

M100 USERS HANDBOOK

INTRODUCTION

The M100 is a three-way seven-unit integrated active loudspeaker system from Boothroyd Stuart. The design has been developed from the M10, well established both sides of the Atlantic.

Careful alignment of the long-throw bass drivers with the enclosure, the electronic crossover and the committed power amplifiers has resulted in a new low-frequency system giving a sixth order Butterworth response at low frequencies. This results in smooth, firm and powerful bass to below 33 Hz with accurate transients.

The design employs a new high frequency drive unit with ferro-fluid damping. This gives exceptional power handling capacity. A smaller diaphragm results in better dispersion of the extreme high frequencies.

This ingenious loudspeaker benefits from over ten years experience in the design and making of active loudspeakers and represents a true systems approach.

The power amplifiers, power supplies and electronic crossovers are all contained within the lower part of the cabinet.

UNPACKING

IMPORTANT. Do not slit sealing tape on the cartons as with some of the cartons this can damage the loudspeakers

A pair of M100 speakers arrives packed in four cartons.

Carton 1 contains the bases of both loudspeakers together with all accessories (see below for list).

Cartons 2 and 3 each contain the top part of each loudspeaker.

Carton 4 contains a pair of front grilles.

The accessories supplied consist of:-

1. An audio connecting cable [not in USA]
2. Two three-core power cords, one for each loudspeaker.
3. Four long bolts with large washers for securing the tops to the bases.
4. A spanner for tightening the four bolts.
5. Eight spike feet with plastic covers as alternative feet when spikes cannot be used.
6. A spanner to lock the spikes with the provided locking nuts and star washers.
7. A hex wrench for tightening the bolts on the bass and mid-range loudspeaker drive units.
8. Two wire clips for retaining the power cords.

The packing should be retained for future transportation.

ASSEMBLY

After opening and removing the two top parts of the cabinets and the bases, proceed as follows;

1. Inspect the wood grain to establish which base most closely matches which top.
2. Carefully invert the top parts [cabinets with loudspeaker drive units] so that they are resting on a clean soft surface on their tops.
3. Locate the four long bolts and washers. Ensure that the rubber sleeve round the bolt is "screwed" fully up to retain the large washer against the head of the bolt.
4. Start to screw the two bolts for each speaker into the holes in the bottom of the top parts of the speakers [now facing upwards].
5. Lift the matching base [inverted] and slide the base so that the two bolts engage the slots in the base. Observe how loose the bolts still are, and remove the base. Now screw the bolts so that you judge that the base will slide snugly under the large washer. This procedure saves tedious screwing of the bolts with the spanner.
6. Look at the two plugs mounted in the top parts and observe that there is a key-way to ensure that the line sockets from the bases engage in the correct orientation. Note the direction of the key-way.

7. Lift the base [inverted] and slide it partially under the washers. Now carefully plug the two line sockets, in making sure that the two cords do not cross over. Observation of the keyways should ensure that these sockets are not twisted to and fro too much in an attempt to mate them. They should be pushed home fully.
8. Now continue sliding the base so that it is perfectly in line with the top. With the spanner provided, tighten down the two long bolts thoroughly.
9. Locate the two wire clips for securing the power cords. Each side of the power-in chassis plug [recessed at the back of the bases] there are two pillars which have holes in them. By squeezing the clip arms together slightly, fit them so that the ends of the clips go through the holes in the pillars. They should be fitted so that the clips drop down over the power cord sockets and prevent them from being pulled free.
10. Locate the eight spike feet. Fit the locking nut to the thread and then fit the star washer. Screw the feet into the bases. Do not remove the plastic covers at this stage.
11. Carefully invert the speakers.
12. When the speaker is finally positioned, it can be levelled using the screwed feet. The locking nuts should then be screwed up against the base of the cabinet using the short spanner provided. It is important not to overtighten these nuts and this is why the spanner provided is short.
- 13 The speaker can be tilted to remove the plastic covers to the spikes. SINCE THE SPEAKER IS HEAVY, AVOID LOWERING OR DROPPING IT ONTO YOUR FOOT OR ONTO THE POWER OR AUDIO CORDS

CONNECTIONS

First check the power voltage setting indicated on the carton corresponds with your supply voltage.

