SERVICE INFORMATION

STARTING WITH SERIAL NO. 20801

McINTOSH LABORATORY INC. 2 CHAMBERS STREET BINGHAMTON, NEW YORK
**ELECTRICAL SPECIFICATIONS**

**Usable Sensitivity**
2.5 microvolts at 100% modulation for less than 3% total noise and harmonic distortion.

**Audio Frequency Response**
Within 1/2 db from 20 to 20,000 cycles.

**Distortion**
Less than 0.5% at 100% modulation.

**Capture Ratio**
1.5 db at 100% modulation.

**Mutual**
At least 60 db noise reduction between stations.

**Image Rejection**
Better than 80 db at 90 MHz.

**Hum**
Better than 70 db below 100% modulation.

**Output**
Approximately 2.5 volts; low impedance.

**Multiplex Channel Separation**
Better than 35 db at 1000 cycles.

**Multiplex Filter**
Greater than 48 db suppression of 10 kHz pilot and 38 kHz carrier.

**SCA Filter**
50 db down at 67 kHz to 74 kHz.

**Power Consumption**
70 watts, 105 to 125 volts, 50 to 60 cycles.
<table>
<thead>
<tr>
<th>STEP</th>
<th>TUNER DIAL SETTING</th>
<th>FREQUENCY</th>
<th>SIGNAL GENERATOR</th>
<th>MODULATION</th>
<th>INDICATOR</th>
<th>CONNECTED TO</th>
<th>ADJUST</th>
<th>TEST LIMITS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>100kHz</td>
<td>100 kHz</td>
<td></td>
<td>DC VVM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>100kHz</td>
<td>100 kHz</td>
<td></td>
<td>VFM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Same</td>
<td>Same</td>
<td>12kHz (100kHz)</td>
<td></td>
<td>Audio VVM</td>
<td>Pin 1 or 2 of 38kHz transformer (17)</td>
<td>38kHz transformer (Bottom Core)</td>
<td>Adjust for maximum voltage</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td></td>
<td>Audio VVM</td>
<td>L or R output jack</td>
<td>38kHz transformer (Top Core)</td>
<td>Adjust for stable scope display</td>
<td>On the top of the chassis is an opening labeled “RF Light Adjust.” Insert a screwdriver into this opening from the top of the chassis and turn the control completely clockwise.</td>
</tr>
<tr>
<td>5</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td></td>
<td>Same</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td></td>
<td>Same</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Same</td>
<td>Same</td>
<td>Turn off 1 kHz audio modulation</td>
<td></td>
<td>Same</td>
<td>This step checks the rejection of 1kHz and 3kHz frequencies. Residual output should be at least 40db below modulated output.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Tune to a strong MORO FM station</td>
<td>Same</td>
<td>NFX stereo indicator light on tuner</td>
<td></td>
<td>NFX light adj. control (R)</td>
<td>MPX</td>
<td>Sure control until light comes on. Then back off just enough to cause the light to go off. Then back off about 1/8 of a turn more. Light should operate ORAY on an MPX signal.</td>
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<td></td>
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</tr>
</tbody>
</table>

