EQUIPMENT REVIEWS

Lecson HL1 loudspeaker

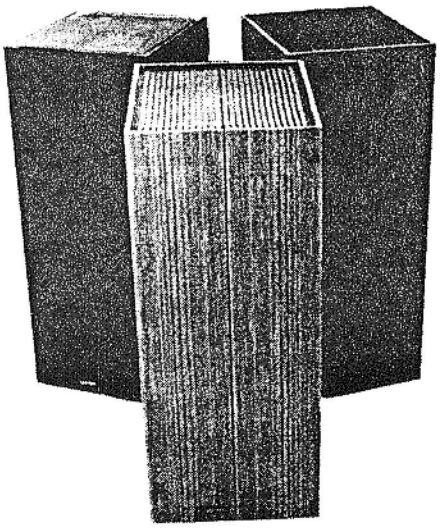
IT is less than 2 years since the young company of Lecson began to get themselves talked about by showing at audio exhibitions a range of products that were highly interesting in appearance as well as in their technical design and performance. The range includes a power amplifier, control unit, tuner and the HL1 loudspeaker.

A main point of interest in the Lecson HL1 loudspeaker design is the decision to go for horn loading on all three of the frequency bands covered. Thus the tweeter, which operates in the range 5–25 kHz, is a diecast exponential horn. It is mounted at the front of the cabinet, near the top at the left hand side, and is fuse protected against overload. The mid-range horn covers 380–5,000 Hz and has a 5-inch driver with hyperbolic paper cone. The horn is of expanded polyurethane foam. It has an effective length of about 12 inches and a rectangular mouth of 12 by 6 inches. This is somewhat below the ideal dimensions that theory would dictate, and indeed the last couple of inches at the side are cut away.

A feature that I cannot recall seeing before is the mounting of this mid-range horn on a pivot to permit rotation through a wide angle. The designers planned this feature to allow re-setting for optimum stereo effect in any given disposition of speakers in a room. As it is, the horn is said to produce near plane waves and have a radiation pattern of 100° horizontal, 30° vertical.

To cover low frequencies, there is a split path exponential bass horn terminating at the rear of the cabinet. Practical limitations of size make the horn of relatively low gain and this is compensated for by using two 13 by 8-inch drive units to provide a large throat area. For best results, it is recommended that the speaker is placed across a corner, facing out into the room. This will permit the walls and floor to act as an extension to the cabinet horn. Alternatively, with little loss of bass performance, the speaker can be placed with its back flat against a wall, up to 3 or 4 feet away from a corner.

Either of these positions should enable this larger-than-average speaker—it measures 17½ by 15 by 37½ inches high—to fit into any reasonably sized room. The styling certainly helps the unit to be pleasantly self-effacing. Instead of the traditional wooden box, the Lecson HL1 is fabric-covered over the whole of the front and sides. The standard colours are black or cream,



The Lecson HL1 speaker is available in various finishes

with other colours available on request. The top consists of a solid, and heavy, panel veneered in teak or rosewood which can be lifted up to give access to the mid-range horn when this requires to be rotated for best stereo effect.

Horn loading brings two important advantages, which Lecson properly point out in their accompanying literature. The first is abnormally clean transient response with low distortion and the second is high efficiency. Transients are a vitally important element in all music—and speech too, for that matter—and they tend to be blurred in a great many moving coil speakers. The electrostatic principle has a clear lead in this area, but proper attention to horn design can at least give magnetic speakers a chance to catch up.

The matter of high conversion efficiency may appear relatively unimportant in these days of very high-power amplifiers. But I would beg to disagree: the extra liveliness of efficient horn-assisted designs, where diaphragm amplitudes need not be excessive for a healthy acoustic power output, adds a definite sense of effortless zest to the reproduction. It is true that speakers of the dimensions of the Lecson HL1 can make only a token stab at horn loading in the extreme bass. Also, there are several problems arising from the fact that the mouths of the three horns in a 3-way design like the present example must be physically spaced apart. This is bound to give rise to phase effects, however successful the designers are in minimising them.

Proper design of the crossover characteristics is of first importance here. The Lecson system has a sophisticated crossover network giving 12dB/octave slopes at the 380 Hz point and 18dB/octave at 5 kHz. Connection to the speaker is via spring-loaded terminals in the base, impedance is nominally 8 ohms and power handling capacity is up to 100 watts programme level.

How it performed

I must confess to a predilection to the column shape for loudspeakers. This puts the drive units, or at least the high frequency units, at a sensible height to clear furniture while taking up only a small floor area. You may say that a conventional rectangular speaker mounted on a stand or shelf produces the same effect, but the column design makes full use of the available internal volume from top to floor.

Having carried the Lecson HL1 speakers up a flight of stairs, I was also impressed by their weight, and ready to sit down and listen to some good music. I connected the speakers to top quality ancillary equipment, with facilities for A/B switching between various other speaker types. On switching, the extra efficiency and 'sprightliness' of the Lecson units was immediately apparent. All the predicted effects were confirmed: I found the room corners gave by far the best bass solidity, and turning the mid-range horn made a vivid difference to the stereo impression.

At the same time, I am not greatly fond of widely displaced drive units and I would choose a 3-way horn-loaded system like the Lecson HL1 only for a room where I could listen at a fair distance—say a minimum of 10 feet away. With this proviso, the treble and mid-range sources then virtually coincided and I found phase effects of no great importance. Chamber music sprang nicely to life and, with all that power in reserve, I could wind the volume well beyond my normal listening level with no signs whatever of speaker overload. On voice, I could just about detect small amounts of colouration, but this is true of practically all speakers and—at the degrees we are talking about here—becomes a question of personal taste and reactions.

