

MESA/Boogie Mark II-C OPERATING MANUAL

Congratulations! You have purchased the finest music instrument amplifier that modern technology and Old World craftsmanship can produce. Nothing has been spared in terms of cost or care to make this unit the most versatile, most reliable, and best sounding amplifier available. The MESA/Boogie itself is more like a fine musical instrument than a piece of commercial gear, and as such it will continue to reward you richly as you gain more practice in its use. With only reasonable care it should last a lifetime and, as experience has shown, a well kept Boogie will maintain or increase in value as it ages.

Here is a list of controls and features and sample settings to help you gain familiarity with your new amplifier. You are encouraged to experiment every way possible with speakers, controls and external effects; your Boogie has been made virtually foolproof so damage in the event of accident or misuse is quite unlikely. First, plug the AC cord into a wall socket and turn the Power switch ON. It is not always necessary to have the three-pin power plug grounded, and in some situations (such as multiple amp setups) a ground float adapter may reduce line buzz. The Ground switch located on the amplifier rear panel should be set to the middle position and switched to right or left only when buzzing line conditions warrant its use. With the amplifier on STANDBY, plug the footswitch box into the lower front panel Jack using the cord supplied, though any cord will work. If the red LED indicator on the footswitch box does not light up, press the footswitch, also check that all five pullout switches on the control knobs are fully pushed in. When the red LED is lit, the amplifier is in the Rhythm mode (Red = Rhythm). Set Volume 1 to about 7 and Master 1 to about 2. These are the two gain controls used primarily for rhythm playing. Generally you will want to run the Volume 1 control as high as possible without causing unwanted distortion, in order to have available the most possible sustain when switching into the Lead mode. The Master 1 will control the playing loudness without changing the tone. The Bright switch pullout on the Volume 1 control has less and less effect as the control is turned up higher and will have no noticeable effect from about 8 to 10. Set the Treble control to about 7. When the knob is pushed in, the tone control equalization is similar to that on old Fender amplifiers; when pulled out, the Treble control frequency center point is shifted downward to give a more robust sounding midrange. Treble Shift, when pulled, is automatically switched on in Lead mode to give a hotter, fatter lead sound. Set the Bass and Middle controls to about 2 each. The Master 1 control (already set to 2) also incorporates the Gain Boost pull switch that can be used for adding extra bottom to the amp's tone as well as a slight increase in gain.

The Lead Drive controls the amount of overdrive sustain and distortion; set it to about 8. The Pull Lead switch built into this control performs the same function as the footswitch, namely triggering the relay. You will see the LED indicator on the box go out when the Lead Drive knob is pulled. The Lead Master controls the playing loudness in the Lead mode, set it to about 2. The Pull Bright on this control only has effect on the Lead mode and not the Rhythm mode, and adds gain and sustain as well as brightness. So, to summarize briefly: Volume 1 and Master 1 regulate the gain and the loudness of the Rhythm mode, Lead Drive and Lead Master regulate the overdrive distortion and loudness of the Lead mode where Volume 1 still provides the initial signal strength. Or, in other words, the amp uses two volume controls for Rhythm (Volume 1, Master 1) and three volume controls for Lead (Volume 1, Lead Drive and Lead Master).

With only a little Practice you should be able to work these controls to provide just the right rhythm tone and just the right lead tone with the loudness of both independently adjustable by the Master controls. So hit the Standby and go ahead and try it!

The Slave Level control and Slave Output jack located on the rear panel of the amplifier give you a direct output feed which faithfully captures the entire sound of the amp and preamp and can be regulated to properly match anything from a mixing board to a power amp to another Boogie for a linked up arrangement. Although a few mixing boards (mainly Yamaha) won't properly accept the Slave Output signal and cause distortion, an absolutely noise free recording can be made with most other mixers. Set the amp normally. Start with the Slave knob off. While playing, turn it up to provide sufficient signal for your power amp or Line In on your mixer. Higher Slave settings and lower Master settings will result in lower overall noise. Always run the Boogie with a speaker or load resistor (8 to 20 ohms, 50 watts) if you are using the Slave Out. A Pre Amp Out-Pwr Amp In jack is located on the bottom of the chassis and provides access to the junction of the preamp and the output power amp. With it, another Boogie can be linked up (Slave Out of the first amp to Pwr Amp In of the second), or it can allow you to use the Boogie as a preamp only.