**MULTIPLEX DECODER ALIGNMENT**

**TEST EQUIPMENT REQUIRED**

1. PH Signal Generator (Measurements 20A or equivalent)
2. VFM
3. Multiplexer Generator (RCX MR-21A or equivalent)
4. 10.7 MHz Generator (Preferably crystal controlled)
5. Oscilloscope (Hewlett-Packard 1208 or equivalent)
6. Harmonic Distortion Analyzer, desirable — was not essential (Hewlett-Packard 3506 or equivalent)
<table>
<thead>
<tr>
<th>STEP</th>
<th>TUNER DIAL SETTING</th>
<th>SIGNAL GENERATOR</th>
<th>CONTROLLER</th>
<th>MODULATION</th>
<th>TYPE</th>
<th>CONNECTED TO</th>
<th>ADJUST</th>
<th>TEST LIMITS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Point of no interfer.</td>
<td>10.25MHz</td>
<td>Through external 0.01\mu F capacitor to pin 7 of 2242 mixer</td>
<td>CW</td>
<td>VTM</td>
<td>TP #1</td>
<td>Top (Secondary and bottom (Primary) coils of T1, T2, T3, and T4)</td>
<td>Maximum negative voltage</td>
<td>Shunt to ground the winding not being adjusted with a 0.1\mu F capacitor in series with a 5k ohm resistor. Alternate signal generator until output voltage at TP #1 is less than 1.5 volts with one IF transformer winding shunted. IF transformers have terminal #1 marked with a green dot and are numbered clockwise.</td>
</tr>
<tr>
<td>2</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>Pin 6 of 75</td>
<td>75 Primary (Bottom coil)</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
</tr>
<tr>
<td>3</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>Junction of C4 and R12</td>
<td>75 Secondary (Top core)</td>
<td>Adj. For 00 volts</td>
<td>Same</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>Pin 6</td>
<td>75 Primary (Bottom coil)</td>
<td>Maximum negative voltage</td>
<td>If a distortion analyzer is available, unit this step at this time. Adjust TP primary after step 4. At this time, use a strong signal from FM generator, modulate 100kHz, and use 75kHz deviation. Adjust primary for minimum distortion. Should be less than 0.5%.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>TP #2</td>
<td>75 Secondary (Top core)</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
</tr>
<tr>
<td>6</td>
<td>100kHz</td>
<td>100kHz</td>
<td>300 ohm antenna terminals (w/ Matching network)</td>
<td>120 cycles 75kHz deviation (100kHz modulation)</td>
<td>VTM connected to TP #1 and scope connected to L or R audio output</td>
<td>Oscillator trimmer</td>
<td>Maximum negative voltage</td>
<td>As output increases, alternate signal generator to keep maximum output at TP #1 to a low level. By doing so, precise alignment can be achieved.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>100kHz</td>
<td>100kHz</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>Oscillator coil</td>
<td>Same</td>
<td>Same</td>
<td>Repeat steps 6 and 7 until dial calibration is accurate.</td>
</tr>
<tr>
<td>8</td>
<td>100kHz</td>
<td>100kHz</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>Mixer trimmer, RF transformer, and Antenna tuner</td>
<td>Same</td>
<td>Same</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>100kHz</td>
<td>100kHz</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>Mixer Rf, RF and antenna coil tuning slugs</td>
<td>Same</td>
<td>Same</td>
<td>Repeat steps 8 and 9 until output is as high as possible.</td>
</tr>
<tr>
<td>10</td>
<td>Same</td>
<td>100kHz</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
<td>Mixer adjust. control</td>
<td>Same</td>
<td>Same</td>
<td>Turn muting switch to &quot;FM&quot; position. Adjust muting control until background noise just disappears.</td>
</tr>
<tr>
<td>11</td>
<td>100kHz</td>
<td>100kHz</td>
<td>300 cycles, 75kHz deviation (100kHz modulation) attenuated to 2.5\mu V output</td>
<td>VTM connected to TP #1 and scope connected to L or R audio output</td>
<td>20MHz sensitivity</td>
<td>For 5% total noise and distortion</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Note: If signal generator has output characteristics other than 50 ohm internal impedance, use a resistor of 500 ohm; less internal generator impedance.
1. R104 does not appear in units below serial number 75B50.
2. R29 had a different value in earlier units.
3. C6 was 10pF in earlier units.
4. R27 was either 1.2K ohms or 2.0K ohms in earlier units.
5. R103 does not appear in units below serial number 67B00.
6. L6 was not used in some units below serial number 21B50; L1 was link coupled to L2.
7. C100 was used in some units below serial number 66B55.
8. R36 was 220K ohms in earlier units.
9. C101 does not appear in some earlier units.
10. In all units below serial number 62B00, C7 was 220pF and C43 was .01uF (disc); R102 was not used.
11. In all units below serial number 58B00, R92 and 93 was 680 ohms, R43 was 0.3K, and R64 was 220K.
12. R96 was 10 ohms in all units below serial number 39B00.
13. C58 was a .01uF (2 section) capacitor in earlier units.
15. C99 and R100 do not appear in units below serial number 45B00. Refer to McIntosh Service Bulletin #111 (part number 038-141).
16. C55 was 10pF in all units below serial number 45B00.
17. R3 was 5K ohms in some earlier units.
18. In all units below serial number 86B60, C71 is .0027 5% 100V. (Part No. 063-001)
## Replacement Parts

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

McIntosh Laboratory, Inc.
Customer Service Department
2 Chambers Street
Dobbs Plains, New York 13003
(telephone 607-723-3018)

