

# INSTRUCTION MANUAL

McINTOSH MODEL MI-60

WATT POWER AMPLIFIER  
FOR RACK MOUNTING

TYPE A 127

THIS MANUAL APPLIES FOR AMPLIFIERS  
WITH SERIAL NO. 1G141 AND ABOVE

McINTOSH LABORATORY, INC.

2 Chambers St., Binghamton, N. Y.

U.S.A.

## SPECIFICATIONS FOR THE McINTOSH

### MODEL MI-60 AMPLIFIER

#### ELECTRICAL CHARACTERISTICS

Power Output:	60 watts continuous, with distortion less than 0.5%, 20-20,000 cps
Frequency Response:	20 to 20,000 cps $\pm$ .2 db at 60 watts output 16 to 40,000 cps $\pm$ 0, $-$ 1 db at 60 watts output
Harmonic Distortion:	Less than 0.5% at 60 watts output or less, 20 to 20,000 cps
Intermodulation Distortion:	Less than 0.5% if instantaneous peak power is below 120 watts
Noise and Hum Level:	90 db or more below rated output
Input Level:	Approximately .5 volts will drive the amplifier to 60 watts output. A gain control is provided to handle input levels up to 20 volts. Greater input sensitivity is possible using a plug-in input transformer.
Input Impedance:	250,000 ohms
Output Impedance:	4, 8, 16, and 600 ohms, 70.7 volts and 117 volts. All winding are isolated from ground and may be loaded balanced or unbalanced.
Output Damping Factor:	15 to 1 or greater 20 to 20,000 cps
AC Power:	117/125 volts, 50/60 cps, 155-280 watts
Preamp Input:	May be operated with any McIntosh audio compensator.

## MECHANICAL CHARACTERISTICS

<b>Chassis Dimensions:</b>	The amplifier is designed for relay rack mounting. The chassis requires 8¾" of panel space (standard 19" wide panel) and projects approximately 1¼" in front of the panel and approximately 9" behind the panel.
<b>Operating Controls:</b>	On-off switch, gain control, pilot lamp and fuse are mounted on the amplifier chassis panel
<b>Finish:</b>	Grey hammertone.
<b>Weight:</b>	46½ pounds
<b>Tube Complement:</b>	12AX7 input amplifier 12AU7 phase inverter 12BH7 voltage amplifier 12AX7 driver 2—6550/KT88 output amplifiers, cathode-plate loaded using the McIntosh unity coupled output circuit 2—5U4GB rectifiers

## ACCESSORIES

<b>Input Transformers:</b>	Type M-107 (or M-107A) provides a 50, 250, or 600 ohm input at approximately -14 dbm level Type M-108 provides a 20K bridging input at approximately -2dbm level Type M-180 provides a 250 or 600 ohm input at approximately -24 dbm NOTE: The maximum input level that can be used with any of the above transformers must be limited to +10 dbm
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## DESCRIPTION

The McIntosh Model MI-60 is a 60 watt industrial power amplifier designed for such applications where high power and distortion-free performance is required. The Model MI-60 designed for rack mounting, like all other McIntosh power amplifiers, uses the exclusive McIntosh high efficiency output circuit and bifilar output transformer to obtain its high standard of performance. Some of the more important characteristics of the amplifier are: less than 0.5% harmonic distortion at any power output up to 60 watts and at any frequency in the audio spectrum, (20 to 20,000 cps); less than 0.5% intermodulation distortion for all power levels up to 120 instantaneous peak watts; noise and hum 90 db or more below rated output level.

The MI-60 input facilities include a high impedance input which may be operated from any signal source delivering 0.5 volts or more, or directly from a McIntosh Audio Compensator such as the Models C-4 or C-8. An input transformer socket is provided to accept a plug-in input transformer for low impedance or isolated bridging input. Output impedances of 4, 8, and 16 ohms are provided for direct connection to loudspeakers and additional outputs for 70.7 volts, 117 volts and 600 ohms are provided.

*Location*

INSTALLATION

The MI-60 must be located in a well ventilated area. If the amplifier is housed in a cabinet or other enclosure, adequate ventilation and air circulation must be allowed.

