CAUTION: This is a FISHER precision high-fidelity instrument. It should be serviced only by qualified personnel trained in the repair of transistor equipment and printed circuitry.

TEST EQUIPMENT REQUIRED

The following are needed to completely test and align modern high-fidelity instruments such as amplifiers, tuners and receivers:

- Vacuum-Tube Voltmeter
  (100-mV DC scale)
- Audio Vacuum-Tube Voltmeter
  (10-mV AC scale)
- Oscilloscope (Flat to 100 KHz Minimum)
- Audio (Sine-Wave) Generator
- Intermodulation Distortion Analyzer
- Harmonic Distortion Analyzer
- AM/FM Signal Generator
- Multiplex Generator (preferably with RF output — FISHER Model 300 or equal)
- 10.7-MHz Sweep Generator
- 455-KHz Sweep Generator
- Line Voltage Autotransformer or Voltage Regulator
- 2 - Load Resistors, 4 or 8 Ohm, 50 Watt
- 2 - Full Range Speakers for Listening Tests
- Stereo Source — Turntable or Tape Recorder
- for Listening Tests
- Soldering Iron with Small Tip
- Fully insulated from Power Line
- Section Desoldering Tool

PRECAUTIONS

Many of these items are included just as a reminder — they are normal procedures for experienced technicians. Shortcuts can be taken but often they cause additional damage to transistors, circuit components or the printed-circuit board.

Soldering — A well-trained, hot, clean soldering iron tip will make it easier to solder without damage to the printed-circuit board or the many circuit components mounted on it. It is not the wattage of the iron that counts — it is the heat available at the tip. Some 50-watt irons reach temperatures of 1,000°F — others will have ratings as low as 20 watts. Small-diameter tips should be used for single solder connections — larger pyramidal and chisel tips are needed for larger areas.

- When removing defective resistors, capacitors, etc., the leads should be cut as close to the body of the circuit component as possible. (If the part is not being returned for in-warranty factory replacement it may be cut in half — with diagonal-cutting pliers — to make removal easier.)
- Special de-soldering tips are made for unsoldering multiple-terminal units like IF transformers and electrolytic capacitors. By unsoldering all terminals at the same time the part can be removed with little chance of breaking the printed-circuit board.
- Always disconnect the chassis from the power line when soldering. Turning the power switch OFF is not enough. Power-line leakage paths, through the heating element, can destroy transistors.

Transistors — Never attempt to do any work on the transistors amplifiers without first disconnecting the AC linecord and waiting until the power supply filter-capacitors have discharged.

- Guard against shorts — it takes only an instant for a base-to-collector short to destroy that transistor and possibly others direct-coupled to it. In the time it takes for a dropped machine screw, washer or even the screwdriver, to glance off a pair of socket terminals (or between a terminal and the chassis) a transistor can be ruined.
- DO NOT bias the base of any transistor to, or near, the same voltage applied to its collector.
- DO NOT use an ohmmeter for testing transistors. The voltage applied through the test probes may be higher than the base-emitter breakdown voltage of the transistor.

Output Stage and Driver — Replacements for output and driver transistors, if necessary, must be made from the same beta group as the original type. The beta group is indicated by a colored dot on the mounting flange of the transistor. Be sure to include this information, when ordering replacement transistors.

- If one output transistor burns out (open or shorts), always remove ALL output transistors in that channel and check the bias adjustment, the control and other parts in the network with an ohmmeter before inserting a new transistor. All output transistors in one channel will be destroyed if the base-biasing circuit is open on the emitter end.

- When mounting a replacement power transistor be sure the bottom of the flange, the mica insulator and the surface of the heat sink are free of foreign matter. Dust and grit can prevent perfect contact reducing heat transfer to the heat sink. Metallic particles can puncture the insulator and cause shorts — ruining the transistor.

- Silicone grease must be used between the transistor and the mica insulator and between the mica and the heat sink for best heat conduction. (Use Dow-Corning DC-3 or C201094 or equivalent compounds made for power transistor heat conduction.)

- Use care when making connections to speakers and output terminals. Any frayed wire ends can cause shorts that may burn out the output transistors — they are direct-coupled to the speakers. To reduce the possibility of shorts at the speakers, lugs should be used on the exposed ends or at least the ends of the stranded wires should be tinned to prevent frayed wire ends. The current in the speakers and output circuit is quite high. Poor contacts or small size wire can cause power losses in the speaker system. Use 14 or 16 AWG for long runs of speaker wiring.

