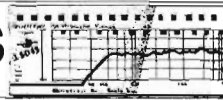


Equipment Reviews



Meridian M2 active loudspeaker system

Manufacturer: Boothroyd Stuart Ltd., 13 Clifton Road, Huntingdon, Cambs PE18 7EJ. Price: £750 per pair in seven standard finishes, £825 in rosewood or yew.



"WHAT a beautiful way to have Hi-Fi!" The cultured lady I quote had just seen (and heard) a superb but simple system I had set up using a pair of these M2 loudspeakers in their most luxurious rosewood veneer finish plus Meridian's slim control unit and matching switched FM tuner. To complete this elegant outfit I had chosen Bang & Olufsen's latest press-button controlled radial tracking turntable, the Beogram 8000, also in rosewood. This little lot had cost its owner a fraction over £1,600, a bargain in his life style and one which was giving him untold pleasure to both ear and eye.

The concept of active loudspeakers, or if you like the inclusion of power amplifier(s) in the loudspeaker cabinet, is by no means a new idea. Professional users in studios and broadcasting have long enjoyed the convenience of being able to plug in their loudspeakers of all sorts and sizes at line or headphone level. The high fidelity application has been more recent (although one can find that historically there were examples in the 1930s) and has developed with the increased use of multiple-unit loudspeakers normally requiring complex crossovers. To drive each unit or set of units, bass, mid-range and treble, with their own individual amplifiers and to precede these amplifiers with electronic crossovers has a number of undoubted advantages in terms of resulting sound; to be weighed against the very considerable disadvantage of greatly increasing the cost. However there are quite a few of these so-called bi-amped or tri-amped systems in the homes of enthusiasts today, running in price up to £5,000. In the main these consist of standard amplifiers driving standard loudspeakers from which the usual crossover has been omitted, disconnected or removed. Boothroyd Stuart have considerable experience of such schemes but have also taken the basic idea several stages further in integrating the overall design so that neither the electronics nor loudspeaker are standard and could never be used apart. The M2 is their current masterpiece (though an even smaller system was shown at Cunard, see report in June issue). The M2 has been perfected over the last year and in it they have cleverly optimised both areas so that the whole is much better than the parts. What is perhaps more important, the cost is lower (several hundred pounds lower) than the nearest traditional equivalent might be.

It may be helpful and certainly instructive if I quote at some length from some amusing notes by Bob Stuart listing advantages of his M2 design:

"The first benefit is economic—now it is not necessarily our intention to make top hi-fi available for Everyman, but we do believe passionately that if it is possible to offer better value for money then we must do it. Why is it cheaper? Putting the electronics into the speaker cabinet considerably reduces the cost of housing the electronics—particularly if you are Meridian—reduces the handling problems in manufacture, simplifies the scheduling of production, reduces despatch costs and makes distribution, procurement and installation infinitely easier for distributors and retailers.

"It is cheaper—and here is the real crunch—because we are able to design the power amplifiers and power supplies to exactly match the characteristics of the drivers in the box, secure in the knowledge that the amplifier cannot be asked for more than x amps by the drivers nor can the power amps overdrive the motor units. In the M range we have been able to design the power amplifiers to suit their purpose and not go in for overdesign—so for example the bass amplifier of the M2 is never required to produce more than 5 amps peak and the tweeter 3 amps peak.

"The second advantage is reliability. Because the speaker load is known, the opportunities for oversteering the power amplifiers, e.g. inadvertent short-circuit, mismatching or misearthing are eliminated.

"The third advantage is that we have the ability to realize filter shapes not possible in passive systems, the ability to compensate the phase and amplitude characteristics independently—a possibility denied to passive networks.

"The fourth advantage is only possible with completely integrated active systems, the ability to adjust out in the electronics normal, and by absolute standards deeply worrying, production variations of the drive units. For example high-quality tweeters show normal production variations of 1.5 to 2dB in sensitivity and equal variations in response shape. Add this to similar variations in the bass units and is it any wonder that speakers are sometimes thought to be variable—especially when at this level of quality we can demonstrate to you that sample variations in response shape of 0.5dB are extremely significant?

"Fifth and final advantage: by putting the amplifiers and speakers in the same box gives us the freedom to employ our interactive approach to the low end. Remember that the M2 is -3 dB at 37Hz and, if the electronics were not committed, this speaker could not go lower than 60Hz."