To set the speaker to a different supply voltage requires the services of a competent technician [see details at the end of this handbook].

Separate power cords are provided for each speaker, and these should be directly connected to a wall outlet.

Where the supply is two-wire (with no grounding or earthing connection), switch number 8 [grey- see row of coloured switches adjacent to the audio input at the back of the base of the speaker] must be switched ON.

The audio connection is made to the phono socket at the back of the speaker. The twisted directional lead (where supplied) is suitable for use with the MERIDIAN control units 101, 101B and MLP (MCLP). It may also be suitable for the more conventional unbalanced outputs from ordinary preamplifiers, provided that the output impedance is sufficiently low to ensure hum- and interference-free sound. No harm will come from experimenting with the audio lead to find out if it is suitable.

Where a lead is supplied a RED code indicates RIGHT channel.

With conventional (unbalanced) preamps it will often be necessary to employ screened connecting audio leads. Advice on suitable cable types should be sought from your dealer.

IMPORTANT: Always use the spring clip to retain the mains cord. This inhibits removal by small animals, human, domestic or wild.

INSTALLATION

The siting of the loudspeakers in your room plays a very important part in obtaining the best possible results from the system. Priorities vary. Decor needs may deny the speakers their best acoustic position, and this will result in a compromised performance. Having said this, the M100 has been designed to present sound on a readily interpreted scale by having a radiation pattern similar to the speaking human being. In consequence, the M100 is less susceptible to room placement than most other designs.

The M100s should be placed so that they form an equilateral triangle with the listener. They should be angled so that the axes of the speakers cross at the listener.

For best results the speakers should be positioned three feet (1m) or more from any side wall, and with two feet (0.6m) or more clearance behind. A really substantial space behind the speakers can help realize the astonishing imaging and sound stage capabilities of the speakers.

The wall behind the speakers should not be glazed doors. If possible, do not have the speakers facing glazed doors either.

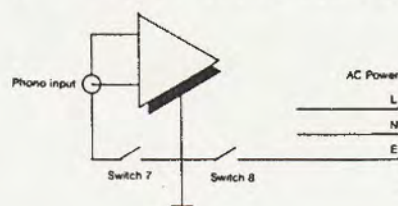
For notes on practical suggestions for improving the acoustics of your room, see the section on ROOM ACOUSTICS.

For two-wire AC supply (no grounding lead) switches 7 [violet] and 8 [grey] should be ON.

For three-wire supply and balanced audio signal, switch 7 should be OFF and switch 8 ON.

For three-wire supply and unbalanced (screened or coaxial) audio signal, start with switch 7 OFF and switch 8 ON. In some installations superior sound may be achieved by reversing these, that is switch 7 ON and switch 8 OFF.

The diagram shows how these switches are connected.



The M100 is provided with "equalizing" controls for final adjustment of the sound. These controls are the switches 2 through 5 [red, orange, yellow and green] at the back of the bases of the speakers. The table below (and on the back of the speakers) shows the effects of the switches on the response. At first sight this may seem confusing, but the procedure for selecting your preferred sound is quite straightforward. Start with response B + Y. This is achieved by turning 2 OFF, 3 ON, 4 OFF, 5 ON.

Switch 6 is inoperative.

For listening material it is advisable to include the speaking human voice together with different sorts of music. Because of the great familiarity we all have with the sound of the speaking voice, it is possible to detect artificiality in the form of "boominess", "chestiness" and excessive sibilants more quickly with this source (provided of course that the original microphone techniques used in the recording or broadcast are up to standard). When you have become familiar with the sound in the B + Y response setting, it is time to experiment by altering the position of the switches one at a time. Do not attempt to arrive at your final choice by altering more than one parameter at once. When you have selected your preferred setting, it is advisable to return to B + Y for a direct comparison with the starting point. This procedure is not difficult, but requires patience which will be well rewarded. We strongly recommend that each speaker be adjusted with the same final setting.

