MC150 POWER AMPLIFIER

IMPORTANT SAFETY INSTRUCTIONS

THESE INSTRUCTIONS ARE TO PROTECT YOU AND THE McINTOSH INSTRUMENT. BE SURE TO FAMILIARIZE YOURSELF WITH THEM.

1. Read all instructions - Read the safety and operating instructions before operating the instrument.
2. Retain Instructions - Retain the safety and operating instructions for future reference.
3. Heed warnings - Adhere to warnings and operating instructions.
4. Follow Instructions - Follow all operating and use instructions.
   WARNING: TO REDUCE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS INSTRUMENT TO RAIN OR MOISTURE.
5. *Power Sources - Connect the power supply only to the type described in the* operating instructions or as marked on the unit.
6. Power Cord Protection - Route power supply cords so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the instrument.
7. Ventilation - Locate the instrument for proper ventilation. For example, the instrument should not be placed on a bed, sofa, rug, or similar surface that may block ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet, that may impede the flow of air through the ventilation openings.
8. Heat - Locate the instrument away from heat sources such as radiators, heat registers, stoves, or other appliance (including amplifiers) that produce heat.
9. Wall or Cabinet Mounting - Mount the instrument in a wall or cabinet only as described in the owner's manual.
10. Water and Moisture - Do not use the instrument near water - for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement or near a swimming pool, etc.
11. Cleaning - Clean the instrument by dusting with a dry cloth. Clean the panel with a cloth moistened with a window cleaner.
12. Object and Liquid Entry - Do not permit objects to fall and liquids to spill into the instrument through enclosure openings.
13. Nonuse Periods - Unplug the power cord from the AC power outlet when left unused for a long period of time.
14. Damage Requiring Service - Service must be performed by qualified service personnel when:
    A. The power supply cord or the plug has been damaged; or
    B. Objects have fallen, or liquid has been spilled into the instrument; or
    C. The instrument has been exposed to rain; or
    D. The instrument does not appear to operate normally or exhibits a marked change in performance or
    E. The instrument has been dropped, or the enclosure damaged.
15. Servicing - Do not attempt to service beyond that described in the operating instructions. All other service should be referred to qualified service personnel.
16. Grounding or Polarization - Do not defeat the inherent design features of the polarized plug. Non-polarized line cord adapters will defeat the safety provided by the polarized AC plug.

17. **CAUTION: TO PREVENT ELECTRICAL SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.**

ATTENTION: POUR PEVENIR LES CHOCS ELECRIQUES PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR, UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

The lightning flash with arrowhead, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

CAUTION: TO PREVENT THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: THIS UNIT IS CAPABLE OF PRODUCING HIGH SOUND PRESSURE LEVELS. CONTINUED EXPOSURE TO HIGH SOUND PRESSURE LEVELS CAN CAUSE PERMANENT HEARING IMPAIRMENT OR LOSS. USER CAUTION IS ADVISED AND EAR PROTECTION IS RECOMMENDED WHEN PLAYING AT HIGH VOLUMES.

LIGHTNING - For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lightning or power line surges.

OVERLOADING - Do not overload wall outlets, extension cords or integral convenience receptacles as this can result in a risk of fire or electric shock.

REPLACEMENT PARTS - When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.

SAFETY CHECK - Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

IMPORTANT SAFETY INSTRUCTIONS

THESE INSTRUCTIONS ARE TO PROTECT YOU AND THE McINTOSH INSTRUMENT. BE SURE TO FAMILIARIZE YOURSELF WITH THEM.

THANK YOU

Your decision to own this piece of McIntosh Stereo Equipment ranks you at the very top among discriminating music listeners. You now have "The Best". The McIntosh dedication to "Quality", is assurance that you will receive thousands of years of musical enjoyment from this unit.

Please take a short time to read the information in this manual. We want you to be as familiar as possible with all the features and functions of your new piece of McIntosh. This will ensure that you receive all the performance benefits this instrument can offer you, and that it will become a highly valued part of your home music system.

The serial number and purchase date are important to you for possible insurance claim or future service. Record this information here.

Serial Number	Purchase Date

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INTRODUCTION

The electrical and mechanical design of the MC150 power amplifier is the result of the many years of engineering and manufacturing experience of the design staff at McIntosh. This "Know How", along with the meticulous attention to design and production details, makes the MC150 one of the finest amplifiers ever produced by McIntosh Laboratory.

The use of 6 complimentary connected output transistors per channel, allows not only full power output into normal loads, but extra high current output to drive uneven speaker loads. Some speaker designs have impedance characteristics that may dip to as low as 1 or 2 ohms at certain frequencies. It is possible for the MC150 to deliver as much as 50 amperes peak current into these lower impedance loads.

