detailed quality available from each of the sources. Even records showed signs of sounding better than usual.

Akai System 313W (£679.80)
Akai's *313W* is for those who want something that looks a little different from the usual faceless crowd. Some of the Akai's features are less than clever, for example the arm-in-lid turntable that totally precludes cueing to a desired passage by eye (it didn't sound too good either), and the built-in surround sound option which gave anomalous results. The loudspeakers weren't too hot, but the remaining components have been designed with an element of craft and skill and the system works with integrity. Replacement loudspeakers are advised.

Sony Compact 58S (£749)
A system that tastes almost as good as it looks. Assembled from separates, it is an unusually straightforward and purposeful package, though it still has standard system accoutrements like a graphic equaliser (which can be bypassed) and

RECOMMENDATIONS

a twin cassette deck. Build and finish are as immaculate as only one or two companies outside Sony seem able to accomplish. All source components without exception worked fine and the amplifier was adequate. But the loudspeakers are actively nasty, and should be retired at the earliest opportunity.

Aiwa V4400 (£749.90)
The *V4400* can be seen as a sorted out version of the cheaper *V3300*, which is also reviewed in this publication. It is bang up to date, very well presented and finished in the usual Aiwa tradition, and is also more compact than some. The amplifier is much better than the one in the more expensive *V7700* system, the turntable is quite good judged by prevailing standards at this price, but the CD player is relatively poor. An attractive range of features includes remote control and a timer built into the tuner.

JVC Midi-W77 (£1199)
Amongst the costliest designs tested, the *Midi-W77* straddles the blurred line that separates packaged audio from high fidelity. It doesn't provide the subtlest or most detailed sound around, but all seems quite clean and in control, whilst even the loudspeakers are not altogether bad. In addition, various features have been built in that help make it fun to use, the best of which are the automatic source selection, and of course the remote control.

WORTH CONSIDERING

Mitsubishi E-CD51 (£429)
An uncommonly poor turntable let the *E-CD51* down, but using the other sources, and the CD player especially, this unusually styled design sounds pretty good in its undemonstrative way. Quite good value.

Aiwa V3300 (£649.90)
Not bad value, the *V3300* is also available without the CD player for just under £400, and for £50 extra with a dual transport cassette deck (the one fitted here is a single). Sonics, build and presentation are good — not far behind the *V4400* (see Recommendations).

Technics X33 System (£700)
The X33 qualifies for consideration, partly because it is so well built and presented. The compact disc player (optional) is truly excellent, but the turntable is poor and the loudspeakers trail miserably behind.

Aiwa V7700 (£1499.90)
The *V7700* illustrates the all too common finding, that high selling prices breed complication that often reflects in inferior sound quality. Despite some very good points, the special loudspeakers were very disappointing. But the sophisticated features will prove attractive to some — for example, the multiple tape capability, the 5-event timer, and the programmable turntable.

Finally, it is worth mentioning the **Philips** *FCD560* and *FCD565* (£299.99 and £365 respectively). It may seem perverse to mention systems like these that fail to meet reasonable standards of audio fidelity — even using their admittedly fine compact disc sections. They're strictly 'niche' products, designed to slot in the market at strategic price points and attract custom for that reason alone. But it must also be said that on the evidence of other products at this price level, the 560 and 565 are easily the best of the batch, largely because they are built better and likely to last longer.

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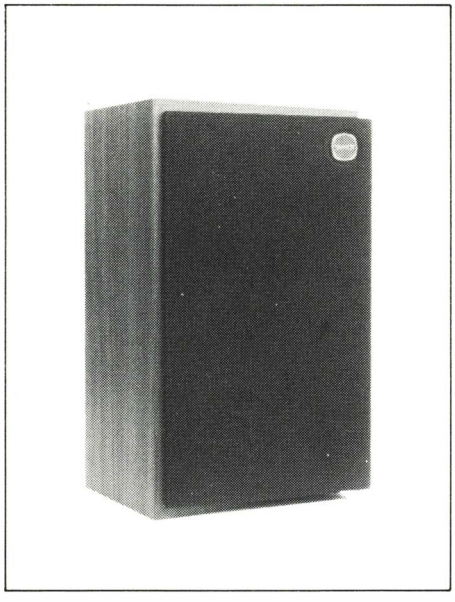
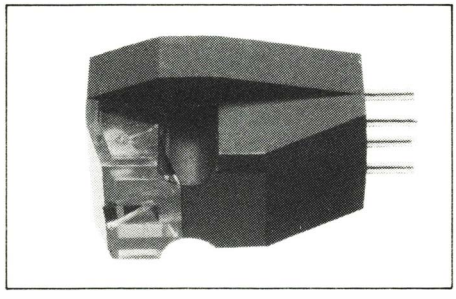
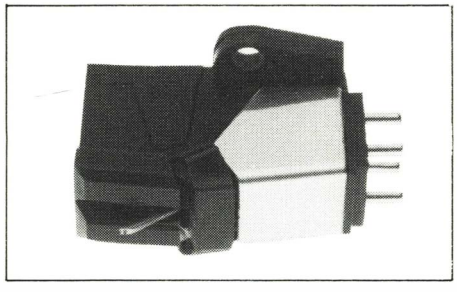
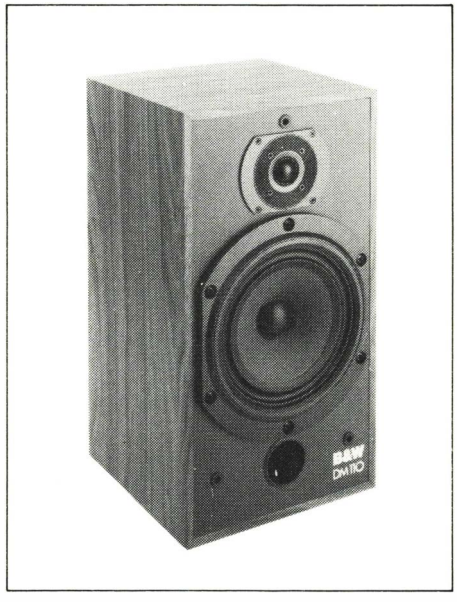
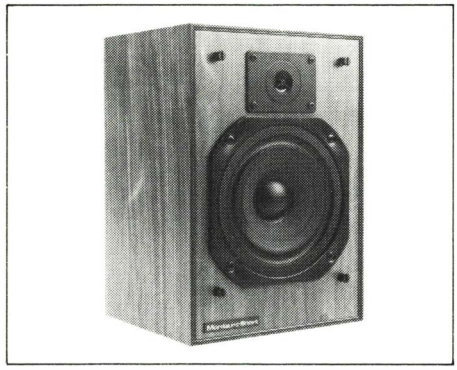
CELESTION
LOUDSPEAKERS











Those who have read this book thus far will probably come to the same conclusions as the author and editor. Although many of the the electronic components offer decent performance at very modest prices, the mechanical elements — loudspeakers, turntables and cartridges — often leave a great deal to be desired.

Many of the review systems were supplied with non-optional loudspeakers that acted as a millstone, dragging performance of otherwise respectable electronics down into the bargain basement level. Notable amongst the honorable exceptions, certain Technics and Sony speakers are already well accepted as specialist hi-fi products in their own right, and their quality was obvious in the review context. Other manufacturers have made a serious effort too, and deserve recognition. But the majority lay an albatross of a curse on the proceedings and merit early redundancy.

Accordingly, the reader might consider adopting the 'Laskys approach' (or the Marantz approach), trying to browbeat the dealer into supplying a system *sans* speakers, so as to select something worthwhile amongst the many quality budget models available. Or simply accept the inevitable and buy some extra decent speakers while consigning the supplied models to some alternative application. As extension speakers in the bathroom maybe . . .

For similar reasons and arguments, vinyl junkies with a precious investment in black plastic might consider an alternative cartridge or even a complete replacement turntable.

To act as a guide for this developmental approach to the CD Midi system, we have collected together a selection of Best Buy and Recommended reviews of budget priced loudspeakers, turntables and cartridges from the specialist volumes of the *Hi-Fi Choice* series, reviewed by Martin Colloms and myself. These are presented in the following *Separates Supplement*, admittedly somewhat out of context, but as a hopefully worthwhile service to enable the reader to get the best out of his new system. The turntables are rather thin on the ground, partly because few quality budget models now exist, but also because we are currently revising this category for our next publication, *Turntables, Arms and Cartridges*, due out in December.

Paul Messenger

BEST BUY

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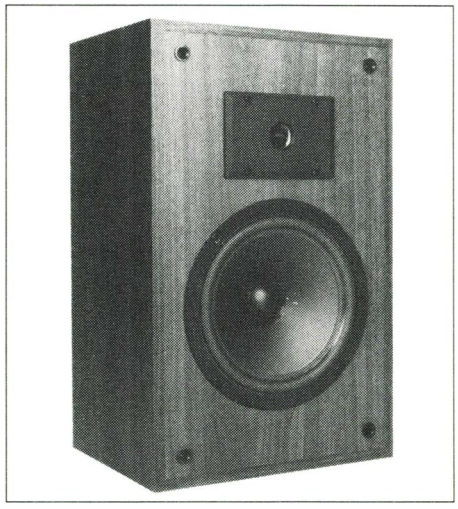


Last year the Acoustic Research budget speakers did not fare too well in *Choice*, as a hurried changeover from pulp cone systems to inadequately developed plastic cones gave unimpressive end results. Since then AR have completed an extensive development programme, resulting in a new set of budget models. The *18* is the middle-sized system, selling at a typical £119 a pair.

This compact two-way design uses a 210mm frame, 165mm cone bass/mid unit, plus 19mm cone dome tweeter. Both radiating elements are plastic, graphite-loaded polypropylene for the larger driver and polycarbonate for the ferrofluid-cooled tweeter.

During development it was discovered that the bass/mid unit possessed a naturally flat response with a convenient rolloff near the intended crossover point. Experiment confirmed that the system could work without an electrical crossover to this unit, and that a single capacitor feeding the tweeter would complete the design. The overall acoustic slopes approximate to 12dB/octave, with the ferrofluid damping helping to establish a defined tweeter bandpass. One outcome of the simple crossover design is that the amplifier is directly wired to the bass/mid unit. Past experience suggests that if such a system can be made to work correctly, this may confer benefits in terms of clarity and definition.

Built largely from 17mm chipboard, the vinyl-clad enclosure has a sealed-box volume of 15.4 litres, loading the bass unit to system resonance at 85Hz. The grille is satisfactorily shallow and rebated. Electrical connection is by 4mm socket/binders. Placement on stands is recommended, fairly close to the rear wall — 0.4 — 0.6m should be a good starting point.

SOUND QUALITY

Improving on its predecessors, the *AR18* scored an average rating while being priced well below. In terms of tonal balance it did sound 'small' for example with a lack of body on piano, but this was not too serious. The bass was nicely articulate, if too dry in the lower register. The midrange seemed somewhat forward, but balanced quite well through to the treble. Stereo imaging gained an overall 'average' rating, but more dynamic clarity was apparent than is usually found in speakers of this price. Again of average quality, the treble was fortunately unobtrusive. Quite good power handling was shown at the higher test levels.

LAB REPORT

In anechoic free space the *'18* provided a really good axial response, albeit one which showed some treble improvement when the grille was detached. The reference sensitivity was a high 90dB/W, with the associated −6dB bass rolloff at 60Hz. Fair bass should be available down to 50Hz, if somewhat attenuated. The general trends are best seen at the 2 metre measuring distance, in particular a rising output through the midrange with a moderate variation in output.

The off-axis curves were poorer than usual, partly because the high crossover frequency operates the bass/mid unit in its more directional region. The above-axis result was also unpromising, so the loudspeaker should be at or directed towards head height. The overall indications were of a 'light', 'forward' balance with some 'lumpiness'.

With a power handling of 60W, up to 103dBA will be possible from a stereo pair. Amplifiers down to 10W per channel will provide sensible sound levels provided party use is not envisaged. Rated 'good' in terms of amplifier loading, the impedance characteristic was fairly even, dipping to a minimum of 5 and averaging 6.5ohms. Most amplifiers will not find this speaker any problem to drive.

Measured in the listening room (without the benefit of wall augmentation), the response showed some mid dominance around 1kHz, but the overall balance was tolerable and the energy reasonably uniform through the crossover region.

Distortion performance was more than competent at the higher 96dB sound level, particularly in the bass. At higher frequencies the third harmonic was held to below 1%, averaging 0.7%. At the reduced 86dB level a proportional improvement was obtained across the range.

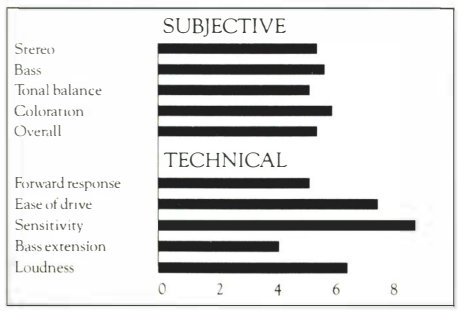
CONCLUSIONS

While the *'18* was not particularly tidy in response terms, it passed the lab tests in quite good form. Subjectively it proved better balanced than anticipated, with moderate coloration, a pleasing dynamic quality, and above average programme detail. The good sensitivity and amplifier loading ensures a Best Buy value for money rating.

GENERAL DATA

Size (height × width × depth)	45.5 × 27.5 × 21cm
Recommended amplifier power per channel (for 96dBA minimum per pair at 2 metres)	(10) −60W
Recommended placement	on stand, near wall (0.5m)
Frequency response, within ±3dB, at 2 metres	65Hz to 20kHz
Low frequency rolloff (−6dB point) at 1 metre	60Hz
Voltage sensitivity (ref. 2.83V, or 1W into 8ohms at 1 metre)	90dB/W
Approximate maximum sound level (pair) at 2 metres	103dBA
Impedance characteristic (ease of drive)	good
Forward response uniformity	average
Typical price per pair, inc VAT	£119

PERFORMANCE SUMMARY



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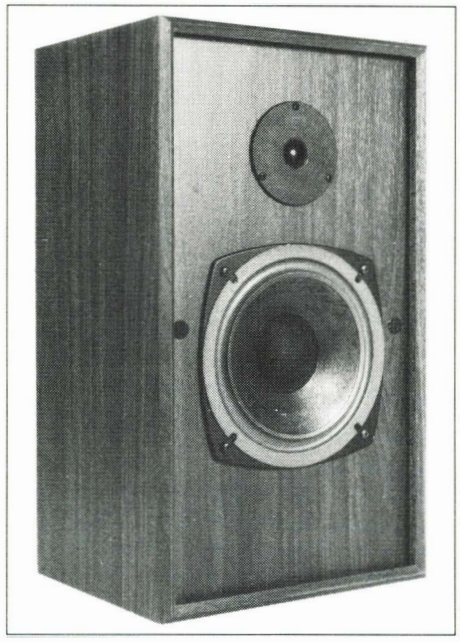


Akroyd have been building loudspeaker systems for a number of years, and although we had unpromising results with one of their earlier models a few years ago, we received the recent A25 model, said to be a relative of the *Coniston*, for 1986. This fair-sized compact system costs a competitive £100 a pair considering that the vinyl-covered sealed-box chipboard enclosure contains a volume of 25 litres, and that this is a three-driver system.

The 220mm frame, bass driver has a quite lightweight 160mm cone resulting in a speaker system resonance of 72Hz. Underdamped at low frequencies, output was actually well maintained down to 40Hz. The main midrange driver employs a coated pulp cone with classic flared profile, an inverted half-roll polyurethane foam surround, and a pressed-steel chassis, the latter strangely showing premature signs of rust — perhaps it had been stored in a damp environment? The treble is handled by the popular Danish VIFA 19mm soft plastic dome, a variation of the long-established SEAS equivalent.

The enclosure is built from 11mm stock and is devoid of bracing. It is acoustically damped by a couple of layers of polyester fibre, but the walls are untreated, leaving the panels a touch resonant. The grille is a plus feature, being cunningly located in a concealed groove in the picture frame front of the enclosure, and formed of 25mm thick acoustically transparent foam. We found a steel disc cemented to the inside of the rear panel, but could not discover its purpose.

Electrical connection is *via* the usual combination 4mm socket/binding posts. The high quality hard-wired crossover uses air-cored inductors and Mullard film capacitors. The crossover slopes are electrically 12dB/octave, but will be higher order in practice due to the drive unit characteristics.

Sound Quality

The A25 scored below average on blind listening, but not disastrously so. Somewhat inconsistent with different program, the panel showed noticeable divergence of opinion as to its merits. Coloration altered piano tone, adding some 'nasal' and 'boxy' emphasis. Taken overall the sound seemed fairly well balanced, yet the treble drew attention to itself, occasionally sounding isolated or exaggerating background hiss in the program. The bass was well controlled with even extension to the lower frequencies.

Stereo imaging was interesting — not particularly well focused, but showing good 'attack' and some resolution of the space and ambience in recordings. Depth was weak, but the system showed some life and dynamic impact.

Lab Report

The A25 has an average sensitivity of 87dB/W, indicating a minimum power of 12 watts. A practical maximum of 75W will provide peak sound levels of 100dBA in a typical room, and the bass was more extended than average reaching down to 52Hz, −6dB.

The alignment was close to ideal. An attenuated but extended output was obtained down to 30Hz, while some mid prominence is associated with a notch at 1kHz (the marker position). At higher frequencies the treble looks nicely even, if over-extended in the high range.

The Akroyd looked rather primitive on the axial reference response at 1 metre. A valley may be seen at 1kHz, apparently due to a drive unit resonance mode, while beyond this point the output recovered, but showed some uneveness coupled with a slight treble lift. With smoothing at 2 metres these features still persisted, and were in fact more clearly defined. Within the obvious irregularities the off-axis traces were actually very well controlled, proving that the 'lumps' were not crossover related.

Just touching the 6.4ohm baseline, this speaker proved easy to drive, with an average impedance value of 10ohms. Distortion levels were poorer than average particularly at 96dB, but improved at the lower 86dB level.

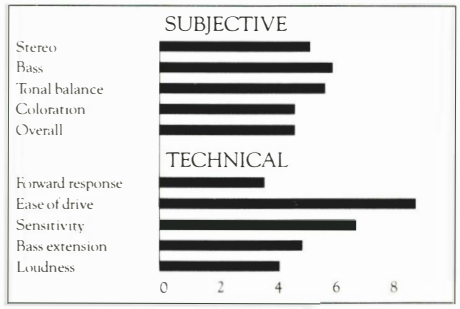
Conclusions

The results for this speaker were rather mixed, both for the lab tests and the auditioning. The indications are that it may not be to everybody's taste, but that it is still worth sampling. Decently sized for the price and with fair bass performance, it has done enough to achieve recommendation, but a personal audition is strongly advised.

General Data

Size (height × width × depth)	51×29.5×24cm
Recommended amplifier power per channel	
(for 96dBA minimum per pair at 2 metres)	(12) −75W
Recommended placement	on stand near wall
Frequency response, within ±3dB, at 2 metres	see graph
Low frequency rolloff (−6dB point) at 1 metre	52Hz
Voltage sensitivity	
(ref. 2.83V, or 1W into 8ohms at 1 metre)	87dB/W
Approximate maximum sound level (pair) at 2 metres	100dBA
Impedance characteristic (ease of drive)	good+
Forward response uniformity	below average
Typical price per pair, inc VAT	£100

Performance Summary



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The '100 is the smaller brother of the successful *DM110*, and follows many of its sibling's good engineering features. For example, the 190mm bass driver chassis is a die-casting, the 145mm flared pulp cone has surface damping treatment and a generous magnet provides the energy.

Our samples were finished in a good quality 'black ash' vinyl. The enclosures are built from plain 15mm chipboard, with an internal volume of 11 litres. A sealed-box design, system resonance was a rather high 100Hz.

Crossing over at around 3kHz, the network is essentially third order, 18dB/octave and uses five elements plus an attenuating resistor. The 25mm soft plastic dome tweeter (made by B&W) is protected by a user-replaceable fuse.

The grille baffle is made from 15mm stock, unrebated, and is best detached for serious listening. Free space or shelf mounting is possible. Electrical connection is made *via* 4mm socket/binding posts.

Sound Quality

The '100 romped through the listening tests with a substantially 'good' score, which is very good for the class. Sounding a trifle 'loud' and light-weight in tonal balance, it provided an even, well-integrated sound, with consistently high levels of both detail and clarity.

Stereo focus was good, with quite good representation of depth and recorded ambience. Perspectives were nicely handled, while the coloration was fairly low throughout the range. It proved a bit shy in the low bass but the upper bass was both clean and tuneful. Good power handling was shown up to 75W above which point some detail was lost.

Lab Report

On axis at the reference 1 metre distance, this speaker proved its pedigree by providing a ±2dB output from 80Hz to 20kHz. The grille was acoustically poor, as the solid line (grille on) showed. The reference sensitivity was 89dB/W, above average, and the −6dB rolloff occurred at 75Hz, a higher than usual frequency.

