

Technics SB-10 speakers

Louis Challis gives the SB-10s the accolade of being "the finest Japanese loudspeakers I have yet heard". What more needs to be said?

Louis A. Challis

EVERY MANUFACTURER of loudspeakers will tell you that they are the weakest link in the reproduction chain of a hi-fidelity system. Most manufacturers, when releasing their latest or greatest loudspeaker, will claim that *this* product finally overcomes the deficiencies plaguing previous models.

On this rare occasion the manufacturer does not speak with a forked tongue; there is definite substance both in the claims made for the Technics SB-10 speakers, and more particularly in the subjective and objective results achieved.

In January of this year we discussed in ETI the extent to which the Japanese speaker manufacturers have been carrying out research work along parallel lines to English loudspeaker manufacturers. Matsushita Electric have undoubtedly been at the forefront of the Japanese manufacturers in developing their laser/holography and finite element method of loudspeaker enclosure analysis to determine the modal characteristics, not only of the cabinets but more significantly of the all-important loudspeakers themselves.

The approach

Technics' approach to this problem has been a little different from that of either K.E.F. or B & W in the United Kingdom, or for that matter from other Japanese manufacturers, the majority of whom have tended to stay with the conventional concept of a loudspeaker.

Technics' engineers decided that in order to achieve a true piston-like motion for a loudspeaker, the basic design philosophy used in the past of having a paper cone, a conventional voice coil and a conventional small magnet assembly would have to be discarded.

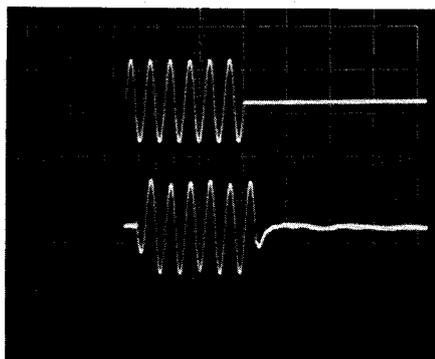
The conical shape of the conventional loudspeaker has never really been a virtue and had always resulted in speakers whose cones could be readily induced into resonance at one or more frequencies. These resonances cause poor linearity and destroy high-fidelity performance. Technics' approach to this problem was to change from the basic concept of a cone to a flat diaphragm with strength and rigidity substantially better than in any loudspeaker previ-

ously constructed. They discarded such principles as aluminium or polypropylene stiffened fibre cones in preference to a material developed by the aircraft industry in the form of an aluminium honeycomb structure.

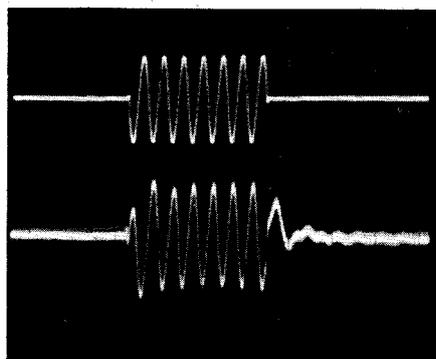
By using an axially symmetrical structure of honeycomb formed into a spirally wound disc with flat stiffening plates above and below, they were able to achieve a stiffness which is almost one hundred times that of comparable paper cone diaphragms. The primary fundamental resonance frequencies were then transposed up to the kilohertz region for the woofer.

The drivers

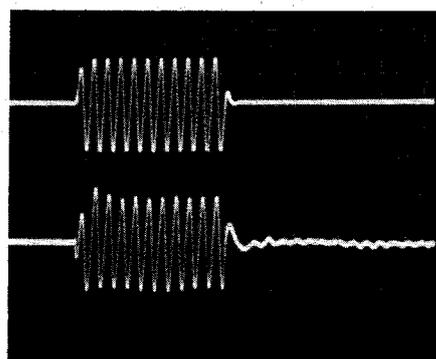
Obviously this approach could still create problems if the voice coil were considerably smaller than the diameter of the speaker diaphragm. To overcome this problem Technics developed a speaker voice coil with a diameter of 160 mm, which provided balanced drive to the face of the honeycomb speaker disc. A typical cross-section of the low frequency driver is shown on page 125 (for the 32 cm honeycomb disc woofer)



100 Hz (20 ms/div.)



1 kHz (2 ms/div.)



