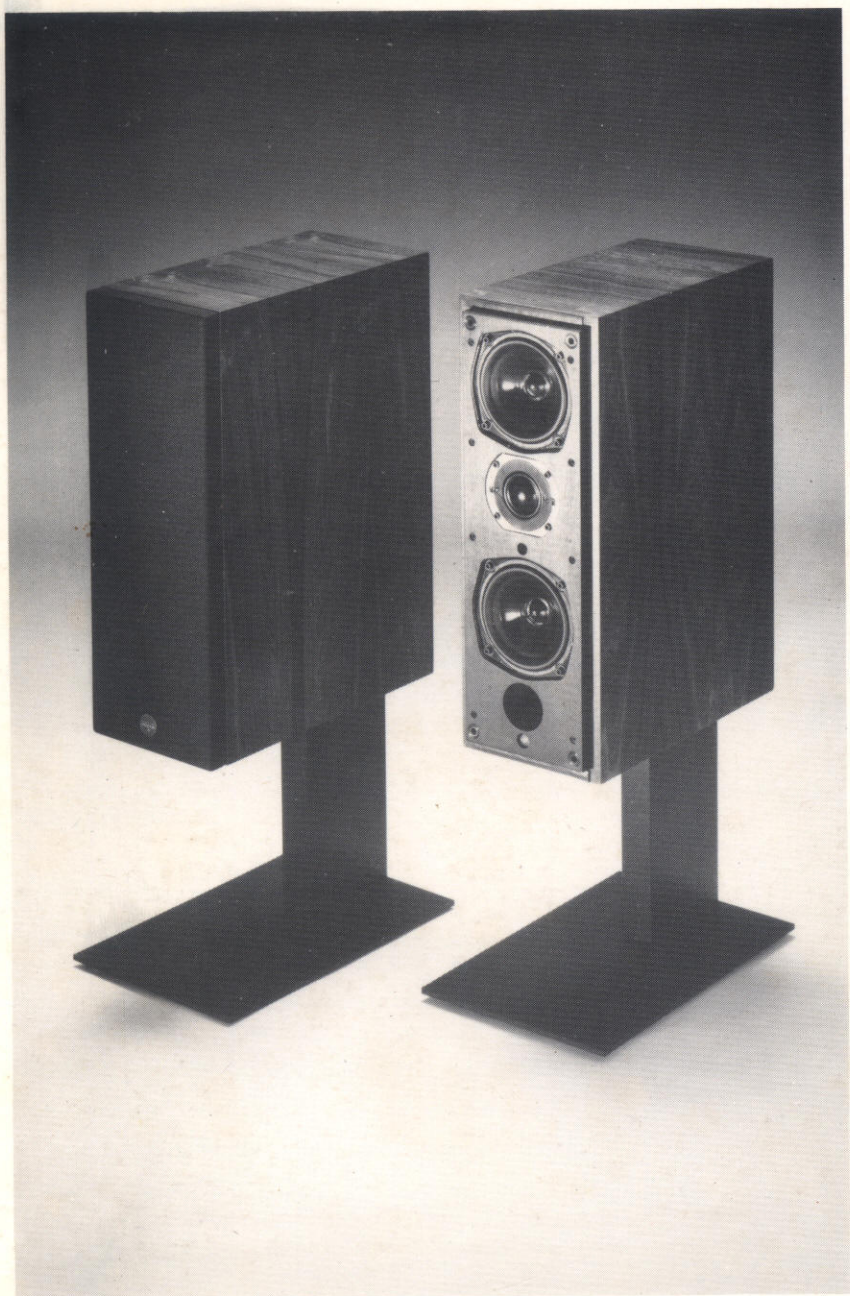




BOOTHROYD STUART
MERIDIAN

IMPORTANT

Before making any attempt to connect or operate the loudspeaker, please read the sections on Installation, Connection and Safety.

IMPORTANT

This apparatus must be earthed (grounded) to a reliable earth point, preferably through the mains lead (power cord).

1 INTRODUCTION

The M2 is a 2-way integrated active loudspeaker system from Boothroyd Stuart. Careful alignment of the two high power long-throw bass-mid drivers with the enclosure, the electronic crossover and the committed power amplifiers, has resulted in a new low frequency system giving a perturbed 6th order Butterworth response at low frequencies. The result is a smooth, firm and powerful bass response down to 38Hz with accurate transients.

