

# *icon Audio*

Instruction Manual Covering:

## ***MB90 mono block Amplifier***



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## **1 Introduction**

Thank you for purchasing the **MB 90s**. These pure valve mono block amplifiers are the result of years of careful design and listening tests with a huge range of speakers. The amplifiers are hand built using carefully selected audiophile components. The transformers are hand wound using low oxygen copper and special Japanese long grain iron. Finally each amplifier is valved, carefully commissioned and tweaked for best performance in Leicester UK.

In order to get the best out of your amplifier, please read the enclosed notes. Even if you are experienced with hi fi **please read the 'quick set up guide'**. Should you be uncertain about anything to do with your amplifier please contact us for advice.

Hi fi reproduction is a long chain of events that includes the recording, editing, mixing etc, before being transferred to a medium such as LP, CD, or FM, before being played through your own source unit, the amplifier and finally loudspeakers.

Your room acoustics will also affect the sound before it finally reaches your ear. Whilst the amplifier is arguably the most important part of a system, it is important to remember that the

weakest link will always affect the final results when making judgements. And not all recordings are 'equal'! Therefore an amplifier which faithfully reproduces the input signal will also reproduce imperfections in the tonal balance and the recording itself. Therefore setting up and judgements should be made with a 'clean' well balanced recording.

The **MB 90** is a push-pull Ultralinear stereo power amp, capable of running in either Ultralinear (half pentode and half triode) or pure triode mode, using the excellent KT90 valves. These are in fixed-bias mode which whilst rarely requiring attention gives maximum power, cool running and wear indication. The driver and phase splitting is all triode for best sound quality and low noise. They are sensitive enough to be used with all modern source equipment having an output of 400mv or greater. Their simplicity coupled with point to point hand wiring without the use of printed circuit boards results in an open euphoric sound that is wonderfully detailed and warm.

## Final Inspection - Your Guarantee of Quality

To assure you of optimum performance and reliability, this amplifier has passed our rigorous final inspection and listening test by the Icon Audio team in Leicester . During which the final set up and adjustments were made.

***To get the best out of your unit and to save time please read this information & keep it to hand for reference***

Date ...../...../.....

Model .....

Amp Serial Number .....

Customer .....

Check amplifier finish .....

Soft Start Fitted .....

Internal wiring check .....

Sales invoice .....

Check Triode mode .....

Bottom label .....

Run min 6 hour test .....

Credit card receipt .....

Check input .....

Customer survey form .....

Output Valve Bias level .....v

Bias meter .....

Sound Quality .....

Transformer Protection .....

Channel Balance .....

### **Upgrades:**

Valve Microphony .....

HT delay fitted? ...Y / N

Valve Seating .....

Output valves .....

Hum level .....mv

1<sup>st</sup> Stage valve .....

RF Test .....

Phase splitter valves .....

LED brightness .....

Capacitor grade (Audio) .....

Serial No sticker and recorded .....

Capacitor grade (Power) .....

Mains voltage 110 / 230-240V

Mains lead .....

IEC Mains Fuse .....A

Interconnects .....

Signed off by .....

Notes:

Please note we do not test the standard mains lead.

# **IMPORTANT READ THESE NOTES THROUGH FIRST!**

## **2 QUICK SET UP GUIDE**

**1 Unpack unit carefully.** Make sure that it is in good condition. If not report to Icon Audio. It is important that you keep the packaging for warranty/service return.

**2 If Necessary fit the valves, or check that they are firmly in place. SEE NEXT PAGE.** The KT90s should be fitted first to the two **REAR** sockets (the two sockets nearest the transformers). To avoid damage to the valves hold the valves as close to the base as possible

**NOTE THE "LEFT" and "RIGHT" KT90 orientation on each amplifier. Also keep the left and right amplifier valves separate.**

**Be careful to note the correct orientation of the central "spigot" between the pins otherwise damage could occur.**

The small valves should be gently pushed into place. The 6SL7 (6188) is fitted to the right hand base (the same side as the triode switch) and the 6SN7 to the left hand base (the same side as the standby switch).

**NOTE: The KT90s and 6SL7/6SN7 are NOT interchangeable! This will result in damage and could be dangerous.**

**3 Connect to source unit,** e.g. Phono pre amp, Passive pre amp etc via appropriate phono sockets.

**4 Connect to speakers** Make sure to make the correct polarity of speaker cables. (See speaker connections chapter). If 'bi-wiring' both 'common' should go to the black terminal, and both 'positive' (or red) should go to the red terminals.

