

# McIntosh<sup>®</sup>

STEREO POWER  
AMPLIFIER

# MC275



## OWNER'S MANUAL

MC275



# MC275 STEREO POWER AMPLIFIER

## INTRODUCTION

The MC275 Commemorative issue amplifier and owner's manual are faithful reproductions of the originals, produced from May, 1961 through July, 1973. A few changes were made to the original amplifier design to reflect technology advances and contemporary system requirements.

Gold plated Balanced Audio Input connectors are added to take advantage of the greater noise reduction capabilities of Balanced Cables. High current capacity Gold Plated Output terminals are also in-

cluded. Close tolerance film resistors, polypropylene capacitors and fiberglass printed circuit boards are used.

This amplifier is dedicated in remembrance of the late Gordon J. Gow, coinventor of the original McIntosh Unity Coupled circuit. Mr. Gow was Vice President of McIntosh Laboratory Inc. from its inception in 1949 until 1977 when he was elected President. He held the position of President until 1989.

## GENERAL DESCRIPTION

Over one million watts of amplifier output power capacity have been manufactured by McIntosh since 1949. In this 1,000,000\* watts of audio power there are less than 10 watts of distortion capacity and less than 1/100 watt of noise capacity!

The dramatic difference in the quality of music reproduction when you listen through McIntosh instruments is directly due to low distortion performance. Careful, devoted research is a way of life at McIntosh. The world's finest amplifier is the creation of persevering, resourceful McIntosh engineers. McIntosh Laboratory is the only manufacturer in the entire industry to guarantee the lowest distortion at all audio frequencies, at full power. The U.S. Patent Office has recognized the advanced technology of the McIntosh circuit by granting 6 patents.

Long life, flexibility, highest quality construction are characteristic designs in every McIntosh instrument. Wide electrical and

thermal margins of safety for all components and tubes, advanced engineering, and cool operating design add to the long life built into every McIntosh product. Reliability prolongs your investment without expensive maintenance costs.

The MC275 has on one chassis two 75 watt power amplifiers. In addition to its use as a stereo amplifier, the flexibility of the MC275 permits it to be used as a monophonic amplifier that delivers 150 watts, or as two separate 75 watt amplifiers with each channel amplifying completely separate programs, or as two amplifiers for use with an electronic crossover network. Such flexibility permits maximum use for greatest return from your investment.

\*1,000,000 Watts was the total power output produced in 12 years from 1949 through 1961. In 1992 alone, McIntosh will produce amplifiers with a total power output of more than 5,000,000 watts with less than 1/100 watt of distortion capacity.

## TECHNICAL DESCRIPTION

The patented McIntosh Unity Coupled circuit and output transformer have established McIntosh amplifiers as the unchallenged leaders in the audio field.

Before 1949, low distortion at high power and high efficiency was impossible. A completely new engineering approach resulted in an amplifier that for the first time permitted high power with distortion below 1%. That new engineering produced the McIntosh Unity Coupled circuit and the McIntosh bifilar wound output transformer. With the introduction of the McIntosh amplifier, new standards for distortion-free performance were established.

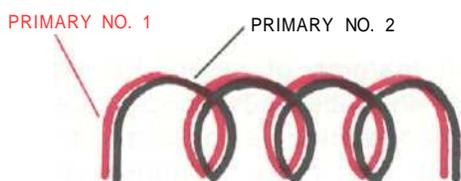


Fig. 1—Representation of bifilar winding.

The McIntosh output transformer is unique. It has two primary windings which are wound bifilarly. In the bifilar technique both primary wires are wound side by side. Each turn of primary number one is next to the same turn of primary number two. There is almost complete magnetic coupling between the two wires. The magnetic coupling is reinforced by the capacitance between the two wires.

