

# **INSTRUCTION MANUAL**

**McINTOSH AE-2**

**AMPLIFIER EQUALIZER**

**McINTOSH LABORATORY, INC**

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U.S.A.

INSTRUCTION BOOK  
FOR THE  
MODEL AE-2 AMPLIFIER EQUALIZER CONTROL

The McINTOSH AE-2 AMPLIFIER EQUALIZER CONTROL has been designed for the home user primarily to give him a real professional quality instrument and to permit a stable and distortionless equalization and amplification to suit the listener's discriminating taste and to accommodate, we believe, all known phonograph recordings and to permit in most cases, pick-up from magnetic tape machines. Reasonable care is always necessary to keep the unit operating indefinitely and delivering excellent quality for all positions of the controls. Access to the bottom of the unit is by removal of a screw in the bottom plate and the top is accessible by sliding the plywood panel back and removing the metal shield cover underneath the plywood panel. This will enable the procedure of checking and servicing the unit.

The Model AE-2 Amplifier Equalizer Control is intended to provide an adequate amount of amplification between five different program sources and a McIntosh 50 or 20 watt power amplifier. The various program circuits may be selected by means of a front panel control labeled "Selector." Reference to the schematic diagram shown in Figure 1 will be of assistance in following the description.

Circuits 1 and 2 receive 50 decibels of amplification which is constant from 20 cycles to 20 kilocycles.

Circuit 3 receives 40 decibels and Circuit 4 receives 50 decibels of amplification which is constant from one kilocycle to 20 kilocycles but increases below 600 or 300 cycles to compensate for the 6 decibel per octave recording characteristic. Turnover selected by switch on panel.

Circuit number 5 receives 75 decibels of amplification which is constant with respect to frequency.

The amplification of all five circuits may be controlled by a front panel adjustment labeled "Volume."

In addition, all five circuits are subject to variable amounts of bass and treble boost, or bass or treble attenuation. The control affecting a change of amplification with frequency are front panel adjustments labeled "Bass" and "Treble." These two controls are non-interacting and provide boost up to a maximum of 17 decibels, and attenuation to a maximum of 17 decibels. The action of these controls is best clarified by referring to Figure No. 2.

Channels 1 and 2 are intended to be used between such program sources as crystal microphones or pick-ups and FM-AM tuners or other commercial radio receivers. The program level of these devices may exceed the overload point for the input circuit of the Amplifier Equalizer Control, and therefore, a 100,000 ohm potentiometer, which is a screw-driver adjustment at the back of the AE-2 chassis, may be used to reduce the program level in circuits one and two to a suitable value. When crystal microphones or pick-ups are to be plugged into channels one or two, a one to five megohm resistor should be inserted in series with the crystal device. This resistor should be introduced at the phono pin jack so that the capacity of the connecting cable will not cause a loss of high frequency in such a large resistor as would be the case if it were introduced at the crystal device itself.

Circuit number 3 presents a 27,000 ohm load to a program source connected to it. This circuit should provide a flat response from the high impedance Pickering cartridge.

Circuit number 4 presents a 12,000 ohm load to a program source connected to it. This circuit should provide a flat response from the GE variable reluctance cartridge.

Where Circuits 3 and 4 must be used with magnetic cartridges of other manufacturers, the terminating resistances mentioned above may be removed and the optimum value resistance substituted.

Circuit number 5 provides 75 decibels of amplification and loads a program source with a one-half megohm resistance shunted by approximately 60 micro-microfarads of capacity. This circuit will provide adequate amplification from most high impedance magnetic microphones. When it is desired to use a low impedance low level magnetic microphone, a well shielded input transformer, such as the McIntosh Model ATI-1 or ATI-1A, should be used between the microphone and the Amplifier Equalizer Control.

The variable bass and treble adjustments may be used to modify the frequency response of the AE-2 unit of each of the five program circuits. In the case of circuits 3 and 4, the 6 decibels per octave change in amplification below 300 or 600 cycles may be either increased to 12 decibels per octave or reduced almost to a constant amplification with respect to frequency. For most applications, the adjustment of these circuits will be largely a matter of individual preference.

The output circuit of the Amplifier Equalizer Control consists of a parallel connected 12AX7 tube in a cathode follower circuit. It is well to realize that, although the equivalent generator resistance of the 12AX7 in this circuit is only 600 ohms, it is not possible to develop full signal voltage across an impedance less than 15,000 ohms. Therefore, the cable connecting the Amplifier Equalizer Control to the power amplifier should not present a capacitive reactance below this figure at 20,000 cycles. However, the use of greater amounts of capacitance will not result in frequency discrimination if the output signal voltage is suitably reduced, but as implied, this condition will restrict maximum output signal voltage and in some cases, perhaps, to a value unsuitably low.

500 Micro-microfarads is a reactance of approximately 16,000 ohms at 20,000 cycles. A cable having a capacity of 30 mmf. per foot may, therefore, be 16 feet long. A reduction in cable capacity per foot will, of course, permit the use of a correspondingly longer cable.

In the event that a much longer cable capacity is necessary, the problem should be referred to the dealer from whom this unit was purchased.

The combined hum and noise voltage of the AE-2 unit will reflect an equivalent input signal level of less than ten microvolts. This low value of noise voltage will enable the user to maintain a 50 decibel signal to noise ratio from a microphone level of -50 dbm without the use of an input transformer. An input transformer adequately shielded and providing a voltage gain of 20 decibels would permit the same signal to noise ratio from an input level of -70 dbm.

#### GUARANTEE

The McINTOSH AE-2 AMPLIFIER EQUALIZER CONTROL is a masterpiece of laboratory development, completeness of design, and includes perhaps the most rigorous test procedure any equipment of this type has been given in the course of manufacture. Only the finest available materials have been used and it is with full confidence and pride that we guarantee the performance of this equipment and the mechanical and electrical workmanship to be free of serious defects for a period of 90 days with the exception that we do not guarantee the tubes or filter condensers beyond that of their manufacturers.

Patents Pending

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