**5 Connect to mains** supply using supplied IEC mains lead to 240v supply. **If for some reason the welded plug must be removed, please remove plug fuse and dispose of immediately.** (As they can be a danger to children if plugged in). The replacement plug should be wired in the following way Brown to Live terminal, Blue to Neutral terminal and Green/Yellow to Earth terminal.

**6 Before switching on make sure that the "standby switch" is in the "up" position.**

**SWITCH ON!** The blue mains indicator should light up. Leave for at least 60 seconds for the valves to warm up, and then push the "standby" switch into the "down" position. The amplifier should now be working. All valves should have a visible orange glow from the cathode heaters. With the pre amp volume control set to minimum there should be no sound coming from the speakers except a barely discernable gentle hum. If there are any unpleasant sounds coming from

the speakers, switch off and refer to the 'Trouble Shooting' section or contact Icon Audio.

If your unit is fitted with the HT delay timer, operation will begin after the unit switches the HT on (approx 1 to 2 mins). You may hear very low distorted sound from the speakers during the warm up time. This is because there is virtually no HT to operate the amplifier. We suggest you reduce the volume until the HT cuts in.

### **6a Integrated/Power Amplifier Switch**

Located on the rear LH side this switch is normally "UP" for integrated operation (high sensitivity). If use with a pre-amplifier is required, the switch should be "DOWN" in the low sensitivity position.

**7 Your unit should now be functioning.** If not check wiring again. Do not operate at a high volume for the first five minutes to allow the valves to warm up properly.

### **Please note all these things are normal for valve amplifiers:**

- A, Valves can get very hot, BEWARE!
- B, The transformer cover will get quite warm
- C, The amplifier may smell for a few weeks.
- D, Mobile phone 'breakthrough' is normal.
- E, Valves may make a 'tinkling' sound when warming up and cooling down.
- F, One channel may come on before the other at switch on.
- G, There may be a 'click' when switching off.

**8 Health and Safety.** The valves when operating have high surface temperatures. Keep out of reach of children and pets. The use of the supplied guard is recommended in these circumstances. Always unplug when making adjustments. **Like all amplifiers there are potentially lethal high voltages inside (over 600v DC), which when switched off can take twenty minutes to discharge!** Do not remove bottom panel unless you are a competent engineer. There are no user serviceable parts inside. **Like other household electrical appliances do not leave unattended whilst switched on.** Do not adjust the KT90 bias pre sets without reference to the manual. Incorrect adjustment could cause the valves to overheat, with resulting in damage to valves and amplifier.

**To maintain the best performance of the amplifier you should check the bias of the output valves from time to time (say twice a year). Full details will be found in section 6.**

### 3 Connecting inputs & outputs

Many problems associated with electronic equipment involves connecting leads, which are usually either '**BAD CONNECTION**' or a '**WRONG CONNECTION**'. So it's worth making sure that you have good connections and that your leads are the right way round.

#### Inputs

These power amplifiers require some kind of pre amplifier to accomplish switching and volume control. This could either be achieved by either a "passive" or powered unit. Icon Audio make ideal pre amps. You may wish to consult your dealer. If you wish to use a turntable you will need a suitable phono pre-amp. Your dealer or Icon Audio can advise you. Our new PS1 MM/MC all valve phono stage is an ideal partner.

#### Connecting loudspeakers

It is important to use good quality loudspeaker cable. This should be relatively thick and multi-stranded. i.e. QED 'Original' or better. Take care to connect the correct polarity. The use of 'Banana plugs' or 'spade' connections will ensure a good connection whilst minimising the risk of 'shorts'.

In our experience Icon valve amplifiers are more tolerant of cables, therefore the benefits of some very 'exotic' cables may be less apparent. But this is also personal taste.

As all cables have losses, keeping the speaker cables short is best. It may be better and be cheaper to re-arrange your room and use shorter cables than to spend a fortune on longer cables!

You can either 'hard wire' your cable to the amplifier by baring enough cable to fit in the connector and twist together to avoid any spare strands touching anywhere else (soldering the

stands together helps). **Be warned this amplifier does not have an output protection device, which would degrade the sound. So a prolonged short due to strands of wire touching could cause damage.** Alternatively use good quality 'banana' plugs or spade connections, once fitted they are trouble free.