An electronic time delay of 76 micro seconds allows time alignment of the dome tweeter with the bass units, this alignment preserves the important radiation pattern through the crossover region.

This clever loudspeaker system benefits from our years of experience in the design of loudspeakers, amplifiers and active loudspeakers, and represents a true systems approach.

M2 incorporates an adjustable stand to ensure optimum stereo performance but is equally at home on a bookshelf.

The power amplifiers, power supply and electronic crossovers are contained within the cabinet.

2 UNPACKING

Carefully unpack each loudspeaker, and accessories. Each pack should contain:

- 1 matched pair of loudspeakers enclosures complete with electronics, identified by serial number L xxx A and L xxx B.
- 1 mains cord pack, IEC (Europlug) male to 2 IEC female line sockets *
- 1 signal (audio) cord pack DIN – DIN + DIN
- 2 Fuses 2.5 A quick blow 20 mm
- 1 Fuse 1.25A Slo-Blo 1.25 mm *
- 2 Stand Kits †
- 2 Spring clip retainers for IEC line sockets

IMPORTANT

The cardboard carton, and miscellaneous packing material should be retained in case either unit has to be returned to the dealer, manufacturer or distributor for service. Boothroyd Stuart Limited or their agents will not be responsible for repair of damage caused by shipping units for service in defective packing.

* subject to local variations

† may be omitted due to local market variations

3 SERVICE

In case of difficulty refer to the section of the book on maintenance. If servicing is required the loudspeaker in question should be returned to the supplier, distributor or agent who supplied it or it should be returned direct to Boothroyd Stuart Limited with a note describing the fault.

PLEASE only send back the faulty unit, not the complete pair.

PLEASE retain the stand and return only the cabinet and leads.

4 GUARANTEE

These loudspeakers are guaranteed against any defect in material or workmanship for a period of one year from the date of purchase. During the guarantee period we undertake to supply replacement parts free of charge providing that the failure was not caused by misuse, accident or negligence. Labour and carriage charges are not covered unless by local agreement.

This guarantee expressly excludes

Damage caused by incorrect use or abuse or subsequent damage caused by continuous use of a known defective unit.

Loss or damage in transit in either direction.

Contingent and third party liability.

Any consequential loss or damages.

Lamps and fuses.

Any unauthorised modification or alteration renders this guarantee invalid and releases Boothroyd Stuart Limited of any liability on consequential damage.

Within the U.K. the guarantee offered with this equipment does not limit the customers existing statutory rights.

5 ACCESSORIES

Please state part number when ordering.

Accessories which are available for the M2 loudspeaker system and which may be required from time to time include:

- 1421A Electronic Crossover module (standard)
- 1421B Electronic Crossover module option B (for bookshelf operation)
- 1421R Electronic Crossover module option R (for heavy loud continuous rock music applications)
- 1423 75 ohms loaded phono plug (terminator)
- 1424 Stand pack Black
- 1425 Stand pack Brown
- 12014 Locking DIN plug
- 1208 IEC Europlug (male)
- 1209 IEC Eurosocket (female)
- 12010 IEC mains (power) extender 4 m
- 12009 Audio extender DIN female line — DIN 5 pin male, 4 m (mono)
- 1202 2.5 A quick blow fuse 20mm.
- 1200C 1.25A slo-blow fuse 1.25mm.
- 1201A 3.15A quick blow fuse
- 1207 Indicator lamp
- 12021 Self adhesive rubber feet for bookshelf mounting.

6 ASSEMBLY INSTRUCTIONS FOR M2 FLOOR STAND

PARTS REQUIRED

Remove and identify the parts shown below from the stand pack in diagram 1 attached. One stand is packed with each Loudspeaker. The lead pack is only included with one Loudspeaker of a pair. Check you have the correctly matched pair by looking at the label. A matched pair will be either A or B of the same serial number.

1. 4 Fitting Washers 2BA.
2. Tilt screw
3. Tilt plate fitted with rubber grommets.
6. 2 Fitting bolts 2BA.
7. 2BA Allen key to tighten fitting bolts and Drive Units in cabinet.
8. Stand tube.
9. Stand base.
10. 2 Long screws.

