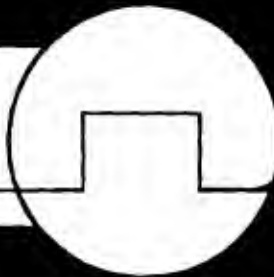


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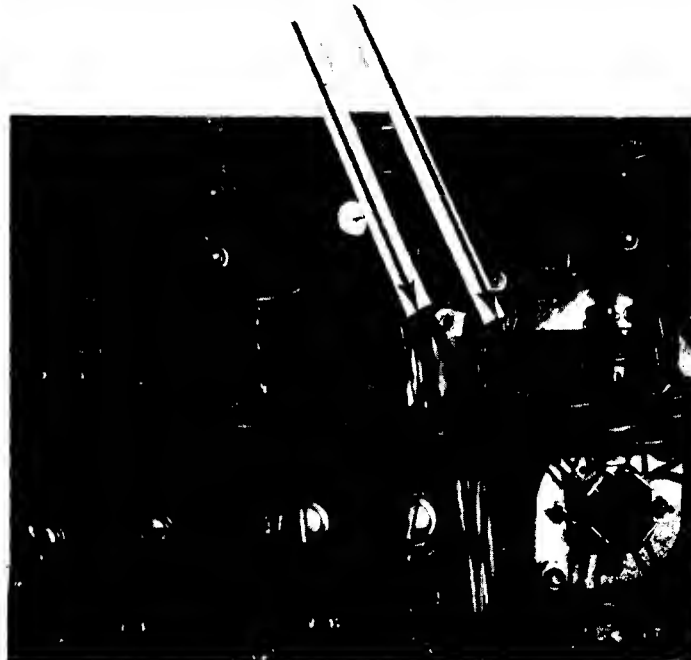


## MA-5100 SOLID STATE INTEGRATED AMPLIFIER

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Servicing the McIntosh MA-5100 solid state amplifier is easy. Transistor and tube type amplifiers have much in common. It is necessary to learn only a few basic principles.

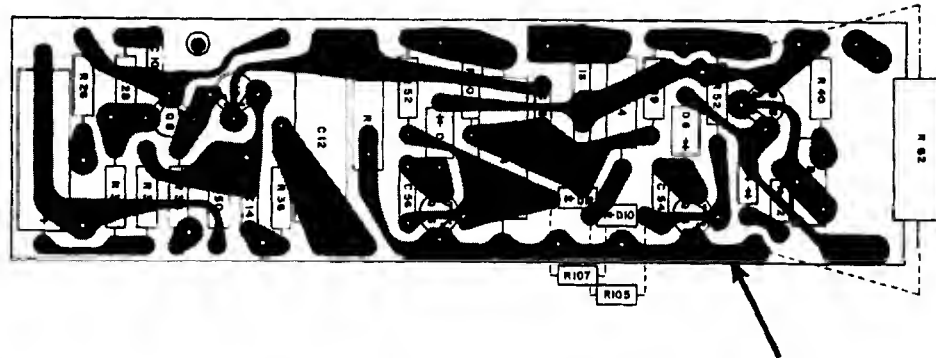
1. Being a solid state amplifier, the circuits are in operation the moment the instrument is turned on. It is important to be certain that all circuits are operating properly before applying full line voltage. If some circuits are not operating properly, it is possible to damage additional circuit components. When a McIntosh MA-5100 comes in for service, NEVER JUST PLUG IT IN AND TURN IT ON. Always use a Variac or Powerstat. Plug the amplifier into the Variac, but set the Variac output to zero volts. Bring the line voltage to the amplifier up very slowly. As you do so, monitor the output voltage on each channel. This is done with the VTVM. Connect the VTVM common lead to the chassis. On MA-5100 amplifiers bearing serial number 10H01 through 20H99, touch the probe to the points shown:



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On MA-5100 amplifiers bearing serial number 21H00 and above, touch the probe as shown:



Probe on this "land"

Set the VTVM on about a 15 volt positive DC scale. Set the needle of the VTVM to the center of the scale rather than to zero. As the line voltage to the amplifier is slowly increased, the VTVM needle will swing positive a few volts, then back past the center position, then slightly negative, then return to center position. This complete cycle will occur before the line voltage of the amplifier reaches 30 volts. Raise the line voltage from zero to 30 volts very slowly. Alternate the VTVM probe between the two channels. There may be trouble in only one channel. The channel without trouble will give a correct indication on the VTVM. So it is necessary to monitor both channels as the amplifier is being turned on.

2. If the amplifier has been turned on with no indication of trouble, the next step is to set the bias. By means of the bias pot on the power output printed circuit board, adjust the bias as follows:
  - a) Serial number 10H01 through 12H99. Check to see if there are 3 capacitors and 2 resistors soldered to the "land" side of the power output printed circuit board. If there are not, adjust the bias for 80 millivolts. If the components are present, adjust the bias for 30 millivolts.