For weaker incoming signals, the Effects Return can be used as an input and then the Graphic would be functional. For Effects Loop use the jacks Mounted on the back panel. The Effects Return Jack will interrupt the signal flow while the Effects Send can be used as an output without affecting signal flow. If your Boogie should ever lose power or die out, always first run a cable between the two Effects Jacks before proceeding to test tubes, etc., as such a problem could likely be caused by faulty switch contacts in the Effects Return Jack.

Also on the back panel are the Reverb (optional) and Presence controls. The Presence control used from 0 to 3 will cut highs resulting in a smooth, mellow tone at a lower overall volume. Used from 4 to 10 it will boost both volume and highs. Three speaker jacks are provided: one 8-ohm and two 4-ohm. With 60 watts models, plug the single 8-ohm speaker into the 8 ohm jack for the most power and clarity. If two 8-ohm speakers are used, plug each one into a 4-ohm jack for proper balance. But you may also try other combinations if you want one speaker slightly louder or happen to prefer the tone caused by a slight mismatch; it will do no harm to the amplifier. With 100/60 watt models we recommend that when you run a single 8-ohm speaker you use the 60 watt position and plug into a 4-ohm jack. This will give the strongest possible output without damaging the speaker. You may get more clean power by switching to 100 watts, and still more by also plugging into the 8 ohm jack but remember to avoid lead tone distortion as it increases power dramatically (though not so much the apparent loudness) and may cause speaker damage. With two 8-ohm speakers, one in each 4-ohm jack, the 100 RMS can be safely used. A cabinet with four 8-ohm speakers can be wired in series-parallel to give a total load of 8-ohms, or a 16-ohm Marshall box may be wired in parallel to obtain 4 ohms. Use a speaker jack for headphones. Again, no harm can be done to the amplifier by mismatched speaker loads and we encourage you to experiment, if you want, with various combinations.

Also located beneath the chassis is a stereo socket for the optional Dual Footswitch. This will be wired to activate, when applicable, the Graphic EQ and Reverb. When an amplifier is built with only Reverb or Graphic, a mono ¼" guitar jack is mounted for use with our Single Footswitch and Cable Set. If your amplifier is equipped with a cooling fan and you wish to turn it off for quiet studio playing, then unplug the fan power cord where it plugs into the chassis on the extreme left end. Most of all, this amp was made for your enjoyment -- so go for it!!