Pair matching was very good. Maximum sound levels of 103dBA are possible and a minimum amplifier power of 10 watts per channel is indicated.

At 2 metres microphone distance, a well integrated set of curves is seen, with only minor variations over the various axes. The overall balance was pretty good.

The fine sensitivity was not compromised by the impedance, which did not fall below 6ohms and averaged 8ohms. Driven to a 96dB sound level the distortion results were good, averaging 0.3% above 300Hz and well balanced below that frequency. By 86dB, a general improvement has occurred with second harmonic falling to negligible levels above 300Hz.

While the low frequency range showed some attenuation, the room response illustrated the finely balanced midrange and the integrated treble of this well engineered performer.

Conclusions

A fitting companion to the '110, the '100 managed to establish a fine performance in its own right, despite its competitive pricing. It sailed through both the lab and the listening tests, proving to be sensitive, clean sounding, and offering good stereo. It suits shelf or stand mounting and offers very good value. A Best Buy classification is mandatory.

Reassessed. First reviewed 1985. Current typical price £100

For graph references see issue No 41

BEST BUY

B&W DM110

B&W LOUDSPEAKERS LTD, MARLBOROUGH ROAD, CHURCHILL INDUSTRIAL ESTATE, LANCING, WEST SUSSEX. TEL: (0903) 750750

Available for some years now, the '110 has been a highly successful loudspeaker. Built to a tried and tested formula, this success seems due to a skilful balance of performance, engineering and fine value. A two-way model of some 22 litres internal volume, it is reflex-loaded by a 5cm diameter port, backed by a 7cm tube.

Bass and midrange frequencies are handled by a 220mm flared pulp cone unit, built on a substantial diecast frame with six hole fixing. A B&W-built unit is also used for the treble, a 25mm soft dome plastic foil unit with cast plate.

The enclosure is well finished in a 'walnut' vinyl material, while the grille and its thick non-rebated frame can be detached. 4mm socket/binding posts are fitted at the rear. The crossover is said to be 4th order acoustic Butterworth, achieved by a good quality 2nd order internal network in conjunction with the drivers' acoustic responses. Acoustic foam is used to provide internal absorption.

Sound Quality

Despite its budget price the '110 scored 'above average'. A good midrange was solidly backed by a lively, articulate quality, and the speaker showed a pleasing transparency with good rendition of fine detail.

Tonally it was well balanced, with just a hint of untidiness at the response extremes; in the extreme treble, a touch of 'tizz' was evident while the bass extreme sounded a little underdamped. Some box coloration was present despite the fine overall effect, and this occasionally made itself apparent. Stereo images were well focused, particularly with the grille detached, and the '110 made a surprisingly good attempt to recreate depth of image. High powers were also handled very well.

Lab Report

An excellent pair match was shown, certainly within ±0.5dB limits over the whole range. The reference response was very good indeed, marred by a ripple at 5kHz to 8kHz which was removed by detaching the grille. Sensitivity was a high 89.5dB/W with the remarkable response of ±2dB, 65Hz to 19kHz. The −6dB LF point was typical for the type at 56Hz, and the system is well tuned.

A 350W peak programme signal was handled without damage but 100W peak would be a fairer rating, allowing a generous maximum sound level of around 104dBA for a stereo pair, near disco levels! Out at 2m the forward response family of curves was very good, bar the 15° vertical off-axis response. This suggests that fairly high stands should be used, with the treble units close to ear level. Good driver integration was shown here particularly in the lateral axis.

Even at 96dB sound pressure level, the speaker produced only moderate distortion levels of under 0.3% midband, and this was mainly the less harmful 2nd harmonic. At 86dB and above 200Hz 3rd averaged 0.2%, and 2nd still less. These are very fine results.

The impedance curve gave no cause for concern and essentially represents an 8ohm system of typically good behaviour; no decent amplifier should find this speaker a problem.

In the listening room, the computer averaged response was impressive too. Good output can be seen down to 40Hz with a notably even and well matched midband, while the treble rolloff also conformed to an even axial output.

Conclusions

This well engineered loudspeaker provides good sensitivity with low distortion. The amplifier load is good, the responses even and the tonal balance most presentable. The sound quality is most competitive and the power handling exceptional, while its lively, transparent quality consistently pleases. Overall this is a clear candidate for Best Buy status.

Reassessed. First reviewed 1984. Current typical price £140

For graph references see issue No 41

RECOMMENDED

CASTLE CLYDE

CASTLE ACOUSTICS LTD, SHORTBANK ROAD, SKIPTON. N. YORKS BD23 2TT.
TEL: (0756) 5333

Possessing a 9.8 litres internal volume, the *Clyde* is reflex-loaded by a small ducted port, 28mm long by 37mm in diameter, which does more for the power handling than the bass extension. Both drivers are made by Castle; the lightweight pulp-cone bass/mid unit is built on a 130mm frame, and is partnered by a unique 30mm plastic cone/dome tweeter using a phase-corrected diaphragm. The undamped chipboard cabinet is also made by Castle themselves, having a fully finished teak veneered exterior with a well-designed, acoustically favourable foam grille. A 4-element crossover is fitted with fuses for each driver, accessible through the bass unit aperture.

Flush-mounted spring clip terminals are used for electrical connection, and an acoustic foam lining provides absorption within the enclosure.

SOUND QUALITY

The *Clyde* was felt to sound a little 'small' with a degree of 'forwardness' in the midband, but negligible accompanying 'loudness' or 'shout' was apparent, and the general effect was smooth and well integrated with good detail and natural tone colour. On occasion the treble could sound a little 'sibilant' and 'edgy', while some coloration was also identified, mainly of the 'boxy' kind.

The imaging was clearly defined with some depth and good lateral precision over a wide listening angle. Low bass notes were lacking in power, but the balance was surprisingly good if tending to be slightly 'light' and 'middy' in character.

LAB REPORT

The test samples showed a good pair match, measuring typically +/−1dB: a fine result for a speaker in this price category. Sensitivity was indeed high at 89.5dB/W, and was uncompromised by the impedance/amplifier loading, the latter rated as 'good' and averaging 9ohms. As expected the low frequency range was somewhat curtailed with a −6dB point at 64Hz, but the axial reference response was inspiring, meeting fine +/−2.5dB limits overall, and showing a promisingly even balance.

Under ⅓-octave analysis at a 2 metre measuring distance the output was excellently uniform and integrated; in this respect the system illustrated an almost textbook performance. However the tonal balance showed a gentle rise in output with increasing frequency, with a mild but discernible hump in the treble region centred on 15kHz.

The averaged room response in energy terms did suggest some mid prominence between 600Hz and 1.5kHz, but the overall trend above 1.5kHz was very good, and close to the theoretically ideal characteristic. While the low frequency range had some depression coupled with an early rolloff below 50Hz, it was otherwise fairly uniform.

With comfortable sound levels achieved on as little as 10W per channel, this speaker will happily accept 50W unclipped programme without blowing fuses, thus allowing up to 102dBA sound levels, which is quite loud considering the box size.

CONCLUSIONS

Now a well-established model, the *Clyde* is a tidy little performer which packs a surprising punch in terms of a clear, even and lively sound. It offers a high sensitivity and is an easy amplifier load, giving good dynamic range with moderate distortion, plus good finish and engineering.

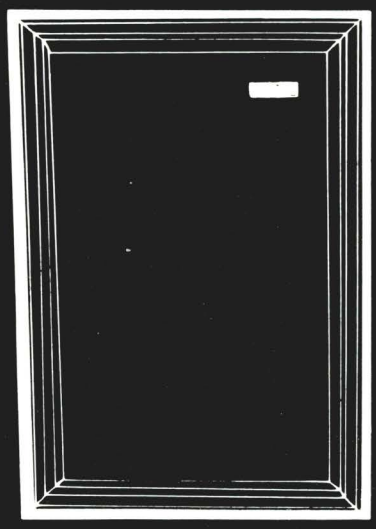
Re-auditioning in 1986 with a current version suggests perhaps that the *Clyde* is at last beginning to show its age, with slightly below average results overall. Considering the low price this is still a good result, though our recommendation is now perhaps a little less enthusiastic in the light of increased competition.

Re-auditioned. First reviewed 1981. Current typical price £119

For graph references see issue No 41

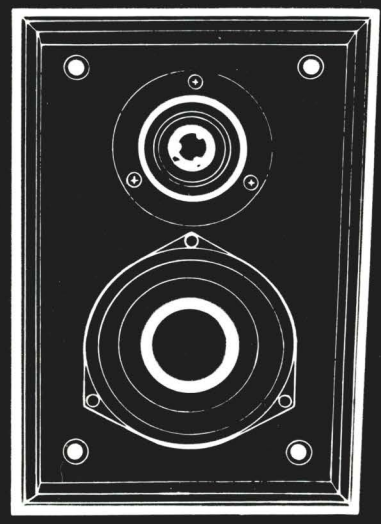
ROYD LOUDSPEAKERS

From A7 to Coniston R

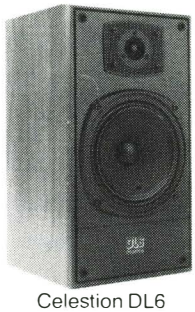


Value for Music

Royd Loudspeakers, Unit A6,
Stafford Park 15,
Telford, Shropshire.
Tel: 0952 617511



Mordaunt Short MS10



Celestion DL6

Celestion DL4

RECOMMENDED BY THIS MAGAZINE

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BEST BUY

CELESTION DL4

CELESTION INTERNATIONAL LTD, DITTON WORKS, FOXHALL ROAD, IPSWICH, SUFFOLK IP3 8JP.
TEL: (0473) 73131

by David G. Prakel

The author of the loudspeakers volume, Martin Colloms, was called in as design consultant on the Celestion *DL* series. Consequently the review is written by DGP, based on the comparative measurement and blind listening data generated during the test programme.

Smallest of the three is the *DL4*. This 10 litre box is styled to capitalise on the association with the *SL6* while the 25mm soft plastic film tweeter has a front-plate ribbed in the manner of the *SL6*/*SL600* trim plates. The brown painted Medite baffle has been divided with painted lines to follow the *SL6* 'modular' appearance.

A 165mm paper-coned mid/bass driver has been chosen which, coupled with reflex loading, enables the system to achieve above average sensitivity.

The 12mm chipboard carcass has a recessed back panel for stiffness and is neatly chamfered around the front edge to give a smooth transition to the moulded plastic grille frame. Michell gold-plated binding posts have been used — an 'audiophile' touch unusual in a £100 speaker.

An eight-component crossover is hard-wired to the back of the moulded terminal block — the two drivers crossing over just below 3kHz. The highish sensitivity of the finished system allows even modestly powered amplifiers to produce fair levels with these speakers.

Sound Quality

There was no disagreement about the considerable strengths and the few compromises in this speaker when presented in 'blind' conditions to the listening panel. All listeners, particularly those seated on-axis, commented positively on the stereo depth imaging ability, but no one was fooled into thinking this was a large speaker as extended bass simply wasn't there. However the bass was always described as tight and tuneful and the overall performance dynamic, exciting and informative.

The only real criticism of this design came from its top end performance which was variously described as 'shrill' or 'whistly'. Later listening tests confirmed that the speaker sounds best on tall stands with some reinforcement from a back wall, say within 0.5m.

Lab Report

The 1m on-axis plot showed a controlled bass rolloff with just a trace of upper bass prominence, the −6dB point at a high 85Hz suggesting that the speaker is best used fairly close to a room boundary. Around the crossover region there is some discontinuity in the response plot, and to some extent in the in-room analysis which also showed the limited bass energy of this system. Good dispersion characteristics were shown by the family of 2m curves, suggesting a strong stereo performance. However the 15 degree above axis plot has a 'treble-strong' balance which indicates that the speakers should be auditioned with the tweeter at least at ear height. Tall stands close to a wall are indicated.

At 96dB sound level, the major distortion peak is a relatively innocuous 2nd harmonic, rising to just over 3% at 200Hz. A tiny tweeter irregularity can be seen around 8-10kHz but the general distortion above the 200Hz centred peak is well below 0.3%.

The impedance plot shows an unremarkable dip to 6.5ohms between 5k and 10kHz.

Conclusions

Taking into account the fact that the *DL4* sells for just under £100 its performance in blind listening tests and in later sighted listening tests is a considerable achievement for the price. This is not a cheap 'audiophile' quality speaker but a design which will produce meaningful musical results when partnered with an inexpensive amplifier and a typically dull budget cartridge; brighter sources may sound 'spitty' and 'hard' however. The strong stereo performance and controlled bass would indicate Best Buy status at this price.

Reassessed. First reviewed 1985. Current typical price £114

For graph references see issue No 41

RECOMMENDED

CELESTION DL6

CELESTION INTERNATIONAL LTD, DITTON WORKS, FOXHALL ROAD, IPSWICH, SUFFOLK IP3 8JP.
TEL: (0473) 73131

by David Prakel

The author of this volume, Martin Colloms, was called in as design consultant on the Celestion *DL* series. Consequently the review is written by DGP, based on the comparative measurement and blind listening data generated during the test programme.

Though similar in principle to the *DL4*, the *DL6* has a considerably larger box. The same 25mm plastic dome tweeter has been used but this time it is crossed over to a 200mm paper mid/bass unit built in a substantial cast chassis and with an inverted PVC roll surround. Paper-pulp-coned drivers with large magnets keep sensitivity of both the models above average — Celestion quote 89dB/W/1m.

The *DL6* reflex-loaded with the port venting through the back panel of the speaker to maintain the visual consistency of the range. The same chamfered box front and tapered grille frame give the speaker a distinctive appearance and reduce the frontal area of the speaker to some extent. The carcass is produced in 16mm chipboard, again with a Medite baffle and fibre filling.

The eight-component crossover is to the same layout as the *DL4* (12dB slopes) again hard-wired and with the components glued to the back of the terminal block, which carries gold-plated Michell 4mm binding posts. Heavy gauge internal wiring is used.

Sound Quality

In the panel listening tests the *DL6* rapidly established itself as a more extended and refined version of the *DL4*. The same strong imagery and lively informative sound was there but the bass was considerably more extended and a degree 'richer'. Treble was slightly 'whiskery', described as being slightly 'gritty' or 'scratchy'. Though on some programmes the speaker could sound a little 'whispy' or 'thin' it was not marked down for this.

The *DL6* gave considerable insight into the scale of music and produced a spacious sound retaining details of the ambience of the recording venue. However, off-axis listeners seemed less able to appreciate the speakers' imaging ability.

Bass was surprisingly controlled and extended for a speaker at this price. The *DL6*'s ability to produce a coherent sense of space with wide dynamic range, plenty of detail and good low end control helped it do well in both 'blind' and later 'sighted' listening tests.

Lab Report

The 1m axial plot showed evidence of the 3kHz crossover point and a slightly ragged treble output rising to peak at 10kHz (about 2dB up on the 1kHz level). The −6dB rolloff point in the bass comes at 60Hz and the upper bass peaks before rolling off into the midband trough. The twin peaks were shown also in the 2m plots. The off-axis curves indicated well controlled dispersion though again there is a 'glitch' in the 15° above-axis plot around the crossover point. As with the *DL4*, the '6 should be used on stands to aim the tweeter towards the listener's ear.

The in-room plots gave a very even smooth output with some evidence of the crossover notch but a well extended low-end.

Conclusions

The control and power embodied in this design sets it a way apart from the run-of-the-mill £120 speaker. Particularly good when pushed hard by a large amplifier, the *DL6* produced none of the listener fatigue generated by lesser designs at this price. Bass performance, stereo imagery and balance were all above average though the treble performance has been bettered in this price bracket. The balance of performance strengths, however, enables us confidently to recommend the *DL6*.

Reassessed. First reviewed 1985. Current typical price £150.

For graph references see issue No 41

BEST BUY

GOODMANS MAXIM

GOODMANS LOUDSPEAKERS LTD, 2 MARPLES WAY, KINGSCROFT CENTRE, HAVANT, HANTS.
TEL: (0705) 486344

In recent years, the British loudspeaker company Goodmans has introduced new models nostalgically named after the classic M-series designs produced two decades ago. We have already seen the reincarnated *Mezzo* and the *Magnum* in recent years, and have now received perhaps the most famous of all. The *Maxim* was a true miniature of exceptional quality for its time, setting a pattern for many other commercial models leading up to the BBC *LS3/5a* design.

However, times change. While the new *Maxim* is certainly a true miniature, in real terms it is far less expensive than its predecessor. The veneered case of the original has been replaced by a vinyl-clad chipboard, and the drivers are not all of Goodmans manufacture. The *Maxim* is actually one of the cheapest models to be included in this issue, with a typical retail price of around £70.

This speaker is intended for stand mounting, not too close to a rear wall. The bass reflex type enclosure has an internal volume of only 5 litres, and is tuned by a small ducted port 30mm in diameter and 50mm long, fitted to the rear panel and effective at around 70Hz. The panels are 12mm thick, and polyester fibre provides internal absorption.

A two-unit design, the bass/midrange driver has a 130mm steel frame and a 100mm flared pulp cone with vinyl half-roll surround, and uses a decent magnet. The treble range above 4kHz is covered by the familiar Audax 12mm plastic cone/dome unit which has ferrofluid cooling/damping.

The grille is 12mm thick and unrebated — better left off for more serious listening. The crossover has generous power handling capacity and provides nominal 12dB/octave slopes. Electrical connection is *via* combined 4mm socket/binding posts.

SOUND QUALITY

The *Maxim* scored well for its price in the blind listening tests. In contrast to many small inexpensive systems, which tend to have a 'loud' quality, almost 'shouting' at the listener, the panel found the *Maxim* was pleasantly balanced, with a broad, even midrange. Low bass was understandably absent, while upper bass was somewhat muted, but managed to appear articulate and tuneful. The treble was more than satisfactory, sounding nicely balanced, and showing pleasing detail without drawing excessive attention to itself.

Coloration was quite good and the mid detail was presented well. While clearly a small box, it made no excuses; it just got on with the job. Stereo images were well focused, with fine width and acceptable depth.

LAB REPORT

The sensitivity was only a little below average at 85.5dB/W, so the *Maxim* may be used with amplifiers from 20W per channel up to a sensible maximum of 50W. Acceptably loud 97dBA maximum in-room sound levels will be possible from a pair.

The reference response on axis at 1 metre was pretty good, measuring ±2.5dB 130Hz — 20kHz, though there was a hint of midrange excess and inevitable low frequency deficiencies with −6dB at a high 82Hz. The forward response group at 2 metres gives a better idea of the sound energy reaching a normally seated listener, and this showed very good characteristics, generally uniform with excellent integration. Uncritical of precise listening axes, this speaker offered a consistent response.

The impedance fell to just below the 8ohm limits at 350Hz, but typically held around 10ohms which is a relatively straightforward amplifier load.

This loudspeaker behaved well under power peaks of up to 75W, and achieved satisfactory swept distortion results at the 86dB test level. Overall, second harmonic held to about 0.8% while the more important third harmonic was typically 0.3%. The higher 96dB test level was hard on this miniature, but it coped pretty well even at low frequencies.

The computer-averaged room response confirmed the smooth broad midrange character of this model, neatly demonstrating the excellent mid/treble balance and the associated crossover integration.

CONCLUSIONS

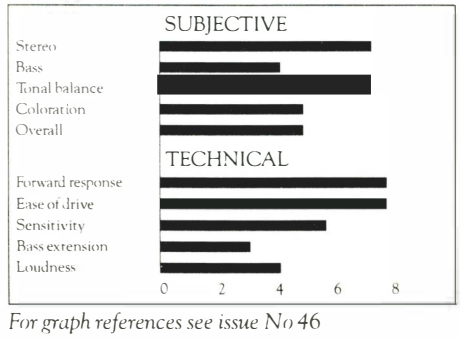
Perfect speakers cannot be had for this price, However the *Maxim* achieved much of the midrange and treble quality of more costly models. Nicely balanced, it performed competantly in the lab tests and scored well for its price on audition. A comfortable budget miniature, it gives sound value and achieves a Best Buy rating.

Note: The author provided a private opinion on an earlier version of this model for the manufacturer.

GENERAL DATA

Size (height × width × depth)	26 × 17 × 21cm
Recommended amplifier power per channel (for 96dBA minimum per pair at 2 metres)	(20) – 50W
Recommended placement	50cm stand, 0.5m from wall
Frequency response, within ±3dB, at 2 metres	120Hz to 20kHz
Low frequency rolloff (−6dB point) at 1 metre	82Hz
Voltage sensitivity (ref. 2.83V, or 1W into 8ohms at 1 metre)	85.5dB/W
Approximate maximum sound level (pair) at 2 metres	97dBA
Impedance characteristic (ease of drive)	very good
Forward response uniformity	excellent
Typical price per pair, inc VAT	£70

PERFORMANCE SUMMARY



For graph references see issue No 46

RECOMMENDED

JPW P1

JPW LOUDSPEAKERS LTD, PO BOX 31, PLYMOUTH, DEVON PL1 1YH.
TEL: (0752) 784284

Least expensive of a range of speakers designed and produced by a small UK company, the *P1* is a standard-formula budget two-way design. Selling for a modest £115, it is distinguished by a real wood veneer in a price category where most are vinyl coated. The cabinet is a 19 litre sealed-box, solidly constructed from 19mm chipboard, its interior lined with acoustic fibre. The 9mm thick grille panel is unrebated.