### Capacitors

<table>
<thead>
<tr>
<th>Symbol Number</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>C35</td>
<td>Electrolytic 10μF 25V MF</td>
<td>066-005</td>
</tr>
<tr>
<td>C43</td>
<td>Electrolytic 11μF 25V</td>
<td>066-031</td>
</tr>
<tr>
<td>C55</td>
<td>Electrolytic 40μF 200V</td>
<td>066-049</td>
</tr>
<tr>
<td>C68</td>
<td>Electrolytic 50/50/50μF 200V</td>
<td>066-036</td>
</tr>
<tr>
<td>C71</td>
<td>Nylar Film 3300μF 125V</td>
<td>064-074</td>
</tr>
<tr>
<td>C75</td>
<td>Nylar Film 1μF 250V</td>
<td>064-037</td>
</tr>
<tr>
<td>C78</td>
<td>Mica Film 1/4μF 100V</td>
<td>063-005</td>
</tr>
<tr>
<td>C99</td>
<td>Mica Film 4/7μF 100V</td>
<td>063-035</td>
</tr>
<tr>
<td>C88</td>
<td>Electrolytic 50μF 12V</td>
<td>064-021</td>
</tr>
<tr>
<td>C93, C94</td>
<td>Electrolytic 1μF 150V</td>
<td>066-050</td>
</tr>
<tr>
<td>C95, C96</td>
<td>Electrolytic 10μF 3V</td>
<td>066-110</td>
</tr>
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</table>

### Diodes

<table>
<thead>
<tr>
<th>Symbol Number</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>Se. rectifier</td>
<td>070-005</td>
</tr>
<tr>
<td>D2</td>
<td>Se. rectifier</td>
<td>070-005</td>
</tr>
<tr>
<td>D3</td>
<td>Variable cap. diode</td>
<td>070-020</td>
</tr>
<tr>
<td>D4</td>
<td>Si. signal diode</td>
<td>070-002</td>
</tr>
<tr>
<td>D5</td>
<td>Si. signal diode</td>
<td>070-021</td>
</tr>
<tr>
<td>D6</td>
<td>Si. signal diode</td>
<td>070-022</td>
</tr>
<tr>
<td>D7</td>
<td>Si. signal diode</td>
<td>070-022</td>
</tr>
<tr>
<td>D8</td>
<td>Si. signal diode</td>
<td>070-022</td>
</tr>
<tr>
<td>D9</td>
<td>Si. signal diode</td>
<td>070-022</td>
</tr>
<tr>
<td>D10</td>
<td>Ge. signal diode</td>
<td>070-003</td>
</tr>
<tr>
<td>D11</td>
<td>Ge. signal diode</td>
<td>070-003</td>
</tr>
<tr>
<td>D12</td>
<td>Ge. signal diode</td>
<td>070-003</td>
</tr>
<tr>
<td>D13</td>
<td>Ge. signal diode</td>
<td>070-003</td>
</tr>
<tr>
<td>D14</td>
<td>Si. rectifier</td>
<td>070-030</td>
</tr>
<tr>
<td>D15</td>
<td>Emitter diode 5.6V</td>
<td>070-035</td>
</tr>
</tbody>
</table>

### Fuses

<table>
<thead>
<tr>
<th>Symbol Number</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>Fuse 1 Amp 310-320</td>
<td>089-001</td>
</tr>
</tbody>
</table>