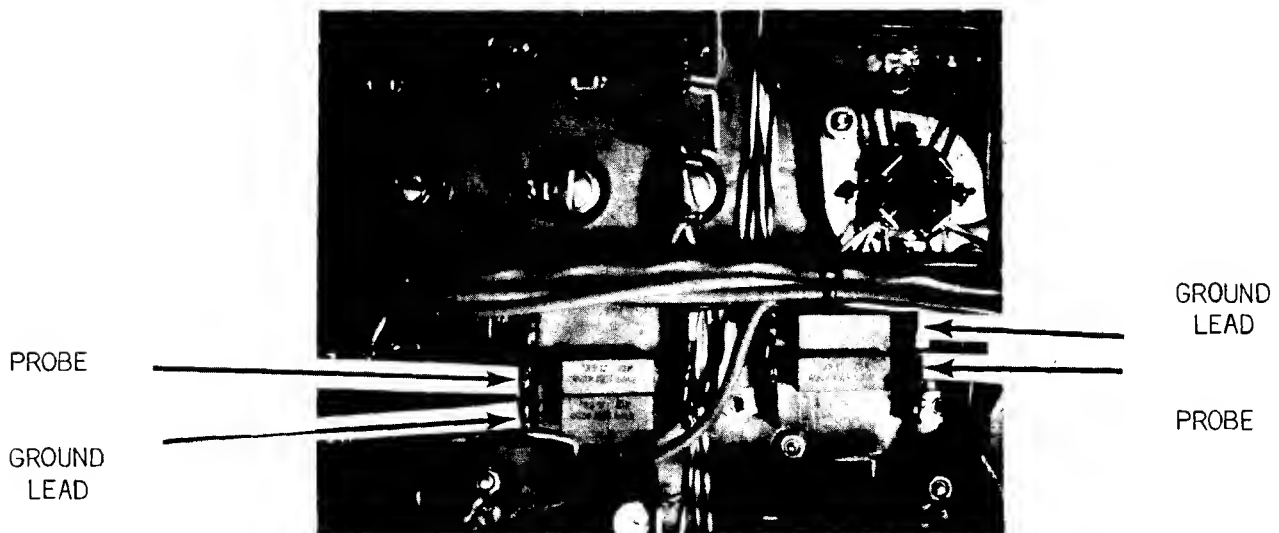
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- b) Serial number 13H00 and above. Set the bias for 30 millivolts.

The bias adjustment is made as follows:

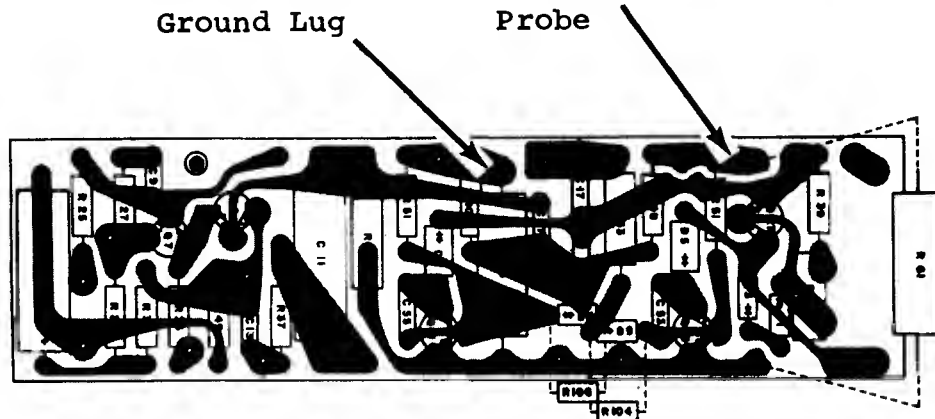
- a) If the serial number is 10H01 through 20H99, connect the VTVM as shown:



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- b) If the serial number is 21H00 or above, connect the VTVM as shown:



## POWER OUTPUT PRINTED CIRCUIT BOARD

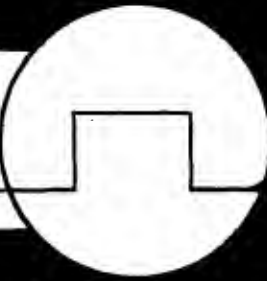
3. If there is trouble in one channel, you will not see the indication on the VTVM described in point 1. Stop right there. There are basically three possibilities of incorrect indication. The VTVM needle may not move at all, it may continue to swing positive, or it may continue to swing negative.
4. Regardless of the incorrect indication, it is usually not difficult to find the source of trouble. Turn the line voltage completely off. Discharge the large filter capacitors. Do not discharge the capacitors by shorting them directly to the chassis. Because of the arcing that will occur, the chassis will be marred. The proper way to discharge these capacitors is with a resistor. Use a resistor of at least a two watt rating whose value is approximately 5 to 15 ohms. Hold it across each of the large filters. In this way the power supply will be safely discharged. Failure to discharge the power supply before working on the amplifier could cause several transistors to be destroyed.

