

I TECHNICAL SPECIFICATIONS

FREQUENCY RANGE	540-1620 kHz, fixed tuned to specific frequency
ANTENNA INPUT	75 ohms nominal unbalanced (BNC type connector)
SENSITIVITY	30 microvolts for 20 dB S/N ratio at 30% modulation
SENSITIVITY FOR CARRIER FAIL OPERATION	100 microvolts minimum
AGC	60 dB
AUDIO FREQUENCY RESPONSE	±1.0 dB, 50-5000 Hz; ±3 dB, 5-10 kHz
HARMONIC DISTORTION	less than 3% at 90% modulation
NOISE LEVEL	45 dB or greater below 100% modulation with 10 mV input
SELECTIVITY	±10 kHz, at 6 dB points
AUDIO OUTPUTS ...	600 ohms balanced at 0 dBm and 600 ohms unbalanced at 1.0V rms
POWER REQUIREMENTS	115 Vac, 50/60 Hz, 6 watts
DIMENSIONS	1 1/2" (4.45 cm) H x 19" (48.3 cm) W x 5" (12.7 cm) D
FINISH	McMartin beige with wood grain trim

II GENERAL DESCRIPTION

The McMartin Model AMR-1 is a low cost, high performance, single channel AM broadcast receiver for use as reliable off-air source for house monitoring systems.

It is also intended as a companion AM receiver unit for use with the McMartin Model EBS-2 EBS Decoder.

The AMR-1 contains a monolithic silicon integrated circuit from which the RF amplifier, IF amplifier, mixer, oscillator, and AGC detector are constructed.

It operates on the superheterodyne principle with a 455 kHz IF frequency. A cascode IF amplifier with controlled output impedance and negligible Miller-effect, eliminates regeneration and selectivity skewing. A discrete diode

detector and audio amplifier are also provided from which both 600 ohm balanced output at a 0 dBm level, as well as unbalanced audio at a nominal 1.0 volt level are brought out to rear chassis screw terminals. The latter serves as audio drive for the EBS-2 monitor. The AMR-1 circuitry also includes a carrier off relay closure to activate external alarm devices in the event the control system becomes inoperative.

The AMR-1 is a completely self-contained, rack mount unit occupying 1 3/4" of vertical space. An illuminated front panel power switch is also provided.

III INSTALLATION

Upon receipt of the AMR-1, remove it from the shipping carton and inspect it carefully for any damage caused in transit.

If any damage is found, notify the shipping agency and advise McMartin Industries of such action.

Remove the top cover of the AMR-1 and inspect all internal circuitry for damage.

The AMR-1 should be mounted in a temperature environment of less than 50°C.

Connect the antenna to the antenna BNC connector located on the rear of the chassis.

NOTE: In high signal strength areas only a short piece of wire will provide adequate input signal level. Where low signal field strengths are involved a more elaborate antenna will be required.

If the 600 ohm balanced output termination is to be employed for house monitoring purposes, the connection should be made using a twisted, shielded pair.

If the EBS-2, Emergency Broadcast Decoder, is to be used, the unbalanced audio output terminations must be connected to the appropriate locations on the rear chassis of the EBS-2.

Connect the power cord to a 117 Vac source and turn the power switch on. The AMR-1 should now be operational.

IV CIRCUIT DESCRIPTION

The AMR-1 is a complement of four subsystems; an RF receiver section, a diode detector, an audio amplifier, and the carrier fail relay circuit.

The RF receiver contains a CA3123E integrated circuit and a discrete IF amplifier.

The antenna input is coupled through capacitor C1 to the input tank composed of the primary of T1 and C2 which is tuned to the input frequency. The secondary of T1 is connected to the RF amplifier portion of IC-1 at pin 12.

The output of the RF amplifier feeds the RF amplifier tuning section, composed of L1, C3, and C5. This provides additional input selectivity.

The amplified RF is then fed to pin 1 of IC-1 which is the mixer input. The parallel tuned circuit (L2, C7, and C8) establishes internal oscillator frequency, which when mixed with the input signal frequency, produces a 455 kHz IF frequency at the mixer output (pin 14 of IC1). C7 and C8 insure stable operation of the oscillator within ambient temperature variations.

T2 provides selectivity prior to IF amplification. The IF amplifier input appears on pin 7 of IC-1. The output (pin 6) is capacitively coupled to pin 5, the AGC drive input, and also connected to the tap of T3. T3 provides additional post IF selectivity and through C18 drives the base of Q1. Q1 is a common emitter gain stage which increases the IF signal to a level sufficient to drive the diode detector. Q2 is an emitter follower which prevents loading of Q1 by the detector. Diode D1 serves as the AM detector. It is followed by a low pass filter and an audio amplifier stage Q4. Q5 is connected as an emitter follower.

