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couple of yards of wire issuing from it terminating in a plug which engages a socket provided at the rear of the machine; one side of this sphere houses a microphone and a red indicator lamp. Also in the carton is a small black box with nineteen white buttons on the top, labelled in the same way as those I have described on the control panel. These two items form a complete remote control. The aluminium sphere has a cylindrical base enabling it to be placed in some position where it can survey the whole room. Frankly its styling is a bit of a 'show off', aimed at a certain export market, for the interior is empty except for a thimblefull of components; however we should perhaps allow this one pretentious exercise, even though you will soon tire of explaining to visitors what it is.

The hand-held remote control unit, powered by a small internal battery, uses another large integrated circuit, plus a very few other components, to transmit a coded signal at a frequency above audibility via a miniature loudspeaker across the room to the microphone in the sphere. Each time a command is transmitted, the red lamp on the sphere winks its acknowledgement. Having once placed record on turntable, owners of this ingenious device can retreat to their favourite chair and assume complete control of operation from there. An interesting personal side effect—not covered by the excellent instruction manual—is perhaps worth mentioning; I have a remote control television set of a rather older vintage, which works on similar principles, and operation of any of the buttons on the Accutrac's controller rather conveniently turns my TV off!

In conclusion

This has been a rather long descriptive report, as befits such a novel piece of equipment and, although I have commented in passing on the technical performance of the constituent parts, the reader will justifiably require an overall assessment of its worth. So, omitting the additional facilities, we have a good direct drive turntable plus a first class arm and an acknowledged top grade cartridge mounted in an adequate if not exceptional plinth fitted with a hinged transparent lid. Looking at near equivalents already on the market, we find that the price would be only marginally on the high side for these items alone: certainly the performance of these essential ingredients is paralleled by others *circa* £250. But the Accutrac offers so much more, and there are few users who would not come to value some aspect of its remarkable versatility even if it were only the removal of the need ever to raise or lower the pickup by hand.

There are very few items in the debit column, but foremost must be the housing problem; one really needs a shelf 20 inches (50cm) deep to take this machine; not too commonly found in British homes. The bold presentation adds to the problem and, if it is not your wish to have the gramophone as a dominant feature of your living-room, then make sure you can find a suitable situation, bearing in mind that it is highly undesirable to extend the 4ft (122cm) leads between gramophone and amplifier. In use, the Accutrac has performed excellently and once an optimum setting of the sensor control was arrived at, its ability to select the desired piece from a tightly banded selection has been almost uncanny; only once or twice has it picked up the last notes of a preceding item or missed the first bars of the wanted one. The operation of the selection takes some fifteen seconds, as it is necessary for the arm to return outside the record area each time in order to count its way into the next selected band.

I have found only two slight snags. The first is a silly one—it is all too easy to get engrossed in setting up a programme, consulting the record label to do so, and then forget to put the record

SPECIFICATION AND TEST RESULTS ADC ACCUTRAC 4000

	Maker's Specification	Test Result
1. Speeds (rpm)	33½ and 45	Accurate
2. Speed adjustment	5%	6%
3. Stroboscope	Yes	—
4. Motor type	Brushless DC direct drive	—
5. Wow and flutter (% at 33½ rpm)	0.03% WRMS	Agreed
6. Turntable diameter (mm)	305	Agreed
7. Turntable weight (kg)	1.4	Agreed
8. Turntable material	Aluminium alloy	—
9. Rumble (dB)	-70 weighted -50 unweighted	Agreed
10. Pickup arm	Own	—
11. Cartridge	ADC LMA1	—

on to the turntable. I thought this might be a personal idiosyncrasy, but no, I've found other users doing it and, if the first band has been chosen, there is nothing to prevent the stylus from descending on to the turntable mat. The other problem arises when one wants to pick out a passage in a long movement or perhaps listen to such a passage several times. One then has to resort to hand operation, or select a high-numbered band and press the Cue button as the arm moves across the record; it would be nice to have two extra buttons which slowly traversed the arm in either direction across the disc.

Although it contains many imported components, the Accutrac 4000 is British and it has already achieved notable success in America and Japan, where deliveries commenced earlier in the year. By the time this report is in print, supplies should be on the home market via a smallish number of selected high fidelity shops. Do make a point of having it demonstrated to you.

GEOFFREY HORN.

Audiomaster Image 2 loudspeaker

Price: £109.90 per pair. Manufacturer: Audiomaster Ltd., 33 Bridle Path, Watford, Herts.. WD2 4BZ.



THE Image 2 was developed by a relatively new company in the business of audio equipment manufacture, Audiomaster Ltd., a member of the KJ Group. The group includes KJ Leisuresound, the well-known audio dealers in London and the Home Counties, from whom the loudspeaker is available, as well as through other franchised dealers. The stated aim of its

design was the provision of a speaker of high performance quality but of modest size and cost. Its dimensions make it just about as large as one would want a bookshelf speaker to be; a two-unit design with a sealed enclosure volume of about 0.03 cu. metre, it employs the familiar KEF 200mm bass and mid-range driver and a 25mm dome tweeter by Peerless. The design impedance is 8 ohms and the crossover network, providing high slope rates, also includes level equalization and unit response correction components. Some measure of enclosure panel damping and acoustic foam filling is provided; connection is by 4mm plugs whilst the grille fits on to Velcro-type fastener strips (Fig. 1). The speaker is guaranteed by Audiomaster for 5 years.



Fig. 1. The Image 2 shown with its grille removed in the anechoic chamber

How it performed

A check on sensitivity shows this to be about average for the Image 2 at 6.6 volts RMS pink noise for 90dB SPL and, being a small speaker, I went on to see how it coped with high sustained signal power in the bass. The result at our standard frequency of 40Hz, with 9 volts applied, is shown in Fig. 2a. An SPL of 83dB was obtained, which is a fair result for this enclosure size and type of loading. At 55Hz, with 11 volts applied, the SPL was 93dB, shown in Fig. 2b, though here harmonic distortion was of the same order. Considering the average sensitivity of the Image 2, these low frequency results can be considered only fair.

The axial pressure response, shown in Fig. 3, has a sensible form, with no significant balance errors; the dips and wave effects above 4kHz are in the overlap region of the two drive units, the crossover frequency being 3kHz. There seems to be quite good middle and lower range balance; the dip at 500Hz does not result from acoustic interference between drive units, since it is well removed from the crossover point. In some systems it could be put down to a diffraction effect at the boundary of the baffle, but this is not the cause here. The key is the rise in harmonic distortion coinciding with the dip, and this suggests that a small resonant phenomenon is occurring. There are similar indications at around 200Hz.

The distortion analysis in Fig. 3 shows that harmonic components are of quite low order at our standard 5 volt test level. Total second and third harmonic distortion is in fact less than 2% throughout the range above 60Hz. Incidentally, the makers claim a pressure response uniformity within 4dB limits between 60Hz and 20kHz, which I agree with except for the unit overlap