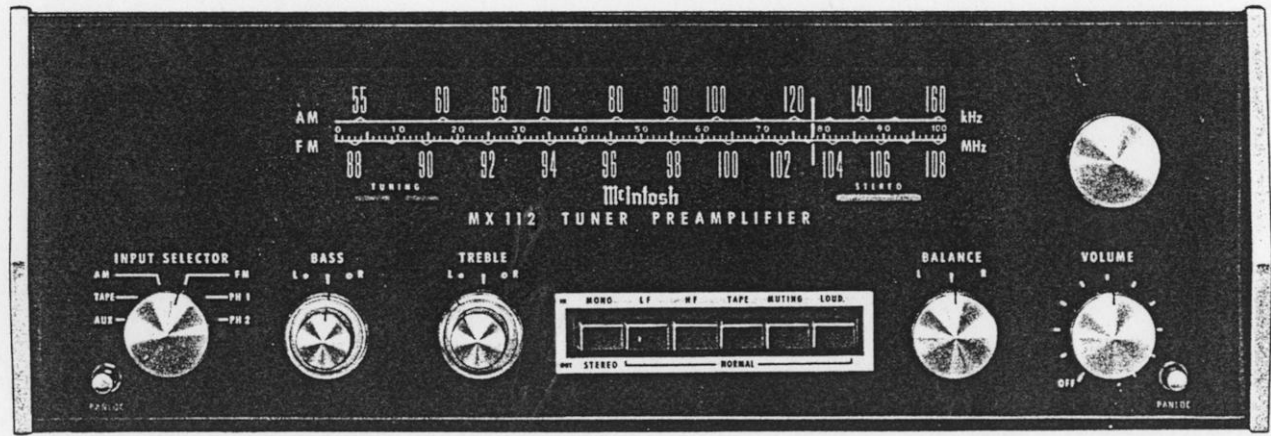


McIntosh MX 112

McIntosh

Owner's Manual



PREAMPLIFIER
FM-AM TUNER

MX 112

STEREO

One Moment, Please

Your purchase of a McIntosh instrument shows that you are a careful discriminating buyer. One who is interested in quality performance, quality engineering, quality manufacturing, and long trouble free equipment life. You can protect your investment by spending a few minutes reading this owner's manual.

When you bought a McIntosh, you bought countless hours of musical pleasure and superior performance. Enjoy it!

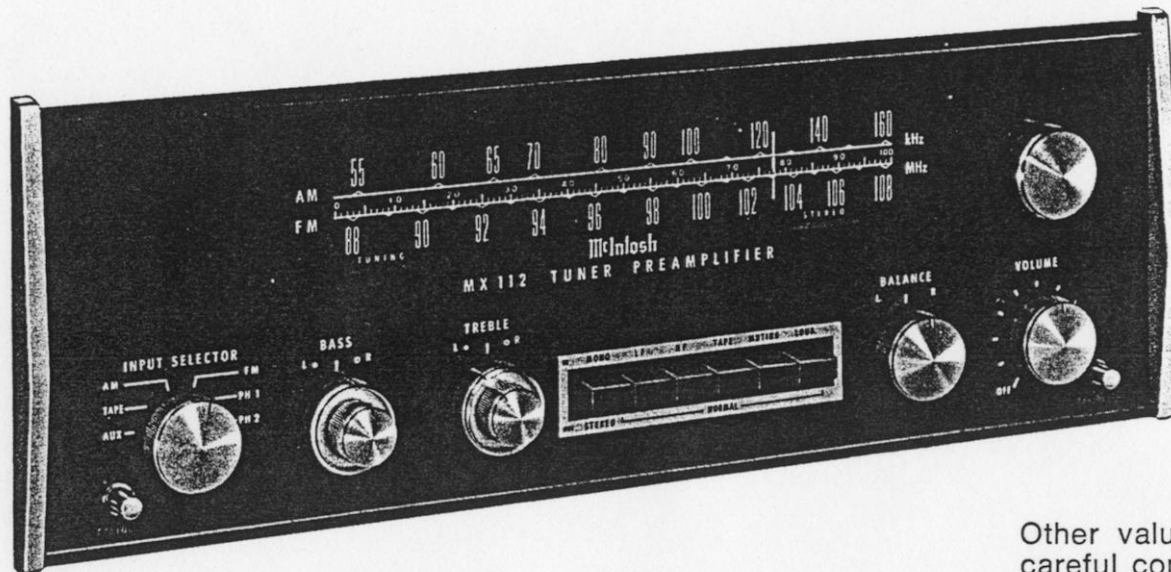
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**PREAMPLIFIER
FM-AM TUNER**

MX 112

STEREO



GENERAL DESCRIPTION

Thank you for your selection of a McIntosh. You have selected the very best.

The MX 112 combines in one unit an extremely low-distortion preamplifier with a highly sensitive FM multiplex tuner and an AM tuner for added and complete listening pleasure. The INPUT SELECTOR gives you a choice of six different program sources.

The McIntosh MX 112 is a beautifully engineered tuner/control center for the finest stereo sound systems.

The MX 112 is completely solid state, with the exception of the tuning indicator. The solid state devices used in the MX 112 are considered "very new" in the state of the art of solid state physics.

The extreme care in manufacturing, in layout design and in quality control promises the usual McIntosh extra values of reliability, performance, and long life.

Other values added to this tuner are: careful control of circuit constants during testing, very high sensitivity, and excellent spurious response rejection.

Every desirable feature of a tuner and preamplifier is included in this design. FM interstation noise suppression (muting), tuning indicator, FM multiplex indicator, individual channel bass and treble controls, and electronic phase switch have all been engineered into the MX 112.

The McIntosh designed PANLOC system is the first professional installation technique to be used on stereo instruments. The PANLOC system gives you absolute ease of installation, operation and maintenance.

By releasing the PANLOC buttons on the front panel, you can slide the MX 112 out of its mounting until the second latch engages. The top mounted controls for interstation noise suppression (muting), phase switching and front panel lighting are now available.

MX 112

TECHNICAL DESCRIPTION

FM SECTION:

The FM consists of two separate modular sections:

A THE RF SECTION:

This section houses the complete FM front-end and part of the AM-RF circuit.

