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
- Suction 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-tinned, 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 weight of the iron that counts—it is the heat available at the tip. Some 30-watt iron reach temperatures of 1,000°F others will hardly melt solder. Small-diameter tips should be used for single solder connections—larger pyramid and chisel tips are needed for larger areas.

- When removing defective resistors, capacitors, etc., the leads should be cut 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 desoldering 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 transistor 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 shot to destroy that transistor and possibly others direct-connected to it. (Use the time it takes for a dopped machine screw, washer or even the screwdriver, to finish 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 shorted), always remove ALL output transistors in that channel and check the bias adjustments, 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 micra-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.

- Silicate greases must be used between the transistor and the micra-insulator and between the micra and the heat sink for best heat conduction. (Use Dow-Corning DC-3 or C1310 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-connected to the speakers. To reduce the possibility of shorts at the speakers, legs should be used on the exposed ends or at least the ends of the stranded wires should be tipped to prevent frayed wire ends. The current in the speakers and output circuitry 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.

BECAUSE ITS PRODUCTS ARE SUBJECT TO CONTINUOUS IMPROVEMENT, FISHER RADIO CORPORATION RESERVES THE RIGHT TO MODIFY ANY DESIGN OR SPECIFICATION WITHOUT NOTICE AND WITHOUT INcurring ANY OBLIGATION.
DIAL STRINGING

1. Disconnect AC power cord.
2. Gently pull all knobs off the front panel control shafts. Remove the hex nuts from the control shafts and lift off the front panel.
3. Remove the dial pointer from the dial cord.
4. Lift off the left dial glass lamp and remove the screw holding the left side of the dial glass panel.
5. Remove the two screws holding the right side of the dial glass panel.
6. Pull dial glass panel towards the left and tilt the panel down as far as the leaves allow.
7. Rotate the tension capacitor drive drum to its maximum counterclockwise position.
8. Tie end of dial cord to one end of small spring. Fasten spring to top right side of drive drum (Figure 1).
9. Run the dial cord through the slot in the drum and set in the retaining clips of groove 1 (see side view).
10. Pull dial cord taut and wrap 1½ times around the flywheel shaft.
11. Rotate the drive drum to its maximum clockwise position, allowing the dial cord to follow the grooves in the drum (Figure 3). Keep the dial cord taut during this procedure.
12. Guide the dial cord over the top of the drive drum and place it in groove 2 (see top view).
13. Run the dial cord through the slot in the drive drum and bring it under and around the beveled washer. Pull the dial cord taut until the spring stretches open. Tighten the machine screw to hold the dial cord under the washer.
14. Rotate the drive drum to its maximum counterclockwise position (Figure 3).
15. Run the loose end of the dial cord out through the slot in the drive drum and place it in groove 3 (see side view). Guide the dial cord around pulleys A and B.
16. Rotate the drive drum to its maximum clockwise position (Figure 4). Keep the dial cord taut during this procedure.
17. Guide the dial cord under the drive drum and into the last groove (see top view). Bring the dial cord up around groove 6 and into the slot in the drive drum.

CAUTION: Do not disturb the dial cord already under the washer.

NOTE: Check that there is an empty groove between this turn and the next to last turn of dial cord on the drive drum.

18. Loosen the machine screw. Pull the dial cord taut until the spring tab lifts off the bottom of the cutout in the panel. Loosen the machine screw, place the cord under the beveled washer and tighten the screw.

CLEANING DIAL GLASS

1. Disconnect AC power cord.
2. Gently pull all knobs off the front panel control shafts. Remove the hex nuts from the control shafts and lift off the front panel.
3. If there are foam-cushion strips located at the ends of the dial glass, carefully remove them.
4. Loosen the screws which hold the retaining clips to the dial glass. Swing the clips aside and lift off the dial glass.
5. Remove dust with a dry cloth. If you wish to clean more thoroughly, use only plain lukewarm water; any stronger cleaning agent may damage the markings on the glass.

6. 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-clips screws. Replace the foam-cushion strips, if removed previously.
7. Replace the front panel and secure with the hex nuts removed previously. Replace the knobs on the control shafts.