ASSEMBLY OF THE STAND

Place parts 3, 8 and 9 onto a flat table surface and align as shown in diagram 2 attached. Ensure that the Stand tube (8) is central on the Stand base (9). Take the long screws (10) and pass the threaded ends into the threaded bosses in the Tilt plate (3) in the order shown. Tighten the long screws (10) with a coin and check again that the stand is squarely aligned.

Place the M2 carefully upside down on the floor and screw the tilt screw assembly (2) fully into the threaded bush nearest the front of the cabinet. Now take the stand, inverted, and slide the tilt screw into the front slot on the tilt plate (3) ensuring that it slides into the groove. Take the 2 fitting screws (6), and, with washers (1) each side of the grommets, fix the rear of the stand to the cabinet using the Key (7). Do not deform the grommet by over tightening.

Turn the Loudspeaker over and move to the listening position. Adjust the M2 for optimum on-axis performance with the tilt knob (4).

7 INSTALLATION

Listening Room and positioning

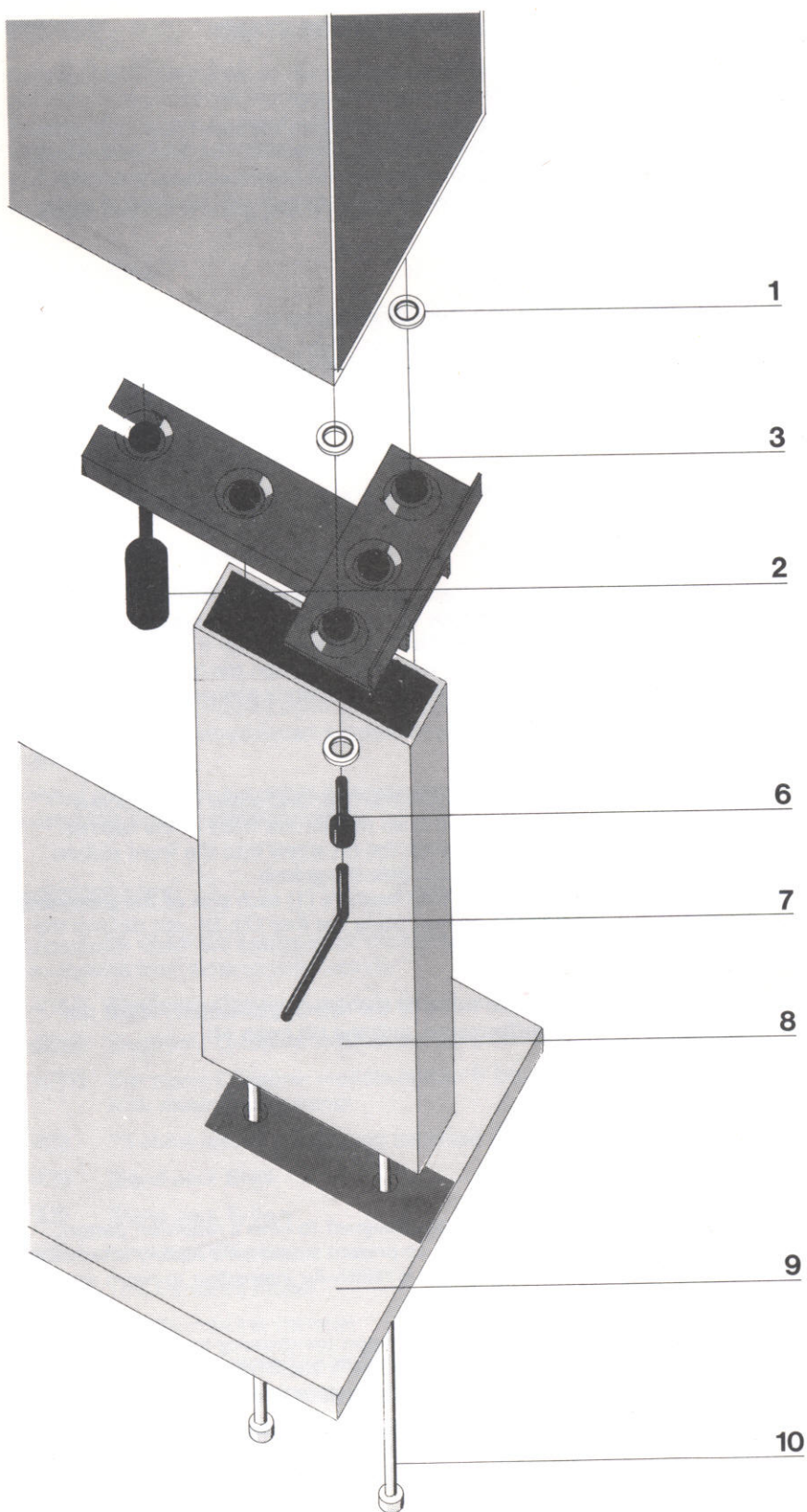
As we have described the M2 has been designed to have a radiation pattern similar to the speaking human being, to present sound on a readily interpreted scale. In consequence the loudspeaker is relatively insensitive to room acoustics in the speech band (300Hz — 3KHz).