### Resistors

<table>
<thead>
<tr>
<th>Symbol Number</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2</td>
<td>RF coil</td>
<td>122-007</td>
</tr>
<tr>
<td>L3</td>
<td>Mixer coil</td>
<td>122-018</td>
</tr>
<tr>
<td>L4</td>
<td>Oscillator coil</td>
<td>122-007</td>
</tr>
<tr>
<td>L5</td>
<td>Filter coil (19kHz phase)</td>
<td>122-008</td>
</tr>
<tr>
<td>L6</td>
<td>Choke 1.5μH</td>
<td>122-012</td>
</tr>
<tr>
<td>L7</td>
<td>Choke 4.7μH</td>
<td>122-010</td>
</tr>
<tr>
<td>L8</td>
<td>Choke 2.5μH</td>
<td>122-013</td>
</tr>
<tr>
<td>L9</td>
<td>Choke 1.2μH</td>
<td>122-011</td>
</tr>
<tr>
<td>L10</td>
<td>Parasitic choke</td>
<td>122-008</td>
</tr>
<tr>
<td>L11</td>
<td>Choke 1.2μH</td>
<td>122-011</td>
</tr>
<tr>
<td>L12</td>
<td>Choke 5μH</td>
<td>122-013</td>
</tr>
<tr>
<td>L13</td>
<td>Choke 1.5μH</td>
<td>122-012</td>
</tr>
<tr>
<td>L14</td>
<td>Choke 2.5μH</td>
<td>122-011</td>
</tr>
<tr>
<td>L15</td>
<td>Choke 7μH</td>
<td>122-013</td>
</tr>
<tr>
<td>L16</td>
<td>Choke 1.2μH</td>
<td>122-011</td>
</tr>
<tr>
<td>L17</td>
<td>Choke 2.5μH</td>
<td>122-001</td>
</tr>
<tr>
<td>L18</td>
<td>Choke 2.5μH</td>
<td>122-001</td>
</tr>
<tr>
<td>L19</td>
<td>Choke 1.2μH</td>
<td>122-016</td>
</tr>
<tr>
<td>L20</td>
<td>Choke 1.2μH</td>
<td>122-011</td>
</tr>
<tr>
<td>L21</td>
<td>Choke 1.2μH</td>
<td>122-011</td>
</tr>
<tr>
<td>L22</td>
<td>Choke 1.2μH</td>
<td>122-010</td>
</tr>
</tbody>
</table>

### Motors

<table>
<thead>
<tr>
<th>Symbol Number</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>Signal strength meter</td>
<td>121-005</td>
</tr>
<tr>
<td>M2</td>
<td>Tuning meter</td>
<td>121-006</td>
</tr>
</tbody>
</table>

### Transistors

<table>
<thead>
<tr>
<th>Symbol Number</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>Si. NPN transistor</td>
<td>122-012</td>
</tr>
</tbody>
</table>

### Potentiometers

<table>
<thead>
<tr>
<th>Symbol Number</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>A.F. control</td>
<td>130-008</td>
</tr>
<tr>
<td>R2</td>
<td>Muting adjust</td>
<td>130-003</td>
</tr>
<tr>
<td>R3</td>
<td>M/V light adjust</td>
<td>130-002</td>
</tr>
<tr>
<td>R4</td>
<td>Volume control</td>
<td>130-007</td>
</tr>
<tr>
<td>R5</td>
<td>Output adjust</td>
<td>130-001</td>
</tr>
</tbody>
</table>

### Resistors

<table>
<thead>
<tr>
<th>Symbol Number</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>R52</td>
<td>Wirewound 220 ohms SW</td>
<td>139-009</td>
</tr>
<tr>
<td>R53</td>
<td>Wirewound 220 ohms SW</td>
<td>139-009</td>
</tr>
<tr>
<td>R56</td>
<td>Wirewound 220 ohms SW</td>
<td>139-005</td>
</tr>
</tbody>
</table>

### Switches

<table>
<thead>
<tr>
<th>Symbol Number</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>Muting switch</td>
<td>140-002</td>
</tr>
<tr>
<td>S2</td>
<td>Mode switch</td>
<td>140-003</td>
</tr>
<tr>
<td>S3</td>
<td>Lamp intensity switch 110/0-003</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol Number</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V2</td>
<td></td>
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<td>V3</td>
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<td>V4</td>
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<td>V5</td>
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<tr>
<td>V6</td>
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<tr>
<td>V7</td>
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<td>V8</td>
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<td>V9</td>
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<tr>
<td>V10</td>
<td></td>
<td></td>
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<tr>
<td>V11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V13</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Shelf bracket (left)  043-593
Mounting template #100  038-179
Hardware package  043-1560

MISCELLANEOUS ITEMS

LKR network  144-010
SRA filter  190-004
PM dipole antenna  170-033
Dial glass  016-073
Pointer  043-811
Coax connector (75 ohm)  127-015
Line cord  170-021
Dial cord  043-815
Fuseholder  178-001
Shipping carton  013-947
Owners manual  035-009
Plastic feet  017-411
Tube shield (7 pin)  073-005
Tube shield (9 pin)  073-006

Schematic Part No. 038-331