The Fisher 202
Stereophonic AM-FM Receiver

WORLD LEADER IN HIGH QUALITY STEREO
The following equipment is required to completely test and align modern high-fidelity amplifiers, tuners, and receivers:

- Line Voltage Auto-transformer or Voltage Regulator
- DC Vacuum Tube Voltmeter
- Oscilloscope (IF flat to 100 kHz Minimum)
- Low-Distortion Audio (50 ohm) Wave Generator
- Intermodulation Distortion Analyzer
- Harmonic Distortion Analyzer
- 2 – Load resistors, 0-Ohms, 100 Watt (Minimum Rating)
- AM/FM Signal Generator

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

Many of these items are included only as a reminder— they are normal procedures for experienced technicians. Shuntouts may be taken, but these often cause additional damage to transistors, circuit components, or printed circuit boards.

SOLDERING: A well-tinned, hot, clean soldering iron tip will make soldering easier, without causing damage to the printed circuit board or the components mounted on it. Regular use of a sponge cleaner will maintain a clean soldering surface. The heat available at the tip (not the wattage of the iron) is important. Some 50-watt iron tips reach temperatures of 1,000°F, whilst others will hardly melt solder. Small-diameter tips should be used for single solder connections, pyramidal and chisel tips for large areas.

Always disconnect the AC power cord from the line when soldering. Turning the power switch OFF is not sufficient.

Power-line leakage paths, through the heating element of the iron, may destroy transistors.

PARTS REMOVAL: If a part is not being returned for warranty factory replacement, it may be cut in half (with diagonal cutting pliers) to make removal easier. Multiple terminal parts, such as IF transformers, or electrolytic capacitors, should be removed using special de-soldering tips made especially for this purpose. Removing solder from terminals reduces the possibility of breaking the printed circuit board when the part is removed.

ACCIDENTAL SHORTS: A clean working area, free of metal particles, screws, etc., is an important precaution in avoiding servicing problems. Screws, removed from the chassis during servicing, should be stored in a box until needed. While a kit is operating, it takes only an instant for a bare-to-collector short to destroy a transistor (and others direct-coupled to it). In the time it takes for a dropped machine screw, washer, or screwdriver, to contact a pair of socket terminals (or terminal and chassis), a transistor can be ruined.

SOLID-STATE DEVICES: Integrated Circuits contain the equivalent of many circuit parts, including transistors, diodes, resistors, and capacitors. The preferred troubleshooting procedure requires isolating the trouble to one stage using AC signal tracing methods. Once the suspected stage is located, the DC voltages at the input and output leads are measured to give an accurate indication of the operating conditions of the IC. DO NOT use an ohmmeter to check continuity with the IC mounted on the printed circuit board. Forward biasing the internal junctions within the IC may burn out the transistors. Do not replace a defective IC until all external resistors, capacitors, and transformers are checked first, to prevent the replacement IC from failing immediately due to a defect in the connecting components. Solder and unsolder each lead separately using a pliers or other heat sink on the lead to prevent damage from excessive heat. Check that the leads are connected to the correct locations on the printed circuit board before turning the unit on.

Whenever possible, a transistor tester should be used to determine the condition of a transistor or diode. Ohmmeter checks do not provide conclusive data, and may even destroy the junction! within the device.

Never attempt to repair a transistor power amplifier module until the power supply filter capacitors are fully discharged. If an output or driver transistor becomes defective (open or short), always check all direct-coupled transistors and diodes in that channel. In addition, check the bias pot., and other parts in the bias network, before installing replacement transistors. All output and driver transistors in one channel may be destroyed if the bias network is defective. After parts replacement, always check the bias adjustment for specified loading current.

In some applications, replacement of transistors must be made from the same beta group as the original type. The beta group is indicated by a colored marking on the transistor. Be sure to include this information when ordering replacement transistors.

When mounting a replacement power transistor, be sure the bottom of the flange, mica insulator, and the surface of the heat sink, are free of foreign matter. Dust and grit will prevent flat contact, reducing heat transfer to the heat sink. Metallic particles can puncture the insulation, cause a short, and destroy 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 transfer. Use Dow-Corning DC-3, or an equivalent compound made for power transistor heat conduction.

Use care when making connections to speakers and output terminals. To reduce the possibility of shorts, lugs should be used on the exposed ends, or stranded wire should be tinned to prevent frayed wire ends. Current in the speakers and output circuitry is quite high— poor contacts, or small sized wires, can cause significant power losses in the system. For wire lengths greater than 30 feet, 16 AWG, or heavier, should be used.

VOLTAGE MEASUREMENTS: All voltages are measured with the line voltage adjusted to 120 volts. All measured voltages are ±10%. DC voltages are measured to ground with a VTVM, with no signal input unless otherwise noted. AC signal voltages are measured under the conditions specified on the schematic.

ALIGNMENT PROCEDURES: DO NOT attempt realignment unless the required test equipment is available, and the alignment procedure is thoroughly understood.

