SERVICE INFORMATION

FROM SERIAL NO. AD1001 TO AD5164

 McIntosh Laboratory Inc.  2 Chambers Street  Binghamton, New York
ELECTRICAL SPECIFICATIONS

SENSITIVITY
2μV for better than 35dB quieting. 2.5μV HF usable sensitivity Max., 1.5μV typical.

SELECTIVITY: HF

<table>
<thead>
<tr>
<th>ADJACENT CHANNEL</th>
<th>ALTERNATE CHANNEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>7dB</td>
</tr>
<tr>
<td>Narrow</td>
<td>22dB</td>
</tr>
<tr>
<td>Super-Narrow</td>
<td>55dB</td>
</tr>
</tbody>
</table>

SIGNAL TO NOISE RATIO
Better than 75dB below 100% modulation.

HARMONIC DISTORTION
Less than 0.37% for mono or stereo at 100% modulation 20Hz to 18kHz.
Typically less than 0.05% at 3kHz.

FREQUENCY RESPONSE
± 1dB 20Hz to 18kHz with standard 75μS de-emphasis.

CAPTURE RATIO
Better than 2.5dB HF.

SPURIOUS REJECTION
Greater than 100dB HF.

IMAGE REJECTION
Greater than 100dB at 100kHz HF.

STEREO SEPARATION
Better than 40dB at 1kHz.

SKI FILTER
500μV down from 67kHz to 74kHz; 750μV per octave slope.

POWER REQUIREMENTS
120VAC, 50 - 60Hz, 35W.

(NORMAL SELECTIVITY UNLESS OTHERWISE STATED)
1. Unless otherwise specified: Resistance values are in ohms, 1/4 watt, and 10% tolerance; Capacitance values smaller than 1 are in microfarads (µF); capacitance values greater than 1 are in picofarads (pF); inductors are in microhenries (µH).

2. Printed circuit board components are outlined on the schematics by dotted lines. The circled numbers around the dotted lines correspond to the numbers on the PC board layouts.

3. The heavy lines on the schematics denote the primary signal path.

4. The terminal numbering of rotary switches is for reference only.

5. All voltages indicated on the schematics are measured under the following conditions:
   a. Use of an 11 megohm input impedance VTVM.
   b. All voltages ±10% with respect to chassis ground.
   c. No signal at input or antenna terminals.
   d. AC input at 120 volts, 50/60 Hz.
   e. Front-panel controls at:
      - Tuning indicator: 100MHz (no signal) Muting Out
      - Volume: Fully CW Mode Auto
      - Selectivity: Normal Meter Sig. Strength
      - Filter: Out Panel Lights Bright

6. In units with Serial No.'s below AD1501 R612 is 3.3k and R613 is 150k.
7. In units with Serial No.'s below AD1508 C602 and C603 are .01µF.
8. In units with Serial No.'s below AD4878 C331 and C334 are .0033.
9. In units with Serial No.'s below AD5014 C26 is 5pF, C27 is 9pF and C25 is 0.5-3pF.
10. In units with Serial No.'s below AD5014 R15 and C34 are not used. In the power supply section D508, R512, C508 and C509 are not used.
Step 1 Before strunging unit,
turn pointer adjustment
screw until pulley "A"
is in the center of its
travel.

Step 2 String unit as shown.

Step 3 After strunging unit,
turn tuning shaft until
pointer is as far to
the left as it will go.
Then turn the pointer
adjustment screw until
pointer coincides with
the zero line of the
logging scale.

Step 4 Turn the tuning knob
making the pointer move
half way left and right.
From one pulley to the other.
Return pointer to the far left
and, if necessary, re-
adjust pointer position.

(To left side pulley) white
(TO side pulley and tuning shaft) black

(TO RIGHT SIDE PULLEY A) WHITE TO RIGHT SIDE
(TOP VIEW) TUNING CONDENSER DRAW

DIAL CORD SEQUENCE

POINTER DIAL STRINGING
MR 78 ALIGNMENT INSTRUCTIONS

All McIntosh tuners are carefully aligned and tested at the factory using the finest available test equipment. All McIntosh tuners will meet their published specifications when shipped from the factory.

After extensive operation, or servicing, it may be desirable to realign the tuner circuits for best performance. The charts below give complete information on the circuit realignment procedure for the MR 78.