The MC150 provides this extra current output with complete reliability due to the use of McIntosh Sentry Monitor protection circuits. Some power amplifier manufacturers have claimed that their products do not use protection circuits since they compromise performance. The real genius of McIntosh engineering design has recognized these potential problems and completely eliminated them. Properly designed protection circuits assure you an amplifier that will operate under all types of user conditions with maximum reliability and freedom from possible speaker or amplifier damage. The benefits of these designs mean you own an amplifier that will continue to operate safely for many years.

The MC150 output is so distortion free, it is difficult to measure with conventional instruments. The performance limit is 0.005% maximum distortion, yet it is typical for an amplifier to measure less than 0.002% at mid frequencies.

The power output watt meters on the MC150 are peak responding, and indicate the TRUE power output of the amplifier. The MC150 meter circuits are constantly measuring both voltage and current delivered into the speaker loads. A speaker may have a different load impedance at different frequencies, resulting in a change of output current. The MC150 meters properly react to this condition and indicate Real Output power.

Other desirable features are included such as high current gold plated output terminals.

As in all McIntosh power amplifiers, the famous patented McIntosh POWER GUARD circuit is included. You never have to be concerned with amplifier overdrive when playing wide dynamic range program sources such as compact discs.

Refer to the technical description for a full account of all the outstanding circuit and performance features of this superb power amplifier.

INSTALLATION

The MC150 can be placed upright on a table or shelf, standing on its four plastic feet. It can also be installed in the optional McIntosh L72 equipment cabinet. Follow the mounting instructions enclosed with the L72 cabinet.

The MC150 can be custom installed in a cabinet of your choice. The mounting panel cutout, mounting shelf ventilation cutout and amplifier dimensions are included on a page further back in this manual.

It is essential to cut out a ventilation hole in the mounting shelf according to the dimensions in the drawing.

Always provide adequate ventilation for the amplifier. The trouble free life of any electronic instrument is greatly extended by providing sufficient ventilation for proper cooling. In a

INSTALLATION

system stack, the power amplifier should always be at the top. If all the components are installed in a single cabinet, a quiet running ventilation fan can be a definite asset in maintaining all the system components at their coolest possible operating temperatures.

Allow at least 1-1/2 inches (3.8cm) above the heat sink area to allow the free flow of air. Cut out a ventilation hole in the mounting shelf corresponding to the dimensions in the drawing. The recommended minimum depth for mounting, including clearance for connectors is 16-1/2 inches (41.9cm). Allow 1-1/8 inches (2.9cm) in front of the mounting panel for knob clearance.

FRONT PANEL

POWER OUTPUT METERS

The MC150 power output meters respond 95% full scale to a single cycle of a 2000Hz tone. Both voltage and current are electronically measured and fed to a special circuit that accelerates the pointer movement in the upward direction. When the meter pointer reaches its peak, it is time stretched to pause just long enough to be read, and then drops.

The upper scale on the meters is calibrated in average watts power, and the lower scale in decibels. The meter calibration marks reading from right to left, starting at the 150 watt indication, are as follows.

150	**Watts Indicated**	**0.15 Watts Indicated**
60		0.06
30		0.03
15	**Watts Indicated**	**15 Milliwatts Indicated**
6		6
3		3
1.5	**Watts Indicated**	**1.5 Milliwatts Indicated**
0.6		0.6
0.3		0.3

Two additional calibration marks above 150 watts are on the meters. The first is 300 watts, (+3dB), and 600 watts, (+6dB). The power amplifier cannot produce a continuous 600 watts of power, but can produce well beyond 150 watts on program peaks, especially into lower impedance speaker loads.

METER WATTS/HOLD

In the METER WATTS position, the meters respond to all the musical information being produced by the amplifier and read to an accuracy of at least 95% of the power output of either amplifier channel.

In the METER HOLD position, the meter pointer is locked to the highest power peak in a sequence of peaks. The meter is electronically held to this power level until another higher power peak passes through the amplifier. The meter pointer will then rise to the newer higher indication. If no further power peaks are reached, the meter pointer will very slowly return to its rest position or lower power level. The decay rate is approximately 6 dB per minute.

FRONT PANEL

POWER GUARD

The patented McIntosh POWER GUARD circuit prevents the MC150 from ever being driven into clipping. This protects you from distortion and possible speaker damage. The POWER GUARD LED near each meter will light whenever POWER GUARD is activated on either channel, and indicates that you are being protected.

POWER/OFF-REMOTE/ ON

Turn on the MC150 power by turning the front panel POWER switch to ON. You can also turn the MC150 power on with a Power Control signal from an accessory McIntosh component or Control Center that includes a Power Control Out. Plug the MC150 power cable into a wall outlet. Connect a data cable from the accessory component Power Control OUT to the MC150 Power Control IN and set the POWER switch to OFF-REMOTE. When the accessory component turns on, it will send a control signal to the amplifier causing it to turn on.

REAR PANEL

HOW TO CONNECT INPUTS

CONNECTING CABLES

Use shielded cables to connect the signal from the preamplifier or other signal source to the power amplifier. To minimize the possibility of hum, the cables should be located away from speaker connecting cables and AC power cords.

