

# McIntosh®

## MC 7150

### POWER AMPLIFIER

### OWNERS INFORMATION

# 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 owners 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 adaptors 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 PREVENIR LES CHOCS ELECTRIQUES 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 flas 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-SERVICABLE 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.

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

Serial Number

Purchase Date

Service Contract Number

Upon application, McIntosh Laboratory provides a Service Contract to the original purchaser. Your McIntosh Authorized Service Agency can expedite repairs when you provide the Service Contract with the instrument for repair.

Your MC 7150 Power Amplifier will give you many years of satisfactory performance. If you have any questions, please contact,

#### CUSTOMER SERVICE

McIntosh Laboratory Inc.  
2 Chambers Street  
Binghamton, New York 13903-9990  
Phone: 607-723-3512

**Take Advantage of 3 Years of  
Contract Service...  
Fill in the Application NOW.**

### McINTOSH THREE YEAR SERVICE CONTRACT

An application for A THREE YEAR SERVICE CONTRACT is included with this manual.

The terms of the contract are:

1. If the instrument covered by this contract becomes defective, McIntosh will provide all parts, materials, and labor needed to return the measured performance of the instrument to the original performance limits free of any charge. The service contract does not cover any shipping costs to and from the authorized service agency or the factory.
2. Any McIntosh authorized service agency will repair all McIntosh instruments at normal service rates. To receive the free service under the terms of the service contract, the service contract certificate must accompany the instrument when taken to the service agency.
3. Always have service done by a McIntosh authorized service agency. *If the instrument is*

*modified or damaged as a result of unauthorized repair the service contract will be cancelled.*

Damage by improper use or mishandling is not covered by the service contract.

4. The service contract is issued to you as the original purchaser. To protect you from misrepresentation this contract cannot be transferred to a second owner.
5. Units in operation outside the United States and Canada are not covered by the McIntosh Factory Service Contract, irrespective of the place of purchase. Nor are units acquired outside the USA and Canada, the purchasers of which should consult with their dealer to ascertain what, if any, service contract or warranty may be available locally.

# INSTALLATION

## LOCATION

The MC 7150 may be installed in a McIntosh cabinet or custom installed in furniture of your choice. Always provide adequate ventilation. The trouble-free life of an electronic instrument is greatly extended by providing sufficient ventilation to prevent the buildup of high internal temperatures that cause deterioration. Allow enough clearance so that cool air can enter at the bottom of the cabinet and be vented from the top. The recommended minimum space for installation is 15 5/8 inches (39.7 cm) deep, 17 inches (43.2 cm) wide, and 6 inches (20.32 cm) high. Never place it above heat generating components.

## CUSTOM INSTALLATION

The PANLOC system of installing equipment conveniently and securely, is a product of McIntosh research. The PANLOC buttons on the front panel will lock the unit firmly in place when turned approximately one-quarter turn clockwise. A one-quarter counterclockwise turn of the PANLOC buttons unlocks the chassis from its mounting.

To install the instrument in a McIntosh cabinet, follow the instructions that are enclosed with the cabinet. For any other type of installation follow these instructions:

### 1. Unpack from Carton

Open the carton and remove the PANLOC brackets, hardware package, and mounting template. Remove the instrument from its plastic bag and place it upside down on the shipping pallet. Unscrew the four plastic feet from the bottom of the chassis.

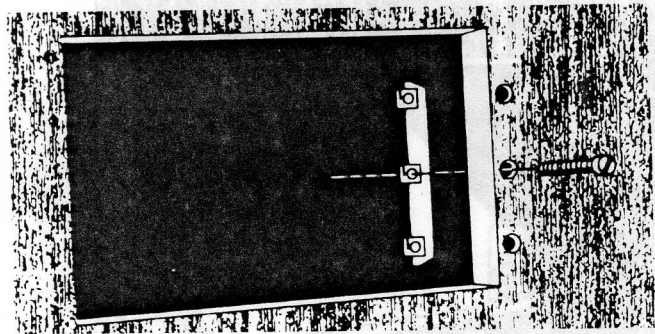
### 2. Mark the Cabinet Panel

Tape the mounting template in position on the cabinet panel where the instrument is to be

installed. The broken lines that represent the outline of the rectangular cutout also represent the outside dimensions of the chassis. Make sure these lines clear shelves, partitions, or any equipment. With the template in place, first mark the six A and B holes and the four small holes that locate the corners of the cutout. Then, join the four corner markings with pencil lines, using the edge of the template as a straightedge.