The FM circuit employs three junction field effect transistors, two of which form the very high frequency amplifier in a series-fed "cascode" type circuit, giving maximum gain at minimum thermal noise.

This VHF amplifier is preceded by a double-tuned circuit and is followed by a mixer circuit employing the third junction field effect transistor and a single-tuned circuit.

The FM local oscillator is designed for minimum response to temperature variations, making automatic frequency control unnecessary. The drift rate is less than 10 parts per megahertz per degree centigrade.

The RF circuits of the MX 112 are completely shielded and exceed the FCC requirements for suppression of oscillator radiation.

Either a 300 ohm or 75 ohm antenna may be used with the MX 112.

A VHF television antenna which is suitable for FM reception can be connected to the MX 112. For maximum performance we recommend a good FM yagi or log-periodic antenna with rotator.

B THE FM-IF AND DETECTOR SECTION:

This section employs two integrated circuit devices, each capable of amplifying the intermediate frequency signal from the mixer by a thousand times (60 db). Lumped selectivity in the form of two sets of quadruple-tuned bandpass filters insure good intermediate frequency skirt selectivity.

The tuned circuits that make up the bandpass filters are designed for electrical stability and for electrical and mechanical resistance to shock and vibration.

"Hard" limiting is accomplished by the use of the two integrated circuits. The limiting is complete at very low levels of input signals.

A phase or Foster-Seeley discriminator is used as the FM detector, and is designed for extremely low harmonic distortion in the recovered output signal. With the "Hard" limiting properties of the preceding two stages a low capture ratio is obtained.

FM STEREO MULTIPLEX SECTION:

The multiplex section uses a special McIntosh developed detecting circuit. A particular advantage of this circuit is the elimination of the critical adjustments necessary with commonly used matrixing circuits. This circuit detects the L - R

sidebands and automatically matrixes the recovered information with the L + R main carrier signal to yield the left and right program output with maximum separation.

The 19KC pilot signal is filtered from the composite stereo input signal, amplified by a special limiting amplifier, doubled to the 38KC carrier frequency, and then amplified again by a limiting amplifier. The composite signal minus the 19KC pilot is combined with the 38KC carrier signal and fed to the special detector circuit mentioned above. Balanced full wave detectors are used to cancel the 38KC components in the output.

A three section phase linear sharp cut off filter rejects SCA interference without destroying stereo separation.

FM muting, automatic FM stereo switching, and an FM stereo indicator are also part of the multiplex section. The FM muting operates by detecting ultra-sonic noise which is present when tuning between stations or when receiving a weak station. The FM muting operates equally well, of course, when receiving mono or stereo stations. The automatic FM stereo switching activates the stereo multiplex circuits when receiving FM stereo. On mono FM stations this circuit is inactive and therefore maximum signal to noise ratio is assured at all times.

The FM stereo indicator is lit when the tuning dial pointer crosses a station broadcasting FM stereo. The light does not indicate when tuning between the stations.

AM SECTION:

The AM circuit employs only field-effect transistors for top performance, increased reliability, and temperature stability.

The use of dual-insulated gate, field-effect transistors in the RF and Mixer circuits insures freedom from cross-modulation and overloading by strong local stations.

A 10kHz whistle filter is connected at the detector output to attenuate any heterodyne that occurs due to the frequency separation between adjacent AM carriers.

A highly-sensitive loopstick antenna is provided. An outside antenna may be used for added "pulling-in" capabilities.

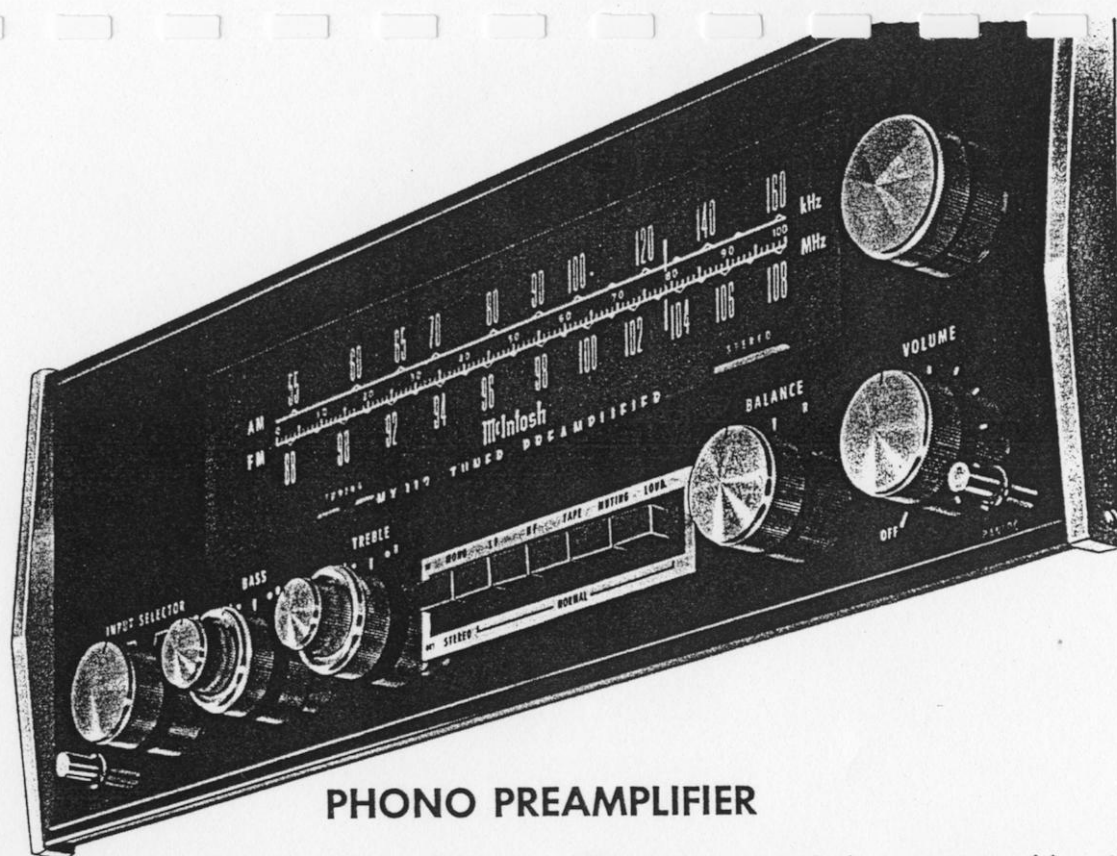
TUNING MECHANISM and DIAL DRIVE:

In the MX 112, a new type of mechanical tuning assembly gives smooth flywheel tuning.