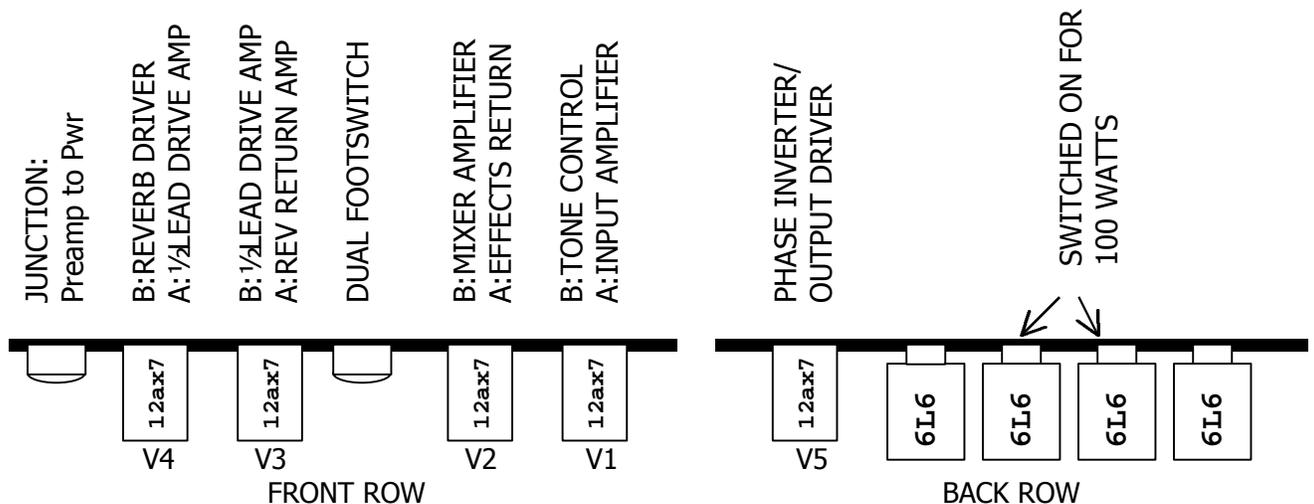
MESA/Boogie Mark II-C MAINTENANCE & REPAIR

INTRODUCTION

Malfunctions can usually be cured quickly and easily and, in most cases, a trip to the repair shop is not necessary. Your Boogie was designed to be reliable, as well as versatile, and simple to service. By using the outline below, you can easily and quickly run a check and most often remedy a problem in a few minutes.

CHECKOUT

1. Always view the amp from the rear for 'left' and 'right'; 'front' is toward the knobs and the input jack.
2. A good basic setting for playing or testing is: Volume 1: 5, Treble: 8, Bass: 0, Middle: 5, Master 1: 3, Lead Drive: 10, Lead Master: 3; EQ OUT; all knobs pushed in, red light on footswitch lit (indicates Rhythm mode. Lead Drive pull-out performs same function as L/R footswitch.) On back panel, Presence: 7, Reverb: 4, all-world (Export) power switch set to the correct voltage for the country you are in (United States, set for 117 volts.)
3. Make certain the speaker works properly and is plugged in correctly: single 8-ohm speaker goes in 8-ohm jack of 60 watt models BUT in 4 ohm jack with 100/60 switch in 60 RMS position on Hundred watt models (four 6L6's) for most powerful operation within speaker ratings. If less power is desired use 8-ohm jack and 60 RMS.



DIAGNOSIS & REMEDY: AMP IS DEAD, WEAK, NOISY, OR HAS BAD TONE

1. Effects Loop switching jack. If at this point the amp is dead or extremely weak, quickly test the Effects Loop and its switching jack by completing the Loop with a guitar cord. Occasionally the internal switching jack of the Effects Return fails to make contact when nothing is plugged in and hence the signal stops here. If completing the Loop via a simple cable restores performance, then the jack should be repaired (by judiciously bending the contacts) or better yet, replaced. Jack is Switchcraft 1.12 (and a 12A will work, too).
2. Pre-Amp Tubes. The most likely cause of an electronic malfunction -- including failure to operate, bad tone, or any kind of noisy or sporadic operation -- is the failure of a pre-amp tube. For this reason a spare 12AX7 is attached by a nylon clamp inside your amp cabinet. Begin by substituting the spare tube in each socket, one at a time, and returning the original tube to its

socket if the trouble remains uncured. It helps to have the Boogie up on a chair or table so you can see inside easily. You may remove 6L6's to improve access to the front row of preamp tubes. Most (but by no means all) problems with microphonics, hiss, squealing, rattling etc are caused by the V1 tube because whatever noise it creates is amplified throughout the entire amplifier. Performance of tubes in the other sockets is less critical; this is why we make a special model available called the SPAX7 and strongly recommend using it in the V1 socket. Other tubes-even though they are brand new-can actually create new problems, as their Performance might not measure up. Types 7025 and 6681 are the same as 12AX7A's and can be -used with uncertain results in a pinch. Do not replace your Boogie preamp tubes except to remedy a specific problem: regular replacement is not required, except for 6L6's.