Bass is covered by a 200mm VIFA unit with a modest magnet and a straight-sided pulp cone. Treble is allotted to a second VIFA unit, a 19mm polyamide soft dome. A standard four-element 12dB/octave crossover divides the signal electrically.

SOUND QUALITY

The original *P1* scored below average on the tests, but not seriously so in view of the modest price. Panel comments were mixed. Over and above a basically satisfactory sound, criticisms of a 'boxy' and 'thickened' effect were made, and while the bass was respectable it lacked real extension. The tonal balance was lightweight and the upper range showed some uneveness, varying in effect according to programme. Both a sharpness and a 'wiry' coloration were evident, and the upper treble was sometimes rather prominent. Stereo images were quite well focused, but again the depth effect was variable with different program. Sometimes it sounded OK, but on occasion the sound was described as rather two dimensional.

Subsequent 1985 & 1986 audition of later samples showed significant improvements in midrange 'sweetness' and mid/treble integration, though the 'bright' balance was still noted.

LAB REPORT

Pair matching was very good, within ±0.3dB over the whole range. Reference sensitivity was high at a mean 90dB/W, and with a 100W power handling, a pair will be capable of 105dBA; even 15W amps will give quite decent sound levels. The −6dB bass rolloff came in at a typical 60Hz and despite the grille rebating, a significantly smoother response was obtainable with grille removed.

Out at 2 metres, the smoothed output still showed some tendency to 'lumpiness', with a plateau around 1kHz and minor peaks at 15kHz. Nevertheless ±2dB limits sufficed for an 80Hz to 20kHz response. Driven to the 96dB sound level, requiring only a modest 4W input, the JPW distortion was about average at around 1% over most of the range. At 86dB, third harmonic distortion was lower at 0.3%, while second remained much the same. Compression measured −1.4dB, poorer than average, but intermodulation was rather better, at −44dB.

From the impedance graph, the system resonance was seen at 88Hz. The impedance variation was small, averaging 7ohms, with a small dip to 6 at 15kHz, which is pretty harmless. In view of the high sensitivity, this loudspeaker should not present any problems for any modern amplifiers.

The room-integrated response illustrated the 'lumpy' nature more clearly, with an almost three-humped response along with a forward midrange. The treble 'bites' a little at 5kHz, and while the bass was fairly extended, it rolled away a little too soon. Realignment to 88dB plus better driver integration at the crossover would help matters a lot here.

CONCLUSIONS

Despite the above discussion of its various character quirks, the *P1* remains a well-crafted, well-finished speaker offering a good general performance. The subjective ratings, enhanced by the improvements of subsequent samples also suggest good value. It is both sensitive and easy to drive, while progressive refinement has maintained its competitiveness by 1986 standards, though a personal audition is advisable, to see whether its tonal quality appeals to you.

Reassessed. First reviewed 1984. Current typical price £115

For graph references see issue No 41

BEST BUY

MISSION 70 II

MISSION ELECTRONICS, STONEHILL, HUNTINGDON PE18 6ED.
TEL: (0480) 57477

Now officially in *Mark II* form, the '70 is Mission's least expensive speaker, whose performance in some areas threatens several of its larger brothers in the Mission speaker range.

A two-way miniature, the '70 has a sealed-box volume of 13 litres, which loads the custom 170mm pulp cone bass/mid unit. Both this and the tweeter are Danish, the latter comprising a 19mm polyamide dome, ferro-fluid damped and built by VIFA. The crossover is of good quality, 12dB/octave acoustic, and uses three electrical elements.

The cabinet is nicely finished in vinyl 'black ash', with a deep grille which is integral with the enclosure. In fact the cabinet comes apart as two shells, locked together by four capped screws at the rear. A fibre wad provides for the internal absorption, while electrical connection is made by sturdy 4mm socket-binding posts. The overall contruction quality is fairly good.

SOUND QUALITY

While use on a shelf or bookcase is likely, this speaker actually gave a good account of itself on 42cm high stands, not too far from the rear wall. The mark was a strong 'average plus', great for the price.

There are however several criticisms. The sound could show some 'sibilance' and 'edge', with a mildly 'thin' tonal balance, some 'boxiness' and a rather 'dry' bass.

Conversely it was favoured for its lively, 'quick' nature, revealing detail throughout the frequency range, and preserving the excitement of the performances. The bass was articulate and tuneful while the stereo focus was good, with a fair reproduction of the natural recorded acoustic around the performer.

LAB REPORT

The axial reference response showed a smooth, slightly uptilted character, on spec at a sensitivity of 89dB/W. The bass −6dB point was a modest 84Hz which is average for the type, with a system resonance at 97Hz. Pair matching was very good, to within ±0.5dB, and at 1 metre the speaker met fine ±2dB limits from 95Hz to 17kHz.

Out at two metres the forward response family showed an exemplary set of responses. The variation over the 15° vertical axis from straight in front was minimal, and the blending was very good in the lateral plane. The forward yet uniform nature of this design was clear enough.

Working hard at 96dB, the speaker nevertheless showed well controlled distortion, generally less than 1%. down at 86dB, still a fair level, the distortions had improved to the 0.4% level, with the low frequency range rather better than average. Compression measured an average 1.9dB while the bass-mid intermodulation was fine at −42dB.

At low frequencies the impedance dipped to just under 5ohms, and a fair rating would be 6ohms, although most amplifiers should have no problems.

Computer averaged in the listening room, the *70 II* response was less even than expected. The mid was clearly forward (noted on audition), while the bass was rather 'shy', and the upper treble a trifle 'exposed'.

CONCLUSIONS

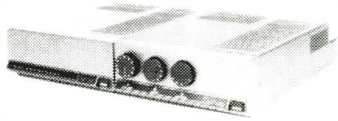
Despite the measured and auditioned tonal imbalance in the energy response, the panel liked the *70 II* for its lively, transparent quality, and here its subjective appeal served to outweigh its problems. The ratings suggest Best Buy status, but I nonetheless feel that it should be carefully auditioned before purchase.

Reassessed. First reviewed in Mark II form 1984. Current typical price £100

For graph references see issue No 41

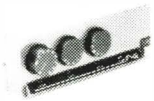
MISSION ELECTRONICS

CYRUS I
BEST BUY



PSX/CYRUS II
BEST BUY

PCM 7000
RECOMMENDED



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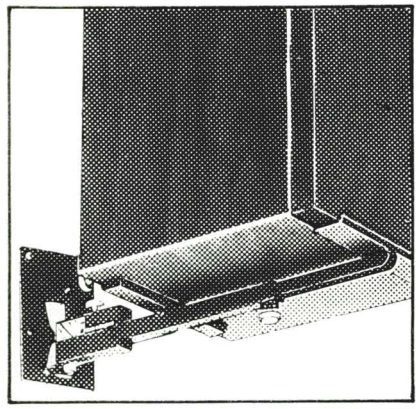

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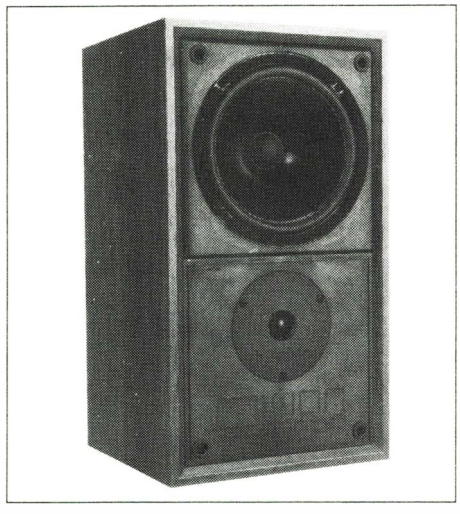


Mission have laid out in their instruction manual a well specified set of conditions for obtaining optimum sound from their loudspeakers. While many of the suggestions are sensible, their injunctions against the use of tone controls, which potentially contravene the guarantee conditions, do seem a little strange. These speakers are intended to be used almost touching a back wall, and arranged to direct the forward sound straight ahead. The resultant mildly off-axis delivery to the centrally seated listener has been compensated by the designer by adjusting the axial response.

The *700LE* is a compact two-way system that has evolved from the *70* series. The sealed-box volume of 9.5 litres produces a system resonance at 88Hz. On a normal stand, the enclosure is a little below head level for the seated listener, resulting in a time delay between the arrival of sounds from the bass and the treble units. Mission exploit this by inverting the usual arrangement and placing the tweeter below the bass unit. The system is therefore inherently approximately time aligned, which allows the use of a 12dB/octave crossover while still maintaining good drive unit integration. The bass unit is fed *via* a large ferrite core inductor, and the 19mm soft plastic dome tweeter receives frequencies above 3.5kHz by an LC combination plus attenuating resistor. Hard-wiring is used for the crossover itself, but only clip terminals for the drivers. Spring terminals are provided for the speaker cables and 4mm plugs can (just) be used! The bass/midrange is handled by a 135mm flared, doped pulp-cone unit with a foam surround in a 165mm pressed steel frame.

The main cabinet carcass is 12mm vinyl-coated chipboard, and the driver baffle is made from moulded reinforced plastic. A single layer of polyester wadding damps the interior, and the well made, rebated grille is another moulding. The system is well made and finished, and can be obtained with matching spiked stands.

SOUND QUALITY

Scoring an average mark on the listening test, this is a respectable result for the price level. Furthermore, wall-mounted systems tend to suffer from some disadvantage on test due to the altered stereo image presentation, but the *700LE* coped well here. Coloration was moderate and the sound was quite well balanced.

The treble was quite good with only moderate 'grain' at the frequency extremes. The general impression was pleasing and articulate, though some listeners felt that there would have been more transient 'attack' and 'air'. The bass was quite tuneful, while the midrange was a touch forward, though not so much so that it dominated the sound.

LAB REPORT

The sensitivity was on the high side at 89.5dB/W, helping to provide substantial room sound levels of up to 104dBA for a pair. A minimum power of 10W is suggested, while the speaker happily sustained peak inputs of up to 100W. The sensitivity was mildly compromised by the poorer than average amplifier loading, but any good 4 to 8ohm amplifier will have no difficulties here.

On axis at 1 metre, the reference response showed a bass rolloff at 73Hz, some lift in the 130Hz range due to underdamping, plus a mildly rising midrange. As the dotted trace showed, the grille was responsible for most of the treble response anomalies. At 2 metres, with the benefit of some response smoothing, the *700LE* met an 85Hz to 20kHz range within ±3dB limits. Good integraton was shown in the off-axis responses, with the output approaching virtual flatness at the designed 20° lateral angle. Distortion results were about average, typically 0.3 to 0.4% at 86dB, while second harmonic approached 2% at the 96dB sound level. Distortion was well controlled at low frequencies, considering its size and price.

The room curve was obtained on an open stand position for the sake of consistency and did not show the mid-bass lift which would be achieved by wall mounting. The mid-treble balance and integration was pretty good, though the low bass could benefit from more power relative to the midrange level.

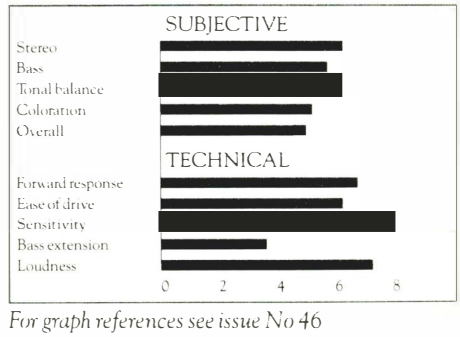
CONCLUSIONS

This speaker was well balanced for a close to the wall position. A consistent subjective performance was obtained with a complementary set of lab results. It handled power well and the good sensitivity allowed for high sound levels if so desired. The cleanest treble was obtained with the grille detached. Taken overall the value rating was respectable, and the *700LE* qualifies for recommendation.

GENERAL DATA

Size (height × width × depth)	38 × 21 × 21cm
Recommended amplifier power per channel (for 96dBA minimum per pair at 2 metres)	(10) – 100W
Recommended placement	on stand near wall
Frequency response, within ±3dB, at 2 metres	85Hz to 20kHz
Low frequency rolloff (−6dB point) at 1 metre	73Hz
Voltage sensitivity (ref. 2.83V, or 1W into 8ohms at 1 metre)	89.5dB/W
Approximate maximum sound level (pair) at 2 metres	104dBA
Impedance characteristic (ease of drive)	average
Forward response uniformity	good
Typical price per pair, inc VAT	£130

PERFORMANCE SUMMARY



For graph references see issue No 46

RECOMMENDED

MONITOR AUDIO R252

MONITOR AUDIO LTD, 34 CLIFTON ROAD, CAMBRIDGE CB1 4ZW.
TEL: (0223) 246344

The *R252* is an inexpensive, two-way sealed box speaker of 17 litres internal volume, employing a 200mm steel-framed pulp cone bass/mid-range driver plus a 19mm soft plastic dome tweeter. It is hard-wired internally including the high-power capacity, good-quality crossover network.

Unusually for this price level, the solid enclosure is finished to a high standard in real wood veneer, the panels built of 12 and 15mm board. The grille is a low profile component, made from fully-rebated plywood.

No box panel damping is used, but the interior has been lined with acoustic foam to suppress internal resonances, while electrical connection is by means of 4mm socket binding posts.

SOUND QUALITY

Initially the *R252* sounded rather below average on audition, appearing aggressively forward as well as brash. However, a bass/mid unit revision provided a significant improvement in tonal balance as well as general character, sufficient to move it up to an average score, which is good for the price.

Some colorations did remain, notably a residual upper-mid 'hardness', some lower-mid 'boxiness' and a rather 'dry' character to the sound. Low bass was rather curtailed, though upper bass was quite detailed, and the treble was also much better than before, due to the improved balance. However the treble was still felt to be mildly 'rough' and 'forward'.

Stereo images were quite well focused with moderate depth and quite clear spatial effects, and the speaker also showed a good level of instrumental detail.

LAB REPORT

Sensitivity was an above average 89dB/W, and in conjunction with a 10 to 75W power range, sound levels of up to 102dBA were possible. Pair matching was very good, while the bass register was very uniform and well damped, measuring 62Hz, −6dB, but rolling off quickly below this point. Note that this and other measurements here are for the original loudspeaker.

At 2 metres the axial response was fairly smooth meeting ±3dB limits from 80Hz to 30kHz, and dispersion was excellent in the lateral plane. However 15° above-axis a noticeable 4kHz notch appeared and we recommend using this speaker directed at ear level. In fact Monitor Audio's matching stands are designed for exactly that purpose. The forward responses were good for the type.

Room-integrated response evidenced the 'dry' nature of this speaker, with a fairly extended but shallow bass plus a slightly prominent midrange. However, the overall effect was pretty smooth.

Distortion at 96dB sound level was moderate at around 1% second and third harmonic even at low frequencies, while higher in the range third harmonic was particularly good. Further improvement was apparent at an 86dB level, with an average of 0.3% recorded here.

Bar a mild dip to 5.5ohms at 10kHz the impedance was well behaved over the range, and the *R252* was classed as a good amplifier load.

CONCLUSIONS

This powerful two-way design is well constructed for the price. Reviewed originally in 1983 it comfortably won recommendation, with low distortion, high sensitivity and a good rating for sound quality. Some minor changes in the 1984 samples were viewed less favourably, the main points of criticism being a hard and bright quality, with insufficient output in the bass. However, a new version auditioned for 1985 had improvements to the cabinet and the tonal balance. The sound quality now shows less 'boxiness' and a smoother overall effect, and this model can now be recommended once again.

Reassessed. First reviewed 1983. Current typical price £150.

For graph references see issue No. 41

RECOMMENDED

MORDAUNT SHORT MS10

MORDAUNT SHORT LTD, DURFORD MILL, PETERSFIELD, HANTS GU31 5AZ.
TEL: (0730) 80721

Rising costs are now weighing heavily on the shoulders of the quality system producers, who have been compelled to seek unusual solutions to the problems of producing speakers at the £85 a pair level. Here Mordaunt Short have made use of a small bass/mid driver with a cone just 90mm across, with a pressed steel frame to support it. This two-way system is completed by a 19mm plastic cone/dome tweeter, both units manufactured by Audax.

The diminutive enclosure has a 5.2 litre internal volume, reflex-tuned to a high 68Hz by a 30mm diameter tuned port, 65cm long, located on the rear panel. Built in plain chipboard the cabinet was well finished in 'black ash' vinyl, but the grille baffle was unrebated, with an acoustically poor profile.

A three-element crossover network aims at nominal 12dB/octave acoustic slopes, with push-on tags used for the internal wiring. 'Positec' protection against overload is included, a most uncommon and welcome feature at this price level. Electrical connection to the amplifier is made *via* 4mm socket/binding posts.

SOUND QUALITY

The panel were very consistent in their judgments, scoring the *MS10* below average but not seriously so, and in fact this is a commendable result given the group context.

On 'blind' testing, it was identified as a small box, the weak bass and 'thin' 'forward' character were noted, and particularly a blend of 'metallic brashness' in the upper midrange. Some 'boxiness' was also evident. On the other hand, it did have some appealing qualities — stereo focusing was particularly good and the sound was detailed as well as subjectively transparent. It also managed to convey some measure of the recorded acoustic.

LAB REPORT

Measured on axis at 1 metre, sensitivity was below average at 85dB, though this is good for the size. An amplifier range of 20 to 50W is appropriate, giving a maximum sound level of 98dB, sufficient for all but 'disco' domestic use. Set against the reference sensitivity, the low frequency rolloff was high at 80Hz, −6dB. Conversely, the impedance characteristic was excellent, not falling below 8.5ohms and rated as a very easy amplifier load.

The reference response was encouragingly uniform, and with the grille removed 100Hz to 20kHz limits (±3dB) were easily met, though the trend shown at 2 metres suggested some brightness as well as a shyness in the bass. Bar a small notch in the vertical axis, the forward response set looked very tidy and the drive units can be seen to integrate well.

Driven to 96dB sound level, the speaker was working near its practical limit with distortion rising to 4% at 300Hz; at higher frequencies it was more satisfactory. A useful reduction in distortion was recorded at the lower 86dB sound level with the overall result averaging 0.4%, though this was still higher than usual. Conversely, the figures at low frequencies were quite good for such a small box.

In the listening room the *MS10* provided a relatively uniform mid/treble response, but the bass was lumpy at 50Hz and lacked extension, as well as being rather deficient. A thin tonal quality was only to be expected from this.

CONCLUSIONS

Well worth considering, this recommended miniature would perform well in a bookcase location and a system fitted with a sweet-sounding cartridge. It produced a 'lightweight' sound, but this was redeemed by the low levels of subjective coloration as well as the fine clarity. The treble was also somewhat better than average for its class.

Reassessed. First reviewed 1985. Current typical price £85

For graph references see issue No 41

BEST BUY

ROTEL RL850

ROTEL HI-FI, 25 HEATHFIELD, STACEY BUSHES, MILTON KEYNES, BUCKS.
TEL: (0908) 317707

A standard two-way sealed box system, this 20 litre speaker is built in the UK. Though Rotel is a Japanese-based company, the design is UK-inspired and uses a British Elac 220mm pulp-cone bass/midrange fitted with a modest magnet and built on a strong pressed-steel frame. The treble is handled by a Peerless 25mm soft fabric dome, and the connections are hard-wired in oxygen-free copper cable, using a simple three-element cross-over network, with an additional resistor to provide attenuation for the treble. Built from 15mm thick chipboard, the enclosure is finished in black ash, and well filled with acoustic absorption. The grille panel is unrebated and 15mm thick — it probably should be discarded to get the best sound.

SOUND QUALITY

Scoring 'above average' on listening tests, the *RL850* did well in its category, and costs less than half the group average.

Some coloration was evident, namely a softening in the bass and a touch of 'boxiness' in the mid, plus a muted 'fizz' in the treble. The frequency response sounded quite even, if slightly dulled, while the upper-mid and treble lacked detail, with an inconsistency here depending on the type of programme played.

Stereo images were good, in terms of width, but central focus was not particularly strong, and depth was constrained. Despite the latter characteristic, the speaker sounded fairly 'big hearted', and could convey some of the weight and ambience present in the programme. Voice quality was quite good, and the speaker also handled high power inputs gracefully, proving quite happy up to 220W peak programme.