The test equipment listed (or its equivalent) is necessary to properly align an MR 78. The accuracy of the alignment will be directly related to the accuracy and calibration of the test equipment used.

If the necessary test equipment is not available, alignment should not be attempted. For additional information, contact Customer Service Department, McIntosh Laboratory, Inc., 2 Chambers Street, Binghamton, New York 13903 (telephone 607-723-5127).

Alignment should be done in the following order: FM-MPX.

FM ALIGNMENT

NOTES:
1. Begin alignment procedure with selectivity switch in normal position, stereo filter out, mute off, mode on monaural, and meter on signal strength.
2. If tuner's RF circuits are known to be working, the IF alignment (Steps 1 - 4) may be performed using an 88 - 108 MHz generator (such as Sound Technology 1000A).

TEST EQUIPMENT REQUIRED
1. FM Signal Generator ( Measurement 188 or Sound Technology 1000A ).
2. VTVM (RCA WY96C).
3. Multiplexer Generator (Radiometer 59131 or Sound Technology 1000A).
4. 10.7 MHz FM Sweep Generator (Kay 385 or equivalent). (Not needed if Measurement 2/5 IF converter is available.)
5. 10.7 MHz Generator (preferably crystal controlled).
6. Oscilloscope (Hewlett-Packard 120B or equivalent).
7. Harmonic Distortion Analyzer (Hewlett-Packard 3334A or equivalent).
8. 10.7 MHz 2/5 kHz Sweep Harmonic Generator.
**MR 78 ALIGNMENT INSTRUCTIONS**

All McIntosh tuners are carefully aligned and tested at the factory using the finest available test equipment. All McIntosh tuners will meet their published specifications when shipped from the factory.

After extensive operation, or servicing, it may be desirable to realign the turn-circuits for basic performance. The charts below give complete information on the circuit realignment procedure for the MR 78.

The test equipment listed (or its equivalent) is necessary to properly align an MR 78. The accuracy of the alignment will be directly related to the accuracy and calibration of the test equipment used.

If the necessary test equipment is not available, alignment should not be attempted.

For additional information, contact Customer Service Department, McIntosh Laboratory, Inc., 2 Chambers Street, Binghamton, New York 13903 (telephone 607-723-5512).

Alignment should be done in the following order: FM-MPX.

---

**FM ALIGNMENT**

**NOTES:**

1. Begin alignment procedure with selectivity switch in normal position, stereo filter out, muting off, mode on mono, and meter on signal strength.

2. If tuners RF circuits are known to be working, the IF alignment (Steps 1 - 4) may be performed using an BB or 10BH Hz generator (such as Sound Technology 1000A).

---

<table>
<thead>
<tr>
<th>STEP</th>
<th>FUNCTION</th>
<th>SIGNAL GENERATOR</th>
<th>INDICATOR</th>
<th>ADJUST</th>
<th>TEST LIMITS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Point of no interference, or no low interference between 10 - 100 MHz</td>
<td>Input 10 - 7 MHz</td>
<td>FM or IF sweeper</td>
<td>AFC</td>
<td>Maximum height of 10 - 7 MHz marker and last syllable of 10 - 7 MHz marker, or</td>
<td>Raw signal generator output low to prevent flutter. PP1 voltage should not exceed 0.5 volts. Rino filters do not have a flattopped response. See typical response curve (Fig. 2). If proper response cannot be obtained go to Step 2. Otherwise go to Step 3. Bottom covers must be on front end and discriminator chassis. Pole gap or second distinct sweep if either cover is removed.</td>
</tr>
<tr>
<td>2</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>Carefully peak top and bottom cuts of T202, T203, T204, and T206 for maximum gain at 10 - 7 MHz. Center of IF bandpass, and then touch up all caps for best symmetry to obtain bandpass on opposite page. Do not stagger tune. Do not touch any other IF tuned circuits. Be sure selectivity switch is in normal position.</td>
</tr>
</tbody>
</table>
### Table with Instructions