Voltage Measurements — Voltage measurements are made with the line voltage adjusted to 117 volts and all readings are ±10%. All voltages are DC measured with a VTVM to ground, with no signal input unless otherwise noted. Indicates 1-KHz audio voltages, measured with an audio AC VTVM to ground at various points from the phone input to the power amplifier output.

Alignment Procedures — Replacement of transistors and components in the front end, IF amplifier and multiplex decoder will normally not require realignment of these circuits. Realignment of these circuits, unless absolutely necessary, is not recommended. Do not attempt a realignment unless the required test equipment is available and the alignment procedure is thoroughly understood.

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FE50D965 FM FRONT END

FRONT END ALIGNMENT

1. Set TUNING dial pointer to zero (0) calibration mark on the toping scale. The dial pointer does not coincide with the 0 on the extreme end of the calibration, reposition the pointer accordingly, so that the dial and pointer are in place to the 0 calibration mark.

2. Connect DC VTM in T3030 on the IF board.

3. Connect an RF generator to the HOREM antenna terminals. Use a 1200 ohm composition resistor in series with each feed from the generator (see Figure 1).

4. Set RF generator frequency and TUNING dial pointer to 90 only. (DO NOT USE MODULATION (AM or FM) and tune the generator output as low as possible during the alignment procedures.

5. Set RF generator frequency and TUNING dial pointer to 106 only. The reference frequency (RF) is 106 MHz, thus adjust the RF generator (C71, C73, C75) for maximum reading on DC VTM.

6. Repeat alignment several times until accurate dial calibration and maximum gain are obtained. Keep the generator output at the maximum possible during all adjustments.

7. Adjust RF generator for output of 200 mV without modulation, at HOREM antenna terminals. Use speakers or headphones to monitor the output.

8. Adjust RF generator for output of 5 mV, with no modulation, at HOREM antenna terminals. (DO NOT USE MODULATION (AM or FM)).

TRANSMITTER

† *1* X 12 INCH CLEARANCE WITH ARC PAINTED
† *2* X 1 INCH CLEARANCE WITH ARC PAINTED

PARTS DESCRIPTION LIST

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C71</td>
<td>Electrolytic, 0.5uF, 50V</td>
<td>C5645-11</td>
</tr>
<tr>
<td>C72, 73</td>
<td>Ceramic, 0.1uF, 100-200, 12V</td>
<td>C5645-14</td>
</tr>
<tr>
<td>R71</td>
<td>Composition, 220K, 105, 1W</td>
<td>RC20BP2ZAKK</td>
</tr>
<tr>
<td>R72</td>
<td>*Gap, Carbon, 49, 95, 1/8W</td>
<td>R120C1000</td>
</tr>
<tr>
<td>R73</td>
<td>2W, 250, AGC Adjust</td>
<td>R5010670</td>
</tr>
<tr>
<td>R74</td>
<td>Gap, Carbon, 1.8K, 0.5, 1/8W</td>
<td>R501C1568</td>
</tr>
<tr>
<td>R75</td>
<td>Gap, Carbon, 220, 35, 1/8W</td>
<td>R120C231J</td>
</tr>
<tr>
<td>R76</td>
<td>Gap, Carbon, 100, 35, 1/8W</td>
<td>R120C181J</td>
</tr>
<tr>
<td>R77</td>
<td>Gap, Carbon, 150, 35, 1/8W</td>
<td>R120C221J</td>
</tr>
<tr>
<td>R78</td>
<td>Gap, Carbon, 220, 35, 1/8W</td>
<td>R120C221J</td>
</tr>
</tbody>
</table>

* Not used on all chassis.
**MULTIPLEX ALIGNMENT**

Two methods of aligning the multiplex decoder are given. The
preferred procedure uses a multiplex generator with IF and
RF output from the generator and with IF modulation, such as the Fisher
Model 3020 Multiplex Generator. This is the better method of
alignment since the front end and IF stages are also checked
through the use of this generator. An alternate procedure for use
with multiplex generators not having an RF output is also
given.

**PREFERRED ALIGNMENT PROCEDURE**

See MULTIPLEX switch to OFF and SELECTOR switch to FM
AUTO.

1. Connect RF generator to LCO antenna terminals. Use
the 10K resistor-composition antenna in series with the generator
for all measurements of Step 1.

