



MC 7150

DIGITAL DYNAMIC STEREO
POWER AMPLIFIER

McIntosh[®]
OWNERS MANUAL

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 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-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.

Contents

INTRODUCTION	4
INSTALLATION	5, 6
HOW TO CONNECT	7, 8, 9
FRONT PANEL	10
PERFORMANCE LIMITS	11
PERFORMANCE CHARTS	12
TECHNICAL DESCRIPTION	13, 14, 15
BLOCK DIAGRAM	16

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 13903-2699
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.

The electrical and mechanical design of the MC 7150 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 MC 7150 one of the finest amplifiers ever produced by McIntosh Laboratory.

The use of 6 complementary 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 MC 7150 to deliver as much as 50 amperes peak current into these lower impedance loads.

The MC 7150 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 MC 7150 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 MC 7150 are peak responding, and indicate the TRUE power output of the amplifier. The MC 7150 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 MC 7150 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.

4 INTRODUCTION

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. This prevents the buildup of high internal temperatures that cause deterioration of circuit components. Allow enough clearance so cool air can enter at the bottom of the cabinet and be vented from the top. Allow at least 1 1/2 inches (3.8 cm) above the amplifier so the airflow is not obstructed.

The recommended minimum space for installation is 17 inches (43.2 cm) wide, 15 5/8 inches (39.7 cm) deep, (including connectors), and 6 inches (15.24 cm) high. Allow 1 inch (2.54 cm) in front of panel for knob clearance.

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,

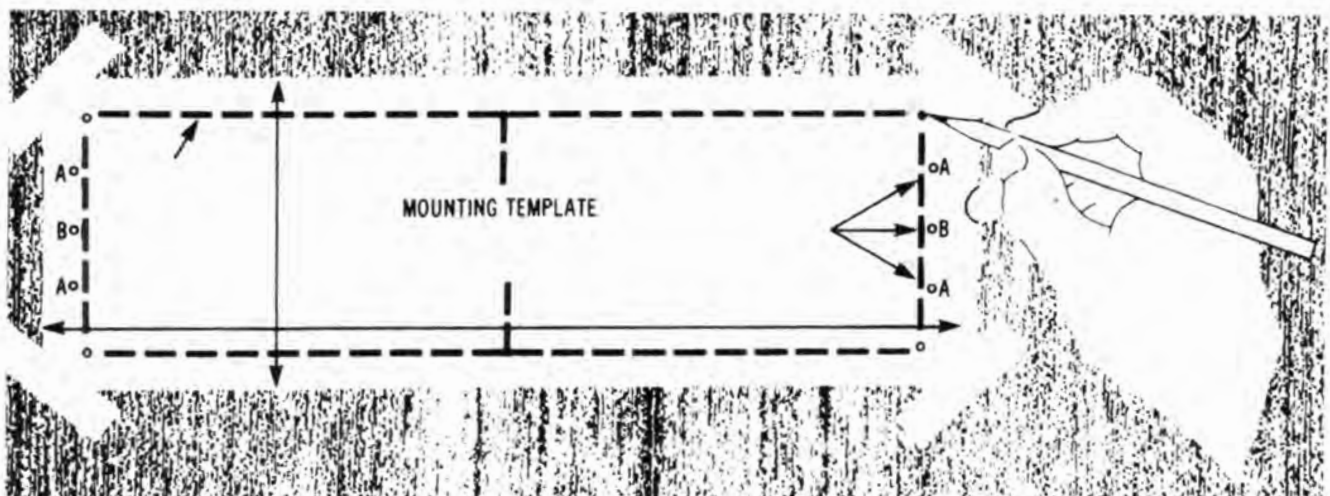
hardware package, and mounting template. Lift the instrument and its shipping pallet from the inner carton and place it upside down on a flat surface. Remove the mounting screws and washers that hold the unit to the pallet, and lift off the pallet. Be sure to save all the shipping materials in case the unit may have to be shipped in the future. Unscrew the four plastic feet from the bottom of the chassis.

2. Mark the Cabinet Panel

Tap 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 straight-edge.

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.

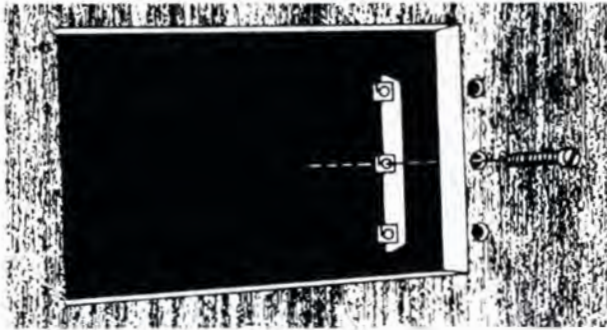


4. Saw the Panel Cutout

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.