The two six-way sockets [at the back of the speakers] are designed for "networking" operation. A facility provided with this type of operation will include remote volume control as well as other sophisticated applications. Explanations of these sockets will follow the availability of the necessary ancillary equipment.

The M100 is provided with "music sensing". This music sensing facility may be by-passed using switch 1 [brown]. Normally the AC supply can be left connected to the speakers and they will be in "stand-by" mode until any music signal is fed to them. The stand-by state is indicated by a green lamp on the badge on the base of the speaker. As soon as a signal is received (for example by playing a Compact Disc), the speakers automatically move to the operating state. This transition is indicated by the lamps changing to red. When first connected the speakers move to the operating state (red lamp), and only after some minutes of no signal do they move to the stand-by (green lamp) state. After using the equipment it takes a few minutes for the speakers to revert to stand-by.

Note that the Music Sensing circuits produce the faintest noise which can be heard when you are very close to the speaker. The tone of this noise is dependent on the switch settings. The level of the noise is below the threshold from a normal listening position.

In the stand-by condition the speakers consume about the same amount of electricity as a nightlight.

Some people prefer to disconnect all appliances from the supply at night or when they leave the house unattended. No damage results to the M100 from following these precautions.

Should you prefer to disconnect the cord or switch off the supply to the speakers when they are not in use, it is well to note that the performance from the speakers improves gradually over several hours from the time the supply is connected. This improvement is caused by the very gentle equalization of temperatures in the crossover section of the electronics which is kept warm in the stand-by state.

The practice of disconnection from the AC outlet before leaving home for several days is recommended.

Although great trouble has been taken over the front grille design, nevertheless some enthusiasts prefer to use the speakers with the grilles removed.

REMOVAL OF GRILLES; IMPORTANT. Before attempting to remove the grilles by easing them forwards, it is necessary to prise the two sides of the grilles at the bottom gently outwards. No great force should be used or damage may result to grilles or cabinet.

NOTES ON ROOM ACOUSTICS

All rooms exhibit resonances [eigentones], the frequencies depending on the distance between opposite surfaces such as walls and floor and ceiling. Usually these resonances are below 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. Although it is usually of academic interest, it is worth noting that an ideal room [whose walls are parallel] will have dimensions in the ratio 1 : 1.2 : 1.6.

MAINTENANCE

Cleaning;

The cabinet is finished over the veneer with a thin coating of clear polyurethane. This can be cleaned with any furniture polish or household non-abrasive cleaner. Do not use strong solvents. Remove the grille [see note above on removing the grilles] before cleaning the cabinet because the polish will mark the grille material. Do not apply any polish or cleaning compounds to any part of the loudspeaker drive units.

The grille should only be lightly brushed with a clothes brush.

Some colour change will occur in the veneer particularly if the speaker is placed in sunlight. This is unavoidable and takes place mostly in the first year.

It is good practice to clean the plug connections every six months or so. This can be achieved by removing and replacing the plugs once or twice, since the contacts are self-wiping. Some proprietary switch and contact cleaners are available and no harm results from their use.

Due to the settling of the wood cabinet, it is advisable to tighten the bolts which hold the four bass and two mid drive units. Looseness of these bolts deteriorates the sound quality by reducing definition and detail. Care and common sense must be employed when tightening these bolts to ensure that they are not overtightened. The tightness of the drive unit bolts should be checked after three, six and twelve months. Thereafter an annual check should suffice.

There are no user-serviceable parts inside the cabinet.
ON NO ACCOUNT SHOULD THE BACK PANEL BE REMOVED WHILE THE POWER CORD IS CONNECTED.