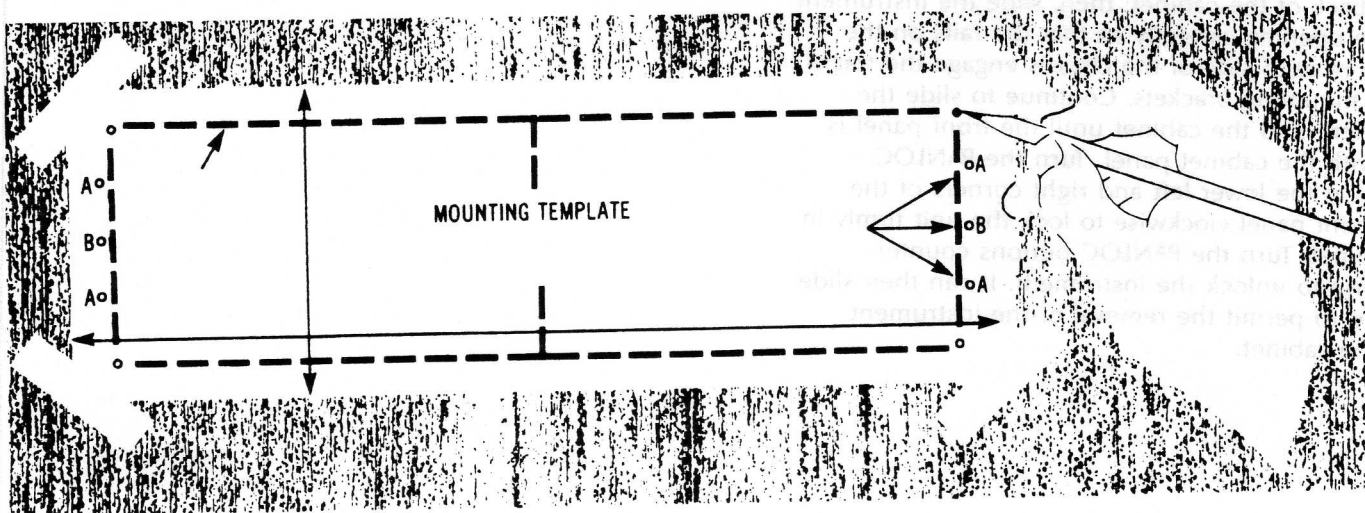
### 3. Drill Holes

Use a drill with a 3/16 inch (5 mm) bit held perpendicular to the panel and drill the six A and B holes. Then, using a drill bit slightly larger than the tip of your saw blade, drill one hole at each of two diagonally opposite corners. The holes should barely touch the inside edge of the penciled outline. Before taking the next step, make sure that the six A and B holes have been drilled.



### 4. Saw the Panel Cutout

Saw carefully on the inside of the penciled lines. First make the two long cuts and then the two short cuts. After the rectangular opening has been cut out, use a file to square the corners and smooth any irregularities in the cut edges.





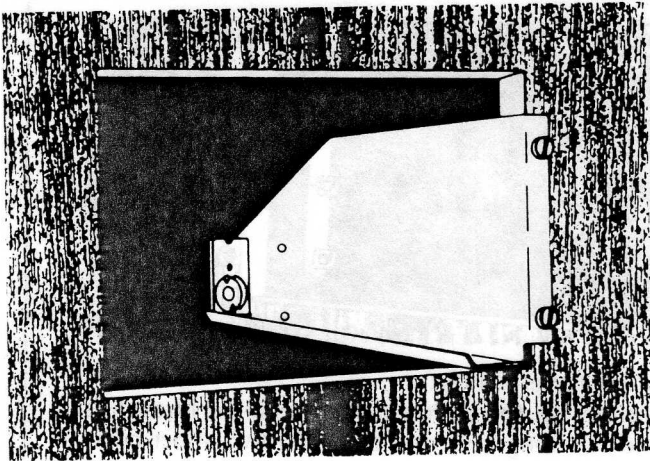
# INSTALLATION

## 5. Install the Mounting Strips

In the hardware package are two mounting strips, and two 6-32 x 1-1/4" (31.8mm) black screws that have a flat head. Use these screws, one on each end, to fasten the mounting strips. They are attached through the center hole, marked B on the template. Make sure the screw heads are drawn flush or slightly into the wood before attaching the PANLOC brackets.