All rooms exhibit resonances dependant upon the distance between the parallel surfaces i.e. walls, floor and ceiling, and usually these resonances occur between 30Hz and 200Hz and are outside the speech band.

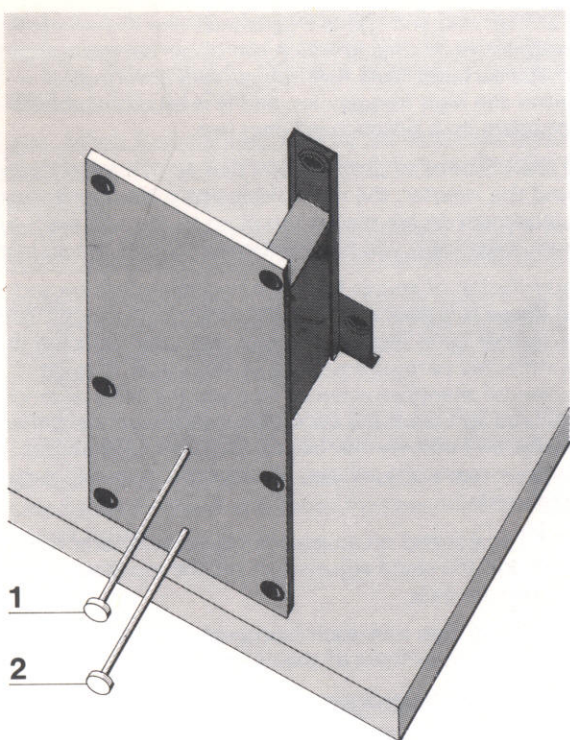
If a choice is available, a better more natural bass response will be obtained in a room whose main dimensions are all different since in a near-cube all the resonances will occur in a narrow frequency range.

If there is no choice of room it may be worthwhile moving around large items of furniture to break up these resonances, in many cases of resonance placing a sofa or large bookcase on one wall will smooth out the low frequency response of the room.