<table>
<thead>
<tr>
<th>Page</th>
<th>Adjustments</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Same Same Same Same Same Same Same</td>
<td>Carefully peak top and bottom corners of 7031, 7032, and 7128 for maximum gain at 10.7 MHz (center of IF bandpass) and then touch up all corners for best symmetry to obtain bandpass in Fig. 3 below. Do not stagger tune. Do not touch any adjustments done in Step 2 above.</td>
</tr>
<tr>
<td>4</td>
<td>Same Same Same Same Same Same Same</td>
<td>Move selectivity switch to Super Narrow Position. Use included screwdriver.</td>
</tr>
<tr>
<td>5</td>
<td>Same 10.7 MHz Inject Signal near IF Chassis, CK VTH TP2 M301 Adjust B510. Zero DC at TP 2.</td>
<td>Move selectivity switch to Narrow Position. With tuner horizontal and right side up, M301 should be centered. 10.7 MHz frequency must be precise for this adjustment.</td>
</tr>
<tr>
<td>6</td>
<td>10.7 MHz or 506-706 MHz, Inject Signal output or IF Chassis or tuner antenna terminals. FM 475 kHz ± 60 Hz rate. Oscilloscope, Fixed audio output jacks. Bias pot M302. Maximum audio output.</td>
<td>With IF output ± clipped, reduce audio output by adjusting R317; muting off, stereo filter out.</td>
</tr>
<tr>
<td>7</td>
<td>116 MHz, 1060 MHz, 3000 antenna terminals thru matching network or balun. VTH to TP 1 (and scope to L or R audio output). Oscillator Trimmer CET. Maximum negative voltage at TP 1.</td>
<td>Keep TP 1 voltage below one volt. Observe signal on scope for reference.</td>
</tr>
<tr>
<td>8</td>
<td>90 MHz 90 MHz Same Same Same Same Same</td>
<td>Same, Repeat Steps 5 and 6 until dial is accurate.</td>
</tr>
<tr>
<td>9</td>
<td>104 MHz 104 MHz Same Same Same Same Same Same Same Adjust E5, C16, and C17.</td>
<td>Antenna selector switch should be in the High Gain Position for the following: Keep TP 1 voltage below one volt. Recheck signal input as circuits align.</td>
</tr>
<tr>
<td>10</td>
<td>92 MHz 92 MHz Same Same Same Same Same Same Same Same Same Same Same</td>
<td>Adjust E5, C16, and C17. Noise and distortion should be more than 30dB down. Molex wire with no modulation should be more than Molex wire. Touch up E5, C16, and C17 if necessary.</td>
</tr>
<tr>
<td>11</td>
<td>104 MHz 104 MHz Same Same</td>
<td>Harmonic distortion analyzer to L or R output.</td>
</tr>
</tbody>
</table>
MULTIPLEX DECODER ALIGNMENT

<table>
<thead>
<tr>
<th>STEP</th>
<th>TUNER DIAL SETTING</th>
<th>SIGNAL GENERATOR</th>
<th>INDICATOR</th>
<th>ADJUST</th>
<th>TEST LIMITS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step</td>
<td>100 MHz or point of no interference</td>
<td>Same as tuner diagram, 2000 ohm terminals with approximately 1000Wq signal ( thru matching network or balun)</td>
<td>Mono (R = L) and 100W modulation</td>
<td>Oscilloscope and AC-VTM connected to either fixed audio output jack</td>
<td>8317 2.5V RMS at fixed output jacks</td>
<td>Make sure tuning meter is at zero center. Maximum indication on signal strength meter and center indication on tuning meter should coincide.</td>
</tr>
<tr>
<td>------</td>
<td>-----------------------------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2</td>
<td>Same</td>
<td>Same</td>
<td>Oscilloscope</td>
<td>Pin 13 of IC on stereo decoder board</td>
<td>L302 and L303</td>
<td>Adjust L302 for maximum 5kHz, L303 for minimum 67kHz. Do not attempt to detect 5kHz at tuner output jacks. Ground scope probe close to multiplex board. Repeat adjustments of L302 and L303 until minimum condition is reached.</td>
</tr>
<tr>
<td>3</td>
<td>Same</td>
<td>Same</td>
<td>Oscilloscope</td>
<td>Base of Q305</td>
<td>L301 and T501</td>
<td>For maximum amplitude. Decrease pilot level, if necessary, so that 19 kHz circuits do not limit or saturate.</td>
</tr>
<tr>
<td>4</td>
<td>Same</td>
<td>Same</td>
<td>Oscilloscope</td>
<td>F302 Pin 1 or 2</td>
<td>T302 top and bottom</td>
<td>Maximum amplitude. Use normal (9) pilot level. Remove scope probe before going to step 5.</td>
</tr>
<tr>
<td>5</td>
<td>Same</td>
<td>Same</td>
<td>Stereo 1 kHz (1000 Hz modulation) left only pilot</td>
<td>Right fixed output jack</td>
<td>T302 bottom (sec) and R423</td>
<td>400F separation or more. First set R401 to maximum resistance. (Fully clockwise looking from front of tuner.) Adjust T300 bottom tuning slug (sec) for minimum output on right (unattenuated) channel. Then adjust R401 for maximum separation. Repeat the adjustment of T302 bottom and R401 until maximum separation is obtained. Then reverse channels and measure left channel separation.</td>
</tr>
<tr>
<td>6</td>
<td>Same</td>
<td>Same</td>
<td>Stereo pilot carrier modulation only</td>
<td>AC-VTM</td>
<td>L or R output jack</td>
<td>Less than 50% of residual. With modulation off but pilot on. (NOTE: Stereo generator must have low spurious output.)</td>
</tr>
</tbody>
</table>