Unusual proportions

Let us examine an M2 in some detail. First of all, its proportions are unusual—tall, narrow and rather deep. It comes with a handsome tilting stand or can be used on a bookshelf. The cabinet is of 14mm birch plywood, braced and damped internally, skillfully veneered and grain matched to its twin. The front face, deliberately narrow to preserve a good directional characteristic, houses a pair of 110mm low-frequency units with a 52mm hard-dome tweeter placed between them; all are of British (KEF) manufacture. Near the lower edge is a tunnel port, for this is a reflex design; the tube is filled with a bunch of polypropylene straws to flatten the natural resonance of the pipe and to avoid the diffractive puffing noises which would occur at the amazingly low frequencies (40Hz) which this box of only 17 litres can readily produce. There is a clip-on front panel frame covered with plain black or brown grille cloth and a tiny lens lit from within when power is applied. The rear of the cabinet is a metal plate which serves as a mounting for the twin amplifiers and power supply, and

as a heat disperser for the output transistors. The solid plywood back of the loudspeaker chamber is recessed just sufficiently to provide a housing for the electronics. Each power amplifier is based on Meridian's Model 105 but the bass and treble requirements are only 70 and 35 watts respectively. The common power supply uses a hefty toroidially wound transformer which sets the scene for the high quality of components employed throughout and the well considered construction.

The electronic crossover is on a separate replaceable plug-in board as several alternatives are available; e.g. for bookshelf operation. Another little trick is brought in here whereby the signal to the tweeter is delayed in order that the arrival time of the sound it produces matches that of the other units, to give the desired propagation pattern. In addition, the frequency responses of both bass and treble channels are deliberately bent and kinked to provide a flat acoustic output over the pass band of the complete loudspeaker. As a matter of interest, and to illustrate this point, we have plotted the voltages applied to the voice-coils of one of our M2s when fed with a flat input and these are shown in Fig. 1. But please understand that this is not the response of the loudspeaker as you hear it.

Almost any control unit could be used to drive these M2 loudspeakers, which comply with the recommendations of ALSO (the Active Loudspeaker Standards Organization). However,

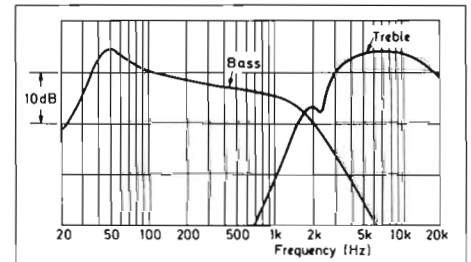


Fig. 1. Voltage applied to voice-coils

persuasively supplied with the review loudspeakers was Meridian's own Model 101 plus all the necessary connecting leads. There is incidentally an excellent instruction manual which, setting out to be both informative and logical, succeeds in both and of course describes how to use the 101 control unit: so I used it! It is outwardly a very simple design—small, plain and neat. There are three switch levers at the left for Input (gramophone or radio), Mode (stereo or mono) and Tape Monitor; at the right a pair of concentric knobs set the balance and adjust volume and on/off. There are no other controls.

MAKER'S SPECIFICATION MERIDIAN M2 ACTIVE LOUSPEAKER

1. Type	Two-way reflex with built-in amplifiers
2. Drive unit diameters	2 x 110 mm low frequency 1 x 52 mm dome tweeter
3. Frequency response (-3 dB points)	38Hz and 35kHz
4. Crossover frequency (Hz)	1,900
5. Input for full output	0dBm, over 11,000 ohms
6. Output maximum (at 1 metre)	105dB music
7. Distortion (in electronics)	less than 0.05%
8. Sensitivity	-20 dBm for 83dB at 1 metre
9. Dimensions (mm)	500 x 180 x 375
10. Finish	American Walnut Brazilian Rosewood Black Lacquer etc.
11. Special features	Electronic crossover with separate bass and treble amplifiers

AUDIO 3

All Meridian units share the common construction of aluminium extruded sleeves, finished optionally in brown or black paint which appears to have been lightly dusted in sand particles. Connections are at the rear, neatly labelled and concealed by a protruding lip on the extrusion. The input and equalization circuits for the gramophone input of the IO1 take the form of plug-in screened modules and this offers considerable versatility. I had two, a normal magnetic module and their new moving-coil double module which uses a development of the 'virtual earth' circuit enabling it to match a variety of low impedance cartridges with adequate bandwidth and overload characteristics.