LAB REPORT

Pair matching was found to be very good — to within ±0.5dB, which is a great achievement for such an inexpensive speaker. The grille has some effect on the treble response and is better left off. The reference sensitivity measured an average 87dB/W; in conjunction with the generous power handling, this means that levels of up to 105dB are possible from a stereo pair, assuming that you have a large enough amplifier. Fairly smooth and well balanced, the response met ±2.5dB limits from 66Hz to 20kHz, while the −6dB bass rolloff came in at 52Hz, which is about average.

Out at 2 metres, the forward response family was fairly well integrated. A dip at 4kHz occurred above axis suggesting that this speaker ought to be at, or alternatively directed towards, ear level. The lateral responses were good.

Driven to 96dB spl, the distortion measured 1% for second harmonic, and rather less for third. Below 100Hz the usual increase to 3% or so was seen. When sound level was reduced to 86dB, distortion improved significantly to a good level, typically 0.4%. Compression was poorer than average at 2.7dB, but the bass-mid intermodulation figure was very good at −48dB.

The impedance curve indicated a normal 8ohm load, typically measuring 10ohms at higher frequencies, and posing no problem at all for a modern amplifier. Driving the listening room, the speaker produced a well balanced and extended response. Within that general trend however, the mid showed some prominence at 800Hz, while a forward energy notch was clearly present at 2.8kHz, indicating poor phase control through the crossover, leaving the treble somewhat isolated as well as uneven.

CONCLUSIONS

While some quirks have been unearthed in the performance of this speaker, the fact remains that it nonetheless offers very good value. A powerful, competent two-way system with a 200mm driver, when most in this category have 110mm, the 850 achieves Best Buy status, current production showing additional refinement.

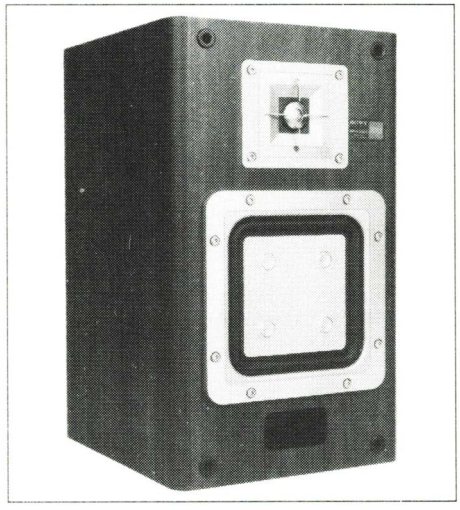
Reassessed. First reviewed 1984. Current typical price £110

For graph references see issue No 41

BEST BUY

SONY APM20ES MKII

SONY (UK) LTD, SONY HOUSE, SOUTH STREET, STAINES, MIDDLESEX TW18 4PF.
TEL: STAINES (0784) 61688
David Prakel



Sony first applied its Accurate Pistonic Motion (APM) drivers in the upmarket Esprit speaker range. The *APM22ES* then made this planar driver technology available at the £200-£250 area. The *APM20ES* reviewed here is a hybrid, marrying a true APM mid/bass driver with a metal dome tweeter dressed to look like the 25mm square tweeter of the '22, and entering the UK market at a very competitive £130.

The Japanese built 140mm square mid/bass driver is a remarkable piece of engineering in a speaker at this price. Rather than a conventional cone, an inverted 'quadropod' thin aluminium pressing moves a diaphragm made in exceptionally light aluminium honeycomb material. The die-cast chassis seen in the *APM22* is not used here, but the pressed-steel basket has been damped with mastic panels. The tweeter is a 25mm aluminium dome with a doped fabric suspension.

The cabinet is built throughout in 18mm chipboard, and finished in good quality woodgrain vinyl. The front vertical edges are rounded. The mid/bass driver, somewhat unusually, is reflex-loaded by a rectangular port equivalent to an ample 57mm diameter, backed by an angled 95mm duct.

The speakers are built — or as Sony would have it 'tailored' — to impressively high standards in Sony's German Wega factory. A good quality crossover gives second-order slopes and some driver equalisation. Binding posts which will accept 4mm plugs complete the picture.

Sound Quality

The *APM20ES* immediately impresses with its confident reproduction of space and acoustic, providing good stereo despite its rather 'positive' perceived balance. The low end of this speaker is 'rich' and a little forward but always tuneful. Bass is not oppressive leaving the sound with plenty of air.

Good midrange definition is spoiled by a touch of sibilance, which hardens into stridency when the speaker is pushed hard. Played very loud the speaker can be a little 'shouty', but this is not a great problem considering the price being asked.

Overall this loudspeaker strikes the listener as a very smooth, well-integrated performer setting a standard at this price point which equals, if not betters, many of the competing specialist UK designs. Stand mounting in free space suited it best; positions close to room boundaries tended to emphasise the already generous bass. The grille frames are cleverly designed to stand off from the baffle and the grilles had surprisingly little effect on the sound — if anything, smoothing the top end somewhat.

Lab Report

Reflex loaded and tuned to 62Hz, sensitivity was rated marginally below average at 86dB/W. Good pair matching was noted to within ±0.5dB. The −6dB low frequency cutoff was measured at 50Hz, respectably low for such a compact design.

The anechoic forward response curves showed a slight 'hole' between the drivers at 2.8kHz, though this seems to be of little subjective importance, unless lending a certain detached brightness to the treble.; The off-axis anechoic traces showed excellent dispersion, confirming the ability to produce a generous and stable stereo 'fill'.

At 96dB sound pressure levels the expected second harmonic port distortion was noted with a second hump based on 200-300Hz, no doubt adding that 'generosity' and 'forwardness' to the upper bass. A 1kHz distortion peak was little reduced at the lower 86dB level — this could well be evidence of the 'shouty' quality noted at high levels. The impedance curve dipped to 5ohms at 150-200Hz but was otherwise well controlled, the load being rated as average.

The computer-averaged in-room plot shows excellent integration and a smooth rolloff with perhaps some detachment of the mid/bass region though room effects could well predominate here. An excellent high end response however.

Conclusions

With design input from the UK, Sony has produced a much improved second series *APM20ES* with a forthright sound possessing lively bass, excellent treble clarity, easy driving, and surprisingly good stereo performance.

A thoroughly attractive compact speaker, widely available, with no serious shortcomings and many strengths, the *APM20ES* clearly deserves a Best Buy rating.

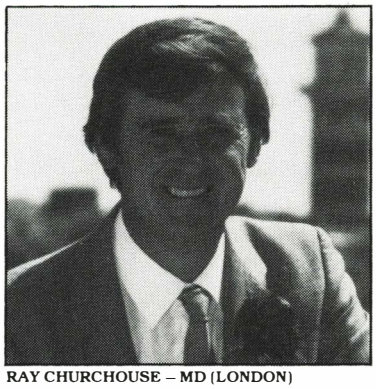
Author Martin Colloms' involvement as design consultant finds David Prakel writing this review, based on his own interpretation of the lab and listening data.

General Data

Size (height×width×depth)	43×25×29cm
Recommended amplifier power per channel (for 96dBA minimum per pair at 2 metres)	(15) −75W
Recommended placement	40cm stand, free space
Frequency response, within ±3dB, at 2 metres	50Hz to 20kHz
Low frequency rolloff (−6dB point) at 1 metre	50Hz
Voltage sensitivity (ref. 2.83V, or 1W into 8ohms at 1 metre)	86dB/W
Approximate maximum sound level (pair) at 2 metres	100dBA
Impedance characteristic (ease of drive)	average
Forward response uniformity	excellent
Typical price per pair, inc VAT	£130

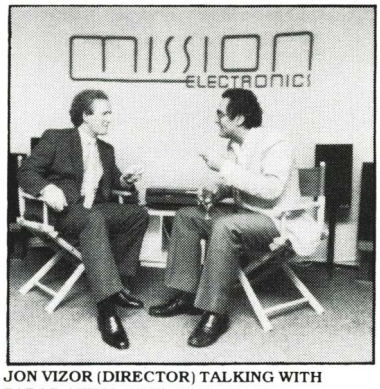
For graph references see issue No 46

The Story So Far...



RAY CHURCHOUSE – MD (LONDON)

HI-FI EXPERIENCE – LION HOUSE



JON VIZOR (DIRECTOR) TALKING WITH FARAD AZIMA (MISSION'S MD) IN THE MISSION ROOM IN LION HOUSE

EXPERIENCE AT THE BEGINNING

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The first HI-FI EXPERIENCE opened in May 1985 in the basement of Lion House Tottenham Court Road London where no less than 6 demonstration rooms were fitted out by some of the Countrys leading manufacturers such as MISSION, LINN, HEYBROOK, QUAD, KEF and B&W. The venture was such an unprecedented success hailed by both Press and public alike that other similar SPECIALIST HI-FI in-store departments were planned elsewhere in the Country. The second HI-FI EXPERIENCE opened in WARWICK followed shortly by both BRADFORD and MILTON KEYNES and December 1986 is the planned opening of the latest HI-FI EXPERIENCE also in the West End of LONDON. The factors that make HI-FI EXPERIENCE stores somewhat unique are the almost unequalled demonstration facilities which we believe are vital in showing the very real differences between items of Audio Equipment which you our customers might have shortlisted, and the enthusiastically knowledgeable staff always on hand to assist and advise.

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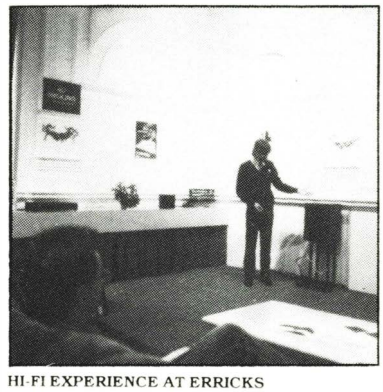

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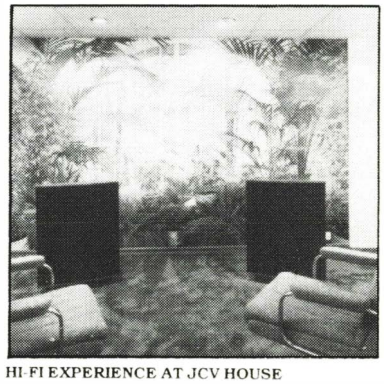
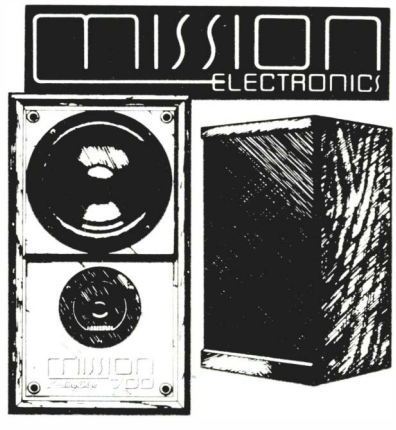


HI-FI EXPERIENCE AT JCV HOUSE



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An early *Titan* turned up rather late for the 1984 edition of *Loudspeakers*, and proved somewhat unpromising. However, since then it has been improved and was resubmitted in 1985 in full production form.

Built a little like the Mission *70*, the *Titan* uses rear mounting for its two drivers, with a fixed front grille; access is *via* the flimsy screwed-in rear panel. The sealed-box interior of 9.3 litres is damped by a loose fill of polyester fibre wadding.

The drive units originate from Japan, and include a soft dome treble, plus a 160mm steel frame bass/mid unit, the latter having a light pulp cone. In one sample the tweeter fixings were loose. The crossover has three elements plus a damping resistor and is aiming at 12dB/octave acoustic slopes. Push-on connectors are used, while the rear terminals are 4mm socket/binding posts.

Vinyl covered, the 15mm thick chipboard enclosure is grooved on the long sides to reduce panel resonance. Optimum placement is near a rear wall and the angled front means that this speaker may be left neatly in the 'straight ahead' position.

SOUND QUALITY

Scoring a straight average with little panel dissension, the *Titan* did well for its price group. The sound was described as somewhat 'boxy' with a 'forward' upper midrange plus a 'bright', moderately 'ragged' top end. On the plus side the speaker also showed a clear, open character with explicit detail, and a 'lively' nature. Low bass was absent, but upper bass was fairly 'quick' and clean.

LAB REPORT

A rising response trend was characteristic of the *Titan*, though this was not extreme at 4dB from 100Hz to 20kHz, a result expected from a design intended for wall mounting.

Pure sensitivity came out at 89dB/W, above average and uncompromised by the impedance characteristic; this happily met the 8ohm standard, so the *Titan* is rated as a very good amplifier load. System resonance was rather high at 90Hz, and from the axial response (nearfield converted at low frequencies) the −6dB bass rolloff was fairly high at 67Hz. With a power input range of 10 to a maximum of 50 watts, realistic maximum sound levels of up to 102dBA can be achieved.

Out at 2 metres this loudspeaker's forward response balance, seen in the pattern of the off-axis responses, looked well integrated with good uniformity. Pair matching was fairly good, though in the 3-4kHz crossover range up to 2dB difference was noted.

When driven to 96dB sound level, distortion was poorer than average, reaching 3% in the lower frequency range for (relatively innocuous) second harmonic. Third harmonic was variable with frequency, up to 0.8% in the midband. Reduced to a moderate 86dB sound level, third harmonic remained the same, while second showed a considerable reduction.

In the listening room the *Titan* gave a forward upper mid with some treble uneveness but a fair overall balance. The bass was smooth and well integrated even if it did decay gently in the lower range.

CONCLUSIONS

Apart from the loose tweeter on our sample, the *Titan* did quite well on both lab and listening tests, confirming its suitability for shelf mounting. It sounded much better than our early examples, and is now recommended.

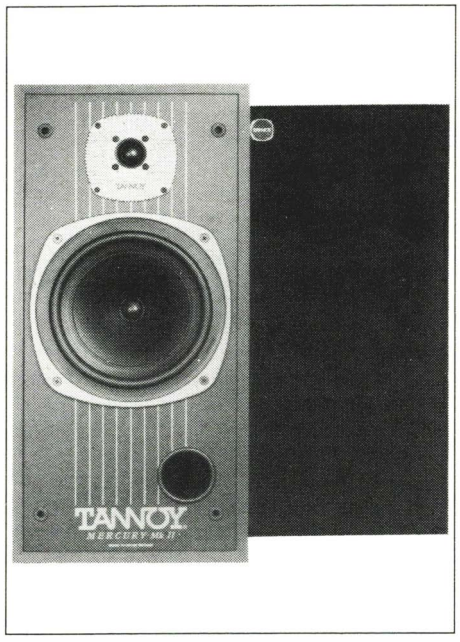
Reassessed. First reviewed 1985. Current typical price £100

For graph references see issue No 41

BEST BUY

TANNOY MERCURY II

TANNOY PRODUCTS LTD, THE BILTON CENTRE, CORONATION ROAD, CRESSEX IND ESTATE,
HIGH WYCOMBE, BUCKS. TEL: (0494) 450606



Tannoy have enjoyed a very successful run with the *Mercury* and over the past year or so have produced an upmarket derivative called the *M20 Gold*. 1986 sees the introduction of a new *Mercury*, incorporating significant design stages. The cabinet has been reshaped and is now taller, while the Audax soft dome tweeter has been replaced by a Tannoy soft plastic dome design. The polypropylene-coned bass unit has undergone continued development, while other changes relate to the low frequency tuning and the crossover network. Essentially, this may be regarded as a new loudspeaker.

The new *Mercury II* is a compact two-way model with a 20 litre internal volume, reflex-tuned at low frequencies by a 50mm front port, 105mm long. The bass unit is energised by a generous magnet and has a 155mm flared cone on a 235mm pressed steel frame, whose central area has been reinforced to prevent flexure. Mounted on a specially cast asymmetric plate, the tweeter employs a 25mm polyamide dome. The high quality crossover is built for simplicity and clarity and designed to 12dB/octave slopes with good quality components. Though the crossover is hardwired, spring clips are used to connect the drivers. Connection to the system is by 4mm socket/binding posts.

Built mainly from vinyl walnut 14mm chipboard stock, the enclosure includes a circumferential brace between the two drivers, and a lining of acoustic fibre. On our sample the grille was unrebated, and for critical listening is better left off. Ideal placement is in free space, on open stands around 35-45cm high.

Sound Quality

The *Mercury II* scored well in the listening tests, substantially beyond its price expectations and virtually repeating the success of the original *Mercury* in its day. The sound was well balanced, uniform, and well integrated. Coloration was moderate and generally well disguised; some mild 'boxiness' and 'thickening' on piano was noted, plus a touch of 'grain' and 'edge' in the treble.

The bass was very competent, showing fair extension and good control. Stereo images were well focused with a fair measure of depth and transparency. While no significant aberrations were detected in the subjective frequency response, a couple of panelists felt that this speaker was mildly 'soft' and undynamic, though their scoring did not appear unduly affected by this. Driven by clean source material, the *Mercury II* performed equally well on rock and classical sources, both CD and analogue.

Lab Report

A good sensitivity of 88 dB/W was easily established from the smooth axial response at 1 metre. The bass was quite well extended to 55Hz, −6dB, but the sensitivity was somewhat compromised by the dip in load impedance at high frequencies, to 3.8ohms over a short stretch around 6kHz; elsewhere the impedance averaged an easy 8ohms. A 10 watt minimum amplifier power is suggested, while the speaker performed ably on inputs up to 150W, permitting peak sound levels of up to 103dBA.

The forward responses measured at 2 metres looked very tidy, with excellent integration seen in the forward axes. Frequency response limits of ±3dB were easily met from 55Hz to 20kHz. Some distortion rise was noticed around 200Hz, to 3% second harmonic at 96dB for example, with a similar anomaly on the third harmonic. Tuned to 40Hz, the system handled low frequency power well, only showing more serious distortion at high powers and below 30Hz.

The *Mercury* proved to be as well balanced as it sounded on the computer-averaged room measurement, right down to 30Hz in the bass. A mild prominence was evident at 1kHz, but otherwise the curve was most presentable.

Conclusions

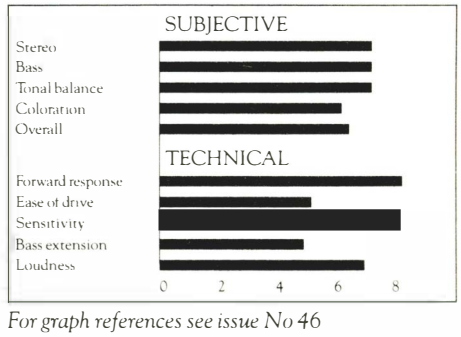
The original *Mercury* was notably well balanced, providing competent all-round performance with a sensible blend of modern loudspeaker engineering. The new *Mercury* is even better balanced, has better response uniformity and lower distortion, while the price is barely greater than when the speaker was first introduced in real terms. This genuine allrounder represents an exceptionally accurate free-space system for the money, and merits a Best Buy classification.

Note: The author provided a private opinion on an earlier version of this model for the manufacturer.

General Data

Size (height × width × depth)	50×25×23.5cm
Recommended amplifier power per channel	
(for 96dBA minimum per pair at 2 metres)	(10) −150W
Recommended placement	open stands, 45cm
Frequency response, within ±3dB, at 2 metres	55Hz to 20kHz
Low frequency rolloff (−6dB point) at 1 metre	55Hz
Voltage sensitivity	
(ref. 2.83V, or 1W into 8ohms at 1 metre)	88dB/W
Approximate maximum sound level (pair) at 2 metres	103dBA
Impedance characteristic (ease of drive)	good
Forward response uniformity	excellent
Typical price per pair, inc VAT	£150

Performance Summary



For graph references see issue No 46

BEST BUY

TOSHIBA SS 33 MK II

TOSHIBA (UK) LTD, TOSHIBA HOUSE, FRIMLEY ROAD, CAMBERLEY, SURREY.
TEL: (0276) 62222

The original successful SS 33 has undergone some refinement for 1986, with a slightly smaller and less resonant enclosure and revised performance in the crossover region. Our retesting has been confined to the listening sessions and the reference response, whose results are incorporated in the text.

Toshiba's British-designed '33 is built and tested at the UK cabinet factory responsible for the enclosure, which makes for a useful saving in transport costs as well as one less mark-up to be taken into consideration.

A moderate sized 22 litre sealed box, the plain, 15mm thick chipboard enclosure is well finished on all frontal surfaces in a 'rosewood' vinyl. The grille baffle is 15mm thick, unrebated and is best left detached for more serious listening. Large enough for stand mounting, it suits a free space position in the room, not too close to the rear wall.

The 200mm steel-framed Elac bass-mid drive unit has a nicely flared, doped pulp cone. Treble is handled by a Tonegen 25mm soft dome with the crossover essentially to a third order 18dB/octave alignment. Connection is *via* spring clips and internal wiring uses push-on connectors. The cabinet panels are undamped while the interior has a loose lay of fibre wadding for internal standing wave absorption.

Sound Quality

The original '33 scored 'above average', which is excellent for the price. The midband was essentially good with quite good balance and above average detail. The same was true of the stereo depth effect and focus. The overall effect was quite well balanced though with a distant upper mid. By contrast, the bass was a bit slow and lacked dynamics, while the treble showed some isolated 'hiss', and was not perfectly integrated with the rest.