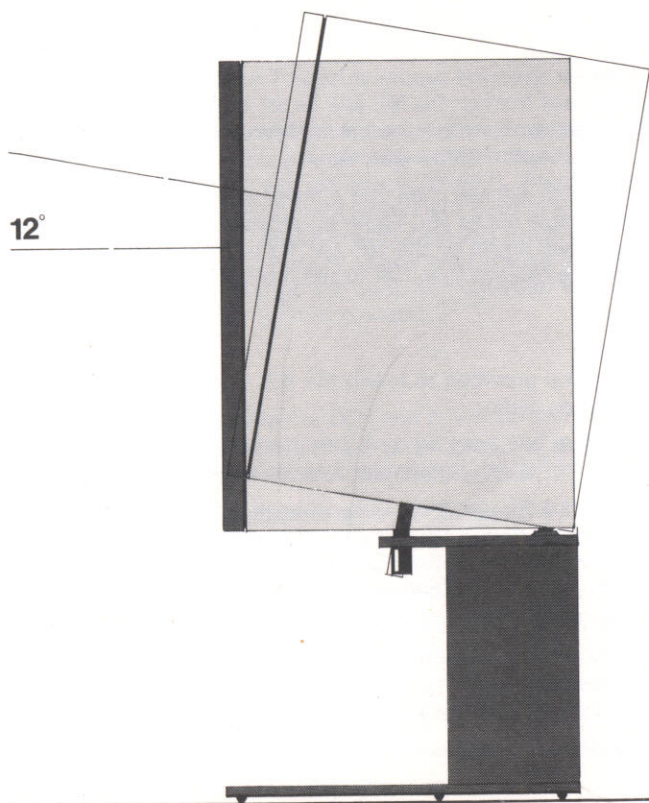
d1



d2



d3



Above the speech band at high mid and treble frequencies one should ideally arrange to avoid sharp resonances or ringing which can occur between plaster walls or on undamped metal surfaces. Soft furnishings, wall coverings or pictures will help to control the high frequencies, and it is usually possible to tell if resonances are a problem by a simple hand-clap test.

Obviously the design of the M2 aims to produce a virtual point source located approximately $\frac{1}{2}$ m behind the tweeter, the wide dispersion in the horizontal plane means that if the loudspeakers are placed too close to the side walls of the room, reflections from these walls will be heard which colour the sound.

In order to allow optimum fusion of sound from the two loudspeakers and create a first class stereo image it is desirable that the direct path length from each loudspeaker to the listener be at least 2m shorter than any reflected path — the time delay on the reflected path of 6mSec or so will cause it to be ignored by the ear. You should therefore attempt to place the M2's as much as 1m from each side wall and $\frac{1}{2}$ m from the back wall, reducing these dimensions may defocus the image and destroy the 'depth' illusion of the sound stage. Of course, if the side or rear walls are very absorbent e.g., heavy drapes, these conditions can be relaxed.

The loudspeakers should be positioned on an approximate equilateral triangle with the listening position, and the stand adjusted to tilt the loudspeakers so that the listener is on the tweeter axis.

Generally it will be beneficial to then turn each loudspeaker inwards slightly to arrange for the axis to cross just in front of the listener.

Of course some experimenting will be necessary in each room.

If it is possible it is well worthwhile trying to locate the speakers some way down a room there is no doubt that keeping the rear reflections to a low level and actually having visual space behind the loudspeakers adds to the illusion of location and depth in sound.

8 CONNECTIONS

Check M2 is adjusted for the local supply voltage. The M2 will be factory adjusted as marked. If not marked the M2 will be set at 230V. Two connections are made to each M2, power supply from the switched outlet of the preamplifier or direct from a wall outlet, and audio signal.

Normally, when used with the Meridian 101 control unit the power is connected using the double outlet IEC cable set provided. The IEC plug is connected to the switched outlet of the 101 (or if a tuner is used to the outlet of the Meridian 104) the cable is then run to the nearest M2 and then on to the second unit.

IMPORTANT

Always use the spring clip provided to retain the IEC Europlug sockets to both M2's. See section on safety.

Normally the audio cable provided, which is a 5 pin DIN stereo to two 5 pin DIN locking mono 'Y' lead, will be used to drive the M2's from a 101.

Carefully separate the two free ends, dividing carefully the two halves of the stereo lead, to allow sufficient length to bridge between the 'speakers. Do not use a cutting tool, be careful not to expose the screen of the cable. Surplus cable should be coiled as shown in Fig. 6. The locking DIN plug with the red identifying band should be connected to the RIGHT loudspeaker.

If the cables provided are not long enough either limb may be extended using IEC and audio extenders available from Boothroyd Stuart Limited or their agents. Please read notes on safety if this is to be done.

For normal installations connections are made as in Fig. 4.

Mains should be wired in accordance with the internationally agreed code: green/yellow earth (ground), brown live, blue neutral. THIS EQUIPMENT MUST BE GROUNDED. DO NOT CONNECT SAFETY EARTH THROUGH SIGNAL INPUT SOCKETS.

- ① Audio signals (unbalanced) may be fed into the phono (RCA, Cinch) socket or connected to the DIN socket, as shown in the label on the rear of the M2 to pin 1 hot, pin 2 ground.
- ②
- ③ The M2 will accept a balanced input on pin 1 and 5 for use with mixers or special subtractive situations such as Hafler quadrophonic installations.
- ④ Normally the balanced — input should be used, if for any reason the + input must be used alone it is necessary to bypass the phono input with a short circuit or 75 ohms terminator to obtain a flat frequency response. No terminator is required in balanced mode.
- ⑤ If the Meridian 101 Control Unit has a 75 ohms output module fitted then a 75 ohms terminator should be fitted to the phono socket of each M2.