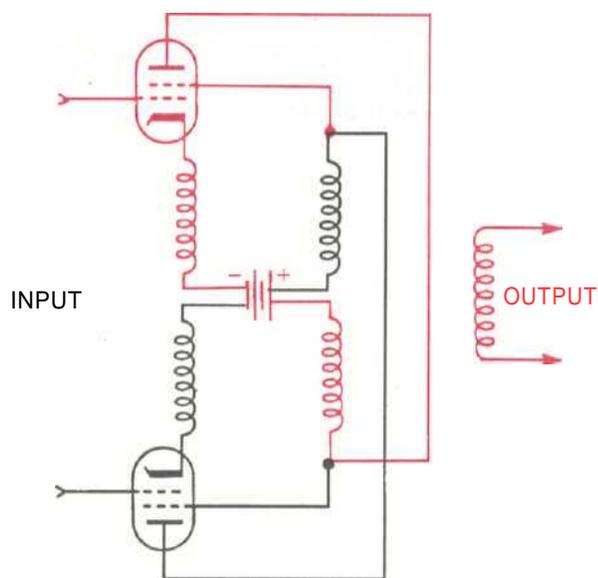


Fig. 2—Representation of McIntosh output circuit.

In the McIntosh Unity Coupled circuit one of the bifilar primary windings is connected through the power supply to the plate and cathode of one of the output tubes. The other bifilar primary winding is similarly connected to the other tube.

All low distortion high power amplifiers use push-pull output circuits known as Class AB<sub>1</sub>AB<sub>2</sub> or B. Two tubes are arranged in a balanced circuit. This permits each tube to operate alternately somewhat over half the time. Compared to full time operation of the tubes, the push-pull method reduces heating and permits more power from a given type of tube. Despite this advantage of the conventional push-pull circuit one problem in particular remained to be solved. When current in each tube is cut off to begin the idle period, distortion is produced at the instant when current flows. This form of distortion is known as Notch Distortion as was well illustrated by Mr. Pen Tung Sah in the "Proceedings of the I.R.E." Volume 24, pp 1522-1541 in 1936.

Imperfect coupling between the primary windings found in all conventional output transformers produces the condition which permits notch distortion. Trying to improve coupling in a conventional transformer decreases the power response at both low and high frequencies, heating the output tubes and lowering the available power output.

The McIntosh Unity Coupled output circuit and bifilar transformer is the first commercial breakthrough that eliminates notch distortion by coupling both output tubes almost to perfection. In the McIntosh transformer, the extremely close coupling of the bifilar windings removes the condition which permits notch distortion. Furthermore the two output tubes are arranged as partial cathode followers. Half of the output circuit is in the cathode and half in the plate of each tube. The output tubes now are operating in a local feedback loop which reduces their distortion, reduces their internal generator resistance, and reduces their balance requirements. The McIntosh circuit in reality perfects push-pull high efficiency output circuits.

The MC275 uses an advanced design of the McIntosh output transformer. The new

transformer design incorporates all of the benefits of the original McIntosh design and even further improves the power band width.

Leakage inductance (lack of coupling) between the primary and secondary windings of the output transformer limits the high frequency response of an amplifier. The primary and secondary windings of the McIntosh output transformer are interleaved five times to improve coupling. The interleaving is accomplished by winding 5 groups of secondary windings spread uniformly with the primary windings and parallel connecting the secondary windings. Interleaving helps to extend the McIntosh power band width to over 100,000 cycles. Since 1949, this new technology has been built into every McIntosh vacuum tube power amplifier.

Good voltage regulation in the power supply permits overloads without overshoot

or blocking, good transient response, and complete stability. To improve regulation a silicon rectifier power supply is used in the MC275. In addition to better voltage regulation, the silicon rectifier allows even higher operating efficiency, cooler operation, and longer amplifier life.

To greatly extend tube and component life, 2 thermistors in the MC275 limit current surges produced when the equipment is turned on. The thermistor is a special type of resistor. Its resistance depends on its temperature. When the amplifier is off, the thermistor has a high resistance value (about 25 ohms). Just after the amplifier is turned on, the current which flows through the thermistor heats it and causes its resistance to decrease to a low value (less than 0.5 ohms). Current is thus limited when the MC275 is first turned on but is not limited as the unit warms.