How they performed

All this described, how did the set perform? Well, firstly, forget the compact dimensions; that limitation seems to have been well disposed of. There is no sensation whatsoever here of listening to small loudspeakers. Bass drum, timps, organ pedal notes, they all flow facily and with adequate amount for any reasonable domestic surroundings. Indeed one finds once again a sensation that I have noticed before with active systems; namely that one can go on turning up the sound far beyond what should reasonably be expected without obvious distress. Of course there does come a point when it all shatters but that would be well beyond anything my tastes dictate. The frequency balance is undoubtedly very good and colorations have been reduced to a very low level indeed; in fact after long periods of listening. I have identified only a couple of minor areas of very little significance. The outstanding characteristic of these loudspeakers is the superb stereo image which they can produce when the source material is good. The narrow frontal area, the layout and phase coherence of the three units, which are encouraged to behave as a true line source, add up to a sound dispersal pattern which is near ideal. As a result there are no fixed 'highlights' in the sound to attract your ears and direct attention to the loudspeakers. Without the

visual clue one would be hard put to to it to identify and accurately point to the sources of sound without approaching them. Used in two rooms of very different characteristics, one rather hard and sparsely furnished and another quite the reverse, yielded a similar result to that which one could expect if the original sounds were performed in like surroundings; to me this is one of the strong indications of a good loudspeaker system. It is quite surprising how in making such a comparison with inferior designs it is found that in one situation or the other there is no illusion of reality, only very obvious loudspeakers imitating music.

The IO1 control unit performed in the same unobtrusive way that its tidy look would lead one to expect. Using M2s, the lack of tone controls called for no real criticism although there were a few times when I would have liked to roll off someone else's excesses in the treble. Both input arrangements were successfully used with a selection of 'establishment' cartridges from moving-coil and magnetic camps. In this respect I must vote against the general promotion of the moving-coil as a superior beast. I know why people prefer them but I would rather have my excitement come from the score; I am also pretty sure that my discs approve the gentler touch of today's magnetics; however the pursuit of that thought must wait for another day. Whatever your choice of cartridge may be—or become—there is a module for it in this flexible design.

I would have said that past Meridian models have in the main attracted, and indeed their current range of amplifiers continues to attract, the 'no compromise' esoteric end of the specialized enthusiast market. With the M2 they are unashamedly making a U-turn with a much wider appeal to a sophisticated music lover who will rejoice in their high standards of design, listen with admiration to their remarkably fine sound and find to their delight that the combination of attractive appearance and small size has, as can be gathered from the quote with which I started, removed the threat of divorce. Neat, sweet and *petite*; I wish the M2 all the success it deserves.

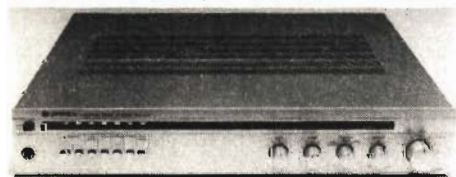
GEOFFREY HORN.

Sharp Optonica Rack System

Manufacturer: Sharp Corporation, Osaka, Japan. UK Distributor: Sharp Electronics (UK) Ltd., Sharp House, Thorp Road, Manchester M10 9BE.

THE Sharp Corporation is another of the giant Japanese manufacturers whose interests cover a wide range of electrical, electronic and mechanical equipment. Optonica is a brand name used by their hi-fi division. The individual items submitted for this review consist of a turntable, cassette recorder, FM/AM tuner and stereo integrated amplifier. These units can be purchased separately at the prices indicated or, if purchased complete with an attractive glass-door vertical rack, a reasonable discount applies.

SM-4100E amplifier (£99.00)



Like all the units, the amplifier is really slim but rather deeper than usual, thus ensuring a large area for heat dissipation. It has a matt silver finish with front panels of extruded aluminium. At the extreme left is the mains power switch, adjoining a long black strip, behind which are the function indicator lamps. Below this is a jack for stereo headphones, followed by switches to select either or both pairs of loudspeakers, a subsonic filter, mono (which parallels both channels), tape dubbing, monitor and loudness control. Rotary controls are used for bass, treble, balance and

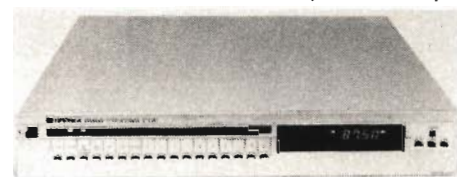
volume, the last-named having a larger knob. The rear panel carries the following facilities: a captive earthing terminal, phono sockets for pickup, tuner and auxiliary (which is also used as tape recorder 2, although it is possible to dub in one direction only). Four more sockets are used for tape recorder 1 in and out. The two pairs of loudspeakers are connected via heavy-duty spring-loaded terminals.