**Speaker polarity. When using a pair of MB90s it is essential that you observe the polarity of the terminals; they must be the same for the left/right connections at each amplifier end and at the loudspeaker end.** Otherwise the sound will be 'out of phase' with the sound stage 'inside out' with reduced bass. **If you are unable to check this or confirm the polarity** (e.g. if you have 'built in' wiring), try the following; Connect the system up and play some music with plenty of bass (e.g. dance music), preferably in mono (FM tuners are usually switchable to mono) and stand the speakers close together. If correct you should hear plenty of bass, if not **reverse the terminals for one channel only, either at the amp or speaker.** You will now hear more, or less bass. The higher bass output is the correct setting to use. Another alternative is to use a test disc. If you are 'bi-wiring' your speakers only two terminals, you must use only 4 or 8 ohms, not both, as this will not load the amplifier properly. The MB 90 is designed to work with full range, low to medium efficiency speakers having impedance between 4 ohms to 8 ohms. Speakers having efficiency of lower than 84db will have greater difficulty in providing a high sound level. But this will also depend upon individual speakers, room size, type of music and positioning etc.

## 4 Getting the best performance from your amplifier

- Do not leave the amplifier switched on all the time. This is not necessary
- Do not switch off and on without a short rest of 60 seconds (to reset the 'soft start')
- Do not adjust the output valve grid bias without reading the manual
- Do not switch from Ultralinear to Triode without first switching to "Standby"
- Do not operate the amplifier without loudspeakers connected
- Do not use valves other than listed as there could be danger of shock or damage
- Make sure the speakers are in phase.
- Use the best possible source material.
- Use efficient, well-designed speakers.

### What is safe maximum volume?

The MB 90 will run happily all day long at maximum power; the valves are not stressed any more at full power than at zero volume. Running into gross distortion will however stress the whole amplifier. Generally speaking if the sound is not distorted then the amplifier is not stressed.

**Triode Switch.** This switch causes the KT90s to operate as Triode valves. **As switching can stress the output transformers switching should only be done when the amplifier is in the "standby" mode or switched off.** You may notice that there is a slight reduction in volume in Triode mode; this is due to the lower gain that output valves have in this mode, advance volume to compensate.

### Leaving the amp switched on

We have been asked if the amp should be left running 24/7 without switching off. Whilst the amplifier will sound at its best when it is properly warmed up, there is no advantage leaving it switched on when it is not in use. It is using electricity and as valves have a finite life. Use the Standby switch when not continuously in use, to avoid switching on and off unnecessarily.

### Standby switch

This switch leaves the valves heated but without power. This prevents "Cathode stripping" at switch on, allows the cathode chemistry to re-form, minimises energy usage, and makes the amplifier available for instant use. However as a general guide it is not recommended that this mode should be continuously used for more than 24hrs.

**We would always advise that any item of home electronics is switched off when unattended.**

### 'Burning in'

Although the amplifier should sound good within about 10 mins it can take up to an hour to sound at its best and will take several months of regular use before it is fully 'run in'.

### Upgrading Valves!

Quality valves should sound better, have a better service life and maintain their performance longer. The upgrade valves supplied with selected models are the result of careful comparison with other makes. But beware of paying a premium for "New Old Stock" valves where you may be paying for rarity value and not performance.

### Cabinet Care

To remove dust we suggest gentle brushing of the polished stainless steel cabinet with a soft paintbrush. Other marks can usually be removed with a damp cloth. The Perspex valve cover may need a gentle wipe with soapy water and drying with a duster. Never use anything wet on the amplifier, and always clean with the power disconnected.

## 5 Trouble Shooting

### Amplifier Dead

Check the 3 amp mains fuse at the back of the amplifier. To gain access, remove the mains lead. The fuse is in a small plastic drawer, which forms part of the socket assembly. To open insert a flat blade screwdriver or similar and prise open. **The fuse in use is the innermost** the outer is a spare. Should the replacement fuse also blow there is a fault you should disconnect from the mains and seek qualified help or Icon Audio. Replacements should be 3 Amp 'anti-surge'.

The fuse in the wall plug should be a 3 or 5 amp fuse, although unlikely to fail, this should be checked if the amplifier fuse is OK.

### No sound

Have you selected the right input? Is the "Tape Monitor" switch up? Are all the connections OK? Is everything switched on? Are the speakers connected?

### Distorted sound.

Try another source; if sound improves then it's probably something wrong with the first source. If no improvement try different speakers, if no improvement there may be an amplifier problem.