The ideal room for reproduced music should be more on the "dead" side, the correct acoustic giving reverberation times between 0.3 and 0.5 seconds at mid frequencies, 0.2 to 0.4 seconds above 10 kHz and no more than 1 second at the lowest audio frequencies. Any liveliness in a frequency band or in particular any tendency for the reverberation times to vary substantially, for example being lively in the bass and dead in the top will lead to unnatural reproduction. The larger the room, the longer the reverberation time will be.

Over liveliness in the low end can be controlled by establishing the parts of the room where the sound pressure is at its largest on low notes and avoiding placing the loudspeakers or listening position in these areas. These high pressure areas can be located by walking round and listening for unnatural emphasis and boom. Further control of low frequency room problems is best done with items of furniture which can absorb low notes such as arm-chairs or sofas placed more centrally where the air velocity [NOT the pressure] is at a maximum.

Over liveliness at high frequencies [identifiable by excessive ringing or echoing on a hand-clap test, or obvious emphasis of sibilants when conversing in different areas of the room] are best treated by some surface-absorption or non-reflective technique such as curtains, wall carpets, pictures or items of furniture against the walls such as bookshelves.

It is equally important that the room be consistent in its behaviour. It is distracting or even oppressive if the room has wildly different liveliness in different directions. An example may be a room heavily draped on the walls but having a solid floor [wood block or marble and a plaster ceiling].

Lack of bass can arise if the boundaries of the room are fairly flexible [partition walls, suspended ceilings etc.] In these circumstances ideal bass performance can never be realized and a compromise position for the loudspeakers will have to be found.

The most insidious problems occur with low frequency resonances where the subjective effect is a disturbance of the pitch relationships in the music, resulting in a marked but undirected dissatisfaction with the MUSIC. When there is a low frequency disturbance such as a resonance or hum, this pitch distortion will occur.

Possible sources include items of furniture, another pair of loudspeakers in the room, central heating installations, musical instruments etc. Radiator panels can sometimes be cured by wedging polystyrene or polyether foam blocks between the panel and wall.

There can be significant changes brought about in the sound through direct resonance of items in the room. These resonances may take the form of rattles or buzzes [loose windows, panels in furniture ornaments etc.] It can also be that these resonances are not directly audible but that they contribute subliminally to the sound in a way which deteriorates it. It is worth removing items you suspect to check the effect.

CHANGING THE SUPPLY VOLTAGE

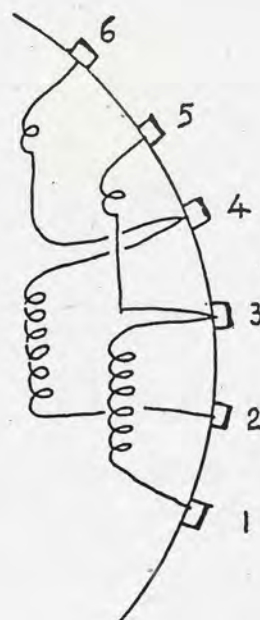
To change the setting for a different supply voltage it is necessary to gain access to the power supply unit within the base of the cabinet and alter the taps on the two toroidal transformers.

If the speakers are assembled, **FIRST DISCONNECT THE SUPPLY CORD** and audio connection, then proceed as follows.

If the speakers have not yet been assembled, proceed from 6 onwards.

1. Remove the grille. **IMPORTANT** see note at end of **INSTALLATION** section before trying to remove the grille.
2. Invert the loudspeaker so that it is standing on its top on a soft clean dry surface.
3. Carefully unplug the two connections which join the top and base. Do not pull on the cable or twist it.
4. Loosen the two bolts which secure the top to the base. These are situated each side of the joining cables.
5. Slide the base apart from the top.
6. Remove the four screws securing the amplifier plate and unplug the two line sockets connecting the amplifier to the power supply within the base. Also separate the green earthing [grounding] lead and the connection to the indicator lamp.
7. Two bolts on the top of the base and two bolts underneath the base secure the power supply. Remove these.
8. The diagram shows the numbered connections to the toroids and the table below indicates how connections should be made for a given supply voltage. Remember that **BOTH** toroids must be changed.
9. For details on re-assembly, see the earlier section on **ASSEMBLY**.