By controlling the relationship of mass and mechanical resistance, and by dividing the workloads in the dial drive system, it becomes nearly impossible to detect any backlash. Yet, the entire dial drive is a model of mechanical stability.

The tuning capacitor rotors of both AM and FM sections are mounted on the same shaft.

For added ease and increased tuning accuracy, a section of the dial pointer is illuminated.



PHONO PREAMPLIFIER

There are three transistors in each channel of the phono preamplifier. The output of the third transistor is connected by a negative feedback loop to the emitter of the input transistor. The feedback loop reduces noise and distortion. It also provides precision RIAA frequency compensation required for magnetic phonograph cartridges. Feedback remains in effect even at 20 Hz, where gain is highest. The negative feedback also provides a low output impedance for the tape output.

Phono input overload is virtually impossible. For example, at 1000 Hz, the phono input can accept 150 millivolts of signal without overload. Ten millivolts of signal at the phono input at 1000 Hz will produce 1.2 volts at the tape output. More than adequate for recording on tape.

The selector switch connects either the output of the phono amplifier, the FM tuner section, the AM tuner section or a high level input to the main preamplifier. The high level input impedance is 250,000 ohms. The high level input feeds directly to the volume control. A loudness contour circuit is connected to a tap on the volume control to provide loudness compensation. Compensation can be switched in or out. The high level signal then feeds to a pair of transistors connected as high gain amplifiers.

In the left channel the second transistor is connected in a balanced output arrangement. This circuit provides equal amplitude signals so that the output level does not change when the phase is reversed. Negative feedback is used

around this pair of transistors to reduce noise and distortion. The negative feedback provides the low impedance needed to drive the highly selective filter networks which follow.

The filter networks can be switched in or out. The high-frequency filter network reduces treble response above 5000 Hz. The low-frequency filter reduces bass response below 50 Hz. The slope of the filters is selected for maximum rejection of commonly encountered noise. Careful design keeps the loss of usable program material to a minimum.

The output from the filter circuits is fed into the balance control. The output of the balance control drives the first stage of the tone control section. The remaining two transistors are connected as a high-gain amplifier stage. The high-gain of this stage is used to advantage for the tone control negative feedback circuits. Negative feedback in the tone control circuits assures low distortion and accurate shape on the tone-control response curves. Negative feedback is maintained at all frequencies, even with the tone controls turned to full boost. Overall distortion is low at all frequencies including frequencies where maximum boost occurs. The negative feedback also provides the low impedance output required for the main preamplifier outputs.

CENTER CHANNEL AMPLIFIER

The L+R amplifier consists of a single transistor connected as a voltage amplifier. Negative feedback is used around the voltage amplifier to maintain low distortion and provide a low impedance for the center channel output.

POWER SUPPLY:

The power supply of the MX 112 has received very special design attention.

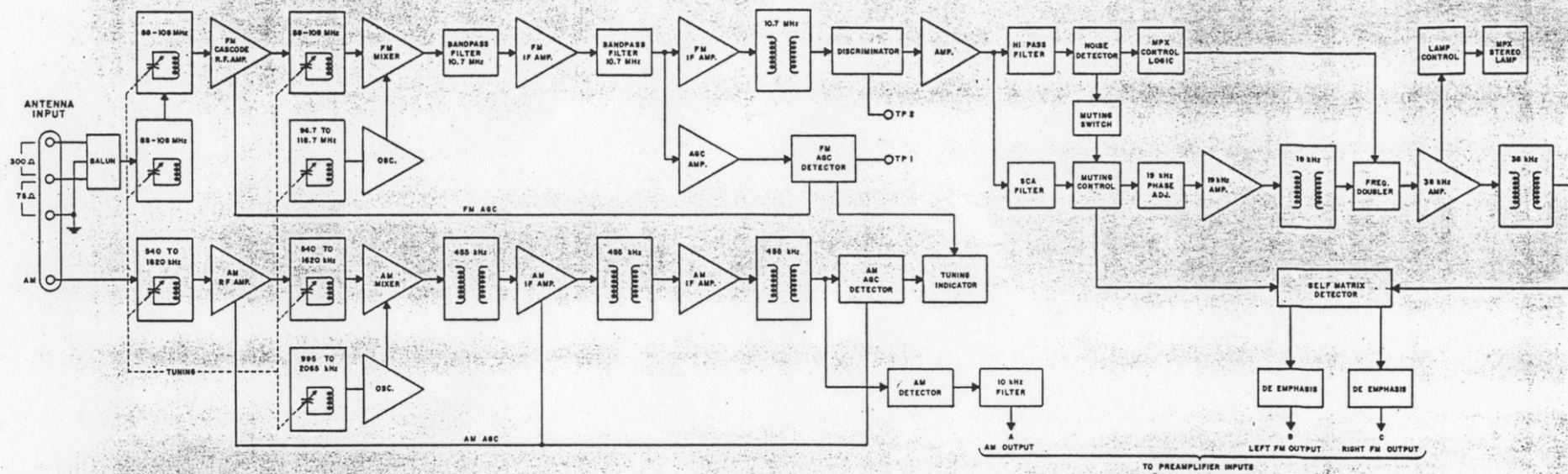
Two separate rectifier circuits are used. First, a full-wave rectifier supplies D.C. to all audio circuits. The second full-wave rectifier supplies D.C. to all tuner and multiplex-decoder circuits.

Both power supplies are very elaborate in design. They use electronic filtering to insure the lowest possible background hum level, maximum stability, and extremely good regulation.