Removing the silver-grey steel cover reveals several unusual features. Across the whole length of the steel chassis is an aluminium extrusion mounted vertically, carrying 80 curved heat-dissipation fins. This is mounted centrally, and below and above it the chassis and top cover are perforated, giving exceptional heat dissipation. Mounted on the extrusion is a large integrated-circuit which uses direct coupling between all stages, a differential amplifier and a semi-complementary output stage with no capacitors between it and the loudspeaker. A massive, screened mains transformer provides 330 watts to drive the amplifier and a time delay relay operates during the warm-up period for protection. A small printed circuit board carries the components and the integrated circuit associated with the rear sockets, whilst a large board carries the power supply components and intermediate amplifier stages. A fuse is mounted near the mains transformer, in the primary circuit (marked 25A, whereas it should be 2.5A).

The Table shows that the amplifier fully meets its specification. Power output was measured just below the clipping point as viewed on an oscillograph and is higher than the claimed figure. No difficulty arose when using electrostatic loudspeakers but, although the makers state that the unit is capable of operating at full power with 4-ohm loudspeakers, I found visible distortion at 36 watts with both channels driven.

Although the bass and treble controls carry a detent, it is possible to adjust them at intermediate positions, and the balance control is adjustable to zero output at each end of its travel. Figure 1 shows that the RIAA disc correction is excellent and that the subsonic filter helps to reduce possible turntable rumble. Separation between channels on disc was very good at 60dB at 1kHz and, at full volume, the background hiss was only just audible. All measurements for harmonic and intermodulation distortion showed figures well below the maker's claims and balance between the stereo channels was within 1dB throughout the range of 20Hz to 20kHz.

ST-5200 stereo tuner (£129.00)



This tuner has several unusual features, one being that it has no continuous tuning control, but employs a wholly electronic tuning system. This uses a highly stable quartz oscillator, which generates a reference frequency, and a microprocessor operates in conjunction with a synthesizer to select any frequency in the FM or AM bands. A phase locked loop demodulator gives excellent channel separation with the least distortion, and the PLL eliminates frequency drift and error. The tuner also has an auto-tuning system whereby it automatically scans each waveband and stops for a few seconds at each station received above a certain signal level. Also there are ten buttons which allow one to pre-set stations in any of the three wavebands. The tuned frequency is displayed in large green figures.

The tuner front panel matches all the other units. At the top left is the mains on-off switch with a dark plastic strip behind which are a number of function indicator lamps. Below each function indicator is a logic-operated switch and, reading from left to right, they give the following facilities. The FM Air Check switch produces a 400Hz tone which enables one to pre-set tape

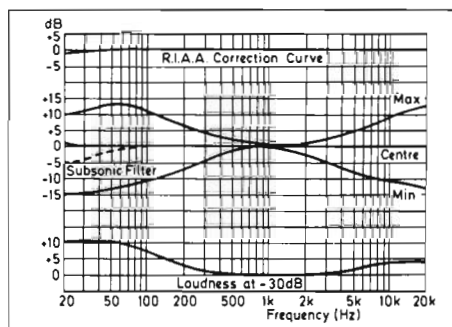


Fig. 1. Amplifier RIAA response, tone control range, filter and loudness contour

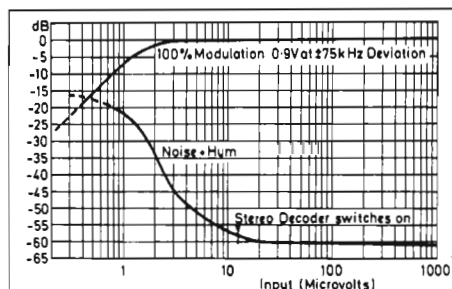


Fig. 2. Tuner sensitivity and noise level plotted against aerial input voltage