*Input Connections*

1. To use the 0.5 volt high impedance input connect the input signal leads to the input terminals at either the input barrier strip or the "Pre-Amp" input receptacle. On the input barrier strip connect the grounded input lead to barrier terminal 1; the "high" input lead to barrier terminal 2. If use of the octal input receptacle is desired the grounded lead attaches to pin 1; the "high" lead to pin 2.

2. When a McIntosh Audio Compensator of the non-self powered type is used with the MI-60, plug the pre-amplifier's inter-unit cord into the "Pre-Amp" receptacle on the MI-60 and adjust the MI-60 "GAIN" control to approximately 3/4 full gain. The "Pre-Amp" receptacle supplies the required plate and filament voltage to the pre-amplifier as well as providing the necessary audio connections.

3. When a low impedance line input or bridging input is desired a plug-in input transformer must be used in the MI-60 "Transformer" receptacle. Three types of transformers are available.

The input levels, impedances, and amplifier input lead connections are as follows.

*Transformer Types:*

Type M-107  
(or M-107A)

50, 250, or 600 ohm input at approximately -14dbm level.

<i>Input Impedance</i>	<i>Connect Input to Terminals:</i>	<i>Jumper Terminals:</i>
50 Ohms	4 and 5	2 to 3
250 Ohms	4 and 6	2 to 3
600 Ohms	4 and 7	2 to 3

Type M-108

20K bridging input at approximately -2dbm level.

<i>Input Impedance</i>	<i>Connect Input to Terminals:</i>	<i>Jumper Terminals:</i>
20K Bridging	4 and 7	2 to 3

Type M-180

250 or 600 ohms input at approximately -24dbm.

<i>Input Impedance</i>	<i>Connect Input to Terminals:</i>	<i>Jumper Terminals:</i>
250 Ohms	5 and 6	2 to 3
600 Ohms	4 and 7	2 to 3

All connections are to the input barrier terminal strip only. Terminal number 1, on the input barrier terminal strip is ground.

#### Output Connections

The MI-60 output impedances of 4, 8, 16, and 600 ohms plus 70.7 and 117 volts output are available at either the output barrier terminal strip or the output octal receptacle. See the "Output Connection" chart on the schematic diagram for the proper connections.

It is important that the loudspeaker or other load be properly matched to the amplifier if best performance is to be obtained. Because many loudspeakers do not have voice coil impedances exactly matching 4, 8, and 16 ohms, the following table lists connections for best impedance matching.

Speaker Impedance	3.2 to 6.5 ohms	6.5 to 13 ohms	13 to 32 ohms
Connect to	4 ohms	8 ohms	16 ohms

**WARNING:** Output plugs wired for McIntosh 20W-2 and 50W-2 amplifiers must not be used with the MI-60 without rewiring the Plug.

Low impedance output connections for the models MC-30 and MC-60 are the same as the MI-60. The high impedance output connections are not the same.

#### Power Connections

Screw terminals are provided within the MI-60 amplifier for connection to any 110 to 130 volt 50-60 cycles power line. It is suggested that the common and 117 volt terminals be used for line voltages ranging from 110 volts to 120 volts and that the common and 125 volt terminals be used for line voltages between 120 volts and 130 volts.

#### GUARANTEE

We guarantee the performance of this equipment and the mechanical and electrical workmanship to be free from serious defects for a period of 90 days. This guarantee does not extend to components damaged by improper use nor does it extend to transportation to and from the factory.