6.3 kHz (0.5 ms/div.)

Tone burst response of Technics SB-10, Serial No. BA0J20B008 (for 90 dB steady-state SPL at 2 m on axis). Upper trace is electrical input; lower trace is loudspeaker output.



and this shows how the resonance problems were minimised and the total voice coil power dissipation rating increased as a result. The 80 mm mid-range driver is built on the same principles but the voice coil here is a more conventional 50.5 mm in diameter. The mid-frequency driver covers the frequency range 450 Hz to 5 kHz, and the top end of the response is provided by a leaf tweeter whose frequency response extends to beyond 100 kHz.

The top end of the frequency response must have caused Technics' engineers a great deal of concern and possibly even anguish. They had to produce a 'state of the art' solution that was efficient, provided a flat frequency response, low distortion and good dispersion.

The leaf tweeter that resulted is unusual, for Technics have developed a tweeter which provides a remarkably flat on-axis response. The frequency response extends to beyond 20 kHz — the upper frequency with which we are

normally concerned — and Technics claim that it works all the way to 120 kHz, which is way up above the range of human hearing. This tweeter makes use of a patterned polyimide film diaphragm with a heat-resistant aluminium voice coil to achieve a device with the characteristics of a ribbon tweeter but the impedance of a more conventional loudspeaker. As no transformer is required to match the tweeter to the rest of the system, phase and transient limitations are positively minimised.

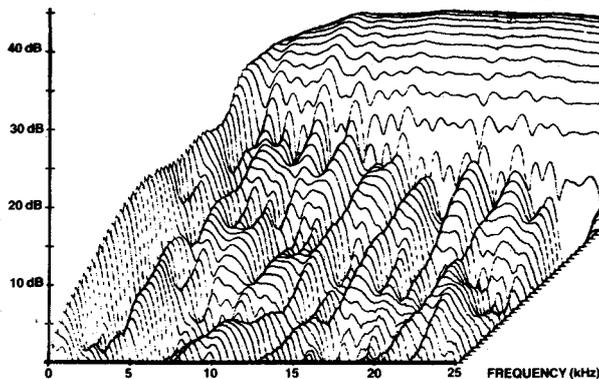
The loudspeakers

The SB-10 is an attractive loudspeaker system, featuring a black-lacquered, veneered cabinet with the same finish on all six faces. The front grille features an open-weave black cloth over a frame which latches into four sensible recessed catches on the front face. Behind this grille a tweeter and a separate mid-range frequency contour control are located, which provide up to a nominal 20 dB of mid-range and high frequency attenuation in reference to the flat response setting.

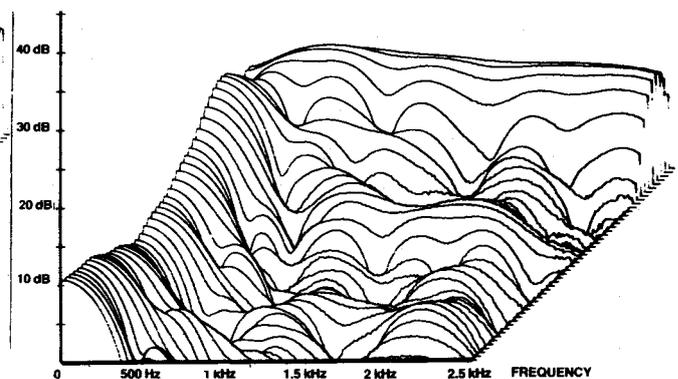
In addition to these two front-panel controls the designers have incorporated three separate self-powered protection circuits for the woofer, mid-range and tweeters, so that in the event of excessive voltage drive the speakers are protected from an untimely demise.