240v	join 2 and 5 : connect	blue wire to 1 brown wire to 6
220v	join 2 and 5 : connect	blue wire to 1 brown wire to 4
200v	join 2 and 3 : connect	blue wire to 1 brown wire to 4
120v	join 1 and 2 : connect join 5 and 6 : connect	blue wire to 1 brown wire to 6
100v	join 1 and 2 : connect join 3 and 4 : connect	blue wire to 1 brown wire to 4



FAULT FINDING

If you suspect a fault, there are a few simple tests which you can carry out to help your dealer diagnose the problem. Fault diagnosis can be confusing, and it helps to write down your results.

No sound from one channel

- 1 check lamp is lit
if unlit check AC power
is on and connected.
- 2 check balance control on
pre-amp is not swung over
to one side.

3 If the lamp stays green, by-pass the music sensing by switching switch 1 [brown] ON. If lamp still stays green, speaker has fault. If lamp goes red and speaker works, there is a fault only in the sensing circuits of the speaker. If lamp goes red and speaker does not work, switch off and swop the audio connection between the speakers. If the original suspected speaker works now, fault lies in audio lead pre-amp or source. If the original suspected speaker still does not work, it has fault.

Sound distorted or lacking bass or treble

try an alternative
source e.g. radio or
tape.

Speaker switches itself to Stand-by

If the speaker gets too
hot through over-
driving or improper
siting, it will switch
itself to Stand-by
automatically.

SAFETY

The line socket which plugs into the speakers is unshuttered. Because the socket is used near ground level special care should be taken if young children or animals may play with the cords. USE THE SPRING CLIP PROVIDED TO SECURE THE AC CORD IN THE BACK OF THE LOUDSPEAKER.

DO NOT MAKE ANY CONNECTIONS TO THE SPEAKERS OR TO YOUR AMPLIFIER OR PRE-AMPLIFIER WHILE THE AC SUPPLY IS CONNECTED.

DO NOT REMOVE THE SCREWS RETAINING THE BACK PLATE OF THE SPEAKER WHILE THE AC CORD IS CONNECTED. THERE ARE NO USER-SERVICEABLE PARTS WITHIN.

SITE THE SPEAKER SO THAT THE BACK PLATE (HEAT DISSIPATOR) RECEIVES CIRCULATED AIR, OR HAS A SUFFICIENT SPACE BEHIND IT. DO NOT SITE IMMEDIATELY IN FRONT OF A RADIATOR OR WHERE IT IS SUBJECT TO DIRECT SUNLIGHT.

TECHNICAL SPECIFICATION

Response	33Hz - 20 kHz +/- 3dB
Sensitivity	0 dBm (775 mV) over 22k Ω balanced or unbalanced.
Power amplifiers	2 x 70 watt bass, 70 watt 70 watt tweeter.
Noise	< 20dB spl @ 1m
Distortion	< 0.01%, up to 20 kHz all power levels.
Crossover	200Hz and 2 kHz,
Frequency response shape	24 dB/octave double Butterworth acoustic slopes. Roll off at 33Hz 6th order Butterworth. Roll off at 24kHz 2nd order Bessel.
Music sensing	switchable
Controls	music sensing / on input balanced/unbalanced chassis ground/unground 10 response settings for room acoustics matching.
Transducers	6 x 110mm bextrene coned high power bass and mid units 1 x 35 mm soft-domed ferrofluid damped tweeter
Consumption	max: 400VA. idle: 60VA stand-by: 10VA
Protection	internal fuses, 1.6AT plus thermal detectors.
Indicator	two-colour LED at front shows green stand-by and red operating
Cabinet Size	39"H 15"W 18"D 1m H 41cm W 46cm D
Weight	66lbs 30kg