**FIG. 1: ANTENNA MATCHING NETWORK**

**FIG. 3: TYPICAL IF RESPONSE CURVE NORMAL**

**FIG. 5: TYPICAL IF RESPONSE CURVE NARROW**
REPLACEMENT PARTS

All parts not listed are common items obtainable from radio parts distributors. Replacement parts may be obtained when ordered by PART NUMBER from:

McIntosh Laboratories, Inc.
Customer Service Department
2 Chambers Street
Poughkeepsie, New York 12601
(telephone 607-723-3512)

CAPACITORY

C79,30 Silver Mica 270pF 061-010
C704 Electrolytic 10 µF 35V 066-173
C804 Tantal. Electrolytic 10 µF 20V 066-239
C806 Tant. Electrolytic 10 µF 25V 066-240
C808 Tant. Electrolytic 6.3µF 35V 066-146
C809 Poly styrene 1700pF 061-093
C100 Tant. Electrolytic 10 µF 20V 066-239
C110 Poly styrene 1500pF 061-097
C114 Tant. Electrolytic 6.3µF 35V 066-146
C116 Tant. Electrolytic 6.3µF 35V 066-146
C123 Tant. Electrolytic 1µF 50V 066-424
C125 Tant. Electrolytic 22µF 25V 066-420
C132,327 Poly styrene 5700pF 064-091
C138 Tant. Electrolytic 6.3µF 35V 066-146
C141 Poly styrene .0083µF 061-090
C144 Poly styrene .0033µF 061-090
C145 Poly styrene 1700pF 061-093
C149 Poly styrene .033µF 061-089
C154,002 Electrolytic 22µF 35V 066-79
C157 Electrolytic 1µF 50V 066-121
C162 Tant. Electrolytic 2700pF 064-093
C163 Tant. Electrolytic 1µF 50V 066-242
C166 Electrolytic 1µF 50V 066-121
C167 Electrolytic 2200pF 50V 066-141
C168 Electrolytic 500/100/50/100/50/50 066-155
C169 Electrolytic 500/50/50/30 066-155
C170 Electrolytic 150mF 63V 066-79
C177 Electrolytic 47µF 16V 066-215

DIODES

01 Pin diode 070-055
02 Si. signal diode 070-047
03 Si. diode 070-055
3104,102 Si. signal diode 070-047
0103 Si. signal diode 070-057
3104,105 Ge. signal diode 070-003

0201,202 Si. signal diode 070-047
0203 Si. diode 070-055
0204 Ge. signal diode 070-003
0301 Si. signal diode 070-047
0206,207 Ge. signal diode 070-003
0208,209 Si. signal diode 070-047
0210 Ge. signal diode 070-003
3111,212 Si. signal diode 070-047
3113,214 Ge. signal diode 070-003
0215,216 Ge. signal diode 070-003
0201,207 Si. signal diode 070-047
0203,206 Si. signal diode 070-047
0205,206 Si. signal diode 070-047
0208,209 Si. signal diode 070-047
3110,311 Si. signal diode 070-047
0401 Si. signal diode 070-047
4201,503 Si. signal diode 070-031
0204 Si. signal diode 070-047
0205 Zener diode 2W 070-066
0206 Si. signal diode 070-031
0601,602 Si. signal diode 070-081
0603,604 Si. signal diode 070-081

