

The McIntosh MR 80



THE ULTIMATE DIGITAL FM TUNER

The MR 80 tuner has the most flexible control System ever designed in a stereo FM tuner

Engineering direction dictated a tuner design governed by insistence on great flexibility and ease of use. This had to be done while designing an RF section with great sensitivity and the world's best selectivity in keeping with the needs of low distortion. These values were achieved and they retain the McIntosh reputation of outstanding performance, long life and reliability.

Tuning in a station on the MR 80 is achieved electronically. This assures long term trouble free operation. You can tune a station on the MR 80 four different ways.

1. Manual tuning by rotating the main tuning knob.
2. Auto Scan automatically searches for the next available station up or down in frequency.
3. Presets - allows you to select your four most listened to stations that can be tuned at the touch of your finger tip.
4. Remote Scanning will allow the MR 80 to be tuned to a station from a remote location.

Two separate antenna systems can be connected to the MR 80.

1) An outdoor or indoor FM antenna, or 2) a cable input from your local cable company. The antenna selection is controlled by an electronic switching

device containing more than 75 dB of isolation and no signal loss as might normally be found in external mechanical switch.

The MR 80 uses electronic varactor tuning instead of the more conventional mechanically gauged variable tuning capacitors. Variable tuning capacitors can with age collect dust and dirt, reducing their performance. McIntosh uses double varactor diodes to provide the necessary tracking between the different tuned RF stages. When a weak distant station is adjacent to a strong local station the Preselector circuit will switch in an additional tuned circuit providing an extra degree of selectivity reducing the interference from the adjacent strong station.

After the RF amplifier two parallel tuned circuits are used to provide the proper load impedance for the bipolar transistor. These two tuned circuits greatly improve the image rejection and overload performance of the tuner, as well as increasing the RF selectivity.

An innovative new lock circuit was developed for use in the MR 80. This new circuit allows correct tuning without the use of a center tune meter. The MR 80 will be correctly tuned even if the station of the

cable company is not on its correct frequency. This is done by the use of two operational amplifiers. The lock circuit will track a station even if it drifts 1 MHz.

The mixer is a balanced matched dual J-FET and bipolar transistor circuit. A low loss toroidal phase splitting transformer is used as an impedance matching network in the gate circuit of the mixer eliminating even order spurious responses.

The MR 80 has the narrowest IF bandwidth ever used in a stereo tuner. It is the correct width to let just one FM station through. The excellent selectivity of the MR 80 (210 kHz wide at 60 dB down) permits tuning to stations that are impossible to receive on ordinary tuners.

After the mixer the signal is electronically switched to go either directly to the IF amplifier or to go through a quartz crystal filter. The SUPER NARROW selectivity position adds a 4 pole - 4 zero crystal filter to the other 5 IF filters. SUPER NARROW permits receiving stations never heard before with most other FM tuners. The 5 stages of IF amplification provide the necessary gain to reduce noise in the signal and interference from other stations. The 5 IF stages use piezoelectric fixed frequency filters in place of normal tuned circuits so the IF stages will always stay in alignment, even with age.

The signal strength indicator column is summed off of all 5 IF stages instead of just 1 so it is looking at the signal strength throughout the entire IF system.

Following the selectivity section of the IF amplifier is the LIMITER. A total gain of 80 dB is used in this circuit. The use of very high gain in the limiter circuit produces hard limiting with very good impulse noise rejection. Limiter bandwidth is greater than 50 MHz, producing excellent detector capture characteristics.

A broadband Foster-Seeley discriminator is used as the detector. This detector coupled with the broadband limiter produces unmeasurable noise and distortion.

The heart of the multiplex section is a new third generation phase locked loop (PLL) stereo decoder integrated circuit (IC). This PLL IC incorporates two special systems, an automatic variable separation control circuit to reduce background noise when receiving weak stereo stations, and tri-level digital waveform generation which eliminates interference from SCA signals and from the sidebands of adjacent channel FM signals.

The variable separation control is operated from the IF amplifier's signal strength detector. A smooth transition is provided from mono to stereo or from stereo to mono at weak signal levels to provide the optimum signal to noise ratio and best stereo separation for the prevailing signal conditions. The circuit operates only during stereo reception. It switches automatically to monophonic if the 19 kHz pilot tone is absent.

In the PLL the internal oscillator operates at 228kHz, locked onto the 19kHz pilot tone. The 228kHz, feeds a 3 stage Johnson counter via a binary divider to generate a series of square waves. Suitably connected NAND gates and exclusive OR gates produce the tri-level drive waveform for the various demodulators in the circuit. The usual square waveforms have been replaced in the PLL and decoder sections by tri-level waveforms. These

tri-level forms contain no harmonics which are multiples of 2 or 3. This eliminates frequency translation and detection of interference from the side-bands of adjacent stations since the third harmonic of the sub-carrier (114kHz) is excluded. It also eliminates interference from SCA broadcasts since the third harmonic of the pilot tone (57kHz) is excluded. Unwanted spurious audible components and phase jitter in the PLL are inherently eliminated by this technique.