# MC275 Tube Power Amplifier

## SPECIFICATIONS

### Performance Limits

#### POWER OUTPUT, STEREO

75 watts into 16, 8 or 4 ohm loads is the minimum sine wave continuous average power output per channel from 20Hz to 20,000Hz.

The output RMS voltage is:

34.6 volts across 16 ohms

24.5 volts across 8 ohms

17.3 volts across 4 ohms

#### POWER OUTPUT, MONO PARALLEL

150 watts into 8, 4 or 2 ohm loads is the minimum sine wave continuous average power output from 20Hz to 20,000Hz.

The output RMS voltage is:

34.6 volts across 8 ohms

24.5 volts across 4 ohms

17.3 volts across 2 ohms

#### OUTPUT LOAD IMPEDANCE

16, 8 or 4 ohms stereo

8, 4 or 2 ohms mono parallel

#### RATED POWER BAND

20Hz to 20,000Hz

#### TOTAL HARMONIC DISTORTION

.5% maximum harmonic distortion at any power level from 250 milliwatts to rated power from 20Hz to 20,000Hz.

#### INTERMODULATION DISTORTION

.5% maximum if instantaneous peak power output does not exceed twice the output rating for any combination of frequencies from 20Hz to 20,000Hz.

#### FREQUENCY RESPONSE (at 1 watt output)

20Hz to 20,000Hz +0 -0.2dB

10Hz to 100,000Hz +0 -3dB

#### NOISE AND HUM (A-Weighted)

100dB below rated output

### Ratings

#### IHF DYNAMIC HEADROOM

1.1dB

#### DAMPING FACTOR

Greater than 10

#### INPUT IMPEDANCE

100,000 ohms unbalanced

180,000 ohms balanced

#### INPUT SENSITIVITY

Unbalanced, 1.0 volt to 30 volts through gain control

Balanced, 2.0 volts fixed

### General Information

#### POWER REQUIREMENTS

120 volts, 50/60Hz

240 watts at zero signal output

400 watts at rated output

The amplifier may be connected for 100,120, 220 or 240 volt 50/60Hz operation. It is shipped connected for 120V.

### Mechanical Information

#### SIZE

16" wide (40.6cm) by 7-1/2" high (19.0cm) by 12" deep (30.5cm)

#### WEIGHT

67 pounds (30.5kg) net, 75 pounds (34.1kg) in shipping carton

## PANEL FACILITIES

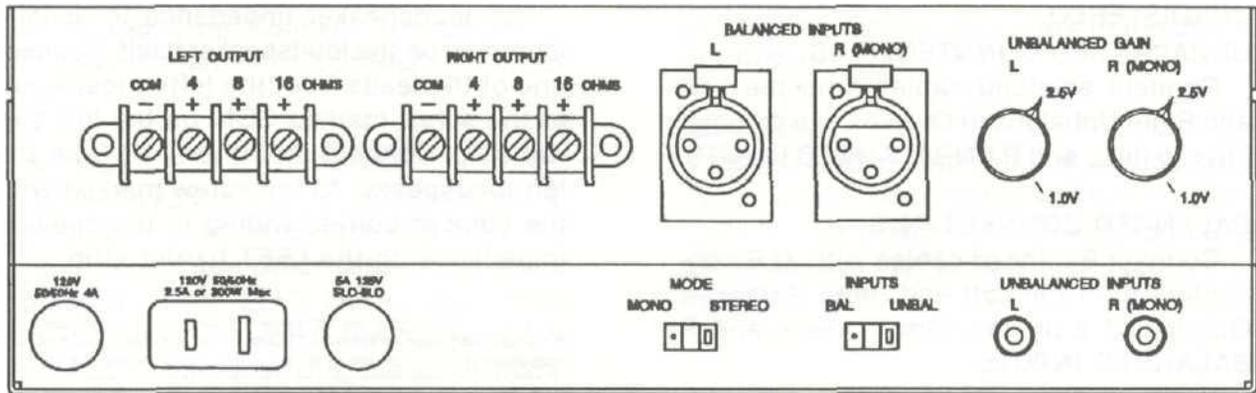


Fig. 3—The end panel of the MC275 showing all input and output facilities.