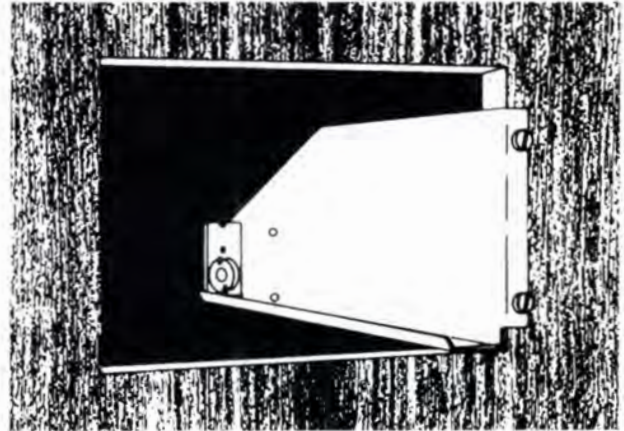
5. Install the Mounting Strips

In the hardware package are two mounting strips, and two 4-40 x 1-1/4" (31.8 mm) 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" (31.8 mm) 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.

6 INSTALLATION

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

Use shielded single conductor cable with RCA type plugs. Connect the cable from the left channel output of a preamplifier to the LEFT INPUT on the power amplifier. Connect the right channel output to the RIGHT INPUT.

THE MC 7150 HAS BEEN DESIGNED FOR STEREO-PHONIC OPERATION ONLY. DO NOT ATTEMPT TO CONNECT THE OUTPUTS TOGETHER FOR MONO.

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 MC 7150 incorporates McIntosh designed and manufactured Autotransformers to insure peak performance and protection, as well as outstanding compatibility between amplifier and speakers.

The MC 7150 Output Autotransformers 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
1.6 to 3.2	Common and 2 ohm outputs
3.2 to 6.4	Common and 4 ohm outputs
6.4 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	60.1	10

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 MC 7150 will produce the extra current necessary to properly drive the speaker under these conditions.

If the impedance of the speaker is higher than 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.

The MC 7150 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 MC 7150 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.

HOW TO CONNECT AC POWER

The MC 7150 is designed to operate on 120 volts 50/60Hz. 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 8 amperes capacity available.

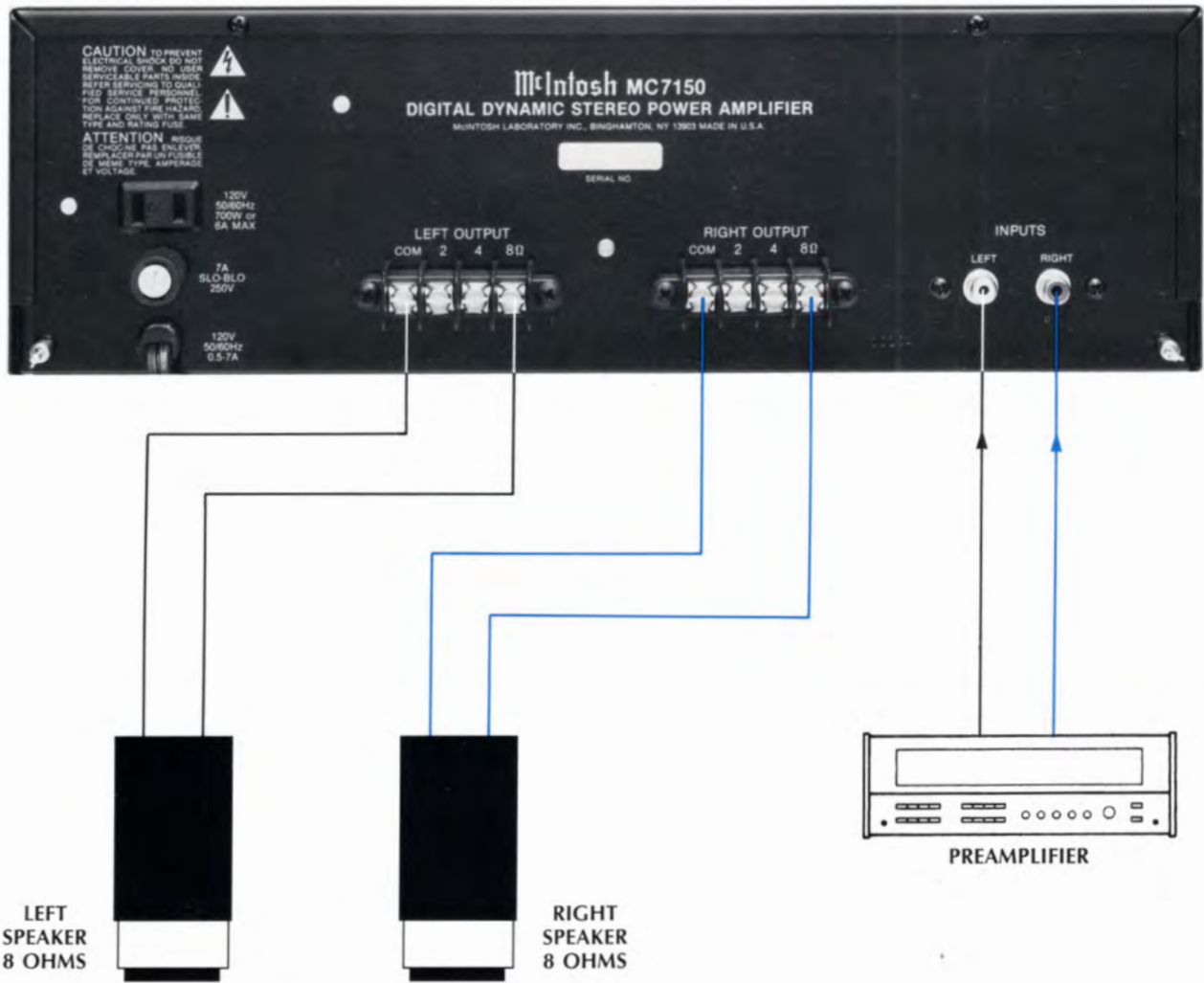
The MC 7150 can draw up to 7 amperes of current from the AC power line when both channels are producing rated power output. The amplifier uses only 0.5 amperes of current when idling at no output.