The back of the cabinet features a simple pair of screw terminals in a recessed plastic moulding, which regrettably do not accept the conventional banana plugs I believe most users would prefer.

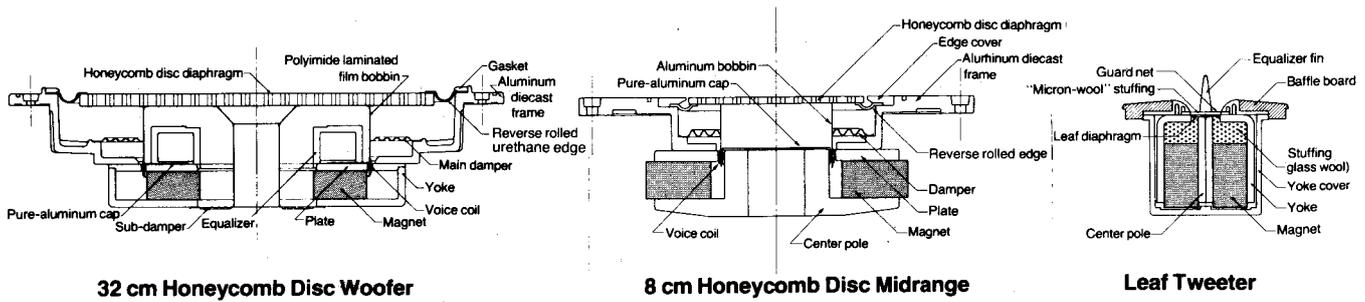
The speakers themselves have a particularly high standard of finish, incorporating not only the aluminium-faced honeycomb structure of the disc ▶



Spectral decay plot to 25 kHz.



Spectral decay plot to 2.5 kHz, covering the bass and mid-range regions.



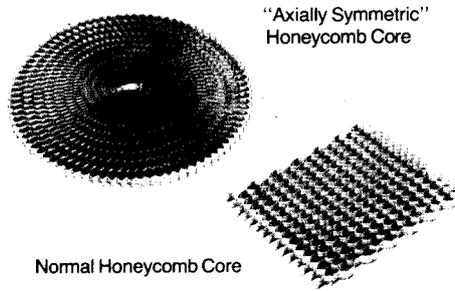
but also the frames round the speaker basket. This finish is so good that many users may wish to discard the grille in order to impress their friends with the speakers!

On test

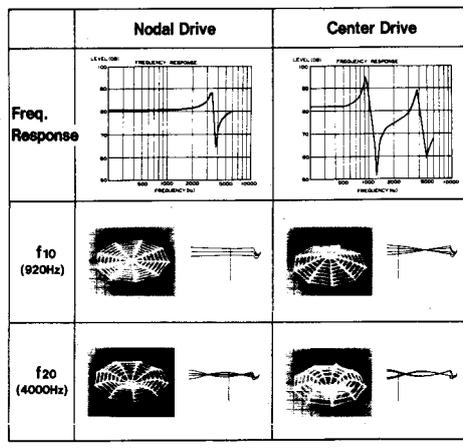
The objective testing proved exciting, as the SB-10s exhibit a remarkably flat frequency response which extends from below 35 Hz to beyond 20 kHz. The on-axis tweeter response in particular is remarkably smooth, whilst at 30° to the main axis it is still only 6 dB down at 20 kHz. The off-axis response does exhibit some interaction between the tweeter and mid-range unit, but the ripples that result come from the interaction of the two halves of the driver's phase responses as one moves to one side or the other.

The phase response of the SB-10 is remarkably smooth and shows how well the honeycomb disc speakers overcome the phase problems and the normal cavity effect created by the conventional cone loudspeaker.