ELECTRES

L1 Antenna Coll 137-133
L2 RF Input Coll 137-147
L31 RF output Coll 137-131
L4 Mixer Coll 137-130
L5 Oscillator Coll 125-137
L6 Oxide 75µH 127-013
L7 Oxide 1.7µH 127-033
L81 Filter Coll (19KHz) 127-093
L801,3 Filter Coll (SGA) 127-093
L801,3 Oxide 10M 127-092
L801 Oxide 3.2µH 127-001

TRANSISTORS

Q1 Si. N Channel J.F.E.T. 132-097
Q2 Si. NPN transistor 132-066
Q3 Si. NPN transistor 132-087
Q101,107 M.O.S. F.E.T. 132-088
Q201,202 Si. Junction FET 132-068
Q201,203 Si. NPN transistor 132-091
Q202 Si. NPN transistor 132-094
Q203 Si. NPN transistor 132-097
Q204,305 Si. NPN transistor 132-094
Q316 SL. NPN transistor 127-095
Q317 SL. PNP transistor 127-096
Q318 SL. NPN transistor 127-090
Q319 SL. PNP transistor 127-096
Q320 SL. NPN transistor 127-098
Q321 SL. PNP transistor 127-096
Q322 SL. NPN transistor 127-094
Q323 SL. PNP transistor 127-085
Q324 SL. NPN transistor 127-052
Q325 SL. PNP transistor 127-066
FUSICS
F501 Fuse 5A, 250V 089-020
POTENTIOMETERS
R312 MWO 10k adjustable 134-160
R216 MWFO full scale adjustable 134-160
R317 Audio level 134-158
R422 Volume control 134-119
R423 Separation knob 134-160
R403 Bias knob 134-156
R410 MBIO adjustable 134-176
RESISTORS
R10 wire 2200 51 1M 139-076
R333, 33K film 33K 11 1M 160-015
R338, 139 film 33K 11 1M 160-015
R503 wire 150 10 1M 139-041
R508 wire 200 10 1M 139-045
R509 wire 1.8K 10 1M 139-077
R605, 606 Wire 2200 5 1M 139-076
R607, 608 film 56.20 1 1M 164-016
SWITCHES
S2 Selectivity switch 166-156
S301 Mode selector 166-160
S302 Muting switch 166-159
S401 Stereo filter switch 166-158
S402 Meter function switch 166-157
TRANSFORMERS
T1 B отношения 03-226
T2 PM mixer 162-062
T201 PM IF filter input 162-053
T202 PM IF filter output 162-052
T203 PM IF filter input 162-053
T204 PM IF filter output 162-052
T205 PM IF filter input 162-053
T206 PM IF filter output 162-052
T207 PM IF filter input 162-053
T308 IF IF filter output 162-052
T301 RF transformer (19kHz) 162-055
T302 RF transformer (38kHz) 162-056
INTEGRATED CIRCUITS
IC1 Integrated circuit 133-006
IC101, 102 Integrated circuit 133-102
IC104, 13 Integrated circuit 133-004
METERS
M301 Tuning meter 124-020
M401 Signal strength meter 124-019
RELAY
R301 Reed relay 087-008
LAMPS
Function lamp 058-043
Stereo lamp 058-042
M160 (Meter lamp) 058-008
M166 (Front panel) 058-014
Testotan lamp (Dial glass) 058-032
FRONT PANEL & TRIM
Front panel 044-305
Front panel end caps 018-156
Tuning knob 044-357
Selectivity knob 090-175
Meter knob 090-175
Filter knob 090-175
Muting knob 090-175
Mode knob 090-175
Volume knob 090-175
MOUNTING SYSTEM
Shelf brik (right) 043-592
Shelf brik (left) 043-593
Mounting temp 108 038-179
Hardware Package 044-151
MISCELLANEOUS
FM dipole antenna 170-033
Dial glass 044-476
Pointers 044-387
Dial cord (complete) 044-475
Fusholder 178-001
AE power cord 170-021
Shipping carton 044-743
Owners manual 038-868
Plastic feet 017-041
Push terminal (antenna) 071-033
Audio cable 6' 170-015