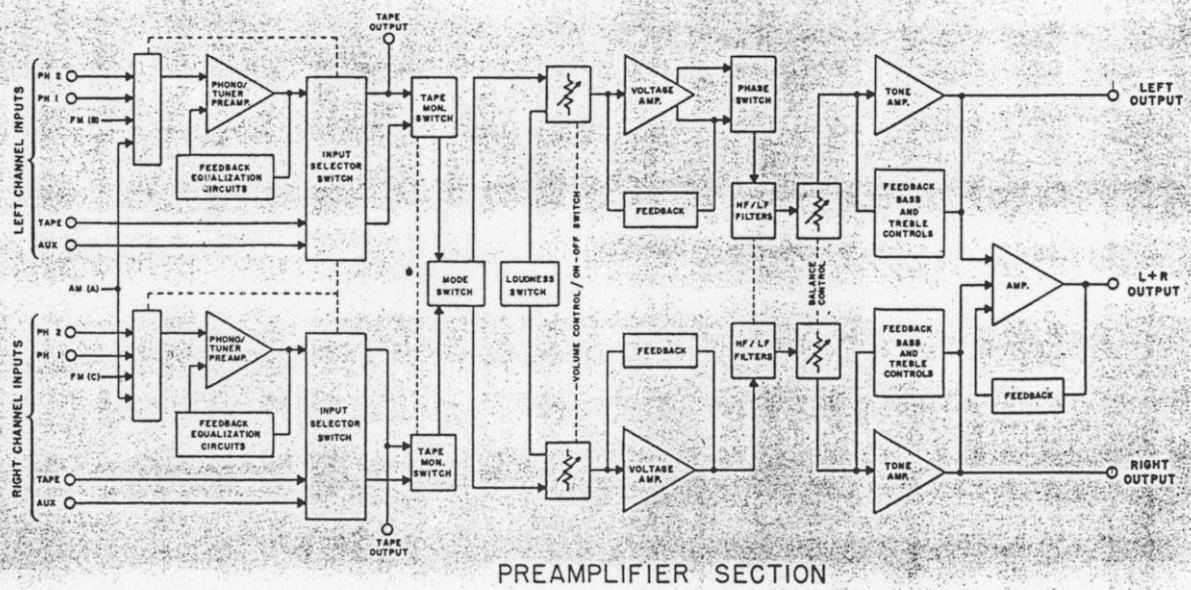
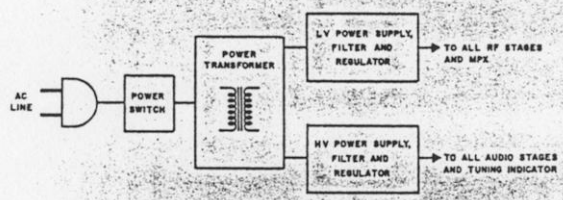
McIntosh
MX 112

MX 112 BLOCK DIAGRAM

FM/AM TUNER SECTION



POWER SUPPLY



PREAMPLIFIER SECTION

MX 112 SPECIFICATIONS

SPECIFICATIONS

FM

USABLE SENSITIVITY: Better than 2.5 microvolts at 100% modulation (± 75 kHz deviation) for less than 3% total noise and harmonic distortion (IHF)

FREQUENCY RESPONSE: ± 1 dB from 20 Hz to 20,000 Hz with standard de-emphasis and 19,000 Hz pilot filter

HARMONIC DISTORTION: Mono, less than 0.5% at 100% modulation ± 75 kHz deviation

IMAGE REJECTION: Better than 80 dB at 100 MHz better than 70 dB at 105 MHz

SPURIOUS REJECTION: Better than 100 dB

CAPTURE RATIO: Better than 1.8 dB

DRIFT: Less than 25,000 Hz

HUM AND NOISE: Better than 65 db below 100% modulation

TUNING INDICATOR: Electron Ray for simple accurate center of channel tuning

STEREO INDICATOR: Stereo light activated by 19 kHz carrier only

AM

SENSITIVITY: Better than 12 microvolts at 1,000 kHz (using external antenna input)

SIGNAL TO NOISE RATIO: Better than 55 dB

HARMONIC DISTORTION: Less than 1% at 30% modulation

FREQUENCY RESPONSE: Down 6 dB at 5,000 Hz and 34 dB at 10,000 Hz

SELECTIVITY: 10,000 Hz at -6 dB

IMAGE REJECTION: 60 dB or greater at 1000 kHz

PREAMPLIFIER SPECIFICATIONS

FREQUENCY RESPONSE: ± 0.5 db 20 to 20,000 Hz

DISTORTION: Less than 0.1% at 2.5 volts output, 20 to 20,000 HZ

INPUT SENSITIVITY AND IMPEDANCE: PHONO 1 and PHONO 2: 2 millivolts at 47,000 ohms for 2.5 volts output.

AUX TAPE: .25 volts at 250,000 ohms for 2.5 volts output

HUM AND NOISE: PHONO 1 and PHONO 2: 70 dB below 10 millivolt input; equivalent to less than 3 microvolts at the input terminals

AUX-TAPE: 85 dB below rated output

OUTPUT: MAIN: 2.5 volts with rated input. Up to 10 volts can be developed without distortion

TAPE: 2.5 volts with rated input
L + R: 2.0 volts with rated input

OUTPUT IMPEDANCE: MAIN: 200 ohms, designed to operate into 47,000 ohms or more

TAPE OUTPUT: About 200 ohms, designed to operate into 47,000 ohms or more

(L + R): About 1,200 ohms, designed to operate into 47,000 ohms or more

TRANSISTOR COMPLEMENT:

4 Junction FET

4 MOS FET

27 Silicon Planar

2 Integrated Circuits (each contains the equivalent of 10 transistors and 7 diodes)

1 6HU6 tuning indicator

20 diodes

POWER REQUIREMENTS: 117/125 volts, 50/60 Hz, 30 watts.