The speaker's fundamental resonance occurs at 43 Hz, with a fairly significant rise in impedance, approaching 30 ohms. This value drops down to a stable 6-7 ohms in the 100 Hz region and then fluctuates between 16 ohms and 8 ohms across the



The 'axially symmetric' honeycomb core of the driver diaphragms compared to normal 'linear' honeycomb structure. The honeycomb core is sandwiched between thin aluminium sheets.

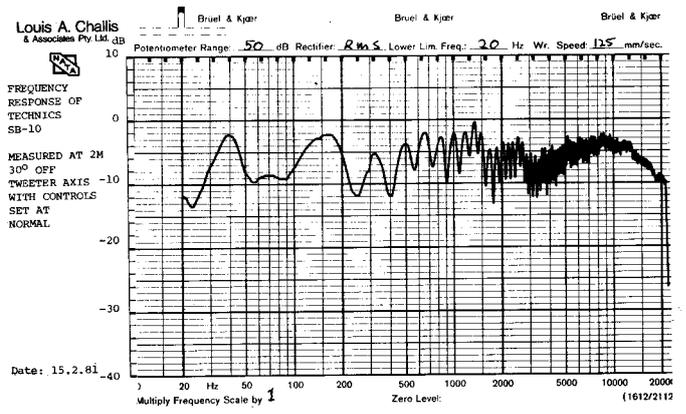
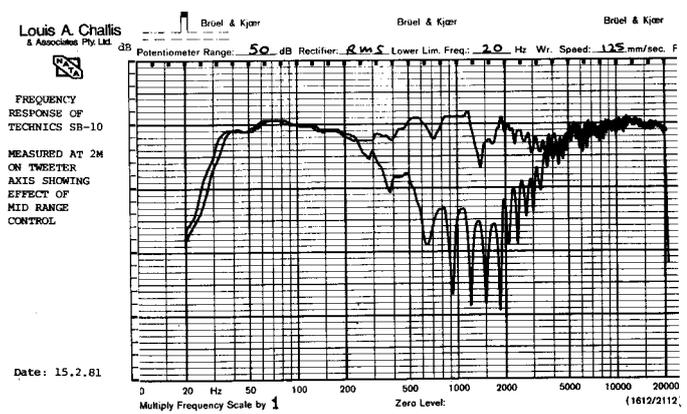


Illustrating how the range of 'piston motion', and thus frequency response, is increased by nodal drive.

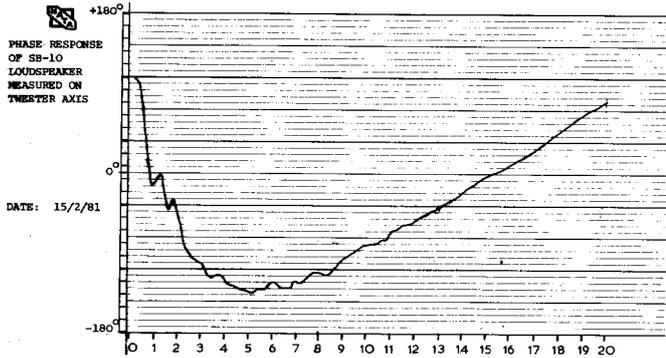
rest of the range. Whilst the mid-range and tweeter contour controls do enable one to change the characteristics of the loudspeaker, it is questionable whether anybody would really want to make use of the controls because of the resulting non-linearity.

The decay response spectrum of the SB-10 is remarkably smooth and exemplary. Whilst there are some observable ripples 20 or more decibels down compared with the fundamental, these come from the speaker basket and the residual cabinet resonances. This speaker comes close to matching the performance of the B & W 801 that we reviewed in the January issue — and that performance was a particularly hard act to follow.