BECAUSE ITS PRODUCTS ARE SUBJECT TO CONTINUOUS IMPROVEMENT, FISHER RADIO RESERVES THE RIGHT TO MODIFY ANY DESIGN OR SPECIFICATION WITHOUT NOTICE AND WITHOUT INCURRING ANY OBLIGATION.
REMOVING DRESS PANEL
(1) Unplug AC power cord.
(2) Remove the screws securing the top and bottom covers to the chassis. Remove the covers.
(3) Gently pull off the SELECTOR, VOLUME, BALANCE, TREBLE, BASS, POWER SPKERS and Tuning control knobs from the control shafts.
(4) Remove the two screws on the top and two screws on the bottom of the chassis securing the dress panel to the chassis. Remove the dress panel by pulling it forward.
(5) Reverse the procedure for reassembly.

REMOVING TUNING METER AND STEREOREAM INDICATOR LAMP
(1) Remove dress panel. Refer to REMOVING DRESS PANEL procedure.
(2) Remove the two screws on the bottom side of the chassis, located above the MUTING ON-OFF switch, securing the bracket of the tuning meter and STEREOREAM indicator lamp. Note the grounding lug of resistor R18 secured to the bracket.
(3) Remove tuning meter and STEREOREAM indicator lamp.
(4) Reverse the procedure for reassembly.

REMOVING DIAL GLASS
(1) Remove the dress panel. Refer to REMOVING DRESS PANEL procedure.
(2) Remove screws attaching ground lug of resistor R18 to tuning meter and STEREOREAM indicator bracket located on the chassis above the MUTING ON-OFF switch.
(3) Tape dial cord to tuning drum. Remove dial cord from the pulley which is attached to the dial housing.
(4) Remove the four screws securing the dial glass and meter housing to the front chassis.
(5) Remove the dial glass and meter housing.
(6) Remove the dial pointer by sliding its mounting carrier from its sliding rail.
(7) Very gently lift up the dial glass and meter housing and turn the housing towards you. Take a knife and gently detach the indicator holder and meter secured to the dial glass by double-sided adhesive tape.
(8) Use a knife and pry loose the dial glass, taking care not to damage the foam rubber mountings.
(9) Reverse procedure for reassembly.
DIAL STRINGING

1. Remove screws securing top and bottom covers to receiver chassis. Remove covers. Unsnap pointer from its sliding carrier. Remove carrier from the rail.
2. Rotate tuning drum fully clockwise.
3. Remove dial cord. Be careful not to remove dial spring from its ear in the drum.
4. Tie end of new cord to end of dial spring. Make sure that dial spring is fastened to tuning drum as shown in the figure.
5. Guide dial cord through slot and wind a full turn around drum. Guide cord around pulleys A, B, and C. Wind dial cord three times around tuning shaft and over pulley D.
6. Wind cord 3/4 turn around tuning drum and through resistor.
7. Pull dial cord taut and hook cord to end of dial spring.
8. Rotate tuning drum clockwise and counterclockwise to dislodge the tensioning.
9. Repeat steps (6) and (7) until spring is tensioned. Then tie dial cord securely to end of spring.
10. Place dial cord and under tabs on pointer carrier (see figure). Snap pointer into sliding carrier.
11. Turn tuning drum fully counterclockwise. Slide pointer to indicate zero on tuning dial while holding tuning drum fully counterclockwise.
12. Check dial calibration. Refer to FAN/AM ALIGNMENT.

HARMONIC DISTORTION TEST

CAUTION:
- Measure the power of one channel at a time.
- Limit measurements to 10 minutes.
- Use a load resistor with a minimum rating of 50 watts.
- Set BASE and TREBLE controls to flat (0), SELECTOR switch to AUX 1, and POWER/SPKR switch to AC OFF.
- Connect a low-distortion sine wave signal generator between L, AUX 1 IN jack and chassis ground. Set the signal generator frequency to 1000Hz and output level to minimum.
- Connect the 8-Ohm load resistor between L, MAIN SPKR and COM terminals. Connect an AC VTM, oscilloscope, and harmonic distortion analyzer across the 8-Ohm load resistor.
- Set POWER/SPKR switch to MAIN. Turn VOLUME control slowly to maximum.
- Adjust the signal generator output until the AC VTM indicates 14.15 V RMS (25 watts). The HD analyzer should indicate less than 1% harmonic distortion.
- Repeat steps (11) through (4) for the right channel.
top view

bottom view

chassis layout
schematic shown on main chassis diagram
CENTER VOLTAGE ADJUSTMENT

1. Connect DC V.TVM to pin 5 of left channel Driver Board. Connect AC power cord. Set POWER/SPKR switch to MAIN.
2. Adjust potentiometer VR01 of left channel Driver Board until DC V.TVM indicates 21 V DC. Disconnect DC V.TVM.
3. Repeat steps (1) and (2) for the right channel Driver Board.
parts connection for this board shown below
am, fm if, and meter schematic diagram for this board shown above

# Denotes component mounted on solder side

- **FM AGC**
- **FM IF INPUT**
- **FM B+ 15V**
- **TUNING METER**
- **AM AGC**
- **AM IF INPUT**

**Component Labels:**
- **FM Audio Output**
- **Ratio Detector Test Point**
- **FM B+ 15V**
- **TO MUTING SWITCH**
- **AM Audio Output**
- **AM B+ AMTP +15V**

**Part Numbers:**
- AL4031-01