Some colorations were present, notably a 'boxy' 'thickening' in the low mid, but this was not too serious.

However, the 1986 version showed a distinct improvement in coloration, and the sound was more 'open', fully maintaining the fine value of the original.

Lab Report

Measured at the reference 1 metre on the median axis, the '33 demonstrated an average 86db/W sensitivity. This was not compromised by the impedance, which rated as a very good amplifier load, and conformed to an 8ohm characteristic, the loading never falling below 6.2ohms.

System resonance was at 73Hz, typical for the type, while the bass response extended to a low 49Hz, −6dB. From a 15 watt programme minimum power input, this model proved quite happy up to 75 watts peak programme, and was capable of maximum sound levels of 100dBA.

A new reference response taken for 1986 showed a distinct improvement over the original. The broad sucked out mid region is almost filled, so the treble is no longer exposed. The crossover region shows better integration having a 4dB dip around 3kHz.

At 96dB sound level the distortion was satisfactory at low frequencies and improved above 200Hz, here averaging 0.3 — 0.4%. By 86dB, good distortion levels were established throughout the range.

Conclusions

This is a lot of speaker for the money. With a classic 'UK sound', the '33 sits very comfortably in a highly competitive field and, in its latest guise fully maintains this competitiveness. Its performance was nicely balanced on both listening and lab tests, and offers Best Buy value for money.

Re-auditioned. First reviewed 1985. Current typical price £80.

For graph references see issue No 41

RECOMMENDED

WHARFEDALE DIAMOND II

WHARFEDALE LOUDSPEAKERS LTD, SANDLEAS WAY, CROSSGATES, LEEDS LS15 8AL.
TEL: (0532) 601222

The tiny Diamond has a 5.2 litre enclosure, reflex-loaded by an equally small ducted port 30mm in diameter by 65cm long, positioned on the rear panel. The bass alignment is in fact 5th order since a large series capacitor is also used.

The 120mm bass unit is built on a steel frame, with treble allocated to the 19mm Son Audax plastic dome/cone tweeter. The crossover is very simple, comprising just two elements plus an attenuating resistor for the treble.

Built from plain 12mm thick chipboard, vinyl coated, the cabinet has a 12mm thick unrebated grille, and spring clip terminals are provided on the rear panel for electrical connection.

Sound Quality

For the price the *Diamond* did reasonably well, but its absolute rating on the listening tests was not too promising, with a well below average score. The panel results were confusing, some listeners liking this speaker fairly well while others considered it to be too weak for serious attention.

Almost all the panel recognised it as a small box, and it was criticised for 'boxy' coloration as well as a 'thinned' midrange, and an uneven treble which tended to emphasise background hiss. The bass was soft and weak though reasonably balanced and extended — in fact rather more so than one might expect. Positioned close to the wall it managed to produce a fairly big sound though depth effects were fairly muted. Left to right imaging was fairly good.

Some merit definitely lurked within, and once one had become accustomed to the sound, it began to make its own impression, which was quite respectable for the size and price.

Lab Report

Pair matching was fine to 2kHz, but poor thereafter with up to 4dB of mismatch. This could well account for the just passable stereo focus. Reference sensitivity averaged 86dBW taking into account normal wall mounting. The bass −6dB point was rather high at 74Hz.

Re-tested for 1986, the 1 metre axial reference response showed close similarity to the 1985 result, albeit with some improved smoothness and less prominence of the treble region. The 'grille-off' response showed that this optional item is best removed.

Out at 2 metres, these effects are smoothed out by the averaging, but the 'lumpy' quality remains. The 100Hz to 20kHz range required ±4dB limits, although the family of forward responses were quite good.

Driven to 96dB sound level, the distortion was unacceptable; typically 3% of second harmonic and 1% of third. At the reduced 86dB level, a moderate improvement occurred, though the third harmonic still did not improve much in the midrange. It survived the compression tests with a poor 3.5dB of loss and −19dB for the intermodulation product.

The impedance curve did not fall below 6ohms, and the *Diamond* can be regarded as a safe 8ohm type amplifier load. Out in the room the averaged forward response clearly showed the speaker for what it was, a seriously midrange-forward design. Bookcase mounting will help but will not entirely solve this aberration.

Conclusions

An interesting and inexpensive miniature, as originally tested the *Diamond* appealed to some panelists, but others were unable to get on with it. In the context of 1986 standards it is felt that a Recommended rating, noting the somewhat idiosyncratic nature of this loudspeaker, is appropriate.

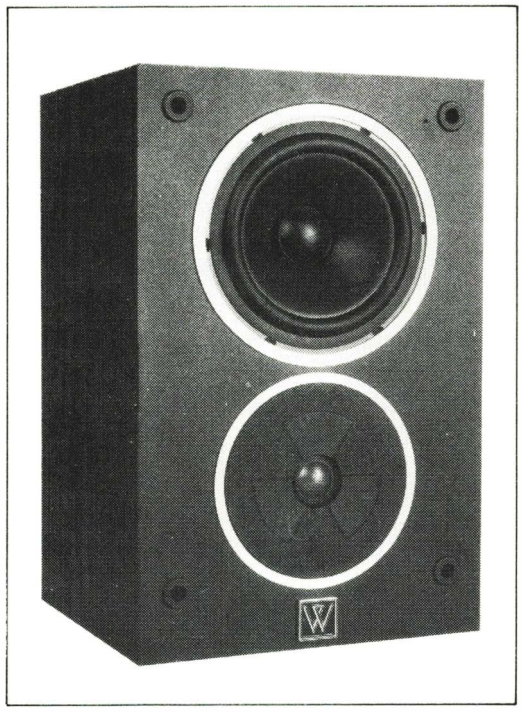
Note: Wharfedale now have a so-called 'active' Diamond with stereo power amplifiers selling for a competitive £100, which should prove a popular add-on for use with personal stereos and television sets.

Reassessed. First reviewed 1984. Current typical price £85.

For graph references see issue No 41

WHARFEDALE 504

WHARFEDALE LOUDSPEAKERS LTD, SANDLEAS WAY, CROSSGATES, LEEDS LS15 8AL.
TEL: (0532) 601222



The success of the diminutive *Diamond* first led Wharfedale to produce a *MkII* model, and thence to create an up-market version, the *504*, whose top performance is enhanced by Wharfedale's 19mm pure piston aluminium dome tweeter. This true miniature is just 29cm high with an enclosed volume of only 6 litres. Surprisingly for such a small box, it uses bass reflex loading, the small 30mm diameter rear panel port with 65mm duct tuning the system to a high 70Hz.

The bass/mid driver uses a flared-profile 90mm polypropylene cone in a 130mm housing which uses a new cabinet locking system. The two-way system has a minimal crossover of normal commercial quality, aimed to provide maximum musical transparency; essentially to 6dB/octave, the slopes are finally modified by the natural acoustic responses of the drive units. Electrical connection to the amplifier is made *via* 4mm combination socket/binding posts.

The 12mm chipboard enclosure is braced using the recessed back panel technique, with polyester fibre internal absorption, the 9mm grille has a half-rounded rebate on the inside edge. The bass unit is mounted above the tweeter, so that the drivers are brought partly into time-alignment with a normal stand (40-50cm); the 504 could be inverted if used on higher stands (60-80cm). Designed for placement almost touching a rear wall, up to 3dB of boundary lift will augment the measured response in the 80 to 700Hz range.

Sound Quality

Despite wall mounting, the *504* made a good impression for its price and size, with a rating almost at the average position. While deep bass was absent it fooled several panelists by managing to give the impression of a much larger system. Stereo images showed good width with reasonable depth, while the treble was free from 'edge' or 'grain'. Focus was rated above average, with more than satisfactory mid detail, obtained at the expense of some 'forwardness'. Transients were clean and dynamic contrasts fair.

Lab Report

The sensitivity was a below average 85dB/W. The 'good' load impedance was typically 8ohms, falling to nearer 5ohms at 10kHz which should be pretty harmless. A minimum 15 watts per channel will be required, while the *504* proved fairly comfortable with up to 50W of music programme, resulting in a moderate peak sound level of 98dBA, for a stereo pair in-room. The bass rolloff was 75Hz, −6dB, with an internal series capacitor tuning the system to a fifth-order damped alignment.

The reference response was unpromisingly 'lumpy', broadly lifted in the upper midrange and poorly integrated with the treble, the latter peaking at 6-7kHz before falling away to a lower level in the range 8-20kHz. Despite the relatively simple crossover, the family of forward responses was encouraging, the small enclosure helping to produce wide dispersion in the lateral plane. The 6kHz axial peak is revealed as a crossover problem, notably ameliorated above axis. Once installed, some experiment with system tilt may be worthwhile to achieve the best sound. The output was plotted without wall gain in the listening room, and this would amount to a lift of a few dB up to 600Hz for such a small system, which would help to fill in the lower mid and upper bass ranges though not to the degree necessary to flatten the room characteristic completely. The bass held up quite well down to 50Hz and was not confined to a single note. Above the mid region the treble was reasonably integrated, tending to a 'rich' balance and helping to give the impression of a larger model. Considering the small size, the swept distortion results were quite good; at 86dB third harmonic averaged 0.2%.

Conclusions

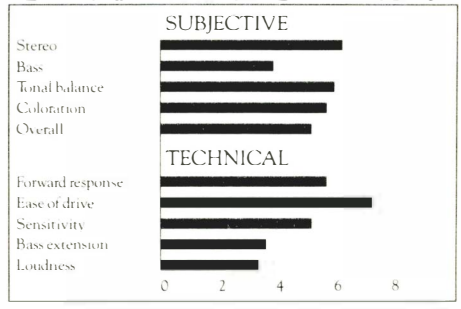
Wall-mounted this system gave a good account of itself, almost unbelievably unobstrusive and producing a clear, reasonably balanced sound with above average treble. The distortion was quite satisfactory and both the stereo and bass performance were better than expected. The value for money is quite good, so the *504* qualifies for recommendation, particularly for those seeking an up-to-date sound in a very compact package.

General Data

Size (height × width × depth)	21 × 18.5 × 20cm
Recommended amplifier power per channel (for 96dBA minimum per pair at 2 metres)	(15) – 50W
Recommended placement	60cm stand, near wall
Frequency response, within ±3dB, at 2 metres	70Hz to 12kHz*
Low frequency rolloff (−6dB point) at 1 metre	75Hz
Voltage sensitivity (ref. 2.83V, or 1W into 8ohms at 1 metre)	85dB/W
Approximate maximum sound level (pair) at 2 metres	98dBA
Impedance characteristic (ease of drive)	good
Forward response uniformity	good
Typical price per pair, inc VAT	£120

* *see text*

Performance Summary



For graph references see issue No 46

DUAL CS505-2 and CS505-2 DELUXE

HAYDEN LABORATORIES LTD, HAYDEN HOUSE, CHILTERN HILL, CHALFONT ST PETER, BUCKS.
TEL: (0753) 888447

In production now for a number of years, the 505 design has undergone a continuing series of minor improvements which have helped maintain its competitive position, while the price has also been kept in check. The player is based on an old-style steel deck plate, supported on four foam-damped coil springs. This deck plate is heavily flanged to increase rigidity, and the modest platter is equipped with a fairly heavy rubber mat.

Belt driven by a 16-pole synchronous motor, the 505 is fitted with a unique variable pitch control, achieved by the use of a multi-lobed variable diameter motor pulley. Correct speed setting is achieved *via* stroboscope markings on the platter rim, though these were found none too easy to use.

The tonearm has been revised for the latest *505-2* version and is now fitted with a special detachable headshell with quite a firm fixing. The *Deluxe* has better looks and a lower resonance construction, with a substantial wooden plinth finished in 'black ash' or 'rosewood' vinyl. Both versions come complete with a compatible Ortofon cartridge.

LAB REPORT

A notable feature of the latest 505 is the significant reduction in rumble, which has improved from 67dB to 73dB. Spectrum analysis showed the usual contribution of motor vibration components, but these were not considered very serious. Speed characteristics were much as before with good wow and flutter, while good torque was also demonstrated, the mild 0.2% slowing under load being up with some of the best, helping to offset the low inertia of the platter. Vibration and acoustic isolation factors remain unchanged, and well above average for the price.

The arm now has a moderate effective mass, 10g, including mounting hardware, the headshell itself weighing a modest 4g. The arm was well aligned and the pivots were reasonable, proving moderate in friction but subject to a rather small pre-load; more than a gentle twist to the arm resulted in audible bearing 'clicking'. Biasing was accurate and downforce calibration acceptable. Arm structural resonances were charted with the cartridge supplied; the first weakness appeared at 90Hz, while the main problems occurred at 220 and 400Hz, not a great improvement on the previous design. Above 600Hz, however, the resonances were pretty well behaved.

SOUND QUALITY

The 505s sound was tuneful, lively, punchy and somewhat 'forward' in presentation. Pitch and timing were good, the bass fairly good, and the stereo image had quite respectable depth and above-average focus. The sound could become a little muddled in the mid and treble but not seriously so, and the cartridge suited it well — we would not change it. The 'S' version showed a small improvement in clarity and definition, attributable to the improved plinth.

CONCLUSIONS

The 505 has managed to maintain its competitive position and provides a competent hi-fi sound. In our view it is the clear £120 group leader, so much so that the less expensive players, including Dual's own *514*, do not really stand much of a chance. Strongly recommended as a complete package with the *OM10* cartridge, the *505-2* merits Best Buy status; the *Deluxe* is Recommended.

Note: Changes have been made to the spring rate since last reviewed.

TEST RESULTS

Motor section

Type	semi auto, belt-drive, subchassis
Platter mass/damping	0.85kg/good
Finish and engineering	very good/good
Type of mains connecting leads	2 core/phonos and earth
Speed options	variable, 33/45rpm
Wow and flutter (DIN peak wtd sigma 2)	0.075%
Wow and flutter (Im peak wtd 0.2-6Hz/6-300Hz)	0.95%/0.08%
Absolute speed error	−0.1%
Speed drift, 1 hour/load variation	+0.065%/−0.2%
Start-up time to audible stabilisation	2.4 secs
Rumble, DIN B wtd, L/R average (see spectrum)	=72/=74dB

Arm section

Approximate effective mass, inc screws, excl cartridge	10g
Type/mass of headshell	special detachable/40g
Geometric accuracy	good
Adjus[illegible] provided	overhang/offset
Finish and engineering	very good/good
Ease of assembly/set-up/use	very good/very good/very good
Friction, typical lateral vertical	40mg/20mg
Bias compensation method	spring
Bias force, rim/centre (set to 1.5g ellipical)	225mg/225mg
Downforce calibration error, 1g/2g	−0.12g/−0.2g
Cue drift, 8mm ascent/descent	very slight, 3.5 secs/3.0 secs
Arm resonances	average+
Subjective sound quality	average+
Arm damping	decoupled counterweight

System as a whole

Size (w×d×h)/clearance for lid rear	43.5×37×14cm/7cm
Ease of use	good
Typical acoustic breakthrough and resonances	average+
Subjective sound quality of complete system	good
Hum level/acoustic feedback	good/good
Vibration sensitivity/shock resistance	good/good
Estimated typical purchase price	£125 (*Deluxe*, £145)

For graph references see issue No 43

THE OAK/ZETA JUNIOR ARM

MOTH MARKETING, 47 ARMSTRONG CLOSE, WILSTEAD, BEDFORD.
TEL: (0234) 741152

The Oak budget turntable can now be supplied fitted with the Zeta *Junior*, a newly-commissioned Japanese-built arm, effectively replacing the now discontinued ADC arm which was supplied with the earlier model some years ago. Considerable improvements have been made over the original version, the current turntable having a well-toleranced inverted main bearing and a well-centred wood composition (MDF) platter, driven by a distinctive bright red synthetic rubber cord. Manual speed change is accomplished by flicking the cord from one pulley stop to the other, and a powerful synchronous motor is fitted.

The arm is reminiscent of the old ADC *LM-F1*, with a detachable, lightweight reinforced plastic headshell (interchangeable with the metal one used in the original Linn *Basik LVX*). A rotating counterweight is used, and overall finish is excellent, but this arm is too inexpensive to offer bearings free of play.

LAB REPORT

Virtually in the low-mass category, the arm's effective mass is 8.3g including mounting hardware; substitution of an *LVX* headshell would increase this to 12g or so, to suit low compliance cartridges better. Geometry was fine, the arm was easy to set up and use, and friction was low. Bias correction tended to the low side at the rim — solved by dialling a slightly higher indicated value. Downforce was well calibrated, and the cue operated satisfactorily. Structural resonances were quite numerous and the arm scored a straight 'average' here.

The disc rests directly on the plain finished platter, resulting in fairly good disc damping; a platter rocking mode was evident at around 35Hz. Wow and flutter was a satisfactory 0.25%, with similar unweighted contributions of flutter and wow. Speed error was all right at 1%, while start-up was rapid; the player had good torque characteristics. DIN B weighted, the rumble levels were unexceptional with figures reminiscent of the mid 'sixties, and not really to hi-fi standards. Analysis showed motor vibration breakthrough at 100 and 200Hz, audible as a slight low level 'drone' on very quiet sections of a record. Acoustic breakthrough was fairly well controlled by the structural solidity, but the stiff plastic feet afforded little vibration rejection from the mounting surface. Variations in performance with different tables, platforms etc were expected and indeed found. Conversely, the rigid construction did afford good shock immunity.

SOUND QUALITY

The arm gave a satisfactory performance, reasonably clean and well balanced but not in the class of the Rega *RB250* with its play-free bearings. Some 'clutter' at high frequencies was associated with certain mid colorations, and lack of stereo depth was noted.

The Oak motor unit gave above-average performance for the type, with good clarity in the mid and treble ranges. The sound depended strongly on location and sounded rather lightweight on the test coffee table, lacking spaciousness with the bass distinctly curtailed.

CONCLUSIONS

Despite the above comments, the Zeta *Junior* is the only well-finished and competent tonearm available at the price, and should be welcomed for its contribution to the costing of budget turntable systems. The Oak deck is now presented in a refined form with a superior finish in real wood (black oak!), and it would be hard to deny that it represents fair value for money. Presentable results are possible from the package if appropriately sited.

TEST RESULTS

Motor section

Type	belt-drive, synchronous (manual)
Platter mass/damping	1.5kg/fairly good
Finish and engineering	very good/good
Type of mains connecting leads	2 core/phonos and earth
Speed options	33/45rpm
Wow and flutter (DIN peak wtd sigma 2)	0.26%
Wow and flutter (lin peak wtd 0.2-6Hz/6-300Hz)	0.27%/0.20%
Absolute speed error	1.0%
Speed drift, 1 hour/load variation	negligible/−0.15%
Start-up time to audible stabilisation	1.5 secs
Rumble, DIN B wtd, L/R average (see spectrum)	−64/−68dB

Arm section

Approximate effective mass, inc screws, excl cartridge	8.3g
Type/mass of headshell	ADC detachable/3.0g
Geometric accuracy	very good
Adjustments provided	height/overhang/lateral
Finish and engineering	very good/good
Ease of assembly/set-up/use	very good/very good/very good
Friction, typical lateral vertical	30mg/<20mg
Bias compensation method	internal spring
Bias force, rim/centre (set to 1.5g elliptical)	120mg/200mg
Downforce calibration error, 1g/2g	−0.05g/−0.05g
Cue drift, 8mm ascent/descent	slight, 1.5 secs/3.5 secs
Arm resonances	average
Subjective sound quality	average+
Arm damping	decoupling counterweight

System as a whole

Size (w×d×h)/clearance for lid rear	46×35×14.5cm/7cm
Ease of use	very good
Typical acoustic breakthrough and resonances	average+
Subjective sound quality of complete system	average+
Hum level/acoustic feedback	average/average−
Vibration sensitivity/shock resistance	average−/good
Estimated typical purchase price	£139 (without arm £99)

For graph references see issue No 43

BEST BUY

REGA PLANAR 2 and 3

REGA RESEARCH LTD, 119 PARK STREET, WESTCLIFFE-ON-SEA SS0 7PD
TEL: (0702) 333071

Since 1984 the *RB300* arm has been a standard fitting on the *Planar 3* deck. The performance of this new combination is discussed fully in the *RB300* review, issue No. 43. The *Planar 2* now comes with a simplified version of the *RB300* arm, called the *RB250*.

This simple turntable design comprises a solid chipboard plinth covered in tough matt black laminate. Three fairly stiff stepped rubber feet provide a stable tripod foundation while the high quality lid is directly hinged to the chassis plinth with neither springs nor isolation. A plain main bearing with thrust ball showed close tolerances, with no detectable play. Belt-driven *via* a rubber cord, the inner platter hub is a reinforced plastic moulding, the uppermost projection forming the tapered centre spindle and the outer platter boss. The platter is made of heavy plate glass (less thick in the *Planar 2*, surmounted by a thick felt mat. In a simple and ingenious gravity suspension, a second drive belt is looped to support the slow speed synchronous drive motor and supress vibrations coupling to the platter.