REPLACING DIAL LAMPS

1. Disconnect AC power cord.
2. Gently pull all knobs off the front panel control shafts. Remove the hex nuts from the control shafts and lift off the front panel.
3. Snap out the defective lamp from the spring clip. Place the new lamp in the socket making sure that the unpainted side of the lamp faces the edge of the dial glass.
4. Replace the front panel and secure with the hex nuts removed previously. Replace the knobs on the control shafts.

REPLACING METER AND STEREO BEACON LAMPS

1. Disconnect AC power cord.
2. Remove the screws which hold the top cover to the chassis and lift off the top cover.
3. Gently pry the lamp reflector shield off the top rear of the meter.
4. Gently pull the four wires off the pins on the top rear of the meter. Label each wire with its associated pin location to make replacement easier later.
5. Loosen the two nuts which hold the meter spring. Lift the compartmental lamp assembly out from under the meter spring. Place the new lamp assembly under the meter spring and line up the holes on the bottom with the projections on the rear of the meter. Tighten the two nuts which hold the meter spring.

NOTE: The lamp assembly must be replaced as a complete unit to insure proper illumination levels.

6. Replace the lamp reflector shield on the top rear of the meter.
7. Carefully insert the terminal connector at the end of the four wires removed previously on their associated pins at the top rear of the meter.
8. Replace the top cover on the chassis and secure with the screws removed previously.

CLEANING FRONT PANEL

WARNING: Use only plain lukewarm water and a freshly laundered, soft lint-free cloth to clean the front control panel.
MULTIPLIX ALIGNMENT

Two methods of aligning the multiplex decoder are given. The preferred procedure uses a multiplex generator with RF and 19 kHz (1 k) outputs and with 1 kHz (1 k) modulation, such as the Fisher 300 Multiplex Generator. This is the better method of alignment since the front end and IF stages are also checked through the use of this procedure. An alternate procedure for use with multiplex generators not having an RF output is also given.

PREFERRED ALIGNMENT PROCEDURE

Set SELECTOR switch to FM, MODE/TAPE MONITOR switch to STEREO and MUTING switch to OFF.
(1) Connect RF output of multiplex generator to the FM ANT., antenna terminals. Set TUNING dial pointer to RF frequency of multiplex generator.
(2) Connect output of audio generator, set for 1 kHz (1), to the external modulation input of multiplex generator and to the external sync input of an oscilloscope. Connect the vertical input of the scope to pin 4B on the multiplex board and adjust the output of the multiplex generator for 1.4 volts peak-to-peak composite multiplex input (see Figure 1).
(3) Ground pin 4C on the multiplex board to the chassis.
(4) Follow procedures given in Table 1 below.
(5) After alignment is complete, disconnect pin 4C from the chassis.

NOTE: Check the alignment of the IF amplifier before aligning the multiplex decoder. Poor IF alignment can make proper multiplex adjustment impossible.

ALTERNATE ALIGNMENT PROCEDURE

Set SELECTOR switch to FM, MODE/TAPE MONITOR switch to STEREO and MUTING switch to OFF.
(1) Connect output of audio generator, set for 1 kHz (1), to the external modulation input of multiplex generator and to the external sync input of an oscilloscope. Connect the vertical input of the scope to the composite output of the multiplex generator and adjust the output of the multiplex generator for 2 volts peak-to-peak composite multiplex output (see Figure 1).
(2) Disconnect the lead going to pin 4B on the multiplex board. Connect the output of the multiplex generator through a 15k ohm to pin 4B on the multiplex board.
(3) Ground pin 4C on the multiplex board to the chassis.
(4) Follow procedures given in Table 1 below.
(5) After alignment is complete, disconnect multiplex generator and resistor, and reconnect the lead going to pin 4B on the multiplex board. Disconnect pin 4C from the chassis.