Absolute Phase. The M2 is arranged such that a positive going input applied to the balance + input will cause the bass units to move outwards (positive pressure front).

9 OPERATION

The M2 has no controls, when used with a 101 and powered from the switched outlets of the 101 as described, the M2 is switched on and off from the control unit and requires no attention.

If for convenience the M2 is powered from a local wall outlet then it will have to be switched on and off for each listening session. Do not leave the loudspeakers on indefinitely and never unattended.

10 MAINTENANCE

Cleaning

The cabinet is finished, over the veneer, with a thin matt coating of clear polyurethane. This can be cleaned with any furniture polish or household non-abrasive cleaner. Do not use strong solvents. The grille panel should always be removed before cleaning since polish will mark the fabric. This fabric should only be brushed carefully with a clothes brush and not while attached to the cabinet. The stand may be wiped with any household non-abrasive cleaner. Some colour change will occur in the veneer if placed in sunlight over some years, particularly with Rosewood.

Connections

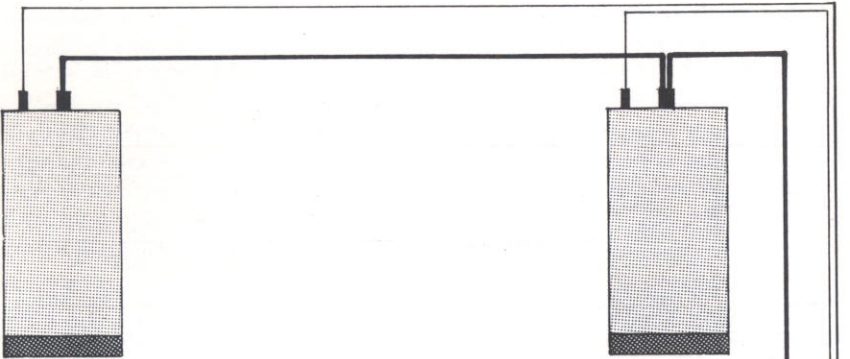
It is good practice to clean the DIN and power connections every three months or so, all that is necessary is to pull out and push in each plug once, with the power off, (the connecting surfaces are self wiping).

At the same intervals it is worthwhile checking the tightness of the cap head screws retaining the bass units and tweeter. These screws should be firmly home but not overtightened. The correct setting for these screws is 15ft.lb. Also check for tightness the stand assembly.

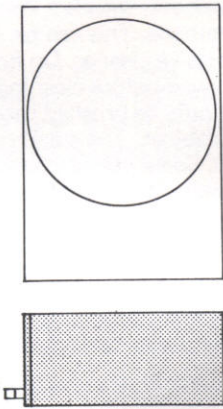
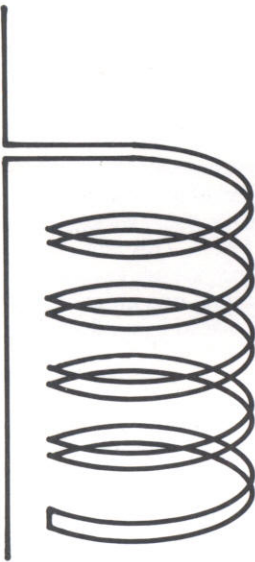
There is no requirement for periodic maintenance of the amplifiers which should operate indefinitely within specification.

In the event of failure or mis-operation of the M2 it is worthwhile carrying out a few simple checks before returning the unit to a dealer or agent for service.

d4



d6



The M2 is protected by internal fuses:

- 3.15A 1 x 2.5 A fast blow in series with the bass units (woofers)
- 2.5A 1 x 1.25A fast blow in series with the tweeter.
- 1.25A 1 x 1.25A slo-blo protecting the mains (power) input to the transformer primary.

1. Unit fails to work — lamp not alight.

Check that there is power input to the speaker, does the other M2 work? Is there a blown fuse in the mains supply? If there is power input check the main internal fuse — see **CHANGING FUSES**.