The emitter of Q5 is capacitively coupled to the unbalanced 600 ohm output and also to the primary of T5. The secondary of T5 is connected to the balanced 600 ohm output termination. D2 generates a negative dc voltage at the base of Q3 proportional to the carrier level. Q3 will be biased in the "off" condition as long as carrier is present. When the carrier is removed, Q3 will be switched "on", energizing the coil of carrier fail relay, K1.

The discrete circuits in the AMR-1 are powered from a +22 volt dc source, produced by a full wave rectifier and an RC filter. IC-1 operates from a +13 volt dc supply, regulated by Z1, and derived from the +22 volt dc supply.

V TROUBLE SHOOTING PROCEDURE

The AMR-1 has been aligned at the factory to conform to the published specifications. All tuned circuits have been adjusted to provide maximum bandwidth and high selectivity. A perfect field alignment cannot be accomplished without proper test equipment, therefore, if this is desired it is recommended that the unit be returned to the factory.

However, the AMR-1 can be aligned in the field, to provide satisfactory operation, with the following procedures:

Connect a volt-ohmmeter to test point "A" located on the printed circuit board and adjust the meter for an "on-scale" positive voltage reading. Adjust L2 for a minimum positive voltage at test point "A". If a dip cannot be noticed on the meter when the slug of L2 is tuned, the field strength at the antenna input may be too low. Tune T1 and L1, in that order, for the same condition at test point "A". Alternately, tune T2 and T3 for the minimum voltage at test point "A". Repeat the tuning of L2, T1, and L1 for the same test condition.

The AMR-1 should now be tuned to respond to the input signal frequency.

NOTE: This tuning procedure will result in maximum selectivity, therefore, the 6 dB bandwidth specification cannot be guaranteed if this tuning procedure is used. Greater audio bandwidth can be obtained by slightly detuning T1 and L1.

In the event of malfunction, check the following symptoms and procedures:

- A. Carrier fail relay will not operate
 - 1. Check power supply voltage
 - 2. Short the collector of Q3 to ground and determine if relay is functional
 - 3. Check Q3 and D2
 - 4. Check antenna input RF level. It should be a minimum of 100 microvolts.
- B. No audio output
 - 1. Connect VOM to test point "A" and remove antenna. The voltage reading on the meter should rise. This indicates that IC-1 is working properly.
 - 2. Trace the signal through Q1, Q2, D1, Q4, and Q5 until trouble is located.
 - 3. Check power supply
 - 4. Perform alignment procedure
- C. Audio output distorted
 - 1. Check power supply voltage
 - 2. Insure that antenna input is not overloaded, by reducing antenna length.
 - 3. Perform alignment procedure
- D. Noise in audio output
 - 1. Check all grounds
 - 2. Antenna input signal level is probably too low, increase antenna length.
- E. All other problems should be referred to the factory by contacting the McMartin's Customer Service Manager.

VI PARTS LIST

The majority of the components used in the AMR-1 are of standard values and tolerances and are generally available from local electronics parts distributors. The following list includes those items of critical value and tolerance or components manufactured by McMartin Industries.

GENERAL PARTS

SYMBOL	P/N	DESCRIPTION
T4	900037	Power transformer
SW-1	480029	Power switch assembly
F1	280033	1/16 amp fuse

PRINTED CIRCUIT BOARD

SYMBOL	P/N	DESCRIPTION
T1, 2, 3	940014	Transformer
T5	910029	Output transformer
L1, 2	930098	Inductor
K1	470029	Carrier fail relay
IC-1	230048	CA3123E
Q1, 3, 4	201056	2N3569
Q2, 5	201049	SE4002
D1, 2	220006	IN87 diode
D3, 4	210008	IN4008 diode
Z1	220007	13 volt zener
C8		Selected in production