Distorted sound at higher volumes may be because one of the output KT90 valves is not working. This could be due a faulty KT90 or one of the KT90 internal fuses blowing. A symptom of this would be no 0.5V bias voltage at the test point. Refer to an engineer or to Icon Audio.



## Hum Problems

If you experience hum, try disconnecting all inputs, if hum persists this is probably an amplifier fault.

If not, identify which input is causing hum. Connect one input at a time. A common cause is a 'hum loop' caused by having too many earths, and may be identified by unplugging each input source from the mains. One remedy for this is to use an interconnect which only has the screen connected at one end. Other causes of low-level hum can be from adjacent equipment, so experiment with moving equipment around to see if this makes the hum better or worse.

## Strange noises coming from speakers

Turn volume to minimum on unused input, if the noise disappears, the fault is with the source or the connection. If noise persists, the problem is with amplifier.

If a whole output valve glows red (other than the heater), often accompanied by a hum through the speakers, switch off immediately, and refer to Icon Audio or a service engineer, as this could be valve failure.

A valve that is lit up is not a guarantee that it is working properly; conversely a valve that is not lit up will not be working.

## Valve Replacement (see also section 7)

Valve life will depend upon such things as hours of use and number of on/off cycles, the Standby/HT Delay Circuit if fitted will extend the life of the valve by not stressing the cathode when it is cold. It is not good practice to remove the valves unnecessarily as this can strain the pins and cause tiny air leaks.

**Service:** Should you suspect a problem, you could return the unit to your dealer or Icon Audio for a periodic service or return the valves for testing free of charge. You should carefully remove the valves (the KT90s should be held by the base when removing, to prevent damage) numbering them with a marker from left to right as you do so in order that that may be replaced in the same position. They should be well packed in cardboard & foam or similar, and returned to Icon Audio for testing. (Valves are very rugged if packed properly).

## Mains Supply

This amplifier is hard wired to work on 230/240v ac. The transformer may be re-configured for 110/120v ac by a qualified engineer. Contact for more information.

# 6 Bias Adjustment

Read these notes all the way through first.

If you are unsure about any aspect contact your retailer, Icon Audio or a competent service engineer.

The MB 90s use the "fixed bias" mode of valve operation. This has the advantage of higher power, and cooler running. However occasionally (once a year) it is advisable to check the bias reading using the supplied meter to ensure best performance from the amplifier. This is a safe procedure which involves measuring 0.5v (500mv) DC in the 2 sockets next to each KT90 and adjusting if necessary.

1, Tools you will need: The supplied meter or one set to measure approx approx 2v (2000mv), and a small flat blade screwdriver. Adjustment is done at zero volume with speakers connected. Run the amplifier for about 10 mins (if possible) first.

2, Connect: the black probe to the chassis 'earth' by unscrewing the '0' speaker terminal and tightening the probe in the exposed hole. And the other in the test socket adjacent to the valve on test. Set the 'Icon' meter to 2000mv or the 'black mark'. See pics.



Making the 'earth' connection.

3, Checking Bias: You should get a reading of ideally 500mV if each valve is conducting correctly. But this will vary from about 450mV to 525mV. Bear in mind that your mains voltage fluctuations can affect your readings by up to 10%.



Showing a probe in output valve test point

4, Adjusting: If all the valves are high or low, set the 500mv by inserting a small screwdriver in each adjuster. If one valve is significantly higher or lower, then it may be faulty or life expired. The adjustment is very sensitive so adjust very carefully. If the reading appears a little unstable this is normally due to mains fluctuations.

5, If one or more valves are showing erratic readings or you cannot set the 500mv, then that valve is probably faulty or out of specification. If you are unable to set the reading high enough this means the emission of the valve is low.

NOTE!

If there is no reading at all the internal 315ma fuse individual to each KT90 should be checked by a qualified engineer. Spares should be located inside.

## 8 Valve Replacement

**Important! Do not attempt to change the KT90 output valves without reading these notes. Failure to do so could be both dangerous and damaging to the amplifier. Keep these notes handy.**

**Take care that you orient the valve correctly before inserting. Line up the centre "Spigot" first.**

**Health & safety: High voltages are present inside the amplifier and on exposed valve sockets when valves are removed, so take suitable care. It is not necessary to remove the bottom cover. Beware valves get hot in operation!**

5, Changing valves: If possible check the bias setting before you attempt to change the valve(s), in order to familiarise yourself with the procedure.