2. Unit fails to work — lamp alight.

Check that speaker fuses are intact by placing ear very close to woofers and tweeter in turn to check for background noise. A quiet hiss/hum should be audible. If no noise is audible check speaker fuses and that the crossover module is plugged in (and not dislodged) — see **CHANGING FUSES**. If hiss can be heard then check audio connections (see section on connections).

If possible swop inputs with a working unit.

3. Unit operates only in bass or treble regions.

Check for a blown fuse — see **CHANGING FUSES**.

4. Unit operates, lamp is not alight.

Change bulb which is held in a bayonet fitting.

Under no circumstances should any maintenance or service be carried out beyond checking fuses and connections by any person other than an appointed agent or employees of Boothroyd Stuart Limited.

If the above checks have not revealed the cause switch off immediately and consult the dealer or agent who supplied you.

11 CHANGING FUSES

DANGER HIGH VOLTAGE

Under no circumstances remove the electronics section from the cabinet while the unit is switched on.

Remove power input cord and all connections. Wait two minutes for the power supply to discharge.

Lay the loudspeaker on its side on a suitable surface and remove the four cross head fixing screws at the centre of the four edges of the amplifier plate.

Retain screws and fibre washers on the inside.

Ease out the amplifier plate, the cord connecting the amplifiers to the loudspeaker enclosure can now be seen, unplug this from the cabinet.

The electronics may now be taken to a suitable working surface.

The loudspeaker protection fuses are mounted on the main printed circuit board and can be removed and checked visually or with an ohmmeter.

If necessary replace with a fuse of the same rating.

The power fuse is in a line socket near the transformer and uses a bayonet fixing, this fuse may be checked in the same way.

Under no circumstances fit a fuse of different rating to the original, to do so may be unsafe and will invalidate the guarantee.

Never try to change the power fuse if the unit is connected to the power.

To reassemble the system, offer the amplifier plate up to the cabinet, plug in the cord connecting the enclosure, refit the plate being careful not to trap any wires at the edges of the cabinet. Replace the four screws, do not over-tighten.

12 SAFETY

The IEC recommended Europlug (line sockets), used to connect power to the M2 are unshuttered outlets and because they are employed near floor level special care should be taken if toddlers, young children or pets may play with the leads.

A retaining clip is provided to lock each Europlug into each M2 and it is strongly urged that these be used at all times, in any event it prevents accidental disconnection.

13 The Design of the Meridian M2 Loudspeaker System

In 1978 we decided to design an active loudspeaker system in keeping with the Boothroyd Stuart Meridian philosophy of providing very high value music standards but which also attended to certain specific problem areas of loudspeaker design which we felt had hitherto been neglected. This new loudspeaker had to produce accurately, detailed and untiring reproduction of music in a domestic environment. It is without dispute that very low levels of colouration and good detailing are essential in order to appreciate and enjoy all the inner points of music. We felt that very real strides could be made in the area of providing the sound at a convincing scale, and that the enjoyment and appreciation of the whole as well as of the detail of the music could come from a loudspeaker system which presented lifelike and convincing sound staging in the domestic environment. This particularly applies to performances which could actually have occurred live. In engineering terms this implied control of the dimensions and radiation pattern of the loudspeaker together, allow not only first class stereo imaging but produce a convincing lifelike sound through the use of familiar radiation patterns.

It must be remembered that the ear-brain, familiar as it is to listening to sound from a human being in the domestic environment, invariably edits out the acoustic effects of the environment itself. It was therefore part of the brief to design a loudspeaker which was not only accurate and detailed, with first class stereo imaging, but also one that was able to give sound on a scale which was, in a sense, man-sized.

It was felt that if these criteria could be achieved then the loudspeaker system would be inherently insensitive to the room acoustic and would give a very dependable result in a wide range of listening rooms. We believe we have come very close to achieving these aims.

Of course, for a loudspeaker to be able to realise the additional benefits of digital recording, implies that the system must have very good dynamics. In the M2 the maximum sound pressure level is 105dB. This presents a dynamic range which is more than adequate for most listening rooms. In addition, low frequency response of the system had to be as good as the expected digital source and the target specification of response down to 40Hz was made.