The *Planar 2 RB250* arm has the same excellent bearings and one-piece cast arm tube as the *RB300* but has been simplified by a conventional rotating/sliding scale counterweight which is partly decoupled. The leadout cable is fixed and the chassis earth combined with one of the signal grounds; phono plugs are fitted.

Effective mass is around 11.5g including the supplied stainless steel mounting hardware, suitable for moderate compliance cartridges or even modest moving coils.

Rega recommend that the deck should be placed on a light shelf, wall mounted rather than 'coffee table' or floor cabinet; this we found to be good advice.

Lab Report

The platter was clearly well founded as the minimal low frequency ringing on the disc impulse response showed. The initial transient was poorly damped, however, a characteristic of thick felt mats.

Almost no metal work was present in the unit and this meant very little humfield screening was provided. Consequently hum levels were poorer than average and the choice of cartridge will need a little care. Weighted wow and flutter was satisfactory but linear wow was on the high side at 0.21%, this measured without the mat as the felt is of slightly variable thickness. Speed was fairly accurate, but slowed a significant 0.4% under load, with some overshoot after recovery due to motor suspension tension rocking. Start-up was average for a belt-drive at 4.5 seconds.

Rumble levels were just satisfactory for the price averaging −71dB with the motor off, however. Acoustic breakthrough was about average and the lid was found to be influential here, and results were better when it was entirely removed. The plot is shown expanded by 10dB for lid up and down, the latter being preferred. Vibration isolation was also poorer than average.

The arm was well finished with very good geometry. It was easy to set up and use and demonstrated low bearing friction. Bias compensation was set to sensible levels and the cue worked well. Downforce calibration proved satisfactory.

Sound Quality

Belying traditional assumed relationships between a number of technical parameters and sound quality, the Rega proves that a well-developed, subjectively-assessed balance of performance counts for more than technical excellence with regards to any one parameter. On the debit side the Rega did suffer from a modicum of programme wow, particularly on rock programme, but this was not considered serious at this price level; a mild loss of stereo depth was also noted, together with an accompanying impairment of low bass definition and evenness. Conversely it sounded 'musical' in a balanced and coherent manner.

With the latest arm the *Planar 2* sounded more confident. In the upper bass it was surprisingly articulate while mid and treble were notably smooth and sweet with better detail than before. Presentation of detail was considered well above average and little inferior to 'super-fi' models.

Conclusions

The *Planar 2* offers a fine subjective performance and is both very well made and finished, which places it firmly in the Best Buy category. The *Planar 3* is also good, but does not offer quite the same value, so a standard recommendation is appropriate here, especially with the excellent *RB300* arm.

Test Results

Motor section	Integrated turntable
Type	manual, belt-drive
Platter mass/damping	2.2kg/good
Finish and engineering	very good/very good
Type of mains connecting leads	2 core phones
Speed options	33/45 rpm
Wow and flutter (DIN peak wtd sigma 2)	0.09%
Wow and flutter (lin peak wtd 0.2-6Hz/6-300Hz)	*0.21%/0.45%
Absolute speed error	+0.4%
Speed drift, 1 hour/load variation	synchronous/−0.4%
Start-up time to audible stabilisation	4.5 secs
Rumble, DIN B wtd, L/R average (see spectrum)	72/ 70dB
Arm section	
Approximate effective mass, inc screws, excl cartridge	11.5g
Type/mass of headshell	universal detachable/8.0g
Geometric accuracy	very good
Adjustments provided	overhang/lateral angle
Finish and engineering	excellent/very good
Ease of assembly/set-up/use	very good/very good/very good
Friction, typical lateral vertical	less than 25mg/15mg
Bias compensation method	internal magnet
Bias force, rim/centre (set to 1.5g ellipical)	300mg/310mg
Downforce calibration error, 1g/2g	0.1g/−0.07g
Cue drift, 8mm ascent/descent	negligible 0.5 secs/1.5 secs
Arm resonances	very good
Subjective sound quality	very good
Lead capacitance/damping method	70pF/counterweight decoupling
System as a whole	
Size (w×d×h)/clearance for lid rear	45×36×12.3cm/7cm
Ease of use	fairly good
Typical acoustic breakthrough and resonances	average
Subjective sound quality of complete system	good
Hum level/acoustic feedback	average −/fairly good
Vibration sensitivity/shock resistance	average −/good
Estimated typical purchase price	Rega 2 £125; Rega 3 £188

**worsened by unevenness of thick felt mat*

For graph references see issue No 43

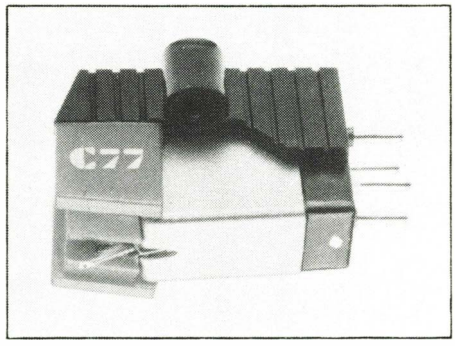
BEST BUY

A&R C77

A&R CAMBRIDGE LTD, DENNY INDUSTRIAL CENTRE, WATERBEACH, CAMBRIDGE CB5 9PB
TEL: (0223) 861550

A&R are best known for their A60 amplifier, but in recent years have expanded their activities into the loudspeaker and cartridge markets. Their original cartridge policy was to take a fairly conventional moving magnet design and specify a very high quality stylus (Weinz Paroc on the original *P77*), while keeping the price quite modest.

The unassuming *C77* moving magnet model shows good mechanical integrity in body and stylus assembly. The latter has a spherical tip which was small, neat and well-mounted. Compliance is moderate with little damping, suited to the many arms in the effective mass range 7-15g. Tracking weight for this model is a sensible 1.8g, a figure which confers reasonable groove security.



LAB REPORT

Output is conveniently average, and amplifier input capacitance is quite uncritical (250pF increase adding 1dB to treble level).

Frequency response showed a fairly obvious broad 3dB suckout in the mid treble, followed by a mild rise to the 16/17kHz resonance. Channel balance improved steadily towards high frequencies, and the overall trace did in fact manage to look quite 'clean' even at high writing speeds.

The separation analysis showed decent enough figures which were generally pretty consistent down to low frequencies, though reducing somewhat at HF. Tracking abilities were fine.

SOUND QUALITY

The measured frequency balance was quite obvious in the sound quality, but this is something of a compliment to an inherently very clear and clean sounding cartridge, which in many respects sounds most impressive considering its price.

The treble peak was a trifle obvious and sounded a little 'detached', perhaps because the extreme HF was not particularly detailed. Elsewhere the balance and dynamics were thoroughly impressive, with plenty of 'bounce' and a genuine attempt to convey stereo depth. Surface noise was not exaggerated, midrange focus was pretty good, and the general integrity was good.

CONCLUSIONS

Belying its rather nondescript appearance, the *C77* is the sort of model that gives moving magnets a good name. It offers good compatibility and sound quality at a very sensible price. Clearly a Best Buy, the only question mark lies over the treble peak and how it might interact with a given system and pair of ears.

TEST RESULTS

Type, mass	moving magnet, 6g
Stylus type	spherical
Stylus inspection result	confirmed, well mounted
Output Level (1kHz, 5cm/s)	3.75mV
Relative output (0dB = 1mV/cm/s)	−1dB
Channel balance	0.85dB
Channel separation (L,R)	28.5, 28.8dB
Tracking ability (L,R)	50,50µm
Frequency response limits 100Hz-5kHz	+1, −2.5dB
Frequency response limits 30Hz-20kHz	+1, −9dB
Stereo Separation L on R 100Hz, 3kHz, 10kHz	22, 31, 22dB
Stereo Separation R on L 100Hz, 3kHz, 10kHz	28, 24, 22dB
Channel diff. from graph, 100Hz, 1kHz, 10kHz	0.5, 0.5, 1dB
Response limits ref computer mean, 1kHz-15kHz	+2.5, −1.5dB
Response limits ref computer mean, 1kHz-20kHz	+2.5, −2dB
Test tracking weight, loading	1.8g, 300pF
LF resonance frequency, 12.5g arm (vert, lat)	10, 10.3Hz
Estimated compliance (vert, lat)	16, 15cu
Recommended arm effective mass	6-16g
LF resonance rise, 12.5g arm (vert, lat)	14.5, 12dB
Typical selling price	£20

For graph reference see issue No 43

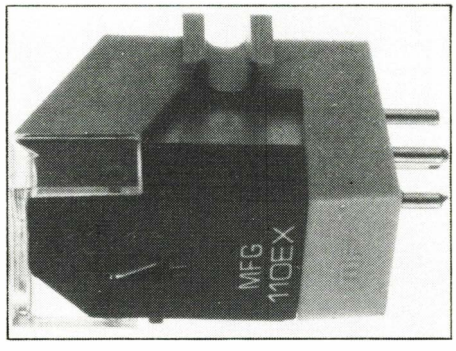
BEST BUY

AUDIO-TECHNICA AT110E

TECHNICA HOUSE, LOCKWOOD CLOSE, LEEDS, LS11 8EU
TEL: (0532) 771441

This conventional low cost (£17) magnetic cartridge shares bodywork and the LC-OFC (linear crystal) wiring with the *105* and *115E*. The rigid body, mildly compromised by half-circle mounting lugs, accepts a firmly located stylus assembly. It tracks securely enough at a sensible 1.5-2g, though the specified mild-profile elliptical stylus looked suspiciously spherical under the 'scope — a curious juxtaposition with the test *'105*..

Compliance is pretty sensible, suiting a wide range of arms, though better class turntables are to be preferred as there is little damping of the resonance. The highish mass of the cartridge suggests that the lowest mass arms are better avoided.



LAB REPORT

Output level is about average, and although low capacitance is specified, a high capacitance load did flatten the response and extend the bandwidth, not to mention sounding slightly better. Most pre-amps should provide suitable loading, though experimentation with a little extra might pay off in some systems.

Frequency response downtilted quite noticeably until some capacitance was added, when a good overall response to 14kHz was obtained. Channel balance error was a less than impressive 1.1dB, though the match between channels was quite close. Even at the fast writing speed the response traces were pretty smooth, with only a couple of minor 'glitches'.

Separation was very good considering the modest price of this model, only mildly asymmetrical and showing a 5dB improvement at high frequencies over the cheaper *'105*.

SOUND QUALITY

This extra treble was immediately apparent in the listening tests, providing a significantly 'livelier' sound than the *'105*. With high capacitance loading, the cartridge could sound rather brittle and aggressive, so the recommendation for low capacitance should be followed. The sound was quite 'fast', 'firm' and 'bouncy', with a good overall balance, but a mild 'steely' coloration was also described.

CONCLUSIONS

This exceedingly well balanced budget cartridge is a very capable performer, with few grounds for technical criticism, a sound quality that more than stands up to scrutiny, and performance more than able to do justice to better quality turntables. Whether the LC-OFC wire actually is a worthwhile 'magic ingredient' remains a moot point, but the *'110E* is clearly a very competitive package well deserving recommendation.

TEST RESULTS

Type, mass	moving magnet, 7.2g
Stylus type	elliptical
Stylus inspection result	spherical!
Output Level (1kHz, 5cm/s)	4.0mV
Relative output (0dB = 1mV/cm/s)	0dB
Channel balance	1.1dB
Channel separation (L,R)	30, 30dB
Tracking ability (L,R)	80, 75µm
Frequency response from graph 100Hz-5kHz	+1.5, −2dB
Frequency response from graph 30Hz-20kHz	+1.5, −7dB
Stereo Separation L on R 80Hz, 3kHz, 10kHz	33, 36, 32dB
Stereo Separation R on L 80Hz, 3kHz, 10kHz	36, 39, 33dB
Response limits ref computer mean, 1kHz-15kHz	+0, −2dB
Response limits ref computer mean, 1kHz-20kHz	+0, −5dB
Test tracking weight, loading	1.8g, 150pF
LF resonance frequency, 13.5g arm (vert, lat)	9, 9Hz
Estimated compliance (vert, lat)	15, 15cu
Recommended arm effective mass	5-16g
LF resonance rise, 13.5g arm (vert, lat)	14, 16dB
Typical selling price	£17

For graph reference see issue No 43

RECOMMENDED

GLANZ MFG 110EX

PRESENCE AUDIO, EASTLAND HOUSE, PLUMMERS PLAIN, HORSHAM, WEST SUSSEX RH13 6NY.
TEL: (044485) 333

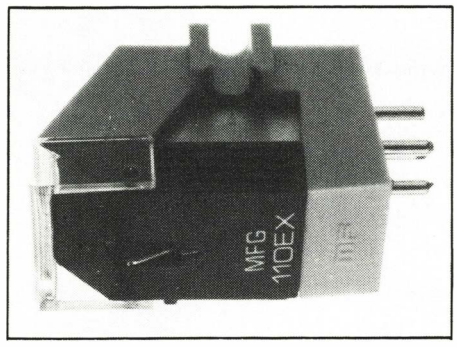
Perhaps less readily available than they were a few years ago, Japanese manufacturer Glanz make a comprehensive range of 'Moving Flux' (loosely moving magnet) and moving-coil cartridges in the low and medium price ranges. The *MFG 110EX* is a £22 moving magnet model, which as it happens is also the first Glanz model to come the way of the reviewer.

Substantial in size, construction seems well-founded, and the stylus assembly fixes in quite precisely. The stylus itself, a simple ellipitical, showed an indifferent standard of polish. The semi-circular lugs seem strong enough for rigid fixing, and a reasonable headshell contact can be made despite a superfluous centre trim piece.

Output level is sufficient for all moving magnet inputs, and different loadings have little effect upon response. Mechanically, the *110EX* should suit most tonearms, and gave good tracking ability at a sensible 1.75g downforce. The discrepancy between the size of horizontal and vertical resonances is curious as the frequency is identical, though it is impossible to predict cause or effect.

LAB REPORT

Frequency response was gently downtilted in the usual manner, generally very smooth and even though with some variation between channels at high frequencies. Adding capacitance produced a flatter total response at the expense of a slightly more exposed, but effectively ultrasonic, treble peak. The difference amounted to only about 1dB and may probably be safely ignored.



Separation was rather disappointing by the standards of most of today's cartridges, reaching only 24dB on one channel, 30dB on the other. Ultrasonic spuriae were reasonably well down.

SOUND QUALITY

Subjectively marginally preferred with capacitance loading, the Glanz was warmly recieved by a panel who admittedly appeared to be in a generous mood at the time of its presentation. Tonally described as a little 'bright' not unlike CD, the midrange sounded lively if slightly coloured, the bass detailed if a little slow, and the treble clear with only slight over-emphasis at times.

The 'average' ratings were very good considering the modest enough price of this model.

CONCLUSIONS

The *MGF-110EX* doesn't define any new standards in technical performance, but nevertheless it delivers a very competitive sound deserving recommendation. If typical of Glanz cartridges in general, the rest of the range should also be worth exploring.

TEST RESULTS

Type, mass	moving flux (magnet) 5.5g
Stylus type	elliptical
Stylus inspection result	simple ellipse, indifferent polish
Output Level (1kHz, 5cm/s)	3.4mV
Relative output (0dB = 1mV/cm/s)	−1dB
Channel balance	0.5dB
Channel separation (L,R)	20, 16dB
Tracking ability (L,R)	80, 80μm
Frequency response from graph 100Hz-5Hz	+1, −1dB
Frequency response from graph 30Hz-20kHz	+1, −4dB
Stereo Separation L on R 80Hz, 3kHz, 10kHz	24, 24, 22dB
Stereo Separation R on L 80Hz, 3kHz, 10kHz	32, 30, 25dB
Response limits ref computer mean, 1kHz-15kHz	+1.5, −1.5dB
Response limits ref computer mean, 1kHz-20kHz	+3.5, −1.5dB
Test tracking weight, loading	1.75g, 100pF
LF resonance frequency, (13.5g arm) (vert, lat)	9, 9Hz
Estimated compliance (vert, lat)	16, 16cu
Recommended arm effective mass	6-16g
LF resonance rise, (13.5g arm) (vert, lat)	9, 14dB
Typical selling price	£22

For graph references see issue No 43

BEST BUY

GRADO MT

MOTH MARKETING, 47 ARMSTRONG CLOSE, WILSTEAD, BEDFORD.
TEL: (0234) 741152

Like all Grado models, this is a simple design of unprepossessing appearance, sensibly constructed to couple well with the tonearm mechanically. The mounting lugs are a little flimsy and should not be over-tightened, but they at least provide circular contact with the bolts.

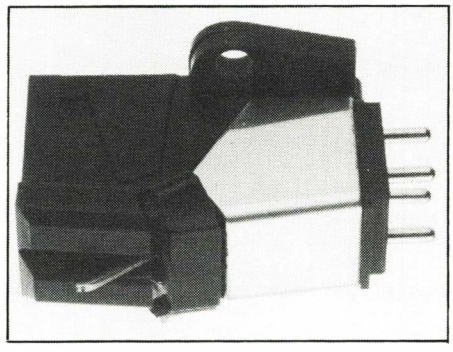
The stylus assembly fit is remarkably tight, with additional mastic-type damping. Indeed those foolhardy enough to attempt removal without the special tool provided risk terminal cantilever damage — as we discovered last time around!

A fairly stiff compliance means that medium and heavy mass arms are to be preferred, while the lack of any cantilever damping (a characteristic Grado trait) implies that tonearm damping could be beneficial if available, and that poorer quality turntables should be avoided. Tracking abilities should be adequate, but in an adequate player could be caught out on the more difficult material (opera, choral etc).

Output is fine for conventional moving magnet inputs, but the design of the generator means Grados, though entirely unaffected by input capcitance loading, may be somewhat susceptible to hum pickup in the 'wrong' system (glass turntable platters, for example).

LAB REPORT

Frequency response was certainly a little dramatic, suggesting a cartridge stronger on character than neutrality. Dropping a full 3dB through the midrange from 200Hz to 5kHz, there is evidence of slight recovery and then a sharp rise to a +2dB peak at 18kHz.



Separation showed good channel matching and impressive evenness, despite absolute values which were below average. Ultrasonic output was higher than usual, corroborating the high frequency response problem.

SOUND QUALITY

The frequency characteristic proved a major element in the subjective reaction, though 'listening through' the effect revealed a sound of rare quality considering the low price.

The balance was rich and slightly 'heavy', marred by some softness in bass definition and some sibilant and surface noise exaggeration. Inherent good clarity and 'speed', along with the balance, helped to convey impressive scale with good vocal projection and ambient detail.

CONCLUSIONS

Despite the odd frequency balance, this Grado produced sufficient of the sound quality goods to indicate recommendation at its very reasonable price. Other aspects of technical performance were decent enough in any case.

However, significant reservations remain regarding the suitability of such a lightly-damped model in the budget turntables it is likely to partner. Good performance in a high quality system does not necessarily imply that the quality will be maintained when the compromises get tough. A fine potential performer, it needs, more than most, to be checked out in the prospective system.

TEST RESULTS

Type, mass	moving magnet 5.5g
Stylus type	not specified
Stylus inspection result	mild elliptical
Output Level (1kHz, 5cm/s)	3.5mV
Relative output (0dB = 1mV/cm/s)	−1dB
Channel balance	0.6dB
Channel separation (L,R)	24, 25dB
Tracking ability (L,R)	80, 66μm
Frequency response from graph 100Hz-5Hz	+1.5, −1.5dB
Frequency response from graph 30Hz-20kHz	+2, −3dB
Stereo Separation L on R 80Hz, 3kHz, 10kHz	26, 31, 29dB
Stereo Separation R on L 80Hz, 3kHz, 10kHz	32, 34, 31dB
Response limits ref computer mean, 1kHz-15kHz	+2.5, −3dB
Response limits ref computer mean, 1kHz-20kHz	+4, −3dB
Test tracking weight, loading	1.5g, n/apF
LF resonance frequency, (13.5g arm) (vert, lat)	11, 11Hz
Estimated compliance (vert, lat)	12, 12cu
Recommended arm effective mass	8-18g
LF resonance rise, (13.5g arm) (vert, lat)	18, 21dB
Typical selling price	£20

For graph references see issue No 43

RECOMMENDED

GOLDRING EPIC

GOLDRING PRODUCTS LTD, UNIT 8, GREY FRIAR'S RD, MORETON HALL IND EST,
BURY ST EDMUNDS IP32 7DX TEL: (0284) 701101

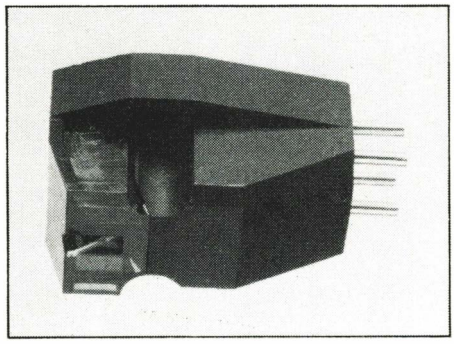
This well established budget cartridge from Goldring attracted much interest and favourable comment from its introduction, as did the version Goldring build for Russ Andrews, the RATA *RP20*. The body is rather large, though it can be mounted tightly with good contact area; it is now made of good quality plastic material which allows firm mounting with no problems.