Use good quality cables. Your dealer can advise you on the type and lengths of cables that will best suit your installation.

STEREO OPERATION (UNBALANCED INPUTS)

Connect two shielded cables using RCA connectors from the left and right unbalanced outputs of a Preamplifier or Control Center to the MC150 LEFT and RIGHT/MONO unbalanced inputs.

STEREO OPERATION (BALANCED INPUTS)

Modern technology has made it possible to build preamplifiers and power amplifiers with the high signal to noise ratio necessary to reproduce the sound quality present on compact discs or any other wide dynamic range signal source.

It is possible for conventional interconnecting cables to pick up electrical interference from other equipment, AC cables or electrical appliances. Using the balanced inputs provides an additional 40dB more protection against noise pickup.

Use 2 conductor shielded cables with XLR type connectors to connect between the preamplifier and the power amplifier. The maximum effect of balanced cables is realized when both the preamplifier and power amplifier have similar XLR balanced connectors.

Connect the left balanced output cable from a preamplifier to the LEFT BALANCED INPUT on the power amplifier. Connect the right output to the RIGHT BALANCED INPUT.

Pin configuration for the XLR INPUT connectors on the MC150.

PIN 1: Shield or ground.

PIN 2: + input.

PIN 3: - input.

In stereo installations where the amplifier and preamplifier are close to each other and require interconnecting cables of six feet or less, using quality unbalanced connecting cables is usually equally satisfactory. If the units are farther apart and require longer interconnecting cables, using balanced cables will give extra protection from noise or interference.

REAR PANEL

MONOPHONIC BRIDGED OR PARALLEL

A rear panel MODE switch allows the amplifier to be used in normal STEREO, MONO (BRIDGED) or MONO (PARALLEL). When switched to either MONO (BRIDGED), or MONO (PARALLEL) operation, the RIGHT BALANCED and UNBALANCED inputs are the only ones used for the mono input signal. The LEFT inputs are automatically disconnected.

Connect the appropriate cable from a preamplifier or other mono source to the appropriate RIGHT UNBALANCED or BALANCED amplifier input.

HOW TO CONNECT OUTPUTS

The McIntosh output circuit, superior in its performance, demands a superior method of coupling the amplifier output to the loudspeaker load. The MC150 incorporates McIntosh designed and manufactured Autoformers to insure peak performance and protection, as well as outstanding compatibility between amplifier and speakers.

The MC150 Output Autoformers have 3 different output impedance taps for optimum matching to the particular speaker or combination of speakers being used. Use the following table to determine which tap should be used. It may be desirable to consult your dealer, or the manufacturer of your speaker for the best impedance tap to use.

SPEAKER IMPEDANCE IN OHMS	AMPLIFIER OUTPUT CONNECTIONS
2 to 4	Common and 2 ohm output
4 to 8	Common and 4 ohm outputs
8 and up	Common and 8 ohm outputs

Use high quality speaker cables. The total resistance of the cables must be as low as possible, so larger diameter, (lower gauge number), cables are most desirable. The longer the speaker cable is, the lower the gauge number must be to keep resistance low. Consult your dealer for the best cables for your particular installation.

RECOMMENDATIONS FOR SPEAKER CABLE LENGTHS AND GAUGE (SIZE)

These speaker cable lengths represent a resistance equal to approximately 5% of the speaker impedance. The cable sizes are the minimum that should be used. If there is a choice, the larger diameter cables, (smaller gauge number), should be used.

4 OHM SPEAKERS		8 OHM SPEAKERS		CABLE
FEET	METERS	FEET	METERS	GAUGE
15	4.6	30	9.1	18
25	7.6	50	15.2	16
40	12.2	80	24.4	14
60	18.3	120	36.6	12
100	30.5	200	61.0	10

STEREOPHONIC OPERATION

Set the rear panel MODE switch to STEREO

Connect a cable from the left speaker common terminal to the amplifier LEFT OUTPUT COM terminal. Connect a cable from the left speaker hot terminal to the amplifier LEFT

OUTPUT (impedance tap desired) terminal. Two ohms, 4 ohms and 8 ohms are provided.

Connect the right speaker in an identical manner to the amplifier RIGHT OUTPUT terminals of the correct impedance for your speakers.

If the actual load impedance of a speaker is lower than the specified impedance, particularly at different parts of the frequency range, it will cause no problems. The high current output capacity of the MC150 will produce the extra current necessary to properly drive the speaker under these conditions.

If the impedance of the speaker is higher then the 8 ohm tap, no change in performance quality will occur. The available power output will simply be slightly less.

The COMMON and HOT terminals of both speakers must be connected in an identical manner to the proper amplifier output terminals. This is essential for keeping the speakers operating IN PHASE. This means that the speaker driver surfaces move back and forward the same in each speaker. Almost all speakers have their hot and common terminals color coded, with red as hot.

MONOPHONIC BRIDGED OPERATION

Set the rear panel MODE switch to MONO BRIDGED and use only a RIGHT/MONO balanced or unbalanced input.