2. Follow procedure given in Table 2 below.

**ALTERNATE ALIGNMENT PROCEDURE**

See MULTIPLEX switch to OFF and SELECTOR switch to FM
AUTO.

1. Disconnect RF generator from antenna terminals.

2. Set IF amplifier off and connect the IF generator to the
multiplex board. Connect RF generator to antenna terminals.

3. Dog-ear alignment with the help of the IF generator
before aligning the RF generator. Pan IF alignment can make
proper multistory alignment impossible.

**TABLE 1**

<table>
<thead>
<tr>
<th>STEP</th>
<th>GENERATOR MODULATION</th>
<th>RF DEV</th>
<th>INDICATOR TYPE AND CONNECTION</th>
<th>ADJUST</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>195kHz (2kHz) pilot only.</td>
<td>1750kHz (2kHz)</td>
<td>DC VTVM to TP401</td>
<td>Z401 reg A, Z402</td>
<td>Minimum DC VTVM reading.</td>
</tr>
<tr>
<td>2</td>
<td>Short RF connection 6F to ground.</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>3</td>
<td>Connect portion of 195kHz (2kHz) generator output to scope horizontal input.</td>
<td>no read.</td>
<td>Scope vertical input through T401, scope set for external sweep.</td>
<td>Z403 tap</td>
<td>Stable Linearity pattern 2L (Figure 1) as slow moving as possible.</td>
</tr>
<tr>
<td>4</td>
<td>Same as Step 3.</td>
<td>no read.</td>
<td>Scope vertical input through T402, scope set for external sweep.</td>
<td>Z405 bypass</td>
<td>Maximum scope amplitude, adjust Z402 top as necessary for slowing down Linearity.</td>
</tr>
<tr>
<td>5</td>
<td>Disconnect connection 6F from ground.</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>6</td>
<td>Composite RF signal 1kHz (3kHz) in left channel only.</td>
<td>175kHz (4kHz)</td>
<td>Audio (AC) VTVM and scope input to left channel.</td>
<td>Z402</td>
<td>Minimum audio AC VTVM reading, clean 1kHz (3kHz) sine wave on scope.</td>
</tr>
<tr>
<td>7</td>
<td>Composite RF signal 1kHz (3kHz) in right channel only.</td>
<td>175kHz (4kHz)</td>
<td>Same as Step 6.</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>8</td>
<td>Same as Step 7.</td>
<td>175kHz (4kHz)</td>
<td>Audio (AC) VTVM and scope input to left channel.</td>
<td>Same as AC VTVM reading of less 30dB below reading in Step 6.</td>
<td>Same as AC VTVM reading of less 30dB below reading in Step 6.</td>
</tr>
<tr>
<td>9</td>
<td>Same as Step 8.</td>
<td>175kHz (4kHz)</td>
<td>Same as AC VTVM reading of less 30dB below reading in Step 6.</td>
<td>Same as AC VTVM reading of less 30dB below reading in Step 6.</td>
<td>Same as AC VTVM reading of less 30dB below reading in Step 6.</td>
</tr>
<tr>
<td>10</td>
<td>195kHz (2kHz) pilot only.</td>
<td>13.2kHz (4kHz)</td>
<td>DC VTVM to connection.</td>
<td>Trigger Control</td>
<td>Sine Beacan lights up 0.5 V reading on DC VTVM.</td>
</tr>
</tbody>
</table>

*NOTE: Step 6 is in connection of preamplifier board.