The stylus assembly made a fine tight fit, and the specified elliptical tip was confirmed and neatly mounted. Compliance is moderate and well-damped, so arms of up to 16g effective mass looks a safe enough bet. The downforce of 2g helps to give reasonable tracking performance.

LAB REPORT

Plenty of output for the least sensitive amplifiers, plus a response which shows little change in shape with added capacitance will ensure no compatibility problems here. In fact the rather 'dim' response was improved a couple of dB by an extra 250pF without any untoward side effects, so adding a little extra capacitance may be beneficial.

The response trend is determinedly downtilted at high frequencies, falling some 6dB between 1kHz and 20kHz, which is not too promising. But it does follow a smooth and even trend, the final HF region is under fine control, and the



curve itself is pretty smooth, with only one minor (750Hz) 'glitch'.

Channel balance was acceptable enough for the price, and separation likewise, at least showing good balance and evenness if not at a particularly exalted level. Tracking abilities are adequate, and groove stability pretty good.

SOUND QUALITY

Dominated by the dulled response, the *Epic* tended to sound bass heavy but was quite impressive in terms of integration and focus, and was quite liked as a result on the listening tests. One hesitates to call it lively, but 'punchy' is not a bad adjective. Dynamics and coloration were pretty decent throughout, and stereo imaging showed some depth, albeit with some congestion.

CONCLUSIONS

This unpretentious cartridge is rather too dull in balance for the standard of ancillary equipment we used during listening, but the right high frequency control is not ill-suited to the budget equipment it is likely to partner. Now that the body plastic has been reinforced, the generally decent performance in other respects indicates cautious recommendation in the right system context.

TEST RESULTS

Type, mass	moving magnet 6.5g
Stylus type	elliptical
Stylus inspection result	neat simple elliptical
Output Level (1kHz, 5cm/s)	3.8mV
Relative output (0dB = 1mV/cm/s)	0dB
Channel balance	0.3dB
Channel separation (L,R)	28.6, 25.7dB
Tracking ability (L,R)	70, 69µm
Frequency response limits 100Hz-5Hz	+1, −3dB
Frequency response limits 30Hz-20kHz	+1.5, −6/7dB
Stereo Separation L on R 100Hz, 3kHz, 10kHz	21, 27, 29dB
Stereo Separation R on L 100Hz, 3kHz, 10kHz	18, 23, 25dB
Channel diff. from graph, 100Hz, 1kHz, 10kHz	0.5, 0.5, 1dB
Response limits ref computer mean, 1kHz-15kHz	+0, −3dB
Response limits ref computer mean, 1kHz-20kHz	+2, −3dB
Test tracking weight, loading	1.8g, 200pF
LF resonance frequency, 12.5g arm (vert, lat)	10, 10Hz
Estimated compliance (vert, lat)	13, 13cu
Recommended arm effective mass	6-14g
LF resonance rise, 12.5g arm (vert, lat)	11, 11dB
Typical selling price	£17.50

For graph references see issue No 43

BEST BUY

LINN BASIK

LINN PRODUCTS LTD, 257 DRAKEMIRE DRIVE, CASTLEMILK, GLASGOW G45 9SZ.
TEL: 041-634 0371

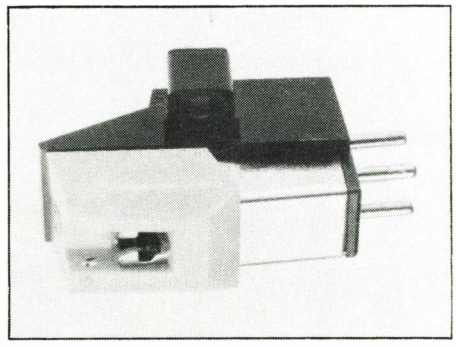
Conceived originally by Linn as a giveaway with the arm of the same name, to drive home the company's view that the arm is infinitely more important than the cartridge, the current model *Basik* is now available as a separate £18 item. It is made in Japan by Audio Technica and based on the *AT93E*, but seems to have acquired something of a cult reputation for itself as a 'giant killer'.

This simple moving magnet design has good mechanical properties in terms of body rigidity and stylus fit, though the stylus itself was rather heavily glued. Compliance is on the high side of medium, which means that arms should be on the low side of medium mass, a category which just about accommodates Linn's own designs!

LAB REPORT

Output is quite sufficient in level, and although fairly tolerant of capacitance, there was little doubt that it sounded best when well-loaded.

Frequency response actually measured best with low capacitance, where it was very good indeed, holding ±1dB from 20Hz-16kHz; increased capacitance emphasised the 10kHz peak a touch and curtailed the bandwidth slightly. Channel balance was poor in terms of absolute error. The high writing speed trace was



a little untidy, confirming the slight unevenness on the original chart.

Separation was distinctly uninspiring, lurking around the 20dB mark, due we suspect to the lively highish vertical compliance. Tracking, on the other hand, was pretty good.

SOUND QUALITY

Reflecting its low cost in terms of general brashness and unsubtlety, the *Basik* nevertheless did a decent job in conveying detail and dynamics through most of the range, though surface noise tended to be exaggerated and the sound could occasionally be described as 'fierce'. Definitely preferred on rock rather than classical music, this cartridge tried hard to give a good impression of overall integrity. Groove stability was reasonable.

CONCLUSIONS

No cartridge better deserves the epithet 'cheap and cheerful', yet the Basik goes much further in delivering the goods than its price level might indicate. It is one of the brightest-sounding amongst the better low cost cartridges, which will either be a blessing or a curse to the prospective purchaser, according to system and taste.

TEST RESULTS

Type, mass	moving magnet 5g
Stylus type	spherical?
Stylus inspection result	rather heavy glueing, small
Output Level (1kHz, 5cm/s)	3.38mV
Relative output (0dB = 1mV/cm/s)	−1.5dB
Channel balance	0.98dB
Channel separation (L,R)	28.1, 28.5dB
Tracking ability (L,R)	80, 80µm
Frequency response limits 100Hz-5Hz	+1, −1dB
Frequency response limits 30Hz-20kHz	+1.5, −3.5dB
Stereo Separation L on R 100Hz, 3kHz, 10kHz	20, 23, 19dB
Stereo Separation R on L 100Hz, 3kHz, 10kHz	20, 19, 16dB
Channel diff. from graph, 100Hz, 1kHz, 10kHz	1.5, 1.5, 1.5dB
Response limits ref computer mean, 1kHz-15kHz	+3, −0dB
Response limits ref computer mean, 1kHz-20kHz	+3, −2dB
Test tracking weight, loading	2g, 300pF
LF resonance frequency, 12.5g arm (vert, lat)	8.8, 8.6Hz
Estimated compliance (vert, lat)	25, 26cu
Recommended arm effective mass	6-14g
LF resonance rise, 12.5g arm (vert, lat)	15.6, 11.2dB
Typical selling price	£18

For graph references see issue No 43

BEST BUY

NAGAOKA MP10

PATH GROUP PLC, 1 BERENS ROAD, LONDON NW10 5DY.
TEL: 01-969 2514

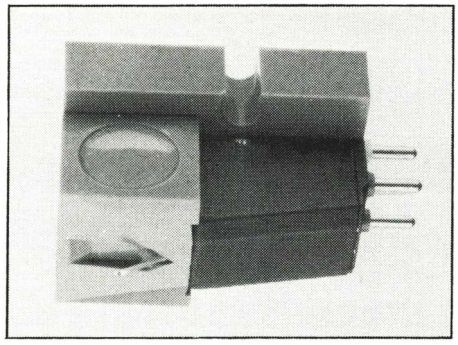
Very much the 'baby' of the Nagaoka moving magnet range, the *MP10* shares the same impressive rigid body structure, albeit as a plastic moulding in an unattractive dull red colour, with lower mass than the metal models higher up the range. Humbly sporting a spherical tip, which was actually quite small and neatly mounted, a substantial 2.3g downforce ensures good tracking ability and groove stability.

Compliance is lower, nicely symmetrical, and less damped than the other Nagaokas, so although the *MP10* is probably best served by low mass arms, medium mass models are almost as suitable.

Lab Report

Substantial enough in output for any moving magnet input, Nagaoka specify low capacitance loading, which should be particularly respected in this instance, as the treble rolloff is already quite severe, and is only made worse by increasing capacitance.

Frequency response shows a pronounced downtilt commencing at 300Hz, increasing in slope a little around 2kHz until levelling out some 5dB down at 13kHz, then finally rolling off at 17kHz. Despite the inaccuracy of this response in absolute terms, the lack of sudden



change throughout the band is praiseworthy. Furthermore, channel balance stayed closely within 0.5dB, and 'glitches' were merely minor unevenesses, predominantly below 1kHz.

Separation figures rivalled many cartridges costing many times the price, even showing respectable control at high frequencies.

Sound Quality

Despite the treble rolloff, which in the manner of spherical styli becomes more severe towards the end of a side (our response was taken at roughly the middle of a side), the *MP10* was very well liked for the 'seamlessness' and control of its sound, which showed remarkably good integration for such a low cost design. High frequencies did sound 'shut in', and depth was curtailed, but the bass and mid were satisfyingly energetic, 'bouncy' and 'punchy'.

Conclusions

An obvious Best Buy; spherical tip apart, the *MP10* is clearly substantially better balanced than the other Nagaokas, with much better stability and control than the over-compliant *'11*. Moreover, the slightly 'dim' balance could well prove to be an ideal partner to the less-than-tidy tonearms, amplifiers and loudspeaker which its price suggests will be frequent partners.

Test Results

Type, mass	moving magnet 6.8g
Stylus type	spherical
Stylus inspection result	small and neat
Output Level (1kHz, 5cm/s)	3.75mV
Relative output (0dB = 1mV/cm/s)	-9.5dB
Channel balance	0.54dB
Channel separation (L,R)	28.9, 30dB
Tracking ability (L,R)	80, 80µm
Frequency response limits 100Hz-5Hz	+1, -3dB
Frequency response limits 30Hz-20kHz	+1.5, -7dB
Stereo Separation L on R 100Hz, 3kHz, 10kHz	27, 29, 24dB
Stereo Separation R on L 100Hz, 3kHz, 10kHz	32, 30, 25dB
Channel diff. from graph 100Hz, 1kHz, 10kHz	0.5, 0, 0dB
Response limits ref computer mean, 1kHz-15kHz	+0, -3.5dB
Response limits ref computer mean, 1kHz-20kHz	+0, -4dB
Test tracking weight, loading	2.3g, 100pF
LF resonance frequency, 12.5g arm (vert, lat)	9, 8.7Hz
Estimated compliance (vert, lat)	17, 18cu
Recommended arm effective mass	5-13g
LF resonance rise, 12.5g arm (vert, lat)	11.3, 12.3dB
Typical selling price	£17

For graph references see issue No 43

BEST BUY

ORTOFON OM10

ORTOFON UK LTD, DENMARK HOUSE, TAVISTOCK INDUSTRIAL ESTATE, RUSCOMBE, TWYFORD, BERKS RG10 9NJ. TEL: (0734) 343621

This cartridge is often supplied with the popular Dual 505 budget turntable, and is also available as a separate item. The OM designation refers to an optional mass facility, because the 5g cartridge mass contains 2.5g of ballast, which may be removed if the tonearm is capable of balancing such a low mass.

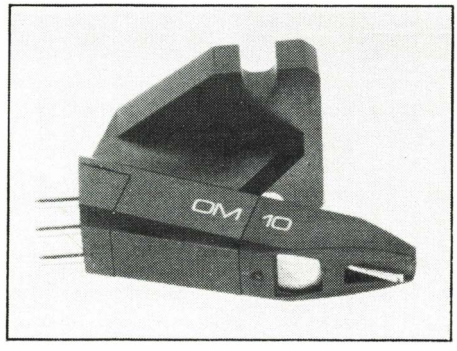
Experiencing this difficulty ourselves, we elected to retain the ballast, but this option, theoretically at least, should allow a wider range of arm masses to be accommodated.

However, it can be argued that the provision of mass as mere ballast must compromise structural rigidity, and certainly the body mounting was rather skeletal, though the stylus assembly made a good fit. Compliance was moderate enough to suit a wide range of arms, the heavier ones benefitting from ballast removal.

Lab Report

With enough output to drive any amplifier, this model is designed to work into a highish capacitance to achieve the manufacturer's intended results at the high frequency resonance. Where pre-amp input loading is low, adaptors may be used in the signal line.

Frequency response looks most impressive despite the low cost of the cartridge, dropping quite smoothly 3dB between 100Hz and 7kHz,



then rallying to 19kHz. Adding capacitance to the manufacturer's recommendation reduces the treble droop to 1dB at 3kHz, and the response starts rolling gently at 10kHz. Channel balance was found to be quite close, but with a broad 0.5dB error 100-600Hz which cannot be corrected and may be audible. There is also evidence of quite pronounced 'glitches' in response at 500Hz and 1.2kHz, with some general uneveness at high frequencies.

Separation figures were pretty good, albeit asymmetric to a marked degree between channels and with significant sample variation, while tracking abilities were fine.

Sound Quality

Nice but noisy (referring to record surfaces) is a snapshot comment on the *OM10* sound. High frequencies were audibly down compared with the more expensive OMs but were nevertheless clean and well controlled.

The midrange was nicely integrated and open-sounding, while the bass did show a degree of overhang.

Conclusions

Clearly one of the leading 'cheapies', the *OM10* gives a decent overall performance, albeit with some sample variation, not to mention a fine level of sound quality for the price.

Test Results

Type, mass	moving magnet 5g*
Stylus type	'E'
Stylus inspection result	neatly mounted simple elliptical
Output Level (1kHz, 5cm/s)	3.6mV
Relative output (0dB = 1mV/cm/s)	-1dB
Channel balance	0.23dB
Channel separation (L,R)	23.6, 21.6dB
Tracking ability (L,R)	80, 80µm
Frequency response limits 100Hz-5Hz	+1, -1dB
Frequency response limits 30Hz-20kHz	+1, -5dB
Stereo Separation L on R 100Hz, 3kHz, 10kHz	30, 45, 39dB
Stereo Separation R on L 100Hz, 3kHz, 10kHz	22, 24, 25dB
Channel diff. from graph, 100Hz, 1kHz, 10kHz	0.5, 0.5, 0.5dB
Response limits ref computer mean, 1kHz-15kHz	+1.5, -0dB
Response limits ref computer mean 1kHz-20kHz	+1.5, -0dB
Test tracking weight, loading	1.5g, 400pF
LF resonance frequency, 12.5g arm (vert, lat)	9, 7.6Hz
Estimated compliance (vert, lat)	19, 24cu
Recommended arm effective mass	5-15g**
LF resonance rise, 12.5g arm (vert, lat)	7, 11.7dB
Typical selling price	£19

**includes 2.5g ballast*
***if arm can be re-balanced with ballast removed*

For graph references see issue No 43

RECOMMENDED

RATA RP20

RUSS ANDREWS TURNTABLE ACCESSORIES, EDGEBANK HOUSE, SKELSMERGH, CUMBRIA LA8 9AS.
TEL: (053 983) 247

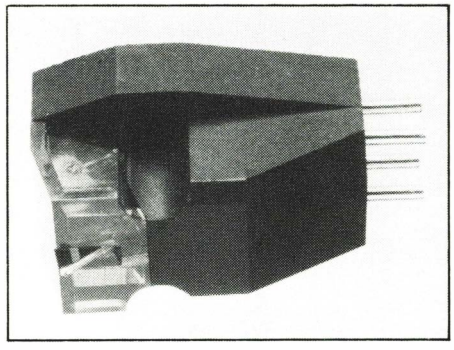
For a number of years now, RATA have been importing and distributing fairly expensive Grace and Supex cartridge models from Japan; more recently they have launched a home-grown range under their own brand name. First of the RATA models to appear was the *RP20*, which is built for Russ Andrews by Goldring, and in fact shares a common body with the Goldring *Epic*. The body design is inherently good, if rather allowing tight mounting with a good contact area. Internal wiring differs from that of the *Epic*, as does the elliptical tip, which has a rather sharper profile. However, the inherent shape is good, if bulky. Stylus fit is pretty secure.

Compliance is close enough to the *Epic* for a similar range of suitable arm masses, but damping is lighter, so the heavier arms are better avoided, particularly as tracking weight is reduced to 1.5g.

LAB REPORT

The healthy output will drive amplifiers most efficiently. Claimed to be independent of loading capacitance, our sample still showed both measured and audible improvement when using high capacitance.

The response trace illustrates the reduced damping at high frequencies, where the treble



flattens out at around 5kHz and then regrettably builds up to a substantial peak on one channel though the other channel is very impressively controlled. Once again the slight 800Hz 'glitch' is visible, though the trace is nice and steady otherwise. Tracking abilities and groove stability seemed much the same, in spite of the lower tracking weight.

SOUND QUALITY

Marred by the distinctly audible treble peak on one channel (5dB difference between channels!), the sound was otherwise very promising for the price with good integration and low frequency solidity, and a clear dynamic midrange with the beginnings of fine stereo imaging. The 'sparkle' was a bit strong at the top of course, and tended to upset the imaging rather, but hopefully this is merely a sample problem.

CONCLUSIONS

Despite the treble problems of our sample, and now that body strength is improved, this model clearly merits recommendation. It offers an inherently rather better balanced sound than the *Epic* which justifies the slightly higher cost.

TEST RESULTS

Type, mass	moving magnet 7.6g
Stylus type	simple elliptical
Stylus inspection result	confirmed neat mounting
Output Level (1kHz, 5cm/s)	3.55mV
Relative output (0dB = 1mV/cm/s)	−1dB
Channel balance	0.9dB
Channel separation (L,R)	28, 26.6dB
Tracking ability (L,R)	80, 80µm
Frequency response limits 100Hz-5Hz	+1, −2.5dB
Frequency response limits 30Hz-20kHz	+1, −3dB
Stereo Separation L on R 100Hz, 3kHz, 10kHz	26, 41, 27dB
Stereo Separation R on L 100Hz, 1kHz, 10kHz	19, 24, 27dB
Channel diff. from graph, 100Hz, 1kHz, 10kHz	1, 1, 0dB
Response limits ref computer mean, 1kHz-15kHz	+3, −1dB
Response limits ref computer mean, 1kHz-20kHz	+6, −1dB
Test tracking weight, loading	1.8g, 250pF
LF resonance frequency, 12.5g arm (vert, lat)	9, 9Hz
Estimated compliance (vert, lat)	15, 15cu
Recommended arm effective mass	6-14g
LF resonance rise, 12.5g arm (vert, lat)	15, 14dB
Typical selling price	£20

For graph references see issue No 43

RECOMMENDED

SHURE M92E

HW INTERNATIONAL LTD, 3-5 EDEN GROVE, LONDON N7 8EQ.
TEL: 01-607 2717

This is the bubble-packed baby amongst Shure's P-adaptable moving magnet cartridges, costing £15.

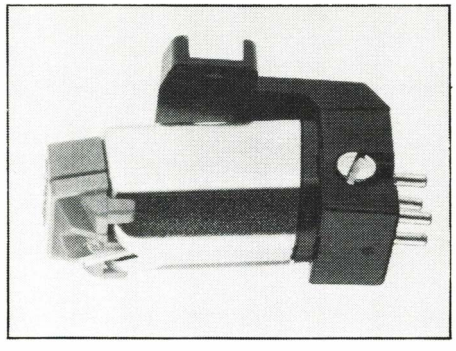
Stylus is a simple neatly mounted elliptical, and tracking weight a light 1.25g. Compliance is modest enough, though unusually the vertical figure is higher than the horizontal. The range of arm masses which can ideally be accommodated is therefore quite narrow, but well chosen nonetheless, while heavy damping will assist general compatibility with cheaper equipment.

LAB REPORT

Output level is pretty substantial, so no problems here, but this model is fairly sensitive to capacitance loading, and a high rather than low figure improves the trace 2dB at 9kHz while also suppressing the 20kHz peak.

Frequency response shows yet again the problem of the P-adaptor, yet in other respects is most impressive, particularly with loading, where the ruler straight range from 300Hz to 9kHz falls a gentle 2dB, with decent rolloff control beyond. Channel balance is pretty close, and the trace is relatively free from 'glitches' outside the P-mount influence.

Separation figures were unimpressive, with significant channel asymmetry, and tracking abilities were not too impressive either, though they are nevertheless adequate.