## 6. Attach the PANLOC Brackets

Using two 6-32 x 1-1/4" (31.8mm) screws in the A holes on each side, attach the PANLOC brackets to the cabinet panel; the short flange is mounted against the front (face) of the cabinet panel. The screws pass through the PANLOC bracket flange, the cabinet panel, and then through the mounting strips previously mounted.



## 7. Install the Instrument

Guide the AC power cord through the panel opening to the back of the cabinet; then, slide the instrument into the opening carefully so that the rails on the bottom of each side of the chassis engage the tracks on the mounting brackets. Continue to slide the instrument into the cabinet until the front panel is flush with the cabinet panel. Turn the PANLOC buttons at the lower left and right corners of the instrument panel clockwise to lock the unit firmly in the cabinet. Turn the PANLOC buttons counter-clockwise to unlock the instrument. It can then slide outward to permit the removal of the instrument from the cabinet.

# HOW TO CONNECT

Use shielded cables to connect the signal from the preamplifier or signal source to the power amplifier. To minimize the possibility of hum, the shielded cables should be of parallel construction or loosely twisted together, located away from speaker connecting cables and AC power cords. Be certain to use good quality shielded cables for all interconnections. Your dealer can advise you on the kind and length of cable that will best suit your installation.

Plug the left output of the preamplifier into the Left input jack of the power amplifier. Plug the Right output of the preamplifier into the Right input jack of the power amplifier.

The appropriate length and size of loudspeaker cable for your installation will help to preserve the quality of sound for which the loudspeakers have been designed. If undersize wire is used, resistance reduces the damping factor, modifies the frequency response and reduces the power output. Your dealer's advice will serve you best for your installation. The cables to and from the speaker should be of parallel construction or be loosely twisted together. The chart shows the recommended minimum wire size for the length of wire between the amplifier and the loudspeakers.

## SPEAKER CABLE LENGTHS AMPLIFIER TO SPEAKERS

| For 4 Ohm Load |        | For 8 Ohm Load |        | Wire<br>Gauge |
|----------------|--------|----------------|--------|---------------|
| Feet           | Meters | Feet           | Meters |               |
| 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            | 60.0   | 10            |

These speaker cable lengths represent a wire resistance equal to 5% of the speaker impedance.

## CONNECTING LOUDSPEAKERS

Connect a speaker cable from the common terminal of the left speaker to the amplifier LEFT OUTPUT terminal strip COMMON screw. Connect another speaker cable from the other loudspeaker terminal to the correct speaker impedance terminal on the LEFT OUTPUT terminal strip. The right channel speaker is connected in the same manner to the RIGHT OUTPUT terminal strip.

When multiple speakers are to be connected to either or both outputs, the combined impedance must be calculated. The combined impedance must be connected to the appropriate impedance tap. Use this table to aid in selecting the correct impedance

## Combined impedance

in ohms:

1.6 to 3.2

3.2 to 64

64 and up

Connect for:

2 ohm output

4 ohm output

8 ohm output

If the load impedance used is lower than the output impedance tap, reduced power and possible distortion will result. If the load impedance used is higher than the output impedance tap, neither the quality of sound nor the amplifier will be harmed, only the available power is reduced. For multiple speaker operation, run separate speaker cables from the amplifier to each speaker.

The MC 7150 will feed a constant voltage line as is often used in background music applications, paging systems and the like. For constant voltage of 25 volts connect output leads to the 4 ohm connectors on each channel.

Because the crosstalk between channels is almost non existent, each channel can be used as a separate amplifier. (Example: use one channel for mono background program in one area and the other channel for paging in a separate area.)