**TABLE 2**

<table>
<thead>
<tr>
<th>STEP</th>
<th>GENERATOR MODULATION</th>
<th>LEVEL (mV)</th>
<th>INDICATOR TYPE AND CONNECTION</th>
<th>ADJUST</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>195kHz (2kHz) pilot only.</td>
<td>--</td>
<td>DC VTVM to TP401</td>
<td>Variable V to 5V</td>
<td>Minimum DC VTVM reading.</td>
</tr>
<tr>
<td>2</td>
<td>Short RF connection 6F to ground.</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>3</td>
<td>Same as Step 3.</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>4</td>
<td>Same as Step 3.</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>5</td>
<td>Disconnect connection 6F from ground.</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>6</td>
<td>Composite RF signal 1kHz (3kHz) in left channel only.</td>
<td>100mV (350mV)</td>
<td>Audio (AC) VTVM and scope input to left channel.</td>
<td>Z402</td>
<td>Minimum audio AC VTVM reading, clean 1kHz (3kHz) sine wave on scope.</td>
</tr>
<tr>
<td>7</td>
<td>Composite RF signal 1kHz (3kHz) in right channel only.</td>
<td>100mV (350mV)</td>
<td>Same as Step 6.</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>8</td>
<td>Same as Step 7.</td>
<td>100mV (350mV)</td>
<td>Audio (AC) VTVM and scope input to left channel.</td>
<td>Same as AC VTVM reading of less 30dB below reading in Step 6.</td>
<td>Same as AC VTVM reading of less 30dB below reading in Step 6.</td>
</tr>
<tr>
<td>9</td>
<td>Same as Step 8.</td>
<td>100mV (350mV)</td>
<td>Same as AC VTVM reading of less 30dB below reading in Step 6.</td>
<td>Same as AC VTVM reading of less 30dB below reading in Step 6.</td>
<td>Same as AC VTVM reading of less 30dB below reading in Step 6.</td>
</tr>
<tr>
<td>10</td>
<td>195kHz (2kHz) pilot only.</td>
<td>--</td>
<td>DC VTVM to connection 6F</td>
<td>Trigger Control</td>
<td>Sine Beacan lights up 0.5 V reading on DC VTVM.</td>
</tr>
</tbody>
</table>

*NOTE: Step 6 is in connection of preamplifier board.

**FIGURE 1**

Lissajous pattern for IF alignment.
1493 DRIVER

PARTS DESCRIPTION LIST

CAPACITORS
Symbol | Description | Part No.
--- | --- | ---
C851 | 415 C400 Electrolytic, 250V, 15V | C080BA1A4
C852 | 680 C400 Electrolytic, 250V, 15V | C080BA0A7

RESISTORS
Most are 5% tolerance, 5-watt, unless otherwise noted, 5% tolerance, 1-watt.
Symbol | Description | Part No.
--- | --- | ---
R851 | 15K | R50DC152
R852 | 8.2K | R50DC822
R853 | Composition, 3.9K | R020BF302
R854 | 390 | R50DC392
R855 | 210 | R50DC212
R856 | Composition, 92 | R020BF922
R857 | Par, 300, 20%, Center Voltage Adjust | R020BF491
R858 | P100, 20%, Output Bias Adjust | R020BF201
R859 | 2.2K | R50DC222
R860 | 1.2K | R50DC122
R861 | Composition, 92 | R020BF922
R862 | 5K | R50DC522
R863 | Composition, 120 | R020BF121
R864 | Composition, 92 | R020BF922

MISCELLANEOUS
Symbol | Description | Part No.
--- | --- | ---
C853 | Diode, Silicon | B005BH
C854, 855 | Diode, Zener, 6.8V, 3K, 1W | ZR005Z1
C856, 857 | Diode, Silicon | U005BH
Q851 | Transistor, TR1005 | TR1005
Q852 | Transistor, TR1004 | TR1004

POWER AMPLIFIER CENTER VOLTAGE ADJUSTMENT
- Connect two 10K, 1/2 watt resistors in series across capacitor C851 (15VDC). Connect the common lead of a DC VTVM to the junction of the two resistors.
- Connect DC VTVM to the junction of resistors R857 and R859. Adjust Center Voltage Adjust Pot. Resistors on left channel driver board for meter reading of 0.05 VDC.
- Connect DC VTVM to the junction of resistors R858 and R860. Adjust Center Voltage Adjust Pot. Resistors on right channel driver board for meter reading of 0.05 VDC.
- Disconnect 1K resistor.

POWER AMPLIFIER IDLING CURRENT ADJUSTMENT
NOTE: This adjustment is to be performed only after completing Center Voltage Adjustment.
- Connect DC VTVM across resistor R857. Output Bias Adjust Pot. Adjust center tap of R857 for meter reading of 40 ma + 5 ma DC.
- Connect DC VTVM across resistor R859. Output Bias Adjust Pot. Adjust center tap of R859 for meter reading of 40 ma + 5 ma DC.
SERVICE PROCEDURES

TESTING THE POWERAMPLIFIER

CAUTION

DO NOT use unsuitable clips or any contrary except to the correct component leads, socket lug and terminal strips-it is not a function of a service to destroy a transistor with an accidental short circuit. Make sure insulated leads are not touching the chassis or other instrument and common-ground leads.