The AC auxiliary outlet on the amplifier rear panel will provide up to 700 watts (6 amperes), and is not fused or switched.

FUSE

A 7 ampere fuse protects the MC 7150 circuits. The fuse does not protect additional equipment connected to the rear panel, auxiliary AC outlet.

8 HOW TO CONNECT



CONNECTING DIAGRAM 9

POWER OUTPUT METERS

The MC 7150 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)
60	
30	
15	(Indicated)
6	
3	
1.5	(Indicated)
0.6	
0.3	
0.15	(Indicated)
60	MILLIWATTS
30	
15	(Indicated)
6	
3	
1.5	(Indicated)
0.6	
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 6dB per minute.

LEFT GAIN

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

RIGHT GAIN

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

FOR THE BEST SIGNAL TO NOISE RATIO WHEN USING McINTOSH PREAMPLIFIERS, TURN BOTH GAIN CONTROLS TO THE CENTER DETENT POSITION.

When the GAIN controls are in the DETENT position, the amplifier input sensitivity for the rated 150 watts output is 2.5 volts. Turning the GAIN controls fully on will give a greater amplifier sensitivity of 1.4 volts which may be required in other applications.

AC POWER

The POWER switch turns the MC 7150 ON or OFF. The switch does not control the auxiliary AC outlet on the rear panel. If you wish to control the MC 7150 AC power from another source such as a preamplifier or switching relay, leave the switch in the ON position.

10 FRONT PANEL CONTROLS

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.

PERFORMANCE

McIntosh audio power ratings are in accordance with the Federal Trade Commission Regulation of November 4, 1974 concerning power output claims for amplifiers used in home entertainment products.

STEREO 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.

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 20 dB overdrive at 1 kHz.