HARMONIC DISTORTION TEST

Set BALANCE, BASS and TREBLE controls to their center positions. Set SELECTOR switch to AUX and MODE/TAPE MONITOR switch to STEREO TAPE. Set LOUDNESS CONTOUR, LOW FILTER and HIGH FILTER switches to OFF. Unplug AC power cord.
(1) Connect a 4-ohm, 50-watt resistor across the LEFT SPEAKER MAIN terminals. In parallel with the load resistor, connect the input leads of an IM (Time-Modulation) distortion analyzer and the input leads of an AC VTVM capable of reading 0.1 volts with accuracy.
(2) Connect IM-analyzer generator output to the LEFT CHANNEL MON IN jack.
(3) Connect AC power cord and rotate VOLUME control to its maximum clockwise position—full volume.
(4) Increase IM-analyzer generator input to set for 25 watts output (2.2 VAC across 4-ohm load resistors). AFTER ONE FULL MINUTE OF WARM-UP TIME, PROCEED TO NEXT STEP.
(5) IM meter reading should be 0.0% or less.
(6) Repeat preceding steps for right channel.

NOTE: If any of the preceding instructions are different from those in the IM-analyzer instruction manual, it is best to follow those in the manual. If a load resistor of 50-watt rating is built into the IM analyzer, a separate load resistor is not required.

POWER OUTPUT MEASUREMENT

The output amplifier of this unit is designed to deliver its full-rated power with program material (voice or music) into 4 to 18 ohm loads for an indefinite period of time. When a constant audio tone is used as a signal to measure the continuous RMS power output, the following precautions must be taken:
(1) Measure the power output of one channel at a time.
(2) Limit the measurement period to 10 minutes with a load resistance between 4 and 16 ohms.

WARNING: If the power output of both channels must ever be measured simultaneously, use a load of 4 to 8 ohms per channel and limit measurements to a period not longer than 3 minutes for 4-ohm load and not longer than 5 minutes for an 8-ohm load.

TABLE 1. MULTIPLIX ALIGNMENT

<table>
<thead>
<tr>
<th>Step</th>
<th>Multiplex Generator Modulation</th>
<th>Indicator Type And Connection</th>
<th>Alignment</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Composite MPX signal modulated with 1 kHz (1k) on left channel only.</td>
<td>DC VTVM to Test Point 403.</td>
<td>Z602, Z402</td>
<td>Maximum reading on DC VTVM; approximately 3 VDC. Stereo Recons should light.</td>
</tr>
<tr>
<td>2</td>
<td>Same as Step 1.</td>
<td>AC VTVM to left channel RCDR OUTPUT jack, scope thru voltage divider probes (see Figure 2) to Test Point 402.</td>
<td>Z403</td>
<td>Maximum waveform amplitude while maintaining straight base-line (see Figure 3) and maximum reading on AC VTVM, Record reading.</td>
</tr>
<tr>
<td>3</td>
<td>Same as Step 1.</td>
<td>AC VTVM to right channel RCDR OUTPUT jack.</td>
<td>Separation Control</td>
<td>Minimum reading on AC VTVM; at least 30 db below that recorded in Step 2, Record reading.</td>
</tr>
<tr>
<td>4</td>
<td>Composite MPX signal modulated with 1 kHz (1k) on right channel only.</td>
<td>Same as Step 3.</td>
<td></td>
<td>Same reading ±2 db on AC VTVM as recorded in Step 2.</td>
</tr>
<tr>
<td>5</td>
<td>Same as Step 4.</td>
<td>AC VTVM to left channel RCDR OUTPUT jack.</td>
<td>Same reading ±2 db on AC VTVM as recorded in Step 3.</td>
<td></td>
</tr>
</tbody>
</table>

*NOTE: If equal readings cannot be obtained in Steps 3 and 5, readjust Separation Control to bring both readings approximately the same and 30 db below the readings in Steps 2 and 4.*
NOTE: FM 1F alignment must be performed before starting this procedure. Set SELECTOR switch to FM, MODE/TAPE MONITOR switch to STEREO and MUTING switch to OFF.