#### SERVICE INFORMATION

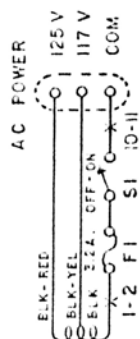
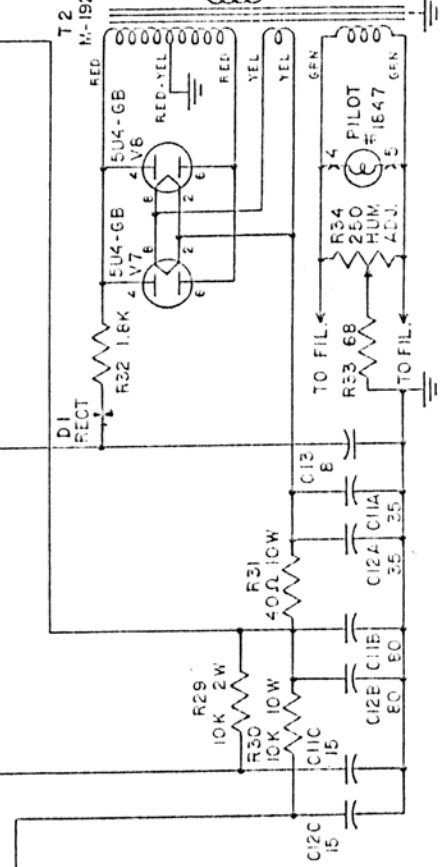
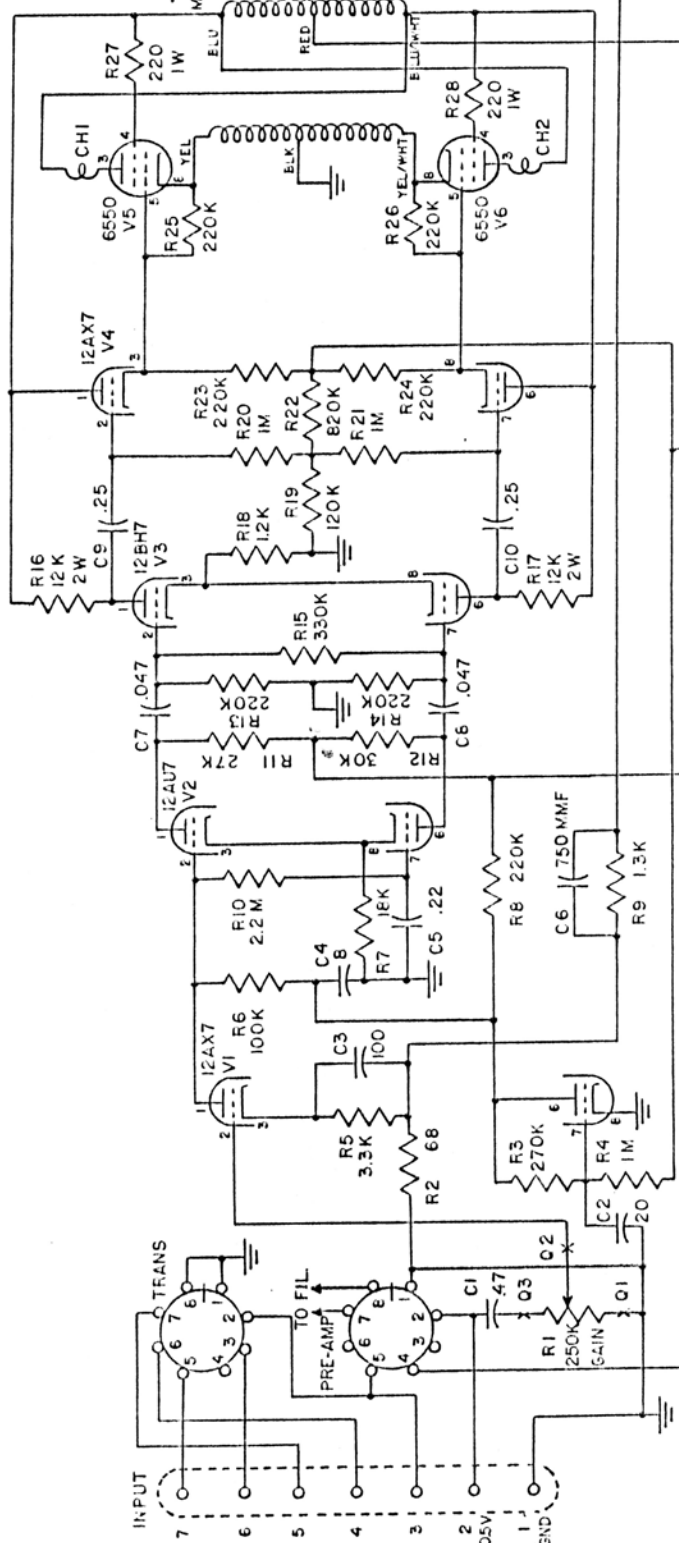
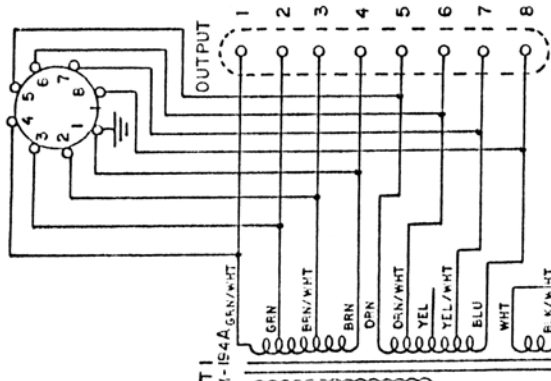
All McIntosh equipment is designed for long trouble-free operation. All components are of the highest quality and are conservatively operated. If trouble develops, the amplifier may be serviced by your dealer, or a competent service man, or returned to the factory. Please write for return authorization before returning defective equipment to the factory.