If changing all the KT90s be ready to adjust the bias in order not to overload the power supply. Don't worry how low the reading goes this will not cause damage. Do final adjustment when the amplifier is fully warmed up.

If all is well there should be no more than a barely detectable hum from the speakers, and the amplifier should sound OK when tested.

6, If you cannot set up 500mv, then the valve is probably faulty or is unsuitable. (if the reading is zero the individual fuse may be blown).

If the valves are brand new, you will need to check again after approximately 10 & 100 hours, after that only occasionally or if you suspect a problem.

**7, To avoid damage to the amplifier and electric shock hazard you must use only valves marked KT90, KT88 (6550), KT66, 6SL7, 6SN7.** Use only valves which you know to be new or good condition and test the amplifier thoroughly before resuming normal use.

**8, Replacing the small valves:**

**6SL7 and 6SN7.** Neither of these requires any set up procedure. It's just 'plug and play' although care should be taken when removing and inserting not to bend the pins. If this happens gently bend the pins back into shape. (These valves are similar with the same pin connection; accidentally interchanging these two valves would not cause damage, but may reduce the amplifier performance).

Icon Audio are happy to check the valves/amp or re-bias your amp free of charge.

## 6 Specification & Features

(Typical conditions @ 240v 50Hz)

- KT90/88 output valves or eqv (/6550)
- 6SL7 double triodes for first stage
- 6SN7 double triodes phase-splitter
- Hand wired point to point components
- No printed circuit board
- No tag board
- Ceramic valve bases for low noise/leakage
- HT delay circuit to protect cathodes (optional)
- 100w RMS (KT90) Ultralinear
- 50w RMS (KT90) Triode mode
- Signal to noise level -90db
- Freq response 20Hz-20kHz +or- 0.1db
- Power bandwidth 10Hz-30kHz
- 0.1% THD
- Custom hand wound transformers using Japanese long grain steel
- Choke regulated power supply inc output
- Supplied with attractive safety guard
- Minimal feedback used
- High quality oversized metal film & wire wound resistors
- Audiophile High quality polypropylene audio caps
- Japanese 'Blue' ALPS volume pot.
- Internal wiring using silver gilt cable
- Valves carefully matched for best performance
- Gold plated Input & speaker terminals
- 400 mv sensitivity for full output (High)
- 1.4 v sensitivity for full output (Low)
- 230/240volts, 150watts (zero signal)
- Standby switch function
- 3 amp T mains rear fuse (with spare)
- 400 ma F KT90 anode fuses (with spares)
- W:20cm. D:50cm. H:22cm. Weight:22kg
- IEC mains lead, (5amp fused)
- CE certified. ROHS & WEEE compliant  
Specification subject to change without notice.

## 9 Guarantee & Shipping

Thank you for purchasing one of our amplifiers. We hope you will be pleased with it.

***This amplifier is guaranteed by the dealer you purchased from for 12 months from the date of purchase for parts and labour, excluding shipping. Valves are consumables and therefore on a 12 months pro-rata wear basis. Please keep your receipt as proof of purchase, this will be needed.***

All units are individually tested for performance for at least six hours before despatch to you. In the unlikely event that you believe the unit is not functioning correctly, it may be helpful to contact us first as we may be able to assist you. Then we would request that you return the item to us for further action.

You are advised to inform us of any change of address in order that we may keep you up to date of any upgrades or improvements. Check our website.

### **Exclusions**

Claims for any damage to either amplifiers or valves must be reported within three days of receipt.

This amplifier is designed for normal domestic hi fi use. It is not guaranteed for commercial, Public

Address use, or use in other situations. The guarantee becomes void if the unit has been modified in any way not approved by Icon Audio.

## 10 Packing Instructions

It is essential that the original box and packing be kept in good condition, as this provides vital protection during transit. Please do not write on box, but use removable labels. Should the original box and packaging be lost or become unusable a repacking charge of one hundred pounds will be made.

- Re-use the supplied plastic bag to keep the amp clean and free from damp.
- The mains lead fits in a foam cut-out underneath the amplifier.
- **Insert the piece of cardboard between the transformer cover and the valve guard; this will prevent transformer damage to paintwork during shipping.**
- Valves should be removed, numbered and packed in "Bubblewrap" or similar for protection inside the valve cover.
- If the amplifier is stored in the box, keep upright.

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