The MC150 can be used as a single channel monophonic power amplifier in bridged configuration. The two amplifier channel outputs add together in series when used in MONO (BRIDGED). The MODE switch connects the right channel inputs to both power amplifiers, with the phase of the left channel inverted to get bridged operation. The speaker connections, both common and hot, should be connected only to the left and right amplifier output impedance taps as shown. The COMmon amplifier output connections are not used in MONO (BRIDGED) configuration. For example, the two 8 ohm outputs will add to become 16 ohms, or the two 4 ohm outputs will add to become 8 ohms.

To maintain the mono output of the amplifier in phase with the input signal in MONO (BRIDGED) operation, connect the Hot speaker terminal to the RIGHT channel impedance tap and the Common speaker terminal to the LEFT channel impedance tap.

SPEAKER IMPEDANCE IN OHMS AMPLIFIER OUTPUT CONNECTIONS	
4 to 8	LEFT 2 and RIGHT 2 (4 ohms total)
8 to 16	LEFT 4 and RIGHT 4 (8 ohms total)
16 and up	LEFT 8 and RIGHT 8 (16 ohms total)

MONOPHONIC PARALLEL OPERATION

Set the rear panel MODE switch to MONO (PARALLEL) and use only a RIGHT/MONO balanced or unbalanced input.

The MC150 also can be used as a single channel monophonic power amplifier in parallel configuration. The amplifier output taps are now connected in parallel and the impedances will be exactly half what is stated at the terminals.

Connect a cable from the speaker common terminal to the either the LEFT OUTPUT COM terminal or the RIGHT OUTPUT COM terminal. (These terminals are wired together inside the amplifier). Connect the cable from the hot speaker terminal to the impedance output desired on either channel. Also wire across to the other channel identical impedance tap. In each case, the chosen outputs of each channel must be wired together.

REAR PANEL

SPEAKER IMPEDANCE IN OHMS	AMPLIFIER OUTPUTS
1 to 2	LEFT COM + RIGHT COM and LEFT 2 + RIGHT 2, (1 ohm)
2 to 4	LEFT COM + RIGHT COM and LEFT 4 + RIGHT 4, (2 ohms)
4 and UP	LEFT COM + RIGHT COM and LEFT 8 + RIGHT 8, (4 ohms)

MAKE SURE THE REAR PANEL MODE SWITCH IS SET TO MONO (PARALLEL) AND USE ONLY A RIGHT INPUT. ALWAYS PLACE THE MODE SWITCH IN THE CORRECT POSITION FOR THE MODE OF OPERATION BEING USED.

The MC150 can be used to feed a constant voltage line, often used in background music applications. For a 25 volt line, use the 4 ohm outputs on the amplifier.

Because the crosstalk between channels on the MC150 is almost non existent, each channel can be used as a separate monophonic amplifier. An example would be one channel feeding background music to a given area, and the other channel used for paging in a different area.

LEFT LEVEL

Use the LEFT LEVEL control to adjust the output in the left channel to the desired listening level.

RIGHT LEVEL (MONO)

Use the RIGHT LEVEL control to adjust the output in the right channel to the desired listening level.

When the amplifier is connected for either bridged or parallel monophonic operation, the RIGHT LEVEL control is used to control the combined monophonic level of both channels.

The 2.5V (detent) settings are recommended for best operation with a McIntosh Control Center or Preamplifier.

POWER CONTROL, IN/OUT

The MC150 AC power can be turned on and off by a control signal fed to the POWER CONTROL IN connector from the POWER CONTROL OUT connector on compatible McIntosh products. The MC150 POWER CONTROL OUT jack will feed the same power control signal out, delayed 0.2 seconds, to turn on and off another accessory component with a compatible Power Control input.

The MC150 POWER switch must be in the OFF/REMOTE setting for the power control signals to turn the MC150 On and Off.

The POWER CONTROL connectors are standard 1/8 inch mini phone plugs. Only the tip (+) and sleeve (-) are used for connecting the plug to a single conductor shielded cable.