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5. After the power supply is discharged, check each transistor. This is done quite easily with the VTVM.  
CAUTION: USE VTVM SUCH AS THE RCA SENIOR VOLTOHMYST. Do not use older 1,000 ohms per volt VOM. This type of instrument may destroy the transistor by introducing excessive current into the transistor. Set the VTVM to measure ohms; after the power supply is discharged, check each transistor. Set the VTVM to measure ohms; use the "R x 1" scale. Measure across each junction of the transistor. Measure from base to collector, base to emitter, emitter to collector, emitter to base, collector to emitter, and collector to base. Also measure from the case of the transistor to ground. In no case should there be a direct short. In most cases, only one channel of the amplifier will be defective. Therefore, until you become familiar with the readings to expect in each case, compare the defective channel with the good channel. Although a defective transistor will usually be indicated by a direct short, this is not always the case. It is possible for a difference of only 2 or 3 ohms to indicate a defective transistor. For example, if a transistor in the defective channel reads 12 ohms from one junction to another, and the similar transistor in the good channel reads 10 ohms, the transistor which reads 12 ohms is probably defective.
6. If the transistors all measure correct, check the power resistors at the emitter and collector of the output transistors. These will have a very low resistance of about .33 ohms to .56 ohms. You may find that one of these resistors has opened up.
7. Also check the bias potentiometer for continuity. Be certain that it has not opened up.
8. After replacing a defective part, always turn the amplifier on as described in point 1. Otherwise, you may damage more parts. For example, you may find a shorted output transistor. You will replace the transistor. If there are other defective parts, that you do not yet know about, and you turn the amplifier on directly, in all probability, you will damage the new transistor that you have just installed.

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9. Before working on a solid state amplifier, ALWAYS discharge the power supply as described in point 4. If you do not do so, and then begin probing with a soldering aid, VTVM probe, or what have you, in all probability you will damage some transistors when you accidentally short from certain places to ground!
  
10. If the difficulty is not located as described in points 5, 6, and 7 you may turn the amplifier partially on. Bring the line voltage up to 25 or 30 volts. This will be enough voltage to enable you to signal-trace, compare voltages between the good channel and the defective one, etc., without damaging any components.

# McIntosh

This bulletin deals with RF suppression in the MA5100. The modifications described will increase the RF suppression capabilities of the amplifier.

If a "pop" is heard through the speakers when the amplifier is turned on, check to see if the on/off switch has a metal shield over it. Also, see if the wires going to the on/off switch are exposed or shielded. For maximum suppression of this "popping", the on/off switch and the wires to the switch should be shielded. If they are not, order the following parts:

1 Shield	McIntosh Part No. 001-474
1 Shielded Cable	McIntosh Part No. 170-025

These parts are available as a kit. Order McIntosh kit number 9043-696.

In a few installations in homes, there have been reports of "clicks" or "popping sounds" when appliances are turned on, refrigerators start, etc. Also, in homes situated near powerful radio stations, there have been a few reports of hearing the radio station in the phono mode. The following modification will eliminate these possibilities.

Two capacitors and one resistor are added in each channel of the MA5100. These parts are placed on the parts card on top of the chassis. They are in the low level input circuits.

Refer to the following diagram:

1. Add a 6.8 capacitor from base to collector of Q1. Add a similar capacitor to Q2.
2. Add a 39pf capacitor from base to emitter of Q1. Do likewise at Q2.
3. On the printed circuit board you will find a yellow wire (for the left channel) and a yellow/white wire (for the right channel). One end of these wires connects to the input selector switch. The other one connects to the printed circuit board near Q1 (for left channel) and Q2 (for right channel). Remove the wires from the printed circuit board.

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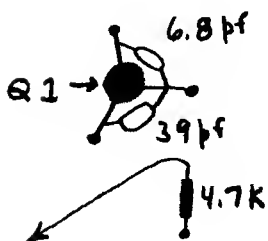
In their place install a 4.7K 1/4 watt resistor in each channel. The resistor should stand vertically on the board. Solder the end of the wire that you removed from the board to the other end of the 4.7K resistor.

## Parts Needed

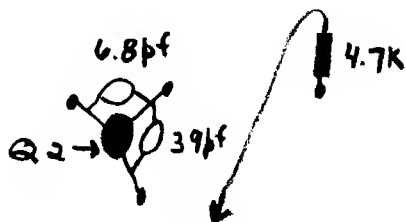
2 -- 6.8pf capacitors	McIntosh part number 061-008
2 -- 39pf capacitors	McIntosh part number 061-017
2 -- 4.7K 1/4 watt resistors	McIntosh part number 136-298

Be sure to use the exact parts as specified.

A kit is available from the McIntosh Laboratory Service Department. Its part number is 9043-643.



Yellow wire to  
selector switch



Yellow/White wire  
to selector switch

NOTE: Keep all resistor and capacitor leads as short as possible. Solder the capacitor leads directly to the "legs" of the transistors.