Of course the requirements of dimensions and radiation pattern for life-like sound and powerful low frequency response are to some extent contradictory in that the radiation pattern calls for a small loudspeaker and it is generally understood that to reproduce 40Hz with sensible efficiency a fairly large loudspeaker cabinet is required, usually of the order of 100 litres (4½ cubic feet) internal capacity.

We were able to call upon our years of experience in the design of active loudspeaker systems to provide a solution to the problem. It can be shown that by using the higher ordered bass system such as is employed in the M2 loudspeaker it is possible to produce low frequency response from a cabinet of nearly half the physical dimensions of an equivalent passive system; (that is up to a sixth of the volume). The interactive systems approach that has been so successfully employed in the M1 active loudspeaker was developed for use with the small long-throw bass units fitted in the M2 with the result that highly accurate bass can be produced down to 40Hz and below from a cabinet of only 17 litres internal capacity.

Recent developments in loudspeaker unit design have allowed two way active loudspeakers to be designed using low crossover frequencies which previously would have resulted in unacceptable colouration in a passive system.

A particularly interesting aspect of the M2 is the driver combination and its physical arrangement. The low frequency power requirement combined with the dimensions for the target radiation pattern meant that it was necessary to use two 5" woofers. Mounting these two in line with the tweeter between and by adding an electronic crossover adjusted to produce an acoustic 4th order crossover shape with time delay compensation resulted in a radiation pattern which is smooth and unbroken in the horizontal plane and which gives a broad axial peak in the vertical plane and of particular importance, no major off axis lobes within the listening area. At low frequencies and up to the region of the crossover frequency the three drive units combine through acoustic coupling effectively to produce one elliptical drive unit of about 12" x 5" with a concentric time-aligned tweeter — in effect a combination producing what is the closest approach to the ideal drive unit. A totally systems designed loudspeaker to this kind of specification could not be constructed without the help of the active approach, and as in these days electronic crossover systems tend to be less expensive to construct than low distortion passive crossovers, we have been able to produce a loudspeaker system which in addition to being without peer in the reproduction of music in the home can be produced at an extremely competitive price.

Much thought has been given to the construction of the loudspeaker cabinet, its floor stand and detail assembly. The cabinet is manufactured from 'A' quality Birch faced plywood of 14 mm thickness braced and damped internally. The wall is finished inside and out with a selection of grain matched veneers. The Amplifier circuits and power supply are fitted to the rear mounted heat sink panel which accepts all connections at its lower edge. The self-assembly stand is provided with a decoupled tilt mechanism to elevate the cabinet to 15° from horizontal for optimal alignment with the listener.

Aspects of the design of the M2 are covered by registered design and copyright.

14 M2 TECHNICAL SPECIFICATION

Response	—3dB @ 38Hz and 35KHz (3/8 radiation)
Sensitivity	—20dBm (unbalanced) for 83dB spl @ 1m @ 1KHz
Output Maximum	105dB spl @ 1m music programme
Noise	less than 24dB spl
Input for full output	0dBm (+3dBm peak) over 11 K ohms balanced or unbalanced
Crossover	1.9KHz, double Butterworth
Frequency	24dB/octave acoustic slopes
Response shape	Roll off at 38Hz 6th order Butterworth Roll off at 35KHz 2nd order Bessel
Cabinet size	500 mms (19.7 inches) high, 180 mms (7.1 inches) wide and 375 mms (14.8 inches) deep. On the stand the top of the cabinet is 830 mms (32 inches) high.
Weight (with stand)	18 Kgs (40 lbs)
Finishes	American Walnut, Brazilian Rosewood or Black Laquer (others to order)
Electronics	Contains two power amplifiers similar to 105s of power output 70W bass, 35W tweeter.
Distortion	In whole electronic system total less than 0.05% at all levels and frequencies, typical 0.01%
Driver	2 x 110 mm bextrene high power low frequency drivers 1 x 52 mm dome tweeter
Connection-Power	IEC detachable power input
Audio	DIN 5 pin and RCA (unbalanced only)

BOOTHROYD|STUART

Boothroyd Stuart Limited

Industrial Estate,
13 Clifton Road, Huntingdon, Cambs PE18 7EJ, England
Telephone Huntingdon (0480) 57339
Telex 32577