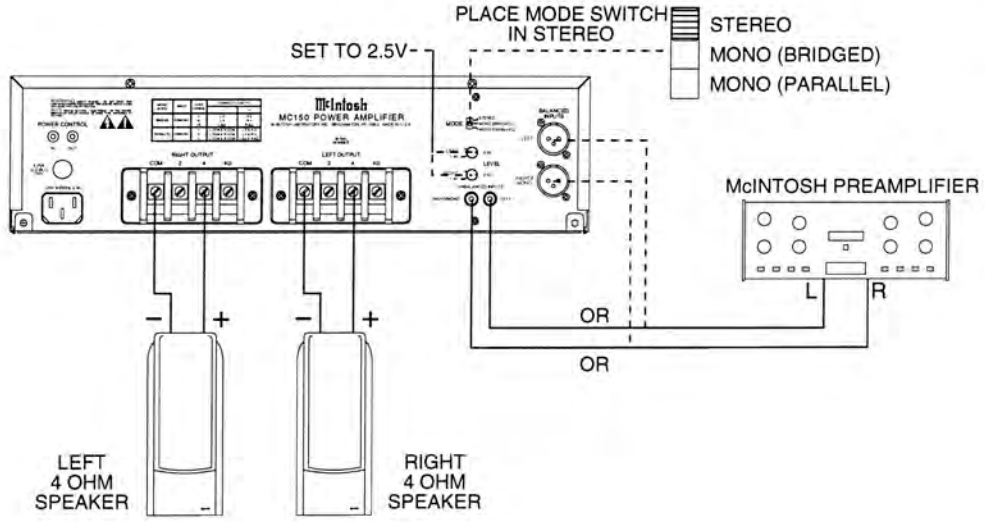
HOW TO CONNECT AC POWER

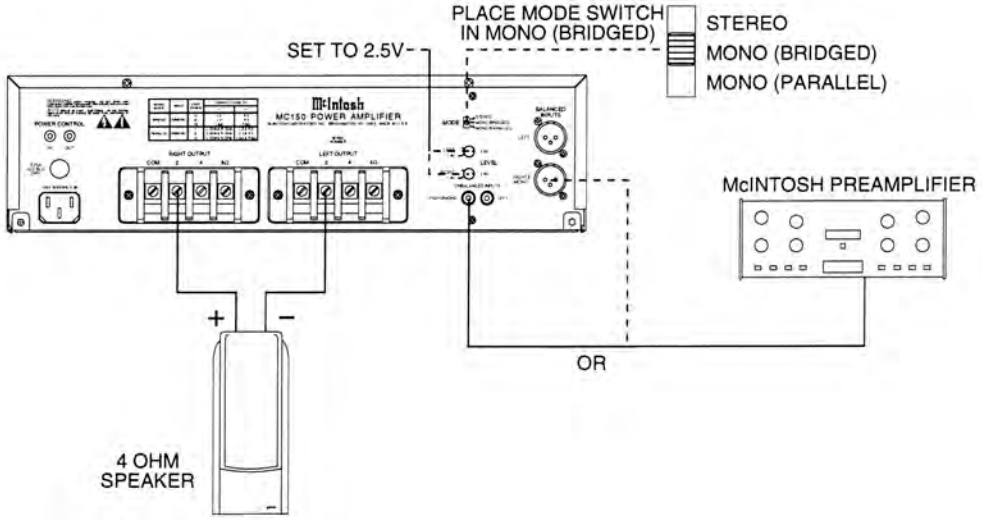
The MC150 is designed to operate on 120 volts 50/60 Hz. Plug the AC power cord either directly into a wall outlet or in the amplifier AC receptacle on the back of a preamplifier. Make certain that the AC power outlet used has at least 7 amperes capacity available.

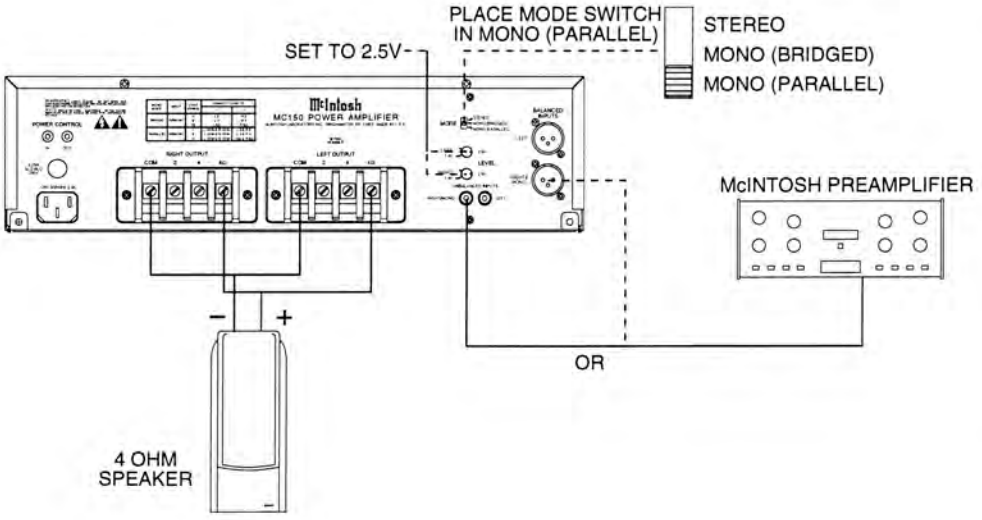
The MC150 can draw up to 6.25 amperes of current from the AC power line when both channels are producing rated power output. The amplifier uses only 0.5 amperes of current when idling at no output.

FUSE

A 6.25 ampere fuse protects the MC150 circuits.