MECHANICAL SPECIFICATIONS

SIZE: Front panel: 16 inches wide by $5\frac{1}{8}$ inches high; Chassis: 15 inches wide by 13 inches deep, including PANLOC shelf and back panel connectors; Knob Clearance: $1\frac{1}{2}$ inches in front of mounting panel

WEIGHT: 24 pounds net, 36 pounds in shipping carton

FINISH: Front panel: Anodized gold and black with special gold/teal panel nomenclature illumination

CHASSIS: Chrome and black

MOUNTING: McIntosh developed professional PANLOC

FACILITIES

BASS CONTROL: -20 dB to $+16$ dB at 20 Hz. Clutch coupled controls for independent adjustment of each channel

TREBLE CONTROLS: ± 20 dB at 20,000 Hz. Clutch coupled controls for independent adjustment of each channel

LOUDNESS: Flat response, or compensated for low listening levels

BALANCE: When program material is out of balance, rotation of the balance control returns the program to natural balance

VOLUME CONTROL: Precision "tracked" to -60 dB so that proper stereo balance is maintained. AC ON/OFF switch is coupled with the volume control

TAPE MONITOR SWITCH: Push button; compares recorded tape with program source while recording

VOLTAGE AMPLIFICATION:

AUX, TAPE

To MAIN output 20 dB

To TAPE output 0 dB

PHONO 1, PHONO 2

To MAIN output 62 dB

To TAPE output 42 dB

AC OUTLETS:

1 unswitched (Red)

2 switched

LF FILTER: Flat, or roll-off below 50 Hz, 6 dB per octave, down 12 dB at 20 Hz

HF FILTER: Flat, or roll-off above 5 kHz, 6 dB per octave, down 12 dB at 20,000 Hz

INPUT SELECTOR: 6 positions: AUX (auxiliary or spare), TAPE, AM, FM, PHONO 1, and PHONO 2

MODE SELECTOR: Pushbutton, STEREO, or MONO

SECONDARY CONTROLS

PHASE CONTROL: Electronically reverse phase in the left channel to correct "out of phase" program sources

MUTING ADJUST: Modifies the noise rejection threshold

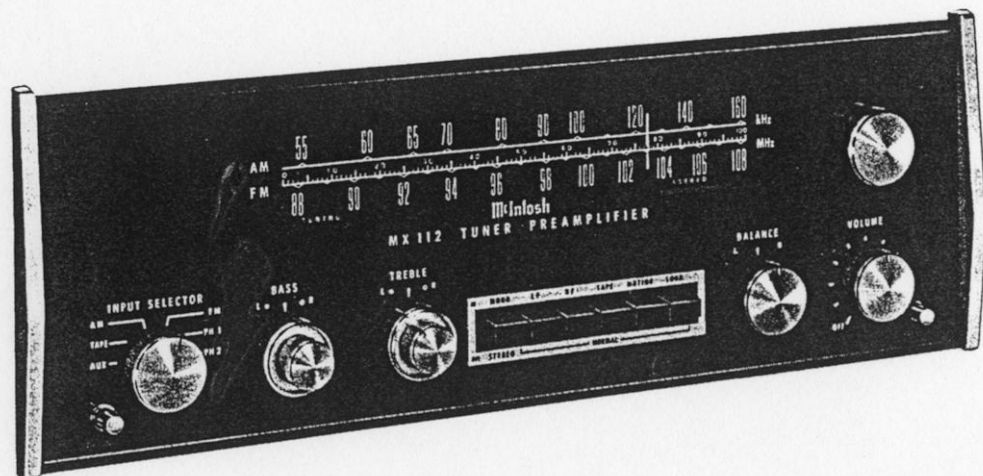
DIAL SCALE INTENSITY: Modifies the briteness of the illumination of the front panel

McIntosh

MX 112

IF YOU'RE IN A

Hurry...



INPUT SELECTOR

AUX: Any program source requiring flat amplification is connected to the AUX jacks on the back panel.

TAPE: The output of a tape recorder with its own electronics is connected to the TAPE jacks on the back panel.

AM: For listening to the AM section of the MX 112.

FM: For listening to the FM section of the MX 112.

PHONO 1: The output of a record player or turntable is connected to the PHONO 1 jacks on the back panel.

PHONO 2: The output of another record player or turntable is connected to the PHONO 2 jacks on the back panel.

TREBLE: Modifies the high frequency program material to suit your taste. The right channel is the large knob, the left channel is the small knob.

BASS: Modifies the low frequency program material to suit your taste. The right channel is the large knob, the left channel is the small knob.

BALANCE: Adjusts for equal loudness in each channel when the program source has unequal channel-to-channel volume.

VOLUME ON/OFF: Turns the MX 112 "ON" and adjusts loudness of the sound.

PUSHBUTTONS:

MODE SELECTOR: Push IN for MONO; OUT for STEREO.

HF: Push IN: Reduces high frequencies to suppress unwanted record noise, etc.; OUT: Flat response.

LF: Push IN: Reduces low frequencies to suppress unwanted rumble; OUT: Flat response.

TAPE: Push IN: Monitor the recorded program from the tape. Push OUT: Hear the program that is being recorded.

MUTING: in the IN position the muting is turned on. Weak stations that may not override noise and interference are suppressed by the muting. In the OUT position, the muting is turned off. This allows conventional FM tuning with the noise and interference present. Use this position to tune weak or noisy stations.

LOUDNESS: Push IN: Adjusts bass as volume is reduced to compensate for average hearing losses at low volume.