### INPUT

The MC275 has a two-position MODE Slide switch to permit the amplifier to be used as a 75 watt per channel stereo amplifier or a 150 watt mono amplifier.

The amplifier also has a two position input slide switch to permit selection of unbalanced or balanced input connections. The unbalanced input sensitivity is 1 volt. Gain controls are provided for higher input levels. The controls are marked for 2.5 volt sensitivity for use with McIntosh preamp equipment. The unbalanced input sensitivity is 2 volts fixed. For mono operation, the input signal is to be fed to the R (mono) input connectors.

### OUTPUT

The two barrier terminal strips marked OUTPUT provide stereo connections for the normal speaker impedances of 4 ohms, 8 ohms, and 16 ohms. For monophonic operation, connections for 2 ohms, 4 ohms, and

8 ohms are provided. The terminal strips may also be connected for a constant voltage output of 25 volts in either stereo or mono.

The Common connections from the output transformer secondary windings are grounded.

### FUSE

The MC275 uses a 5.0 ampere slo-blo type fuse. The auxiliary AC socket is not fused.

### AC OUTLET

The auxiliary AC outlet can be used to supply power to other equipment in the system. The outlet will provide a maximum of 500 watts of power. The AC outlet is not fused.

### LINE VOLTAGE

The MC275 operates on 120 volts, 50/60Hz. The power transformer has two tapped primary windings and can be connected for 100, 120, 220, or 240 volts.

## INSTALLATION

Adequate ventilation extends the trouble-free life of electronic instruments. It is generally found that each 10° centigrade (18°F) rise in temperature reduces the life of electrical insulation by one half. Adequate ventilation is an inexpensive and effective means of preventing insulation breakdown that results from unnecessarily high operating temperatures. The direct benefit of adequate ventilation is longer, trouble-free life.

The suggested minimum space for mounting the MC275 is 20" long x 14" wide

x 10" high. Always allow for air flow either by ventilation holes or space next to the bottom of the amplifier and a means for the warm air to escape at the top.

The MC275 can be mounted in any position except upside down. If the amplifier is to be installed on a vertical surface it is recommended that the transformers be on the down side. The advantage of this position is that the flow of heat from the tubes rises vertically and does not tend to heat the transformers.

## CONNECTING THE MC275

### INPUT-STEREO

#### UNBALANCED CONNECTIONS

Connect shielded cables from the Left and Right Unbalanced Outputs of a preamplifier to the L and R UNBALANCED INPUTS.

#### BALANCED CONNECTIONS

Connect Balanced cables with XLR connectors from the Left and Right Balanced Outputs of a preamplifier to the L and R BALANCED INPUTS.

#### Balanced Jack Pin configuration

- Pin 1. System Ground
- Pin 2. + Input
- Pin 3. - Input

### INPUT-MONO

Connect a shielded cable from either an Unbalanced or Balanced MONO output of a preamplifier to the corresponding R (MONO) UNBALANCED or BALANCED INPUT.

***Be sure to set the INPUTS switch to the BALanced or UNBALanced position to correspond to the Inputs being used.***

### OUTPUT-STEREO

For stereo operation, it is not necessary to use the same impedance load on each output. Simply connect each output for the impedance desired.

**Warning:** Do not parallel the amplifier outputs when using the amplifier as a stereo amplifier. Damage to the output tubes may result if parallel operation is attempted.

Speakers are connected at the barrier strips marked OUTPUT on the left end of the panel.

In compliance with the National Electrical Code, Class II wiring can be used between the speaker and the amplifier at the 4 ohm, 8 ohm, or 16 ohm connection. Class II wiring is lamp cord, bell wire, or other wire with this type of insulation. For the normally short distances of under 100 feet between the amplifier and speaker, #18 wire or larger can be used. For distances over 100 feet between the amplifier and speaker use larger wire.

The loudspeaker impedance is usually identified on the loudspeaker itself. Connect one of the leads from the left loudspeaker to the screw marked COM on the left barrier strip. Connect the other lead from the left loudspeaker to the screw marked with the number corresponding to the speaker impedance on the LEFT barrier strip.