## AC POWER

The amplifier AC power cord is plugged into a 120 volt 50/60Hz wall outlet, or into an outlet on the preamplifier.

## FUSE

A 7-amp slow blow fuse protects the MC 7150 circuits. The fuse does not protect additional equipment connected to the rear panel AC power outlet.

# FRONT PANEL CONTROLS

## METERS

Output power monitor meters calibrated in both watts and decibels, indicate the output power of each channel. The upper scale on the meter has been calibrated to show average watts and the lower scale, decibels.

The meters respond to the peak output of each channel. Ordinary meters lack the capability of indicating the short interval information in a sound wave. The mass of the meter movement is too great to respond to the nearly instantaneous changes in music program material. Short interval information can have a duration as short as half a thousandth of a second. Ordinarily, a meter pointer moving over its scale in such a short time could not be seen.

McIntosh has developed circuits that drive the meters to respond to the short interval information in a sound wave to an accuracy of 95%. The electrical pulse that drives the meter pointer is time stretched so that the peak position of the pointer can register in the persistence of vision characteristic of the retina of the human eye. The pointer can be locked at the peak indication by switching to the HOLD position of the METER range switch.

## LEFT GAIN

Use the LEFT GAIN control to adjust the output in the left channel to the desired listening level. Turn the control clockwise to increase the output. For the best signal to noise ratio when using McIntosh source equipment, turn the LEFT GAIN control to the detent position at approximately 12 o'clock.

## RIGHT GAIN

Use the RIGHT GAIN control to adjust the output in the right channel to the desired listening level. Turn the control clockwise to increase the output. For the best signal to noise ratio when using McIntosh source equipment, turn the RIGHT GAIN control to the detent position at approximately 12 o'clock.

## METER RANGE

The METER RANGE switch has two positions: WATTS and HOLD.

## HOLD

In the HOLD position, the meter needle locks to the highest power peak in a sequence of peaks. The meter is driven to maximum power, electronically held there until a higher peak passes through the amplifier, which moves the meter needle to a new indication. If no further peaks are reached, the meter needle will very slowly return to its rest position (decay rate: 6 dB per minute).

## POWER

The power switch turns the MC 7150 ON or OFF. The switch does not control the power outlet on the back panel. If you wish to control the AC power from a preamplifier control center, leave the switch in the ON position. Be sure the AC cord of the MC 7150 is plugged into the switched outlets on the rear of the preamplifier control center.

OFF: In the OFF position, the AC power to the amplifier is turned off.

## THE MCINTOSH (EXCLUSIVE) POWER GUARD DIGITAL DYNAMICS PROTECTION CIRCUIT

Improved recordings and recording techniques have imposed higher power demands on today's amplifiers. Poorly designed amplifiers can present music listeners with a form of harsh unpleasant distortion due to amplifier overload (hard clipping). Clipping, which looks and acts like non musical square waves, is caused when the amplifier is asked to produce more power output with low distortion than it is capable of or designed to deliver. Amplifiers, when driven to clipping, can deliver up to 40% harmonic and intermodulation distortion that decreases the pleasure and enjoyment you get from listening. This form of distortion (clipped signal) also produces extra heat energy which will damage most speakers. McIntosh leadership in engineering has developed the Power Guard circuit which—(1) dynamically prevents power amplifiers from being overdriven into hard clipping—(2) assures that the amplifier will produce its maximum output without increased distortion—(3) protects your speaker from excessive heating. Power Guard is a patented McIntosh design (U.S. patent #4048573).

The MC 7150 has a circuit that compares the wave shape of the output signal to the input signal. If the disparity between the two signals, due to overdrive, exceeds an average of 0.3% (equivalent to 0.3% total harmonic distortion) an amber POWER GUARD indicator illuminates. With any further increase in distortion the POWER GUARD circuit operates to limit the amplifier input dynamically so that the amplifier cannot be overdriven. POWER GUARD eliminates amplifier output clipping. POWER GUARD only operates when the amplifier is asked to deliver more power than that for which it was designed. While the power output remains within these limits, the POWER GUARD indicators do not illuminate.