The following chart of operating voltages and resistances is offered as a guide for servicing the unit. All voltages and resistances are measured to chassis except those with asterisk (\*). These are measured to chassis with pin #2 of either 5U4G grounded. Voltages are measured with a high impedance VTVM. NOTE—UNIT MUST BE TURNED OFF WHEN MEASURING RESISTANCES.

## VOLTAGE AND RESISTANCE CHART

<i>Tube</i>	<i>Pin No.</i>	<i>DC Volts No Signal</i>	<i>DC Volts at 60W Out</i>	<i>AC Volts at 60W Out</i>	<i>Resistance in Ohms Unit Off</i>	
12AX7 V1	1	84	82	2.2	280K*	
	2	0	0	.32	220K	
	3	.82	.78	.26	3.3K	
	6	113	110	0	180K*	
	7	-.82	-.98	0	200K*	
	8	0	0	0	0	
	12AU7 V2	1	305	255	11.1	38K*
		2	84	82	2.2	280K*
3		96	92	.9	18K	
6		305	255	11.1	40K*	
7		70	70	0	2.5M*	
8		96	92	.9	18K	
12BH7 V3	1	350	300	150	12K*	
	2	0	0	11.1	160K	
	3	17	15	.5	1.2K	
	6	350	300	150	12K*	
	7	0	0	11.1	160K	
	8	17	15	.5	1.2K	
12AX7 V4	1	430	370	110	54*	
	2	-47	-46	150	1.1M	
	3	-47	-46	150	140K	
	6	430	370	110	54*	
	7	-47	-46	150	1.1M	
	8	-47	-46	150	140K	
6550 Both Tubes V-5-6	3	430	370	110	54*	
	4	430	370	104	2.8K*	
	5	-47	-46	150	150K	
	8	.84	2.3	110	15	
5U4GA/GB Both Tubes V7-8	2	440	390	0	0*	
	4	0	0	370	20	
	6	0	0	370	18	
	8	440	390	0	0*	
Pre-Amp Input Socket	4	430	375	0	10K*	
	5	0	0	.32	Inf.	

OUTPUT



OUTPUT CONNECTIONS

IMPEDANCE	CTCL SOCKET	TERMINAL STRIP
4 OHMS	1-2	3-4
8 OHMS	1-3	2-4
16 OHMS	1-4	1-4
TO VOLTS	5-6	5-6
117 VOLTS	5-7	5-7
100 OHMS	5-8	5-8

SERIAL NO. 6141-0F

PARTS LIST		MINTOSH LABORATORY, INC.	
QTY	DESCRIPTION	2 CHAMBERS ST. BINGHAMTON, NY	
2	17-14-55 VAC		
E 7-22-55		M-60 SIXTY WATT AMPLIFIER	
1	6550 V5	1-140	6550 V5
1	6550 V6	10-20-55	6550 V6
1	12AX7 V4	1-140	12AX7 V4
1	12AX7 V2	10-20-55	12AX7 V2
1	12AX7 V3	1-140	12AX7 V3
1	12AX7 V1	10-20-55	12AX7 V1
1	12AX7 V6	1-140	12AX7 V6
1	12AX7 V7	10-20-55	12AX7 V7