If the speaker impedance is:	Connect one left speaker lead to screw LEFT-COM and the other to:	Connect one right speaker lead to the screw marked RIGHT-COM and the other to:
4 ohms	LEFT-4	RIGHT-4
8 ohms	LEFT-8	RIGHT-8
16 ohms	LEFT-16	RIGHT-16

The only adverse effect on the operation of a McIntosh amplifier when it is improperly matched is a reduction in the amount of distortion-free power available to the loudspeaker. Close impedance matching is desirable for maximum distortion-free power.

Use this table to determine proper speaker connections:

If the speaker impedance is between:	Connect the speaker leads between COM and:
3.2 to 6.5 ohms	4 ohms
6.5 to 13 ohms	8 ohms
13 to 26 ohms	16 ohms

### OUTPUT-MONOPHONIC

When the MC275 is to operate as a 150 watt monophonic amplifier, the outputs of the two channels combine to produce a single 150 watt output. This chart lists the proper connections and interconnections for monophonic operation.

If the speaker impedance is:	Connect one speaker lead to the screw marked LEFT-COM and the other to:	Connect a wire between:	Connect another wire between:
2 ohms	LEFT-4	LEFT-COM and RIGHT-COM	LEFT-4 and RIGHT-4
4 ohms	LEFT-8	LEFT-COM and RIGHT-COM	LEFT-8 and RIGHT-8
8 ohms	LEFT-16	LEFT-COM and RIGHT-COM	LEFT-16 and RIGHT-16

When connected as outlined, the MC275 operates as a 150 watt monophonic amplifier.

### LINE OUTPUT-STEREO

For 25 volt line operation, connect one of the left leads to the screw marked COM on

the LEFT barrier strip. The other left lead is connected to the screw marked 8 on the LEFT barrier strip. Connect the right leads in the same manner on the RIGHT barrier strip.

### **LINE OUTPUT-MONOPHONIC**

To feed a 25 volt line, connect one side to the screw marked COM on the LEFT barrier strip. Connect the other side to the screw marked 8 on the LEFT barrier strip. Then connect with a wire the screw marked COM on the LEFT barrier strip to the screw mark-

ed COM on the RIGHT barrier strip. Connect, with another wire, the screw marked 8 on the LEFT barrier strip to the screw marked 8 on the RIGHT barrier strip.

### **AC POWER**

The MC275 operates on 120 volt, 50 to 60 cycle power. The amplifier will be turned on and off if its power cord is plugged in one of the auxiliary AC outlets of an accessory component.

## **OPERATING THE MC275**

Before turning the MC275 on, check all connections and plugs to see that they are firmly and correctly connected. Check to make sure that the tubes are firmly seated

in the proper sockets. After the following adjustments have been completed, the MC275 operate without any further attention.

## **ADJUSTMENTS**

### **MODE SWITCH**

With the MODE switch in the Stereo position, the input signals are to be fed to either the L and R unbalanced jacks or to the balanced XLR, L and R connectors. With the switch in the Mono position, the input signal is to be fed to either the R (MONO) unbalanced jack or to the balanced XLR, R (MONO) connector.

### **INPUTS SWITCH**

Place this switch in the Unbalanced position to use the Unbalanced inputs or in the Balanced position to use the Balanced inputs.

### **UNBALANCED GAIN**

For stereo operation, position the L and R gain controls for desired sensitivity. When using McIntosh preamplifiers, we suggest setting the gain controls to the 2.5V position. For mono operation, use the R MONO control.

### **IMPORTANT**

The excellent performance that is inherent in all McIntosh amplifiers does not depend on the critical adjustment of bias or balance controls in the output circuit. The patented McIntosh circuit delivers its advertised specifications without any need for these controls and is not dependent on carefully balanced tubes for its performance. With McIntosh you can install the amplifier and forget it.

The MC275 you have purchased will give you years of pleasant and satisfactory performance. If you have any questions concerning the operation or maintenance of this amplifier, please contact:

**McIntosh Laboratory Inc.  
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Our telephone number is 607-723-3512**

Design subject to change without notice.





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