SPECIFICATION AND TEST RESULTS
LECSON HL1 LOUDSPEAKER

	Maker's Specification	Test Result
1. Type	3-way horn loaded	—
2. Drive unit diameters	2 off 13 x 8 5 3 x 1½	—
3. Crossover frequencies (Hz)	380 and 5,000	Agreed
4. Frequency Response (Hz)	30–25,000	See Fig. 1
5. Power handling capacity (Watts)	100W programme	Agreed
6. Impedance (Ohms)	8	—
7. Dimensions (in.)	37½ x 17½ x 15	—
8. Finish	Black or cream fabric with teak or rosewood top	—

Objective measurements were carried out at the acoustic laboratories of The Polytechnic of North London. The axial response, with microphone at 1 metre on the tweeter axis, is shown in Fig. 1. The graph is far from flat, due no doubt to phase effects in the overlap regions between the drive units. However, this is hardly a fair representation of the results to be obtained at a normal listening distance in other than laboratory anechoic surroundings. In the same way, the falling bass response in the test chamber does not correspond to the performance to be expected in the recommended room corner situation.

The polar response is shown in Fig. 3, and demonstrates the system's nicely balanced spread in the horizontal plane. The off-centre plot at 10,000 Hz is due to the tweeter being mounted towards one side of the front panel:

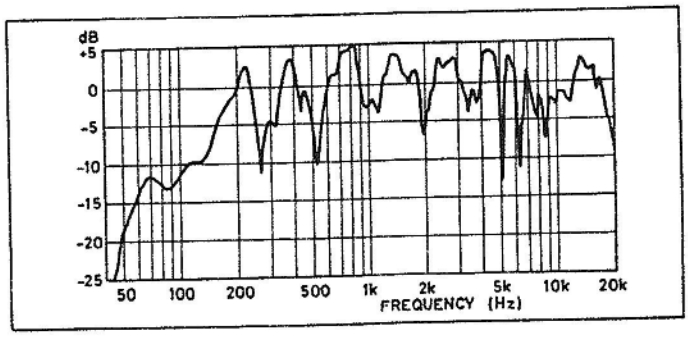


Fig. 1. Lecson HL1 axial frequency response

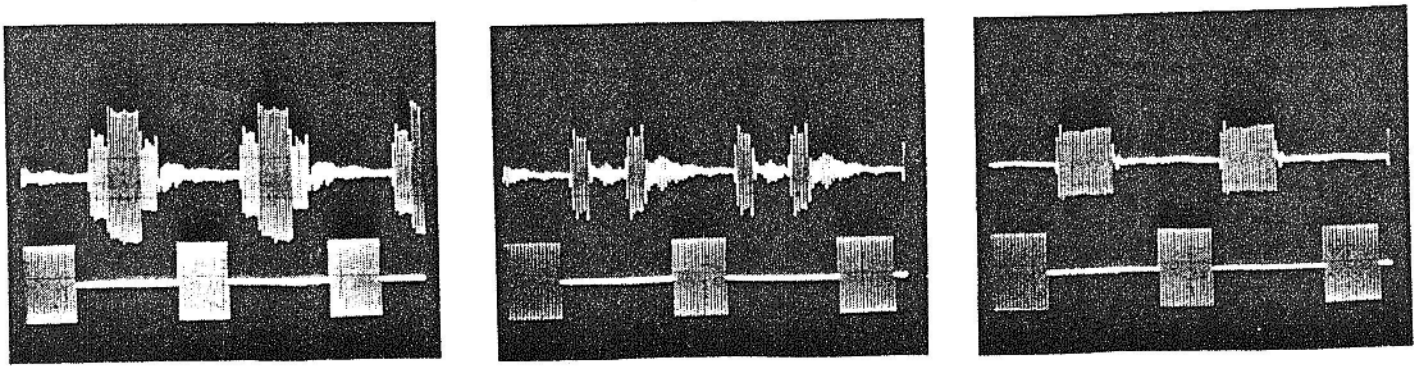


Fig. 2. Toneburst tests at 6,490 Hz, 5,970 Hz and 5,970 Hz again with the mid-range unit disconnected (input is lower trace)

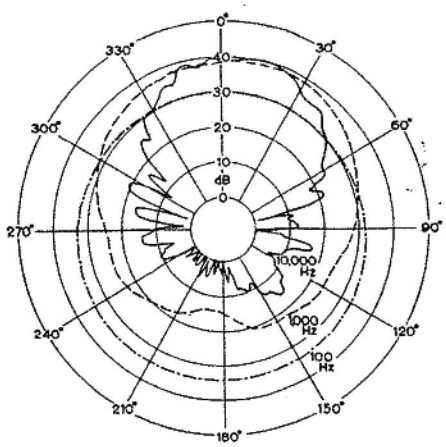


Fig. 3. Lecson HL1 polar response at 100, 1,000 and 10,000Hz

the middle frequency polar distribution of course is variable by rotating the mid-range horn. It was possible to pinpoint some of the tweeter and mid-range interference effects in toneburst tests. In Fig. 2 (a) and (b), for example, we see phase addition and cancellation effects at 6·49 kHz and 5·97 kHz respectively. That interference of the acoustic waves is responsible for these effects is confirmed in Fig. 2 (c) which is a repeat of Fig. 2 (b) but with the mid-range unit disconnected.

Objective and subjective tests both revealed traces of mechanical resonance at middle frequencies. I am inclined to associate this with the pivot mounting of the mid-range horn and possibly its structure. I must emphasize that we are discussing very small points of criticism in what is in most ways a very fine loudspeaker.