CABINET *Installation*

1. On the back of the cabinet panel, scribe a vertical line through the exact center of the area to be cut out.
2. Place the MOUNTING TEMPLATE #100 against the back of the panel. Make sure there is at least $\frac{1}{4}$ inch clearance between the bottom of the cutout (dashed line on the template) and any shelf or brace below the proposed cutout.
3. Mark the back of the cabinet panel with a pointed instrument through the two "C" locating holes. Drill through the cabinet panel with a small diameter drill. Be certain the drill is perpendicular to the panel.
4. Position the MOUNTING TEMPLATE #100 on the front of the panel. Align the "C" holes in the template with the drilled holes in the cabinet panel.
5. Holding the template in place against the cabinet panel, mark the "A" and "B" drill holes and the four corner holes. Join the corner marks with a pencil. The edge of the template can be used as a straight edge.
6. Drill the three holes on each side with a $\frac{3}{8}$ inch drill being careful to make them accurate as to location.
7. Cut out the rectangular opening. Saw on the inside of the pencil lines.
8. Secure the mounting strips to the rear of the cabinet panel using two screws from the hardware package. Use two $\frac{3}{4}$ inch long screws for panels under $\frac{1}{2}$ inch, or two $1\frac{1}{4}$ inch long screws for panels $\frac{1}{2}$ inch thick and larger.
9. Insert the screws in the center holes of the cabinet panel ("B" holes on the template) and tighten into the center clip of the mounting strips. The screw head should pull into the wood slightly.
10. Attach the PANLOC brackets to the back of the cabinet panel using four screws. ("A" holes on the template.)
11. Prepare the PANLOC unit for mounting by removing the four plastic feet that are secured by screws to the bottom of the chassis.
12. Insert the power cord through the opening. Carefully slide the unit into the opening so the aluminum rails on the bottom of the unit engage the grooves in the metal mounting brackets. Continue to slide the unit until it stops at the adjust position.

VERTICAL INSTALLATION

In the hardware packet are two helical springs. Fasten the springs to the small flanges at the rear of the PANLOC brackets. The flange has a notch and a hole to mount the spring. The springs assist in the removal of vertically mounted PANLOC equipment.

DO NOT USE THE SPRINGS ON HORIZONTALLY MOUNTED EQUIPMENT.

CONNECTING A RECORD PLAYER TO PHONO 1

Connect the "left" channel to the "upper" PH 1 input jack.

Connect the "right" channel to the "lower" PH 1 input jack.

PHONO 2 position is used if two record players are used in a system. Connect the "left" channel to the "upper" PH 2 input jack. Connect the "right" channel to the "lower" PH 2 input jack.

CONNECTING A TAPE RECORDER TO RECORD

Connect the MX 112 output jacks marked TAPE to the high level inputs of the tape recorder.

CONNECTING A TAPE RECORDER FOR PLAYBACK

Connect the "left" channel recorder output to the "upper" TAPE 1 input jack.

Connect the "right" channel recorder output to the "lower" TAPE 1 input jack.

CONNECTING THE MX 112 TO POWER AMPLIFIERS

Connect the output jacks marked MAIN to the input of a stereo power amplifier. The upper jack is connected to the LEFT amplifier input jack. The lower jack is connected to the right amplifier input jack.

The output impedance at the MAIN output is 200 ohms. Longer cables than are normally supplied can be connected between the MX 112 and the

CONNECTING YOUR MX 112

amplifiers. The length of the cable is limited by the capacity of the cable.

The total capacity must not exceed 1000 pF. For instance: cables with a capacity of 25 pF per foot may be 40 feet long; 13.5 pF per foot cable may be 75 feet long. The input impedance of the amplifiers should be 47,000 ohms or greater.

CONNECTING AN FM ANTENNA

Monophonic installations that are satisfactory on an indoor antenna may require the use of an outdoor antenna for equivalent results. Satisfactory stereo requires about 10 times as much signal from the antenna.

With the MX 112 one of three antenna systems can be used: (1) the indoor dipole supplied with the MX 112, (2) an outdoor FM antenna, or (3) a VHF-TV antenna. In fringe areas best results will probably be obtained with the use of an outdoor FM antenna. In many areas the indoor dipole antenna may be satisfactory. The use of a VHF-TV antenna is also effective in many installations.

CONNECTING AN INDOOR DIPOLE ANTENNA

The flexible folded dipole antenna (300 ohm) supplied with the MX 112 is for indoor use in urban or high strength signal areas.

Connect the two leads from the dipole to the terminals marked FM ANT (red). The flexibility of the thin flat wire assembly permits it to be placed under a rug, tacked behind the stereo . . . or, placed in any other convenient loca-

tion. In some cases, it may be necessary to "position" the antenna for best signal reception. This should be done before it is permanently located or tacked down.

CONNECTING AN OUTDOOR FM ANTENNA

An outdoor antenna is recommended for optimum performance in all areas. In fringe (outlying) areas, best results will be obtained with a highly directional FM antenna used in conjunction with a rotator. Rotate the antenna until the best reception is obtained. Connect the 300 ohm antenna to the terminals marked FM ANT (red).