Additional advantages of the phase locked loop stereo demodulation are the elimination of inductors to minimize drift, integral lamp driving capability to indicate the presence of the 19kHz pilot carrier, excellent channel separation over the entire audio frequency range, extremely low distortion, low output impedance, and transient-free mono/stereo switching.

Following the MPX decoder is the three position de-emphasis switch. The three different positions allow the MR 80 to be used in North America with standard 75ms de-emphasis and in Western Europe and the Far East with 50ms de-emphasis. The 25ms position is for use with an external noise reduction adapter.

An electronic blend filter circuit, implemented with two J-FETs of a quad J-FET package, is used to reduce out of phase noise when in the stereo mode and tuned to a weak station. This filter is actually a twin-T bandpass that blends the high and low frequencies, leaving separation unaffected at mid-frequencies. This results in a greatly improved stereo image when the filter is required.

Special design attention has been given to the power supply section. Nine separate power circuits are used. Six of these are regulated to prevent loss of performance during a brown out. The - 15, - 5.2, 5, 15 and 30v use integrated circuit 3 terminal regulators, while the 3ma current source is made with discrete transistors because of the high voltage on the input terminal. The remaining voltages are used for the headphone amplifier and the touch control reference signal driver.

McIntosh, recognizing the need for improved reliability, has designed a new circuit to drive incandescent lamps. This new circuit prevents the filaments from failing due to notching when operated on direct current. This failure mode can reduce lamp life from one half to one tenth of the data sheet value. In the MR 80 the three lamps that are used for STEREO, LOCK and FILTER indicators are operated on AC at lower than rated voltage to extend the useful life to well in excess of 15 years. Only McIntosh brings you this feature.

**Your Best
Investment is
McIntosh**

FREQUENCY DISPLAY DIGITAL

The Frequency Display indicates the received frequency to the nearest 100 kHz.

SIGNAL COLUMN

A column of LED lamps respond to the signal strength of the station being received. The stronger the signal the higher the column reaches.

PRESET

These touch pads select one of the four preset stations. Just touch to operate. A small rectangle will light above the pad indicating which preset has been selected.

INDICATOR LIGHTS

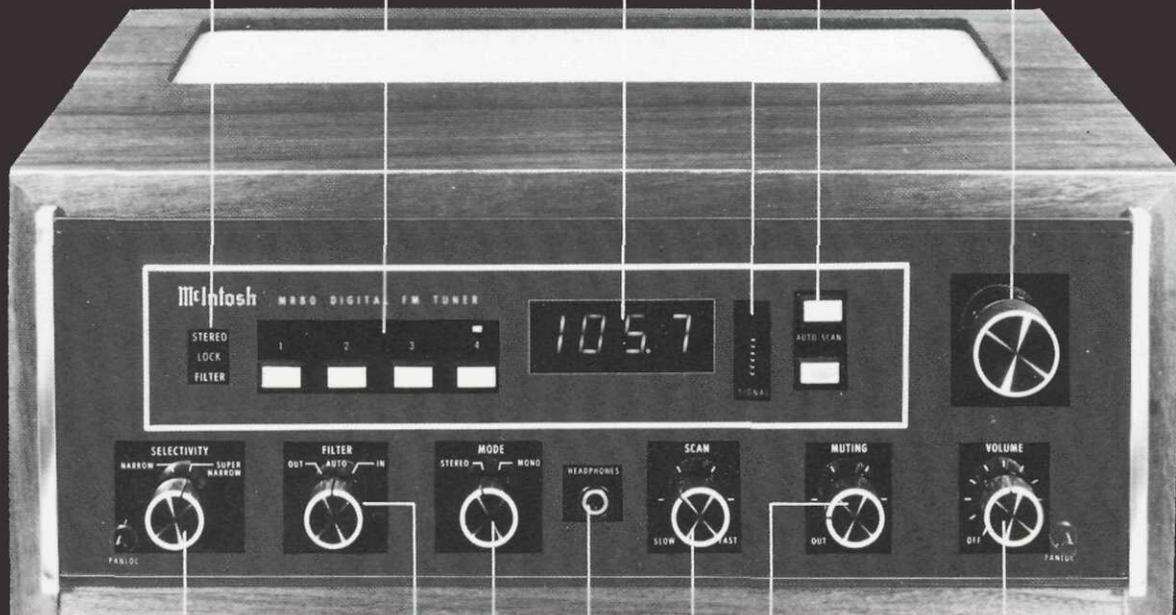
Three indicator lights are provided. The uppermost STEREO indicates when a stereo broadcast is being received. The second, LOCK, indicates when the tuner is locked to the station. The third indicator light, FILTER, indicates when the stereo noise filter is in operation.