3. Power Tubes. Failure of a 6L6 can cause the fuse to blow instantly or sporadically and can also cause weak output with too much distortion, a muddiness in tone or metallic rattling sounds on certain low notes which go away when the tube is held steady against vibration. A dead tube (even if its filaments glow) will only be luke warm, a properly running 6L6 will be too hot to handle after about a minute (with no fan cooling.) Only the outside end 6L6's run when 100/60 switch is in the 60 RMS position. A shorted 6L6 glows red hot, and in an amp operating in the 100 watt mode, the tube next to it will also glow red. Turn the switch to the 60 RMS position and if the end tube remains red, it is probably the shorted one. If both cool down then probably (but not always) the inside 6L6 is at fault. A shorted 6L6 will often correct itself and un-short when momentarily interrupted by the Standby switch or even a pulse from the 100/60 switch, but should be replaced by a reliable tube. Whenever replacing 6L6 tubes, allow a few minutes of warm-up operation then, with the power fully on (but not the volume controls), tap each tube 5-6 times while watching for shorting, arcing or noise: 10% of new tubes aren't good enough-weed out the bad ones before your gig. Always make sure your 6L6's are pushed completely into sockets and see that the retaining clamps are snug against the tube base. We strongly recommend that MESA STR415 types 6L6's are used for replacement. We have spent years in perfecting the manufacture and matching processes that make these tubes much better-and more consistent than any other, including Groove Tubes. MESA STR tubes cost less than Groove Tubes and carry twice the warranty lifetime besides. If you play several times a week, your 6L6's (but not your 12AX7's) should be replaced at least once a year for best tone. As with guitar strings, the tonal response of 6L6's deteriorates slowly with use.

INTERNAL REPAIR INFORMATION: AMPLIFIER CHASSIS REMOVED FROM CABINET

WARNING: High voltage hazard exists inside amplifier chassis. Be sure to remove AC power cord and discharge filter capacitors before proceeding. When in doubt, refer service to competent technician.

1. If the amp has a fan, remember to unplug it from the left end of the chassis. Lift chassis up as you slide it back so fan socket clears side cleat of cabinet.

2. Negative bias voltage has been permanently set during amplifier burn-in and should never need adjustment. Correct bias voltages varies according to amplifier model: Measured at pin 5 of each 6L6, the correct bias for Standard Sixty watt models should be -47, Hundred Watt = -52 (or -47 for Hundred Export) Simul-Class: -56 and -46 (-46 and -37 for Export Simul-Class) Series 300: -56.)

3. Check filter caps. Shorted filter will cause smoke and blow the fuse; an open or intermittent-open filter cap will cause hum, distortion, weak tone, noise, oscillation and lowered voltage. To test, merely clip lead another cap of sufficient voltage rating across each filter one at a time. (Filter caps are large blue cylindrical parts on power supply board, and one on pre-amp board.) Occasionally, one of the very large 220 mf 285 volt caps will break loose from the bottom of the board and cause loud buzzing that is not affected by Volume control setting. To fix, re-solder cap to board.

4. Check diodes. A blown rectifier diode will cause fuse to blow or low voltage and hum at standby switch. Test each diode in circuit (power off) with an ohmmeter. Resistance reading in one direction should be

much greater than reading with meter leads reversed. Use heat sinks whenever soldering is done to diodes. You may remove power supply board for access to bottom.

5. Output transformer. If all voltages are correct and good clean drive appears on the 6L6 grids (pins 5) but not on the plates (pins 3), or on the plates but not at the speaker jacks, the output transformer is suspect. To verify, use a substitute. Fender transformers (Bassman for 60-watt models, Twin or Showman for 100-watt models) may be used until original replacement arrives. If Fender transformer is used, temporarily move feedback over to four ohm jack as Fender transformers have no 8 ohm winding.