GENERAL INFORMATION

POWER REQUIREMENT

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

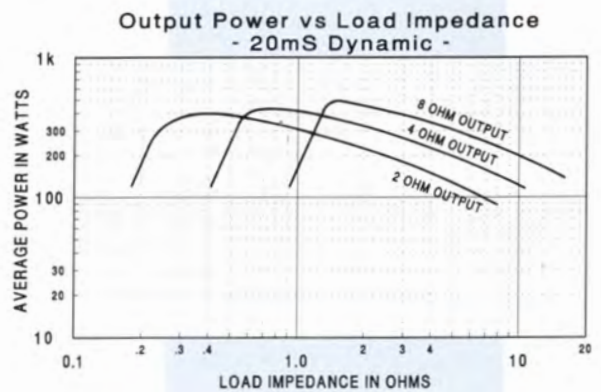
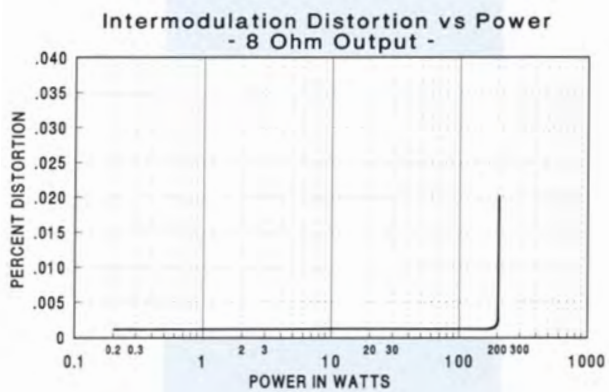
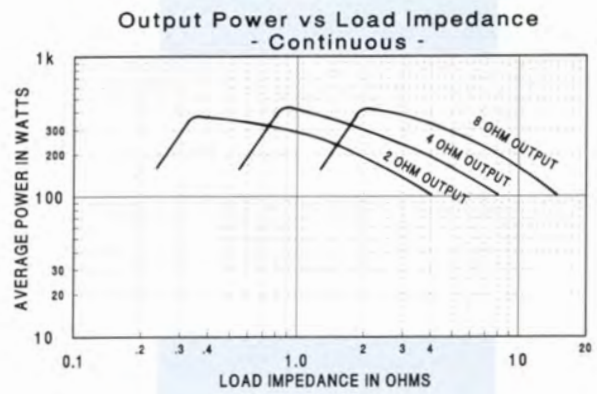
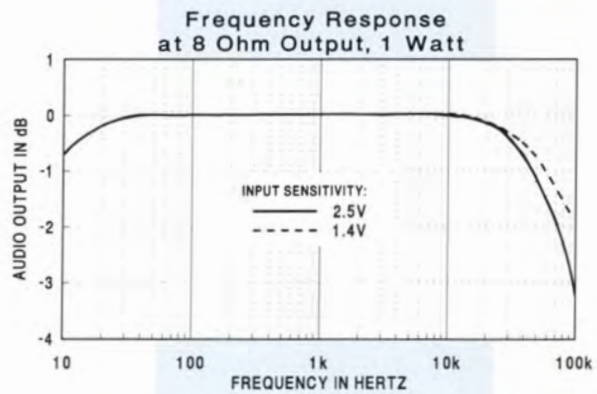
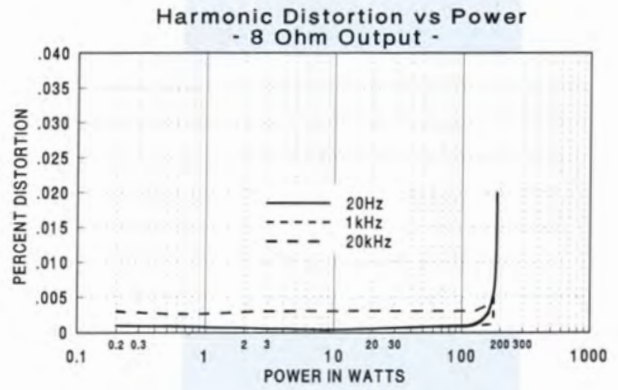
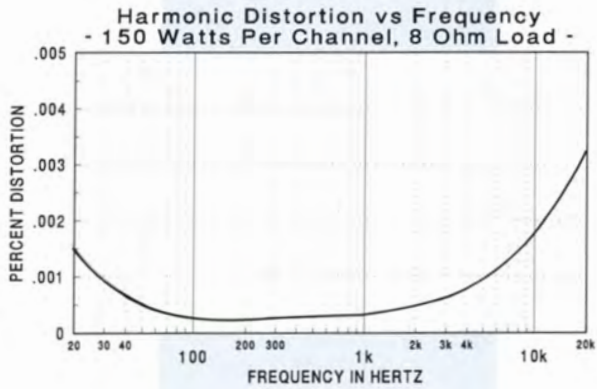
Front panel measures 16-1/8 inches wide (41 cm) by 5-5/16 inches high (13.5 cm) by 15-1/4 inches deep (38.7 cm), including connectors. Knob clearance required is 1 1/4 inches (3.2 cm) in front of mounting panel.

FINISH

The front panel is anodized gold and black with special gold/teal nomenclature illumination. Chassis and chassis cover are black.

WEIGHT

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



12 PERFORMANCE CHARTS

The MC 7150 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 amplifiers 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 MC 7150 was to arrange every stage of voltage or current amplification 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 is increased and linearized where possible 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. 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 ratio and the energy storage necessary for the wide dynamic range that "Digital Audio" demands.