CONNECTING A 75 OHM COAXIAL ANTENNA

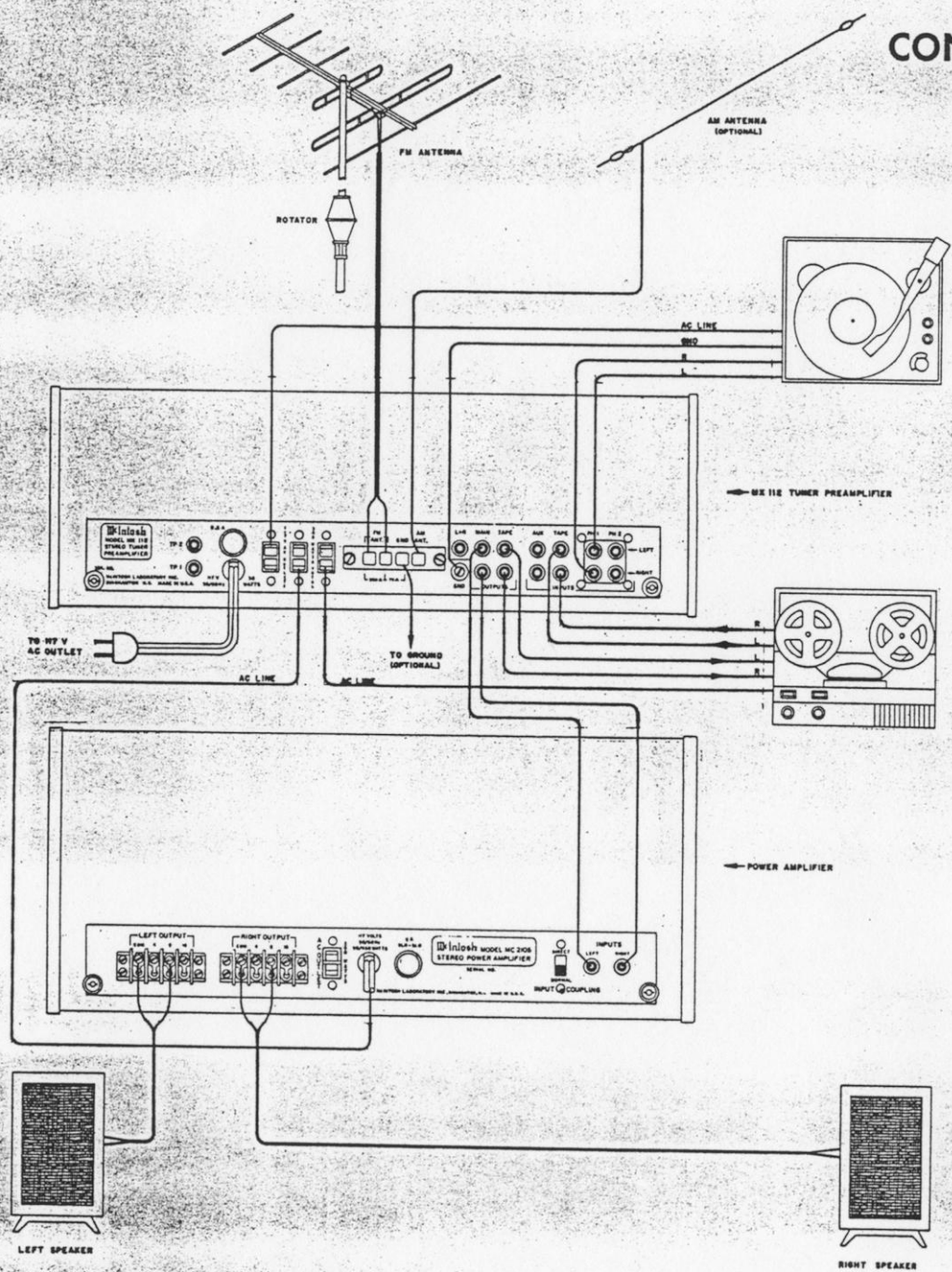
An unbalanced 75 ohm antenna can be connected to the MX 112 with coaxial cable. Connect the center conductor to the left FM ANT (Red) connector. The shield is connected to the GND (black) connector.

The McIntosh designed balun matches the 75 ohm input to the tuner for optimum performance.

AC OUTLETS

There are 2 black AC outlets and one red AC outlet. The power to the black AC outlets is controlled by the front panel switch. Use these outlets for a tuner, tape recorder, etc. The red receptacle is on at all times. Use the red outlet for a turntable or record changer. The turntable is protected by this arrangement. It is necessary to turn off the turntable or record changer with its own AC switch.

CONNECTING THE MX112



FRONT PANEL CONTROLS

INPUT SELECTOR

AUX: Connects the back panel input jacks (AUX) to the MX 112. Has flat amplification. The gain is 20 dB to the MAIN outputs. The gain is 0 dB to the TAPE outputs.

TAPE: Connects the back panel input jacks (TAPE) to the MX 112. Has flat amplification. The gain is 20 dB to the MAIN outputs. The gain is 0 dB to the TAPE outputs.

AM: Connects the AM tuner portion of the MX 112 to the output jacks.

FM: Connects the FM tuner portion of the MX 112 to the output jacks.

PHONO 1: Connects the back panel jacks (PH 1) to the MX 112. The amplification has been compensated for magnetic phono cartridges. The gain is 62 dB to the MAIN outputs and 42 dB to the TAPE outputs. The input impedance is 47,000 ohms.

PHONO 2: Connects the back panel jacks (PH 2) to the MX 112. The amplification has been compensated for magnetic phono cartridges. The gain is 62 dB to the MAIN output and 42 dB to the TAPE outputs. The input impedance is 47,000 ohms.

BASS

The BASS is a concentric control. The large outer knob controls the low frequency response in the right channel. The small center knob controls the low frequency response in the left channel. The two knobs are friction coupled. This permits them to be adjusted together or independently. Clockwise rotation in-

creases lows and counterclockwise decreases lows. Position the control to the center position for flat response.

TREBLE

The TREBLE is a concentric control. The outer knob controls the high frequency response in the right channel. The small center knob controls the high frequency response in the left channel. The two knobs are friction coupled. This permits them to be adjusted together or independently. Clockwise rotation increases highs and counterclockwise decreases highs. Flat is the center position.