PLACE MODE SWITCH
IN STEREO
STEREO
MONO (BRIDGED)
MONO (PARALLEL)
SET TO 2.5V
McINTOSH PREAMPLIFIER
L
R
OR
OR
LEFT
4 OHM
SPEAKER
RIGHT
4 OHM
SPEAKER


PLACE MODE SWITCH
IN MONO (BRIDGED)
STEREO
MONO (BRIDGED)
MONO (PARALLEL)
SET TO 2.5V
McINTOSH PREAMPLIFIER
OR
4 OHM
SPEAKER


PLACE MODE SWITCH
IN MONO (PARALLEL)
STEREO
MONO (BRIDGED)
MONO (PARALLEL)
SET TO 2.5V
McINTOSH PREAMPLIFIER
OR
4 OHM
SPEAKER

TECHNICAL DESCRIPTION

The MC150 is a stereo power amplifier designed to operate with loudspeakers having a nominal impedance of 2, 4 or 8 ohms.

It features a new circuit design that holds harmonic distortion far below the amplifier's remarkably low noise floor. Only by using special spectrum analysis measuring techniques is the distortion measurable at all.

DESIGN PHILOSOPHY

The secret to this performance will sound very simple, but it is more difficult to carry out than it may seem. The principle used in the design of the MC150 was to arrange every stage of voltage or current amplifications to be as linear as possible.

This linear operation is accomplished by using several different techniques.

1. Each transistor is selected to have nearly constant current gain (Beta) over the entire range of currents at which the transistor must operate.
2. The load impedance presented to each amplification stage is made to be as uniform as possible for all signal levels.
3. The input impedance of stages in increased and linearized where possible by using emitter degeneration.
4. Resistors and capacitors in the signal path ar carefully selected to have exceedingly low voltage coefficients (low change of resistance or reactance with applied voltage). Precision metal film resistors and low dielectric absorption film capacitors are used in all critical circuit locations.
5. Output transistors have matched uniform current gain, high current gain-bandwidth product, low output capacitance, and large active-region safe operating area. These characteristics and the automatic tracking bias system eliminates crossover distortion. The distortion graphs show clearly that distortion does not increase at low power output levels.

OVER 58 JOULES OF ENERGY STORAGE

Huge main filter capacitors are used to guarantee an excellent signal to noise ration and the energy storage necessary for the wide dynamic range that "Digital Audio" demands.

ILLUMINATED PEAK RESPONDING OUTPUT WATTMETERS

The MC150 includes REAL OUTPUT WATTMETERS. The power output in WATTS of any amplifier is determined by multiplying the output voltage (E) by the output current (I), EI=W. Output meters on other amplifiers are only voltmeters. Output current is not considered. Calibration is in watts and is based on the false premise that all speakers have a fixed impedance regardless of frequency. In fact, the impedance of many poor speaker designs varies by as much as 4 to 1. For a specific output voltage, the current varies inversely to the speaker impedance. So if the speaker impedance is lower, the output current and power are higher. Since McIntosh cannot control other manufacturers' speakers, we decided to provide extra output current to drive them. Therefore, the meter circuit in the MC150 electronically measures both voltage and current, multiplies them and displays the REAL OUTPUT POWER IN WATTS.

Another important feature of these output wattmeters is their ability to respond 95% full scale to a single cycle tone burst at 2kHz. After voltage and current are measured and multiplied, the product is fed to a special circuit that accelerates the meter pointer in the upward direction. When it reaches its peak, it pauses only long enough for the human eye to perceive its position, then returns to 0. Response is almost 10 times faster than a professional VU meter.

A front panel switch is provided to change the meters to the WATTS HOLD mode of operation, fast upward movement of the pointer, but greatly increased HOLD time at the peak of its travel. The highest power output of the source material is thus recorded.

OUTPUT AUTOFORMERS

The unequalled expertise of McIntosh in the design and manufacture of output autoformers is legendary in the Hi Fi industry. In the MC150, they provide proper matching for 2, 4 and 8 ohm loads. They protect your speakers from damage in the event of an output transistor failure, provide low distortion power transfer at frequencies well beyond human hearing and deliver peak output currents in excess of 53 amperes.

PROTECTION CIRCUITS

Some manufactures of power amplifiers advertised that their products do not require or use protection circuits and that such circuits compromise performance. McIntosh Laboratory agrees that diligent measures are required to allow unrestricted performance, but we also insist that protection circuits are desirable and necessary to prevent amplifier or loudspeaker damage due to abnormal circumstance and that they actually enhance performance. The MC150 incorporates seven protection circuits to enhance its performance, assure its reliability and to protect loudspeakers.

POWER GUARD

Power Guard, a unique feature of McIntosh amplifiers, assures that each channel of the MC150 will deliver full power free of clipping distortion. Clipping is caused when an amplifier is asked to produce more power output than its design is capable of delivering with low distortion. Amplifiers that are overdriven may deliver large quantities of power when they are clipping, but they may have more than 40% harmonic distortion. In this mode, the sound is grossly distorted and the extra energy content of the clipped signal will damage most loudspeakers. The McIntosh Power Guard circuit protects your ears and your speakers from this kind of damage.