ILLUMINATED, PEAK RESPONDING OUTPUT WATTMETERS

The MC 7150 is the first high fidelity power amplifier to have 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's 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 these mismatched low impedances and to indicate the REAL output power required to drive them. Therefore, the meter circuit in the MC 7150 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 transformers is legendary in the HiFi industry. In the MC 7150, 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 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 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 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 MC 7150 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 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.

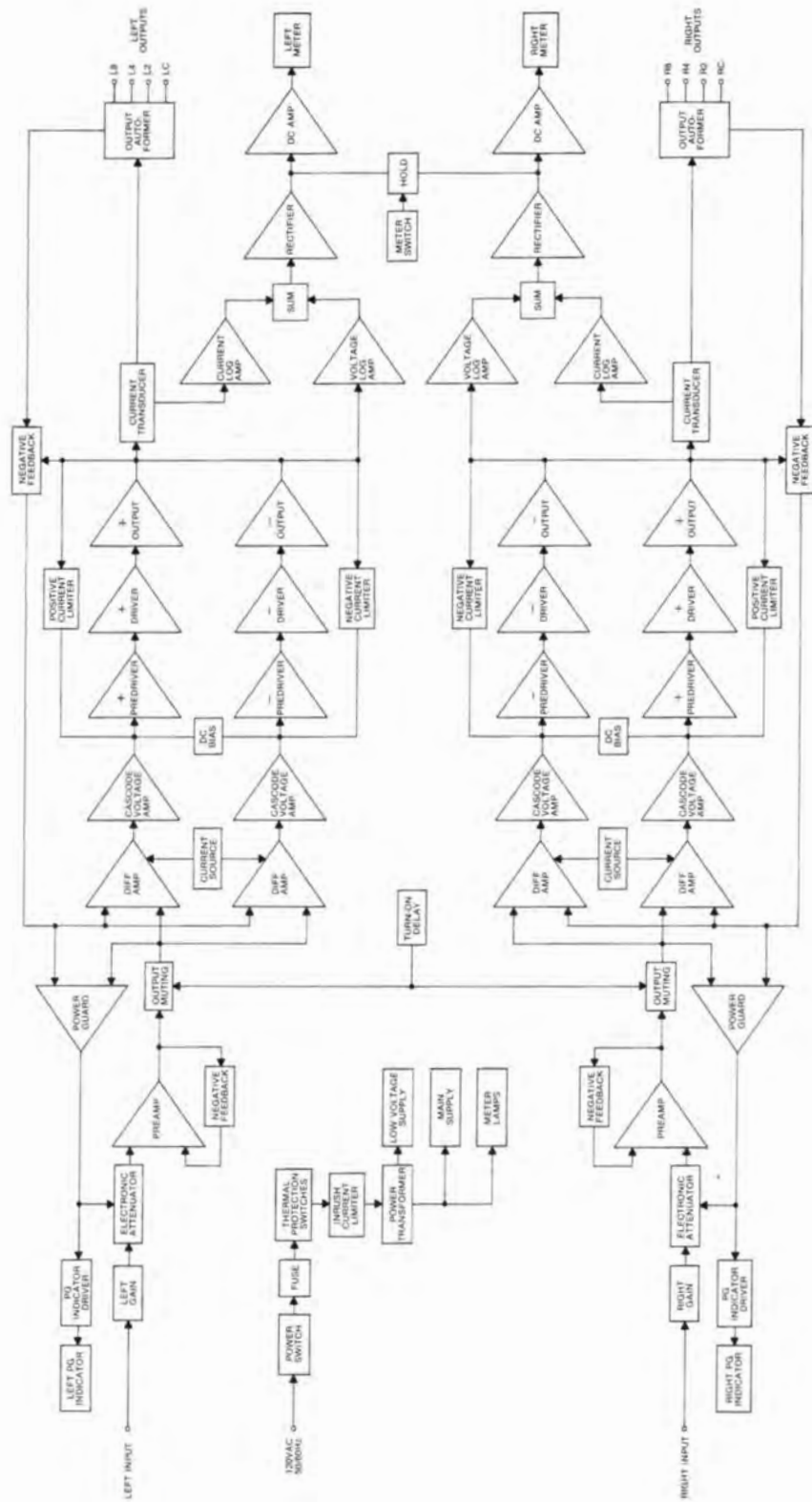
14 TECHNICAL DESCRIPTION

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.

MC7150 DIGITAL DYNAMIC STEREO POWER AMPLIFIER



16 BLOCK DIAGRAM



McIntosh[®]

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