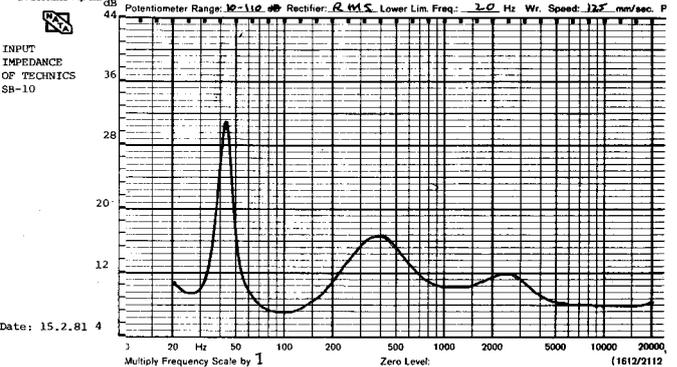
It is clear from the decay response spectrum that Technics have achieved just about everything they claim in terms of minimisation of speaker and cabinet resonances. The responses in the range 0-2.5 kHz and 0-25 kHz are as flat and as smooth as one could reasonably desire. Even the conventional tone-burst responses proved to be particularly good, and more importantly the total harmonic distortion measured over the range 100 Hz-10 kHz is amongst the lowest we have yet measured from any speaker at the 90 dB output at 2 m.



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The subjective testing of the loudspeakers has to be related to the objective testing, and I kept the SB-10s at home for a number of weeks carrying out many direct comparison tests on an A-B basis with the standard monitors, with speakers I have not used for many years, and with a series of other speakers including a pair of B & W 801s and a pair of Quad Electrostatics to provide reference standards for comparison.

The first, immediately obvious attribute is the magnificent stereo imaging the SB-10s provide. These speakers match the B & W 801s in this area and surprisingly come very close to matching the B & W 801s in most of the other prime areas, including frequency response, power handling capability, efficiency and overall linearity. Whilst there are subtle differences between the SB-10s and the B & W 801s they do, nonetheless, have many features in common, and it is a credit to both systems how well they perform.

In playing a wide range of high quality records, including two new ones — "Yehudi Menuhin and Stephan Grappelli — Strictly for the Birds" on Angel Records DS-37710 and "Morton Gould and the London Symphony

Orchestra — Digital Space" on Verese Sarabande VCDM 1000.20 — it became evident that the SB-10s are able to handle without significant problems subtle transients and high-powered signals that would normally destroy or disturb other speakers. Thus at sound pressure levels in excess of 100 dB there is absolutely no trace of distortion, no audible colouration, and they are able to handle the signals in a manner that is comparable to large professional rock group speakers. The response is however far cleaner and the inter-modulation distortion much lower.

Well ... ?

If you have ever believed Japanese manufacturers can't produce loudspeakers as good as those from other countries, the SB-10s will prove you wrong. These speakers are avant garde not only in terms of their technical features and proven performance but more importantly in terms of their acoustic fidelity.

I must rate the SB-10s as being the finest Japanese loudspeakers I have yet heard and acknowledge that they provide a performance only surpassed by speakers selling at more than twice the price.

MEASURED PERFORMANCE OF TECHNICS SB-10			
SERIAL NO. BAC020B008			
FREQUENCY RESPONSE:	32Hz - 20kHz		
CROSSOVER FREQUENCIES:	300Hz - 3kHz		
SENSITIVITY: (for 90dB average at 2m)	9VRMS = 10.1 Watts (nominal into 8 Ω)		
HARMONIC DISTORTION: (for 90dB) at 2m	100Hz	1kHz	6.3kHz (@ 87dB)
2nd	-45.3	-53.1	-48.4
3rd	64.8	-49.9	-48.5
4th	-	-	-
5th	-	-65.2	-
T.H.D.	0.5%	0.39%	0.53%
INPUT IMPEDANCE:	100Hz	1kHz	6.3kHz
	7.2 Ω	10.4 Ω	8.0 Ω
	Minimum at 100Hz	7.2 Ω	

TECHNICS SB-10 SPEAKERS

Dimensions: 711 mm high x 402 mm wide x 318 mm deep
Weight: 32 kg
Manufactured in: Japan by Matsushita Electric Limited
Price: \$1598 pair
Distributed by: National Panasonic, P.O. Box 319, North Ryde NSW 2113.

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