WARNING: Disconnect AC power cord while removing or installing transistors.
- Remove transistors 8Q1 to 8Q4, 8Q6 to 8Q8, 8Q11 and 8Q16 from their sockets. Label each transistor with its location in the unit.
- Set VOLUME control to its minimum position (extreme counter-clockwise).
- Set BIAS voltage through an adjustable transformer to 117 VAC. Plug in AC power cord.
- Connect common lead of DC VTVM to the chassis.
- Measure voltage across filter capacitor C19 or the BAT terminal of the bridge rectifier; reading should be between 60 and 65 VDC.
- Measure voltage at junction of resistor R50 and emitter diode CR6+ (reading should be between 11-13.5 VDC). Reconnect this line to R50 and measure voltage at junction of resistor R51 and emitter diode CR3; reading should be between 23 and 25 VDC.
- Insert left channel predriver transistor 8Q1 and 8Q6 (8Q12, 8Q16-right channel) in their sockets on the predriver board.
- Measure voltage at connection BF 1 to predriver board (8Q16-right channel); adjust Output for 45-50 VDC. Adjust 8Q16 for 40 VDC for reading of 10 VDC.
- Insert left channel driver transistor 8Q2, 8Q3 (8Q5, 8Q4-left channel) in left channel driver board and measure voltage at connection BF 1 to predriver board (8Q16-right channel). Set Center Voltage Adjust for BF 1 to 8VDC for reading of 2.3 VDC.
- Insert left channel power driver transistors 8Q5, 8Q6 in their sockets.
- Measure voltage at connection BF 1 on left channel driver board; reading should be between 23 and 24 VDC.
- Insert left channel predriver transistors 8Q2, 8Q3 (8Q4, 8Q5-left channel) in their sockets.
- Measure voltage across resistors R53 and R55 (R24 and R16-right channel); reading should be between 40 and 50 VDC across each.

NOTE: VTVM must be set for 200mv or lowest full-scale range to make this reading properly.
- Repeat preceding steps for the right channel.

INTERMODULATION DISTORTION TEST

- Set BALANCE, BASS and TREBLE controls to their center position. Set MODE/TAPE MONITOR switch to left channel STEREO position, SELECTOR switch to AUX and SPEAKERS toggle switches to MAIN. Set LOUDNESS CONTOR, LOW FILTER and HIGH FILTER switches to OFF. Unplug AC power cord.
- Connect a dummy load of 400 ohms to the left channel LEAD speaker terminals. In parallel with the load resistor connect an LM1731 distortion analyzer and the leads of an AC VTVM capable of reading 8.5 volts with accuracy.

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SERVICE PROCEDURES

DIAL STRIMRING

- Disconnect AC power cord.
- Gently pull out the front panel control shafts. Remove the hex nuts from the control shafts and lift off the front panel.
- Remove the two foam-cushion strips located at the ends of the dial glass. Loosen the screws that hold the retaining clips to the dial glass. Swing the clips aside and lift off the dial glass.
- Remove 2 lamp bulbs from the holding clips on the rear of the pointer base; swing the holding clips off the pointer base, and lift off the lamp bulbs.
- Slide the dial pointer assembly directly downward to release it from the pointer base; slide the new dial pointer assembly upward, pressing downward on the pointer base, until the tab on the pointer mates with the slot in pointer base.
- Twist the lamp wire toward and place them under the holding clip on the rear of the pointer base. Do not leave any clip in the wire above the pointer.
- Connect the leads of the two wires to the slots on the top of the chassis.
- Replace the dial glass and position it down and towards the left of the chassis front. Swing the retaining clips back into place and tighten the retaining-slip screws. Replace the foam-cushion strip.
- Replace the front panel and secure with the hex nuts removed previously. Replace the knobs on the control shafts.

REPLACING METER LAMP

- Disconnect AC power cord.
- Remove the screws which hold the top cover to the chassis and lift off the top cover.
- Gently push on the lamp base and turn it counter clockwise to remove. Replace the new lamp base with the new lamp holder, insert the new lamp in the socket. Replace the new lamp in the socket, push in and turn clockwise to tighten.
- Replace the meter lamp and secure the chassis and secure with the screws removed previously.

REPLACING STEREO BEACON LIGHT

- Disconnect AC power cord.
- Gently pull out all the front panel control shafts. Remove the hex nuts from the control shafts and lift off the front panel.
- Remove the lamp from the socket replacing it with a newly purchased one. Swing the lamp into the socket to tighten.
- Replace the lamp and secure the chassis and secure with the hex nuts removed previously. Replace the knobs on the control shafts.