The Power Guard circuit consists of a waveform comparator which monitors the wave shape of the amplifier input and output signals. Normally, there is no disparity between these signals and the comparator produces no output. When the amplifier is driven beyond its maximum power capacity, a difference will develop. If the disparity exceeds 0.3% (equivalent to 0.3% total harmonic distortion), the comparator output causes the amber Power Guard indicator to light. If there is a further increase in the disparity, the comparator output controls and electronic attenuator at the amplifier input to reduce the amplifier gain, thus holding the amplifier output to a low distortion value. Overdrive by 14dB is possible before the output distortion exceeds 2%.

SENTRY MONITOR

All power transistors have limits for the maximum amount of power they can handle. The MC150 output transistors and power supply have been designed to allow very high current flow into properly matched load impedances. If, however, a short circuit or very low value of load impedance is applied tot he output of the MC150, destructive current levels could be reached if it was not controlled by the Sentry Monitor circuit. This circuit senses the dynamic operating time, voltage, and current of the amplifier output sage and controls the current flow confining it to nondestructive limits. Sentry Monitor does not limit the power out-put available from the amplifier.

TECHNICAL DESCRIPTION

THERMAL CONTROL

All power transistors have limits for the maximum amount of heat they can tolerate. The MC150 uses a highly efficient amplifying circuit which produces relatively little heat for the output power produced. The amplifier has 4 oversize heatsinks to dissipate transistor generated heat. natural convection air flow is sufficient for cool operation. Should the cooling air be blocked or should the amplifier operating temperature become too high, thermal cut-outs within the amplifier will turn off the power to the amplifier. When the amplifier has cooled, it will automatically turn on again.

TURN-ON DELAY

The MC150 has a turn-on delay circuit that delays amplifier operation for about 2 seconds after power turn-on. This prevents pops or thumps generated in other equipment from causing annoying noises or damaging your loudspeakers.

DIRECT CURRENT FAILURE PROTECTION

The autotransformer protects speakers from damage in the event of amplifier failure. Should a direct current component appear in the output, it is shunted by the autotransformer and DC cannot damage the speaker.

POWER LINE INRUSH PROTECTION

Turn-on inrush current is cushioned by thermistors in the power transformer primary circuit. A soft start is achieved that eliminates component stress during turn-on.

CIRCUIT OPERATION

The audio input passes through the gain control to a preamplifier. The output amplifier is driven by the preamplifier.

The power output amplifier uses two stages of voltage amplifications followed by three stages of current amplifications. All stages are complementary balanced. Even number harmonics are cancelled by the balanced circuits. This means that the amplifying stages have less total harmonic distortion and less negative feedback is required to achieve ultra low distortion.

The signal is fed to one input of the balanced differential stage. Feedback from the amplifier output is applied to the other input. The differential amplifiers drive a balanced cascode connected voltage amplifier stage. Current mirrors are also used to improve band width and linearity.

The cascode voltage amplifier output feeds complementary Darlington connected driver transistors. These supply the signal to 6 complementary connected output transistors per channel. Ancillary components for Power Guard, Sentry Monitor, Power Output Meters and other protection circuits interconnect with the amplifier circuits. The power supply uses a massive power transformer, full wave bridge rectifiers. Large filter capacitors having 58 joules of energy storage. Four large heatsinks provide cooling for the 12 output power transistors.

The mechanical and electrical design of the MC150 is the result of the many years of engineering and manufacturing experience held by the staff at McIntosh This "Know How", the meticulous attention to design and production details, makes the MC150 one of the finest amplifiers ever produced by McIntosh Laboratory, Inc.

SPECIFICATIONS

POWER OUTPUT

STEREO

150 watts minimum sine wave continuous average power output, per channel, both channels operating into 2 ohms, 4 ohms or 8 ohms load impedance.

OUTPUT LOAD IMPEDANCE

2 ohms, 4 ohms and 8 ohms; separate terminals are provided for each output.

RATED POWER BAND

20Hz to 20,000Hz

TOTAL HARMONIC DISTORTION

0.005% maximum harmonic distortion at any power level from 250 milliwatts to 150 watts per channel from 20Hz to 20,000Hz, both channels operating.

INTERMODULATION DISTORTION

0.005% maximum harmonic if instantaneous peak power output is 300 watts or less per channel with both channels operating for any combination of frequencies, 20Hz to 20,000Hz.

FREQUENCY RESPONSE

(AT ONE WATT OUTPUT)

20Hz to 20,000Hz +0, -0.25dB.

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

NOISE AND HUM (A-weighted)

110dB below rated output.

IHF DYNAMIC HEADROOM

1.8dB

RATINGS

DAMPING FACTOR

Greater than 40.

INPUT IMPEDANCE

20,000 ohms.

INPUT SENSITIVITY

1.4 volt, level control provides for higher input voltages; 2.5 volt position at detent.