# PERFORMANCE LIMITS

## PERFORMANCE GUARANTEE

Performance Limits are the maximum deviation from perfection permitted for a McIntosh instrument. We promise you that when you purchase a new MC 7150 from a McIntosh franchised dealer, it will be capable of or can be made capable of performance at or exceeding these limits or you can return the unit and get your money back. McIntosh is the only manufacturer that makes this statement.

## POWER OUTPUT

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

20 Hz to 20,000 Hz.

## TOTAL HARMONIC DISTORTION

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

## INTERMODULATION DISTORTION

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

## FREQUENCY RESPONSE (AT ONE WATT OUTPUT)

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

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

## NOISE AND HUM (A-weighted)

110 dB below rated output.

## 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 20 dB overdrive at 1 kHz.

## GENERAL INFORMATION

### POWER REQUIREMENTS

120 volts 50/60 Hz; .5 to 7 amps.

## SEMICONDUCTOR COMPLEMENT

62 silicon diodes.

2 light emitting diodes.

72 Bipolar transistors.

7 integrated circuits.

## MECHANICAL INFORMATION

### SIZE

16-1/8 inches wide (41 cm) by 5-5/16 inches high (13.5 cm) by 15-1/4 inches deep (38.7 cm), including connectors. Knob clearance required is 1 1/4 inches (3.2 cm) in front of mounting panel.

### FINISH

The front panel is a combination of glass and black anodized aluminum. The chassis is black.

### WEIGHT

58 pounds (26.3 kg) net, 72.5 pounds (32.9 kg) in shipping carton.

# TECHNICAL DESCRIPTION

The MC 7150 is designed to operate with loudspeakers that have a nominal impedance of 2, 4 or 8 ohms.

The circuit design holds harmonic distortion far below the amplifiers remarkably low noise floor. Only by using special spectrum analysis measuring techniques is the distortion measurable.

## DESIGN PHILOSOPHY

The principle used in the design of the MC 7150 arranges every stage of voltage or current amplification to be as linear as possible.

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 is increased and made linear by using emitter degeneration.
4. Resistors and capacitors in the signal path are 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. In this design, distortion does not increase at low power output levels.

Huge main filter capacitors are used to guarantee an excellent signal-to-noise ratio and the energy storage (over 58 Joules) necessary for the wide dynamic range that digital audio demands.

## ILLUMINATED, PEAK RESPONDING OUTPUT WATTMETERS

The MC 7150 has 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 voltmeters and output current is not considered. Calibration in watts is based on the premise that all speakers have a fixed impedance regardless of frequency. In fact, the impedance of many 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. The extra output current in the MC 7150 will drive these

mismatched low impedances and yet indicate the real output power required to drive them. The MC 7150 meter circuit 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 2 kHz. 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 meter indication to the watts hold mode of operation. Fast upward movement of the pointer continues but has greatly increased hold time at the peak of its travel. The highest power output of the source material is thus recorded and retained until higher peaks are reached.

## OUTPUT AUTOFORMERS

The expertise of McIntosh in the design and manufacture of output transformers is legendary in the industry. McIntosh output transformers in the MC 7150 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 manufacturers 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 MC 7150 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 MC 7150 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

# TECHNICAL DESCRIPTION

power when they are clipping but they 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 an electronic attenuator at the amplifier input to reduce the amplifier gain, thus holding the amplifier output to a low distortion value. Overdrive by 14 dB 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 MC 7150 output transistors and power supply have been designed to allow very high current flow into matched load impedances. If a short circuit or very low value of load impedance is applied to the output of the MC 7150, 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 stage and controls the current flow confining it to nondestructive limits. Sentry Monitor does not limit the power output available from the amplifier.

## THERMAL CONTROL

All power transistors have limits for the maximum amount of heat they can tolerate. The MC 7150 uses a highly efficient amplifying circuit which produces relatively little heat for the output power produced. The amplifier has 4 oversized 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 cutouts 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 MC 7150 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 amplification followed by three stages of current amplification. 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 bandwidth 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 MC 7150 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 MC 7150 one of the finest amplifiers ever produced by McIntosh Laboratory.