AUTO SCAN

AUTO SCAN is provided by two touch pads. These two touch pads start the tuner searching for a new station. It will scan until it stops at a station or reaches the end of the band. At the band end the tuner will reverse its scan direction.

MANUAL TUNING

When the MR 80 is turned on the circuitry automatically selects the manual or knob tuning control mode.



SELECTIVITY SWITCH

Two degrees of IF selectivity are selectable by the SELECTIVITY switch. The NARROW or normal position provides adequate selectivity for stereo reception even under severe receiving conditions.

Setting the SELECTIVITY switch to SUPER NARROW adds an additional 4-pole 4-zero quartz crystal filter. Use the SUPER NARROW position to receive stations from distant cities which are on channels adjacent to local stations.

FILTER SWITCH

The MR 80 FILTER switch provides automatic stereo noise reduction on weak stereo stations.

MODE SWITCH

A two position MODE switch is provided so that you may select either automatic stereo or mono reception.

VOLUME CONTROL

The VOLUME control has been precision tracked throughout the listening range (0 to -65 dB) for accurate stereo balance.

MUTING CONTROL

MUTING suppresses the background noise and hiss normally heard between stations.

SCAN CONTROL

The SCAN control adjusts the speed at which the tuner searches for the next station.

HEADPHONE JACK

A HEADPHONE jack is provided to drive low impedance dynamic headphones from an internal power amplifier.

MR 80 Performance Limits

Performance limits are the maximum deviation from perfection permitted for a McIntosh instrument. We promise you that when you purchase a new MR 80 from a McIntosh Franchised dealer it will be 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.

TUNING

88 to 108 MHz

ANTENNA INPUTS

One 30012 balanced and two 7512 unbalanced.

INTERMEDIATE FREQUENCY

10.7 MHz

SENSITIVITY

9.3 dBf (1.6mV) for 35 dB of quieting

14.7 dBf (3mV) for 50 dB of quieting

13.2 dBf (2.5mV) for 3% total noise and harmonic distortion

SIGNAL TO NOISE RATIO

75 dB below 100% modulation

HARMONIC DISTORTION

0.2% 20 Hz to 15 kHz, mono or stereo

Typically, 0.08% at 1000 Hz

INTERMODULATION DISTORTION

0.15% mono or stereo for any combination of frequencies from 20 Hz to 15,000 Hz with peak modulation equal to 100% or less. Typically 0.1%

FREQUENCY RESPONSE

Mono and Stereo ± 1 dB 20 Hz to 15 kHz with 75, 50 or 25ms de-emphasis

CAPTURE RATIO

1.5 dB

SELECTIVITY

	Narrow	Super Narrow
Adjacent channel	8 dB	60 dB
Alternate channel	90 dB	110 dB

SPURIOUS REJECTION

110 dB

TUNER IM (RF)

-23dBm for 2 signals 1 MHz apart

TUNER INTERCEPT POINT

-10 dBm 75W

IMAGE REJECTION

90 dB

MAXIMUM SIGNAL INPUT

8 volts across 75W (1W) antenna terminal will not

increase harmonic or intermodulation distortion.

AUDIO HUM

75 dB down from 100% modulation

MUTING

70 dB noise reduction between stations

MUTING THRESHOLD

2mV to 1000mV

SCA REJECTION

60 dB minimum

STEREO SEPARATION

50 dB to 1000 Hz

STEREO FILTER

10 dB noise reduction

AUDIO OUTPUT

VARIABLE

2.5V into 47k

FIXED

1V into 47k

GENERAL INFORMATION

POWER REQUIREMENTS

120 volts 50/60 Hz. 25 watts

SEMICONDUCTOR COMPLEMENT

57 Transistors

68 Integrated Circuits

81 Diodes

4 LED Displays

18 LED's

7 Neon Lamps

MECHANICAL INFORMATION

SIZE

Front panel measures 16 inches wide (40.6 cm) by 5 7/16 inches high (13.8 cm). Chassis measures 14 3/4 inches wide (37.5 cm) by 4 13/16 inches high (12.2 cm) by 13 inches deep (33 cm), including connectors. Knob clearance required is 1 1/4 inches (3.2 cm) in front of mounting panel.

FINISH

Front panel is anodized gold and black with special gold/teal nomenclature illumination. Chassis is black.

MOUNTING

McIntosh developed professional PANLOC

WEIGHT

27 pounds (12.2 kg) net, 39 pounds (17.7 kg) in shipping carton

The continuous improvement of its products is the policy of McIntosh Laboratory Incorporated who reserve the right to improve design and price without notice.

FRANCHISED DEALER:

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