POWER GUARD

Clipping is prevented and THD does not exceed 2% with up to 14dB overdrive at 1kHz.

POWER REQUIREMENT

120 volts, 50/60Hz, 0.5 to 6.5 amperes

SEMICONDUCTOR COMPLEMENT

62 silicon diodes.

2 light emitting diodes.

72 Bipolar transistors

7 Integrated circuits.

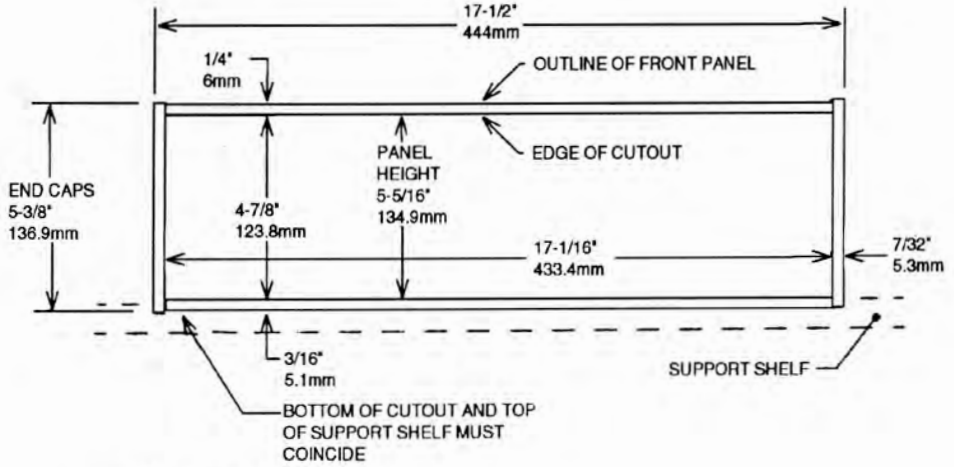
DIMENSIONS

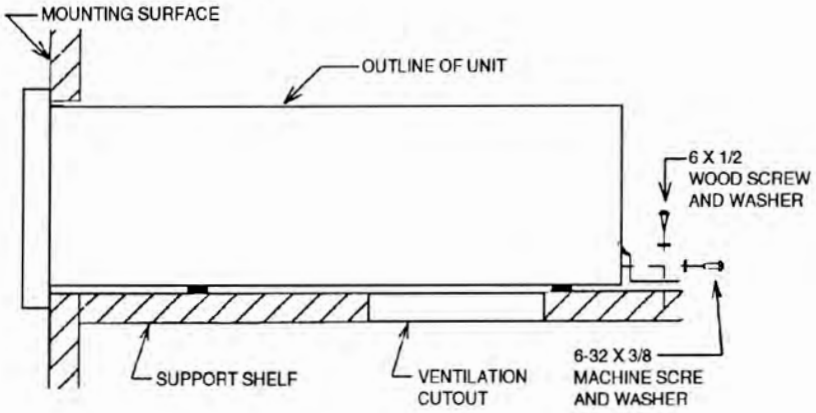
Front panel measures 17-1/2"" (44.5cm) wide, by 5-3/8" (13.7cm) high. Depth behind mounting panel including clearance for connectors, 19-3/4" (50.2cm). Knob clearance required in front of mountin panel, 1-1/8" (2.9cm).

WEIGHT

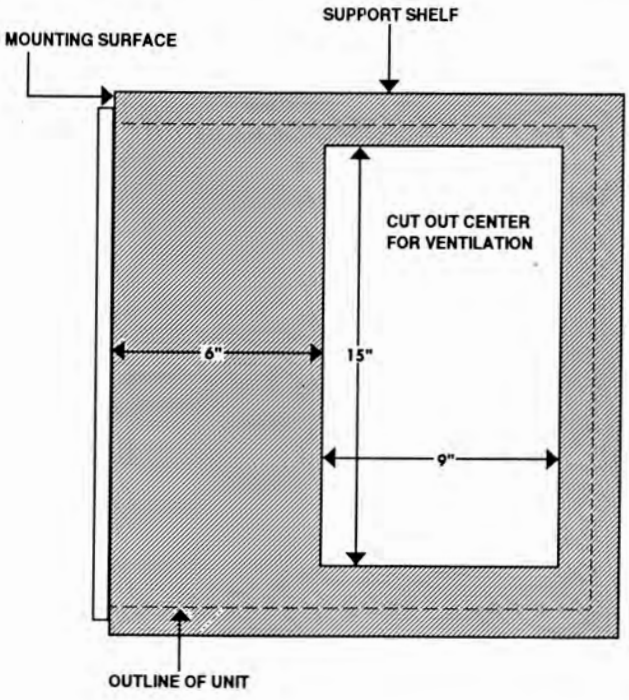
59 lbs. (26.8Kg) net, 75 lbs. (34Kg) in shipping carton.

CUSTOM INSTALLATION DIAGRAM





RECOMMENDED VENTILATION CUTOUT IN MOUNTING SHELF



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