MHz

F

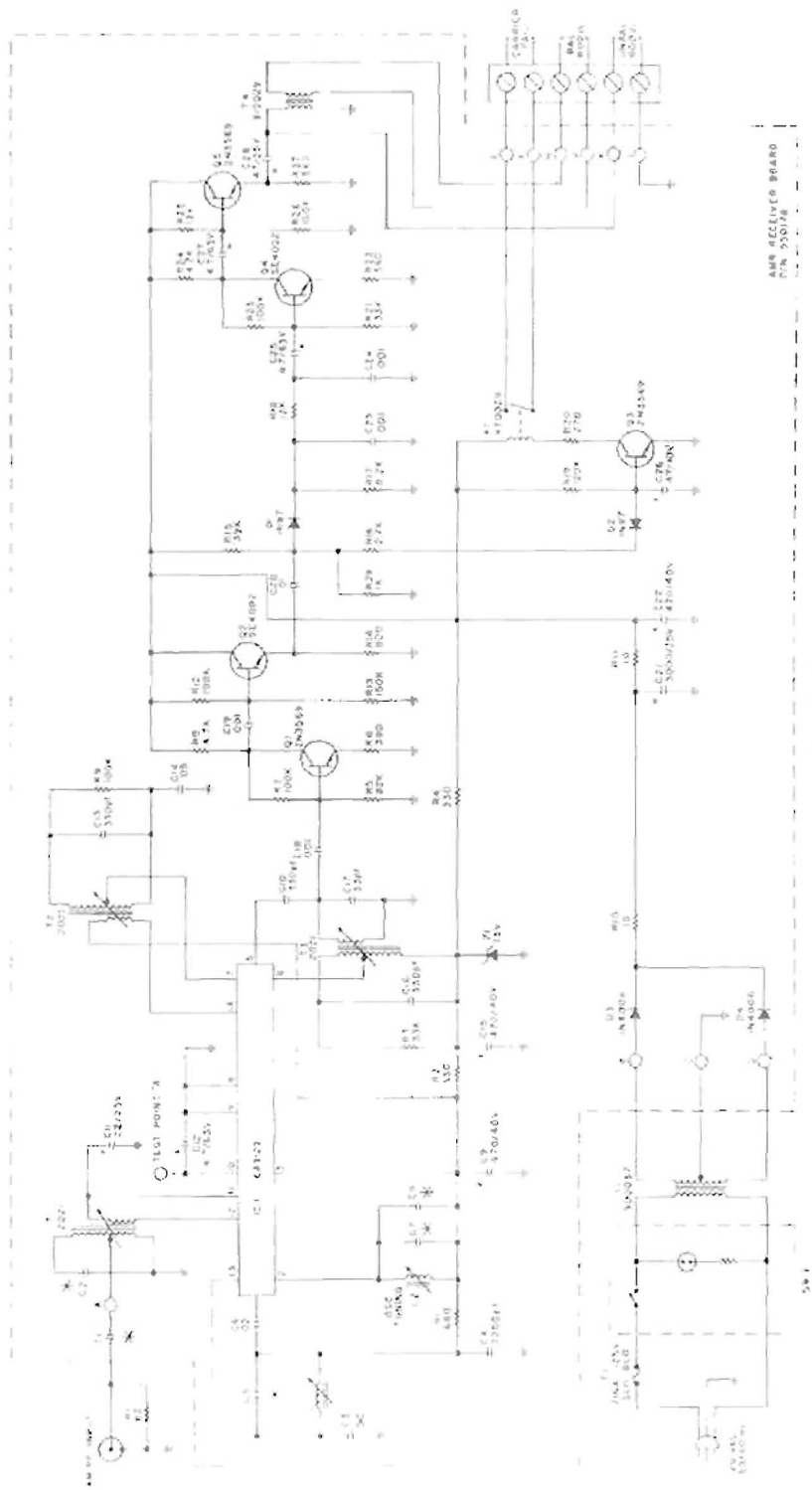
C

L

1.6

50pF

.0253 mH



FREQUENCY RANGE	INDUCTIVE VALUES IN P.P.
500-1000	270-420
1000-2000	180-240
2000-4000	120-180
4000-8000	80-120
8000-16000	50-80
16000-32000	30-50
32000-64000	20-30
64000-128000	15-20
128000-256000	10-15
256000-512000	7-10
512000-1024000	5-7
1024000-2048000	3-5
2048000-4096000	2-3
4096000-8192000	1.5-2
8192000-16384000	1-1.5
16384000-32768000	0.7-1
32768000-65536000	0.5-0.7
65536000-131072000	0.3-0.5
131072000-262144000	0.2-0.3
262144000-524288000	0.15-0.2
524288000-1048576000	0.1-0.15
1048576000-2097152000	0.07-0.1
2097152000-4194304000	0.05-0.07
4194304000-8388608000	0.03-0.05
8388608000-16777216000	0.02-0.03
16777216000-33554432000	0.015-0.02
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