CLEANING DIAL GLASS

- Disconnect AC power cord.
- Gently pull out all the front panel control shafts. Remove the hex nuts from the control shafts and lift off the front panel.
- Remove the two foam-cushion strips located at the edges of the dial glass. Loosen the screws that hold the retaining clips to the dial glass. Swing the clips aside and lift off the dial glass.
- Remove dust with a dry cloth. If you wish to clean more thoroughly, use a slightly abrasive, non-abrasive agent only, any stronger agent may damage the markings on the glass.
- Wash the dial glass and position it down and towards the left of the chassis front. Swing the retaining clips back into place and tighten the retaining-slip screws. Replace the foam-cushion strip.
- Replace the front panel and secure with the hex nuts removed previously. Replace the knobs on the control shafts.

CLEANING FRONT PANEL

WARNING: Use only plain lukewarm water and a freshly laundered, soft flannel cloth to clean the front panel.
<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Part No.</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, 2, 3</td>
<td>Ceramic, 30μF, 60-200, 100V</td>
<td>C0052-5</td>
<td>Capacitor, 120, 10%</td>
<td>R50DC12J</td>
</tr>
<tr>
<td>C4</td>
<td>Electrolytic, 10μF, 25V</td>
<td>C0053-2</td>
<td>Capacitor, 120, 10%</td>
<td>R50DC12J</td>
</tr>
<tr>
<td>C6</td>
<td>Mylar, 33μF, 100V</td>
<td>C0054-2</td>
<td>20K Ohm, 1/8W</td>
<td>R50DC12J</td>
</tr>
<tr>
<td>C7</td>
<td>Ceramic, 270μF, 100V 250V</td>
<td>C0055-7</td>
<td>120K Ohm</td>
<td>R50DC12J</td>
</tr>
<tr>
<td>C8</td>
<td>Ceramic, 12μF, 100V 250V</td>
<td>C0056-1</td>
<td>47K Ohm</td>
<td>R50DC12J</td>
</tr>
<tr>
<td>C9, 10</td>
<td>Ceramic, 10μF, 100V 250V</td>
<td>C0057-1</td>
<td>220K Ohm</td>
<td>R50DC12J</td>
</tr>
<tr>
<td>C11, 12</td>
<td>Ceramic, 0.1μF, 100V 250V</td>
<td>C0058-1</td>
<td>220V 25K Ohm</td>
<td>R50DC12J</td>
</tr>
<tr>
<td>C13, 14</td>
<td>Electrolytic, 12μF, 60V</td>
<td>C0059-1</td>
<td>220K Ohm</td>
<td>R50DC12J</td>
</tr>
<tr>
<td>C16</td>
<td>Electrolytic, 10μF, 200V</td>
<td>C0060-1</td>
<td>4.7K Ohm</td>
<td>R50DC12J</td>
</tr>
<tr>
<td>C18</td>
<td>Electrolytic, 1μF, 200V</td>
<td>C0061-1</td>
<td>1K Ohm</td>
<td>R50DC12J</td>
</tr>
<tr>
<td>C20</td>
<td>Electrolytic, 0.1μF, 25V</td>
<td>C0062-1</td>
<td>10K Ohm</td>
<td>R50DC12J</td>
</tr>
<tr>
<td>C22, 23</td>
<td>Electrolytic, 33μF, 100V</td>
<td>C0063-1</td>
<td>10K Ohm</td>
<td>R50DC12J</td>
</tr>
<tr>
<td>C24, 25, 26</td>
<td>Mylar, 0.1μF, 100V</td>
<td>C0064-1</td>
<td>10K Ohm</td>
<td>R50DC12J</td>
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<tr>
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<td>Ceramic, 22μF, 1K, 1000V 250V</td>
<td>C0065-1</td>
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<td>C30</td>
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<tr>
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<td>C34, 35</td>
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<td>C36</td>
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<td>C37, 38</td>
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<td>C0071-1</td>
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**RESISTORS**

Depicted in ohms, 5% tolerance, watt, unless otherwise noted. \( \times \) = infinity

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Part No.</th>
<th>Description</th>
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<td>R1, 2</td>
<td>Composition, 25%, 10%</td>
<td>R2000B271K</td>
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<tr>
<td>R12</td>
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</tbody>
</table>

For instrumment-operation information and technical assistance write Richard Hamilton, Customer Service Department, FISHER Radio Corporation, Long Island City, New York 11101.