6. Scratchiness in other volume controls is usually caused by leaky tubes and not controls.

7. Sustained or sporadic whistling especially at high volumes indicates ringing microphonic 12AX7, usually the one in V1 input socket.

8. Reverb feedback-a low tone or hum which gradually increases in loudness and stops when Reverb control is turned off may be remedied by reaching in behind the amp cabinet, grasping the reverb chamber in its black vinyl bag and pulling and stretching it around against its mounting strap. The purpose is to unstick the vinyl from the cabinet, pull the unit away from contact with the speaker frame and generally "loosen up" the mounting of the reverb springs in their bag so acoustic feedback is minimized.

9. Sporadic operation or failure of Graphic EQ to boost or cut can usually be traced to intermittent or faulty contacts at EQ footswitch. Closed circuit type jack must ground filter circuit lead for EQ to cut and boost. Complete failure of EQ is usually the fault of a transistor in that circuit. All transistors can successfully be replaced by general purpose audio devices of 60 volt rating or more. Q1, Q2 and Q3 are all PnP, Q4 is NPN. Q2 and Q3 should be same type for proper dif amp operation, and although factory spec Q1 is darlington, a regular PnP (same as for Q2 and Q3) will work with only a small reduction in gain.

NOISE PROBLEMS: BUZZING or loud hum with no signal plugged in

- Unplug instrument and see if buzz goes away.
- Try Ground switch: center position is off, left or right switch cap in between chassis ground and AC line.
- Make sure reverb cables are plugged in securely.
- Make sure tube shield is in place.
- Check pre-amp tubes. Loud hum is most often caused by a shorted 12AX7.
- Check the 2 100 ohm ½ watt resistors (brown, black, brown, silver) located beneath the speaker jacks on the circuit board. A shorted 6L6 can cause them to burn out, resulting in buzz.
- Visually follow the filament string beginning with the twisted green leads at the power transformer and look for shorts or bridges to any other parts.
- Make certain the speaker is not touching a preamp tube.

OTHER REPAIR TECHNIQUES

1. Visual check: Look carefully at all the connections around the tube sockets, and wiggle the tube in its socket, then look at all the connections of parts and wires to the boards, jacks and controls. Give each one a little pull test with pliers while the amp is running. Knock the chassis several times with a small hammer (you'll see the spot where we do this!) It should be quiet and stable and able to withstand great amounts of shock and vibration; it has been built tough and carefully.

2. An arced out circuit board can be repaired by scraping away all carbon traces and replacing any arced high voltage stripes with jumper wires leading directly to the tube socket pins. Remove all carbon from arced tube socket, or better, replace socket. Be certain there is no contact between carbon and conductors.

3. Sugar residue or beer, etc., on the circuit boards must be removed to allow stable operation. Use alcohol or tape head cleaner.

4. An 8-32 tap can be useful for straightening out damaged threads in the chassis if a mounting screw gets cross-threaded. Use 10-24 tap on 300 Series and 15" models.
5. When removing the grille board to get access to the speaker, back the 4 black screws half way out and grip them like handles to pull off the grille board.
6. If speaker mounting screws won't tighten after several replacements, jam a wooden match in the stripped out hole, or if possible, rotate the speaker slightly to expose fresh board underneath the speaker mounting holes. But don't mount speaker with its frame touching tubes!
7. Any problem you or your technician are unable to solve may be referred to us for diagnosis over the telephone. Parts, if needed, will be sent immediately. The Boogie is not so delicate or mysterious that a reasonably competent technician will be baffled or mess up your amplifier. And again, if advice is needed, he (or you) can call us Monday through Friday from 11:30 to 5:30 California time at (707) 778-6565. In extreme cases you may return your amplifier for repair, but please notify us first by telephone.