SOUND QUALITY

As is so often the case with low cost cartridges, the *92E* was quite a pleasant surprise, though it showed its limitations nonetheless, particularly in terms of a 'flattened' sound stage with little apparent depth. The balance was very well judged, with no part of the range particularly obtrusive. Though the treble range was under quite good control, there was little real detail here, and some of its attempts to simulate this were rather obvious. The mid was somewhat recessed, but the bass kept trucking along quite nicely, with little boom or overhang. In all, the *92E* gave a rather impressive display of control for the price, though it was inclined to make heavy weather of high frequency distortion.

CONCLUSIONS

Capable of a respectably decent sound for a respectably low price, the *92E* deserves cautious recommendation. And one cannot help feeling that it might have made a Best Buy were it not hampered by the P-mount adaptor, which reduces its competitiveness in its price class. P-mount users would do well to investigate this model if seeking a low cost replacement, as it is a pretty decent performer.

TEST RESULTS

Type, mass	moving magnet 6.4g
Stylus type	simple elliptical
Stylus inspection result	confirmed, neatly mounted
Output Level (1kHz, 5cm/s)	4.85mV
Relative output (0dB = 1mV/cm/s)	+2dB
Channel balance	0.6dB
Channel separation (L,R)	27.6, 25.1dB
Tracking ability (L,R)	59, 69µm
Frequency response limits 100Hz-5Hz	+3, −3dB*
Frequency response limits 30Hz-20kHz	+0, −4dB*
Stereo Separation L on R 100Hz, 3kHz, 10kHz	18, 22, 22dB
Stereo Separation R on L 100Hz, 3kHz, 10kHz	26, 35, 30dB
Channel diff. from graph, 100Hz, 1kHz, 10kHz	0.5, 0.5, 0.5dB
Response limits ref computer mean, 1kHz-15kHz	+0, −4dB
Response limits ref computer mean, 1kHz-20kHz	+0, −4dB
Test tracking weight, loading	1.25g, 250pF
LF resonance frequency, 12.5g arm (vert, lat)	9, 12Hz
Estimated compliance (vert, lat)	18, 12cu
Recommended arm effective mass	10-15g
LF resonance rise, 12.5g arm (vert, lat)	10, 7dB
Typical selling price	£15

**at low capacitance (c. 100pF)*

For graph references see issue No 43

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AIWA V3300	✓	✓	✓			✓	✓	SINGLE	✓	✓	✓		✓		✓
AIWA V4400	✓	✓	✓			✓	✓	DUAL	✓	✓	✓		✓	✓	✓ RD
AIWA V7700	✓	✓	✓	✓	✓	✓	✓	DUAL	✓	✓		✓	✓	✓	✓
AKAI M313W	✓	✓				✓	✓	DUAL		✓	✓		✓		
AKAI 990	✓	✓	✓	✓	✓	✓	✓	DUAL	✓	✓		✓	✓	✓	✓
ALBA MS700CD						✓	✓	DUAL			✓				
AMSTRAD CD-1000						✓		DUAL			✓				
BINATONE C2000						✓	✓	DUAL			✓				
FERGUSON HF03		✓						DUAL				✓	✓		
FISHER M46	✓	✓				✓	✓	✓			✓		✓ PB		
FISHER M56	✓	✓				✓	✓	✓		✓		✓	✓ PB		
FISHER 2400		✓				✓	✓	D AL		✓		✓	✓		
GOODMANS 5200		✓					✓	DUAL				✓			
HITACHI MD16	✓					✓	✓	DUAL		✓		✓			
JVC MIDI-W12	✓	✓				✓	✓	DUAL			✓		✓		
JVC MIDI-W77	✓	✓	✓	✓	✓	✓	✓	DUAL		✓	✓		✓		
MARANTZ MX166	X					✓	✓	DUAL		✓	✓		✓		
MITSUBISHI CD51		✓						DUAL			✓		✓		
MITSUBISHI 100R	✓	✓				✓	✓	DUAL		✓		✓	✓		
PANASONIC RX-CD70						✓	✓	DUAL		✓	✓		✓	✓	✓
PHILIPS FCD560						✓	✓	SINGLE		✓					
PHILIPS FCD565						✓	✓	DUAL			✓				
SANSUI HG550	✓	✓	✓	✓		✓	✓	DUAL	✓	✓	✓		✓	✓	✓
SANYO W36	✓	✓		✓		✓	✓	DUAL		✓		✓			
SHARP CDVZ1560	✓	✓	✓	✓		✓		DUAL			✓				
SHARP 207E	✓	✓		✓	✓	✓	✓	DUAL		✓	✓			✓	
SONY COMPACT 76	✓	✓				✓	✓	DUAL			✓				
SONY COMPACT 58S	✓	✓	✓	✓		✓	✓	DUAL	✓			✓	✓ PB	✓	
SONY COMPACT 91	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓ PB	✓	✓
TECHNICS TYPE 12A	X					✓	✓	DUAL			✓		✓		
TECHNICS T290	X					✓	✓	DUAL		✓		✓	✓		
TECHNICS X33	✓	✓		✓		✓	✓	DUAL		✓		✓	✓	✓	
TECHNICS X77	✓	✓	✓	✓		✓	✓	DUAL		✓		✓	✓	✓	✓
TOSHIBA SYSTEM 155		✓				✓	✓	DUAL			✓		✓		
TOSHIBA V32CD	✓	✓				✓	✓	DUAL			✓		✓		✓

*CD = CD Player only. PB = Playback deck only. RD = Recording deck only. O = Optional. X = Turntable not supplied. *Surround sound.*

CHART

TUNER						AMPLIFIER									SYSTEM			PRICE	
Medium Wave	Long Wave	FM presets	AM (LW+MW) presets	Digital readout	Signal strength meter	Moving coil input	Auxiliary input	Second tape input	Second tape output	Second speaker connections	'Low' filter	'High' filter	Graphic equaliser	– number of equaliser controls	Microphone input	Automatic source select	Remote control	With loudspeakers	Without loudspeakers
✓	✓	8	8	✓	✓		✓						✓	7	✓	✓		400	
✓	✓	8	8	✓	✓		✓						✓	7	✓	✓	✓	750	
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✓	✓	16 presets AM/FM		✓			✓	✓	✓				✓	5				680	630*
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✓	✓	7	14	✓			✓											400	
✓	✓												✓	3				450	
✓	✓	16 total FM/AM		✓									✓	5				580	
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✓	✓	7	7	✓			✓					✓	✓	12	✓			550	
✓	✓												✓	3	✓			370	
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✓	✓	12	12	✓			✓						✓	5				365	
✓	✓	8	8	✓						✓					✓	✓	✓	840	
✓	✓																	550	
✓	✓												✓	5				439	
✓	✓	6	6	✓	✓		✓						✓	5	✓	✓		920	
✓	✓	5	10	✓									✓	5	✓			530	
✓	✓	20 total FM/AM		✓			✓	✓					✓	7	✓			749	
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✓	✓	✓											✓	3	✓			380	
✓	✓	5	10	✓									✓	5	✓			600	

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AUDIO INSIGHT LTD, 53 Wolverton Rd, Stony Stratford, Milton Keynes. (0908) 561551 A&R, Audiolab, Heybrook, KEF, Linn, Mission Cyrus, Musical Fidelity, Nakamichi, Nytech, Rotel. Dem facilities available. Open Tues-Sat. Home trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Visa. Service dept. BADA MEMBER EXDA

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JCV HI-FI SUPER STORE, 1 Viscount Way, Dukes Drive, Bletchley, Milton Keynes. (0908) 36734. 'Everything from specialist hi-fi to midi-systems, all at the best prices' BADA MEMBER EXDA

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CAM AUDIO, 110 Mill Rd, Cambridge. (0223) 60442. A&R, Creek, Linn, Mantra, Mission, Naim, Nakamichi, Rega, Revolver, Teac. Dem facilities: 3 single speaker rooms Appointment required for one not for 2. Open 9.30-7 00 Mon-Sat 9.30-3.00 Thurs. Free installation, interest free credit. Credit cards: Access, Amex, Visa, Diners.

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TRURO HI-FI & E.T.S. Ltd, 25 King St, Truro. (0872) 79809. A&R, Denon, Dual, Heybrook, Linn, Mission Cyrus, Nad, Quad, Rotel, Thorens. Dem facilities: Single speaker studio. Open Mon-Sat 8.45-5.30. Home trial facilities, credit up to £1,000. Credit cards: Access, ETS Visa. Service dept.

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A.T. LABS, 442/4 Cranbrook Rd, Gants Hill, Ilford. (01) 518 0915. Open Mon-Sat, 10-6. Two single speaker dem rooms. Credit cards: Access, Amex, Visa BADA MEMBER EXDA

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BRENTWOOD MUSIC & HI-FI CENTRE, 2 Ingrave Rd. Brentwood. (0277) 221210. B&W, Denon, Harmon Kardon, JBL, QED, Quad, Rotel, Tannoy, Trio, Yamaha. Dem facilities available. Open Mon-Sat 9.30-5.30. Home trial facilities, free installation, credit facilities. Credit cards: Access, Visa Service dept.

RUSH HI-FI & VIDEO, 5/6 Cornhill, Chelmsford. (0245) 57593. Akai, Aiwa, JVC, Marantz, NAD, Quad, Rotel, Sansui, Sony, Technics. Dem facilities available, ring for appointment. Open Mon-Fri 9.30-6.00 Sat 9 00-5.00. Home trial facilities, free credit. Credit cards: Access, Amex, Visa, Diners. Service dept.

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SOUND ADVICE, The Sound Factory, Duke St, Loughborough LE11 1ED. (0509) 218254. A&R, Creek, Linn Products, Epos, Mission Cyrus, Naim, Rega, Roksan, Rotel, Yamaha Dem facilities, domestic size and furnished studios. Callers welcomed. Demonstrations by appointment. Open 9.30-6.00 Mon-Sat. Free installation. Credit facilities. Credit cards: Access, Visa, Amex. Service dept.

LONDON

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WRBI HOME DEMONSTRATIONS, 13 St Johns Hill, London SW11 1TN. (01) 228 7126. Alphason, Audiostatic, Beard, Castle, Celestion, Deca, Ear, Elite, Jordan, Pink Triangle. Open Tues-Thurs 10-6, Fri 10-7, Sat 10-5 30. Home trial facilities, free installation, instant credit up to £1,000 Credit cards: Access, Amex, Diners, Visa.

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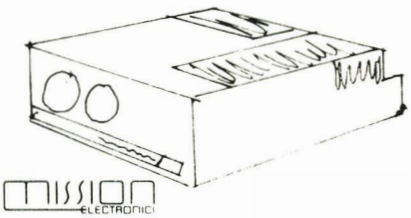
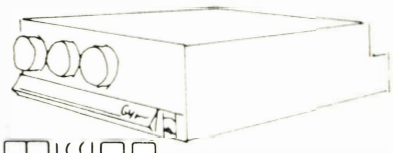


MISSION ELECTRONICS

CYRUS ONE £149.90

Mission's Cyrus One has firmly established itself amongst a very select group of amplifiers which deliver a sound quality and dynamic range performance previously only attainable at much higher prices. Elegant in appearance, devoid of gimmicks, the Cyrus One must be auditioned by everyone searching for the best value for money in amplifiers today.

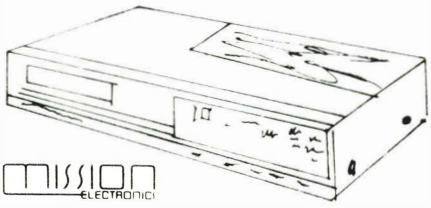


MISSION ELECTRONICS

CYRUS TWO £299.90

The Mission Cyrus Two. A more sophisticated amplifier than the Cyrus One, but with a similar design philosophy. The main difference being the greater current delivery capability which means smoother, more exciting sound. By adding the PSX power supply even greater current delivery is obtained to further increase spaciousness and dynamics.

MISSION ELECTRONICS

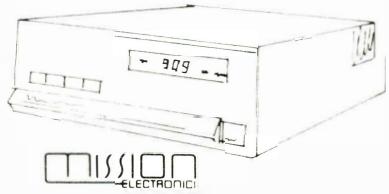


MISSION ELECTRONICS

PCM 7000

£599.90 plus £40 C.D. Discs Free

MISSION, one of the few British companies who fully recognised the full potential of compact discs, had to produce something quite exceptional to replace the excellent DAD 7000. In the recently-released PCM 7000, they have produced the finest sounding machine yet to reach the market. A delight to use with an infra-red remote control that can also control volume.



MISSION ELECTRONICS

CYRUS TUNER

£179.90

Designed to perfectly match the Cyrus One and Cyrus Two amplifiers in both appearance and performance, the Cyrus Tuner stands on its own as a state of the art component whose sonic qualities leave behind many more expensive competitors. High sensitivity and the convenience of auto-search and 19 pre-set FM stations, as well as manual tuning, make this probably the most attractive tuner option available.

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SINGLE SPEAKER DEMONSTRATION

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MISSION ELECTRONICS

70 MK II

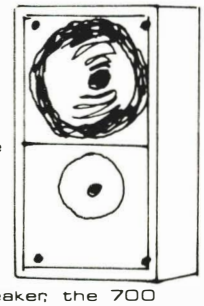
£99.90
per pair

If space is at a premium, then the excellent Mission 70 MK TWO should be on your short list to audition. to be placed close to a wall, this, the smallest speaker of the Mission range, produces really surprising bass. Few peers at the price!

MISSION ELECTRONICS

700 LE

£129.90
per pair



Sometimes, because of the success of their excellent electronics, we forget that Mission are one of Britain's leading speaker manufacturers. Mission's latest speaker, the 700 Leading Edge, re-emphasises their position in the fields of speaker design and production. A ferro-fluid cooled 19mm dome tweeter, inverted drive unit geometry, and a bass unit with an ultra-fine voice coil gap combine to produce a speaker with high power handling and low colouration.

MISSION ELECTRONICS

See the MISSION ELECTRONICS range at the LONDON CONTROL CENTRES

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CLEARTONE HI-FI, 62 King St, nr. Kendals. (061) 835 1156. Best makes, Linn, Creek, NAD, Naim, etc. Dem studio, Compact Disc centre, video and TV. BADA MEMBER

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FIVEWAYS HI-FIDELITY Ltd, 12 Islington Row, Edgbaston, Birmingham. (021) 455 0667. A&R, Denon, Dual, KEF, Meridian, Musical Fidelity, Nakamichi, Philips CD, Quad, Revox, etc. Dem facilities. Single speaker dem room. Open 9.30-6 Tues-Sat. Home trial facilities, free installation, credit facilities. Credit cards: Access, Visa. Service dept.

GRIFFIN AUDIO Ltd, 94 Bristol St, Birmingham. (021) 692 1359. Linn, Naim, Rega, Creek, Denon, Nakamichi, Kef, Quad, Dual, Marantz. Dem facilities 2 single speaker rooms. Open Mon-Sat 9.30-6. Home trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Visa.

SOUND ADVICE, 162 Alcester Rd, Mosley, Birmingham. (021) 449 3328. A&R, Creek, Linn, Manticore, Naim, Nakamichi, Nytech, Onyx, Rega, Revox. Dem facilities 2 studios, ring for appointment. Open Mon-Sat 9.30-6 closed Wed. Free installation, credit facilities. Credit cards: Access, Visa. Service dept.

WARSTONES HI-FI STUDIO, 54a Warstones Rd, Penn, Wolverhampton. (0902) 345114. Dem facilities 3 rooms. Open Mon-Wed 10-6. Thurs-Fri 10-9. Sat 10-6. Home trial facilities, free installation. Credit cards: Access, Visa, Eurocheque. Service dept.

OXFORDSHIRE

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ASTLEY AUDIO LTD, 3 Market Place, Wallingford. (0491) 39305/34349. Akai, A.R. Dual, Mordaunt Short, Mission, Monitor Audio, Philips, JVC, Technics, Tannoy. Open Tues-Fri 9-5.30, Sat 9-5. Records, tapes and 1000+ CDs. Service dept. Access, Visa, Diners.

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WITNEY AUDIO, 28 High St, Witney, Oxford. (0993) 2414. A&R, Aiwa, Akai, Dual, KEF, Mordaunt-Short, Pioneer, Philips, Sony, Yamaha. Dem facilities. Open Mon-Sat 9-5.30. Free installation, instant credit up to £1,000. Credit cards: Access, Visa. Service dept.

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SOMERSET

AVALON HI-FI STUDIO, The Old Nursery, Butleigh, Glastonbury. (0458) 50370. A&R, Audiolab, Goldbug, Helius, Musical Fidelity, Nene Valley, Pink Triangle, Ruark Acoustics, Spendor. Dem facilities: studio & home, ring for appt. Open Mon-Sat 9.30-5.30. Closed Weds. Late night Thurs. Home trial facilities, free installation. Credit cards: Access, Visa. Service dept.

WATTS RADIO — THE ENGINEERS, 1 West Street, Somerton. (0458) 72440. Castle, Dual, Denon, KEF, Mordaunt-Short, Ortofon, Quad, Rogers, Thorens, Yamaha. Dem facilities available. Open Mon-Sat 9-1, 2-5.30, Wed 9-1. Home trial facilities, free installation. Credit up to £1,000. Credit cards: Access. Service dept.

SUFFOLK

BEECHWOOD AUDIO, 3 Brentgovel St, Bury St Edmunds. (0284) 68351. A&R, Ariston, B&W, Kef, Meridian, Musical Fidelity, Nad, Nakamichi, Pink Triangle, Quad. Single speaker dem room: Open Mon-Sat 9.30-6. Home trial facilities, free installation. Instant credit up to £1,000. Credit cards: Access, Amex, Diners, Visa.

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SUSSEX (EAST)

JEFFRIES HI-FI, 69 London Rd, Brighton, East Sussex. (0273) 609 431. 2 dem rooms, closed Mon, late night Wed. Parking, bus route. Credit facilities. BADA MEMBER

JEFFRIES HI-FI, 4 Albert Parade, Green St, Eastbourne, East Sussex. (0323) 31336. 2 dem rooms, closed Mon. Late night Wed. Parking, bus route. Credit facilities. BADA MEMBER

HASTINGS HI-FI, 31-32 Western Rd, St Leonards On Sea. (0424) 442975. A&R, B&W, Mission/Cyrus, NAD, Nakamichi, Quad, Rotel, Systemdek, Tannoy, Yamaha. Dem facilities. 2 single speaker dem studios. Open Mon-Sat 9-7. Home trial facilities. Free installation. Credit facilities. Credit cards: Access, Amex, Visa. Service dept.

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BOWERS AND WILKINS Ltd, 1 Becket Buildings, Littlehampton Rd, Worthing. (0903) 64141. B&W, Dual, JVC, KEF, Nakamichi, Philips, Shure, Quad, Sony, Technics. Dem facilities 2 dem rooms. Open Mon-Sat 9-5.30, Weds 9-1. Home trial facilities free installation, instant credit up to £1,000. Credit cards: Visa. Service dept.

TYNE AND WEAR

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WARWICKSHIRE

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ABSOLUTE SOUND AND VIDEO, 60 Fleet Street, Swindon. (0793) 38222. A&R, Denon, Dual, Linn, Meridian, NAD, Rotel, Technics, Yamaha. (Closed Wed). BADA MEMBER

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ELITE HI-FI, 178 Kings Road, Harrogate HG1 5JG (0423) 521 831. Alphason, Beard, Cambridge, Elite Rock, Michel Engineering, Celestion, Rogers, Monster, Nakamichi. Dem facilities — 2 dem rooms. Open 7 days a week 9-6. Free installation. Service dept.

THE SOUND ORGANISATION, 36 Gillygate, York. (0904) 27108. Akroyd, Dual, Creek, Linn, Mordaunt-Short, Naim, Nytech, Sony, Wharfedale. Dem facilities available. Open Mon-Sat 10-6. Home trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Amex, Visa, Diners. Service dept. BADA MEMBER

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AUDIO PROJECTS, 45 Headingley Lane, Leeds. (0532) 789115. A&R, Audiolab, Creek, Heybrook, Linn, Musical Fidelity, Naim, Quad, Rega, Rogers. Dem facilities available, ring for appointment. Open Tues-Fri, 9.30-6, Sat 2.30-5.30. Home trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Creditcharge, Visa. Service dept. BADA MEMBER

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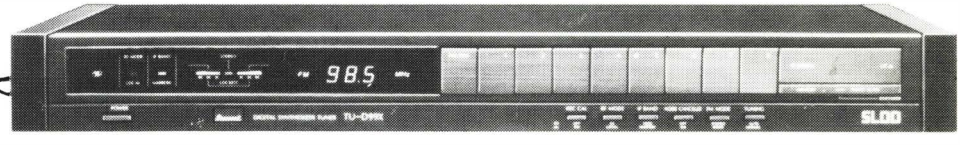

TU-D 99X TUNER £229 inc. vat. Best buy, Hi-Fi Choice. March 1985.
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Ian Kuah. Which Compact Disc. April 1986.

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