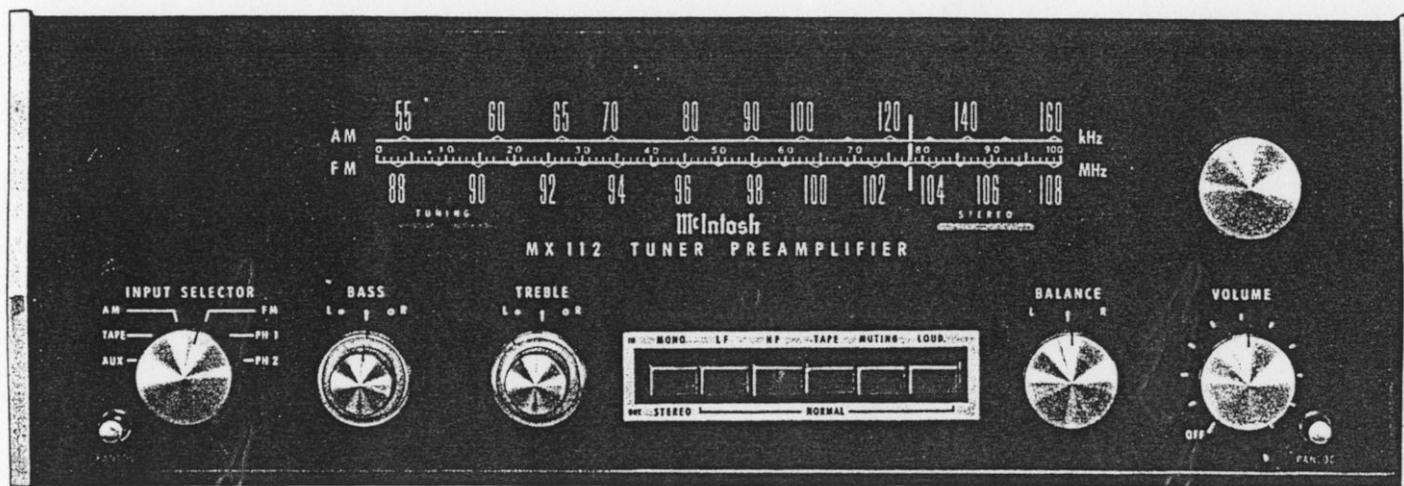
BALANCE

The BALANCE control adjusts for unequal volume in either the left or right channels. The volume of each channel can be varied relative to each other without affecting their combined loudness. Turning the control left accentuates the left channel by reducing the loudness in the right channel. Turning the control right accentuates the right channel by reducing the loudness in the left channel.

VOLUME ON/OFF: Turning the VOLUME control totally counterclockwise turns the MX 112 OFF. The VOLUME control regulates the loudness in both channels. The VOLUME control has been precision tracked throughout the listening range (0 to -65dB) for accurate stereo balance.

PUSHBUTTONS

MODE SELECTOR: STEREO: The left channel is heard from the left loudspeaker and the right channel is heard from the right loudspeaker.



MONO (L+R): The left and right channels are added together and are heard from both loudspeakers.

LF FILTER: With the push button pushed in the low frequency response is attenuated below 50 Hz. The slope is 6 dB per octave. Use of the LF filter reduces unwanted low frequency noise such as rumble. With the push button released, the response of the MX 112 is flat.

HF FILTER: With the push button pushed IN the high frequency response is attenuated above 5 kHz. The slope is 6 dB per octave. Use of the HF filter reduces unwanted high frequency noise like hiss or scratch. With push button released, the response of the MX 112 is flat

TAPE: The TAPE push button is used to monitor tape as it is being recorded. With the push button IN, the recorded tape is heard. Release the button and the program being recorded is heard. Instantaneous comparison of recorded material and the program source is provided by

the use of the TAPE push button. **IMPORTANT:** When the MX 112 is operated with the TAPE push button in the IN position, signal from any other source will not be heard from the loudspeakers. When not in use make sure the push button is in the "OUT" position.

MUTING: Muting suppresses the background noise and hiss normally heard between stations. With the control in the IN position the muting is turned on. Weak stations that may not override noise and interference are also suppressed by the muting. In the OUT position, the muting is turned off. This allows conventional FM tuning with the noise and interference present. Use this position to tune weak or noisy stations.

LOUDNESS

When the volume is turned down, the music will seem to lose much of its bass. As volume is reduced the response of the human ear to bass decreases more rapidly than its response to notes cen-

tered in the midtonal range. The LOUD push button automatically provides the correct amount of bass and treble boost required to compensate for this change in response of the human ear at low-loudness levels. When the "LOUD" button is pushed to the IN position, it converts the volume control to a loudness compensated control. Use the LOUD IN to listen at low volume and still hear full-frequency range.

PANLOC

McIntosh developed PANLOC mounting brings professional installation technique to stereo. Depressing the PANLOC buttons (as with a ball point pen) will release the instrument. It can then be slid forward to the "adjustment" position. In the "adjust" position the top panel controls PHASE, MUTING and DIAL SCALE INTENSITY can be adjusted.

Using YOUR STEREO

LISTENING TO A STEREO RECORD

1. Turn the INPUT SELECTOR to PHONO 1 or PHONO 2, whichever is connected to the record player you wish to hear.
2. Make certain the MODE PUSHBUTTON is in the OUT or STEREO position.
3. Adjust the VOLUME control to desired volume.

LISTENING TO A MONOPHONIC RECORD

1. Turn the INPUT SELECTOR to PHONO 1 or PHONO 2, whichever is connected to the record player you wish to hear.
2. Push the MODE pushbutton IN to MONO.
3. Adjust the VOLUME control to desired volume.

LISTENING TO A STEREO TAPE RECORDER

The TAPE input is used:

1. Turn the INPUT SELECTOR to TAPE.
2. Set the MODE pushbutton to STEREO or MONO, depending on the program on the tape.
3. Adjust the VOLUME control to desired volume.

To monitor while recording, the tape recorder must have separate record and playback heads. The TAPE pushbutton permits monitoring the tape recordings while in the process of recording. When the TAPE pushbutton is in the IN position it will play the sound from the tape as it passes the playback head, a moment after it is recorded. The recording process continues as usual. When the TAPE pushbutton is in the OUT position the program being recorded is heard.

LISTENING TO FM or FM STEREO

1. Turn the INPUT SELECTOR to FM.
2. Adjust the volume to a comfortable level.
3. Rotate the tuning knob to the station of your choice.

The MX 112 uses a new McIntosh developed automatic mono-stereo switching circuit. The switching is electronic without switching clicks or transients.

The circuit switches smoothly and silently when the 19KC multiplex carrier is present. When the STEREO indicator is lit, the station is broadcasting a 19KC carrier. This signal causes the automatic circuit to switch the MX 112 to stereo. If a station is broadcasting monophonic FM program, the STEREO indicator will remain off and the tuner will automatically switch to mono. The ultrasonic muting circuit suppresses all noise between stations. It suppresses all weaker stations not strong enough to override the background noise.

The muting threshold setting determines the strength of the signal which can be heard with muting in operation. The muting threshold is carefully adjusted to optimum at the factory. Casual adjustment of the muting threshold is not recommended.

While tuning you may notice that the tuning indicator will show a station yet no program is heard from the speakers. The muting circuit in the tuner is rejecting the station because there is objectionable noise with the weak signal from the station. Push the MUTING pushbutton to the OUT position and the station will be heard. Most programs that can be tuned in this manner are of poor quality due to interfering noise.

LISTENING TO AM

1. Set the INPUT SELECTOR to AM.
2. Adjust the volume to a comfortable level.
3. Rotate the tuning knob to the station of your choice.