1. (1) Disconnect Test Point 501 on front end from ground. (2) Connect 10.7-MHz (Mc) signal generator to Test Point 501 on the front end. Connect scope's vertical input to Test Point 301 on the 10.7-MHz (Mc) IF amplifier board. 
   NOTE: Connect ground lead of generator to ground near Test Point 501 and ground of scope closest to the scope input.
   (3) Adjust generator output voltage and frequency to observe IF response curve. Use as low a generator output as possible.
   (4) Turn top core of Z302 on IF amplifier board fully out. (5) Align top and bottom cores of Z302, bottom core of Z305, and top and bottom cores of Z301 on IF amplifier board, and core of L506 on front end for maximum gain and symmetry (see Figure 3). Repeat alignment until maximum gain and symmetry are obtained.
   (6) Align top core of Z302 on IF amplifier board for maximum gain and symmetry (see Figure 3). Repeat alignment several times until accurate alignment and maximum gain are obtained. Keep the generator output as low as possible during all adjustments.

2. (1) Disconnect Test Point 501 on front end from ground. (2) Connect 10.7-MHz (Mc) signal generator to Test Point 501 on the front end. Connect scope's vertical input to Test Point 301 on the 10.7-MHz (Mc) IF amplifier board. 
   NOTE: Connect ground lead of generator to ground near Test Point 501 and ground of scope closest to the scope input.
   (3) Adjust generator output voltage and frequency to observe IF response curve. Use as low a generator output as possible.
   (4) Turn top core of Z302 on IF amplifier board fully out. (5) Align top and bottom cores of Z302, bottom core of Z305, and top and bottom cores of Z301 on IF amplifier board, and core of L506 on front end for maximum gain and symmetry (see Figure 3). Repeat alignment until maximum gain and symmetry are obtained.
   (6) Align top core of Z302 on IF amplifier board for maximum gain and symmetry (see Figure 3). Repeat alignment several times until accurate alignment and maximum gain are obtained. Keep the generator output as low as possible during all adjustments.

3. (1) Disconnect Test Point 501 on front end from ground. (2) Connect 10.7-MHz (Mc) signal generator to Test Point 501 on the front end. Connect scope's vertical input to Test Point 301 on the 10.7-MHz (Mc) IF amplifier board. 
   NOTE: Connect ground lead of generator to ground near Test Point 501 and ground of scope closest to the scope input.
   (3) Adjust generator output voltage and frequency to observe IF response curve. Use as low a generator output as possible.
   (4) Turn top core of Z302 on IF amplifier board fully out. (5) Align top and bottom cores of Z302, bottom core of Z305, and top and bottom cores of Z301 on IF amplifier board, and core of L506 on front end for maximum gain and symmetry (see Figure 3). Repeat alignment until maximum gain and symmetry are obtained.
   (6) Align top core of Z302 on IF amplifier board for maximum gain and symmetry (see Figure 3). Repeat alignment several times until accurate alignment and maximum gain are obtained. Keep the generator output as low as possible during all adjustments.

4. (1) Disconnect Test Point 501 on front end from ground. (2) Connect 10.7-MHz (Mc) signal generator to Test Point 501 on the front end. Connect scope's vertical input to Test Point 301 on the 10.7-MHz (Mc) IF amplifier board. 
   NOTE: Connect ground lead of generator to ground near Test Point 501 and ground of scope closest to the scope input.
   (3) Adjust generator output voltage and frequency to observe IF response curve. Use as low a generator output as possible.
   (4) Turn top core of Z302 on IF amplifier board fully out. (5) Align top and bottom cores of Z302, bottom core of Z305, and top and bottom cores of Z301 on IF amplifier board, and core of L506 on front end for maximum gain and symmetry (see Figure 3). Repeat alignment until maximum gain and symmetry are obtained.
   (6) Align top core of Z302 on IF amplifier board for maximum gain and symmetry (see Figure 3). Repeat alignment several times until accurate alignment and maximum gain are obtained. Keep the generator output as low as possible during all adjustments.

5. (1) Disconnect Test Point 501 on front end from ground. (2) Connect 10.7-MHz (Mc) signal generator to Test Point 501 on the front end. Connect scope's vertical input to Test Point 301 on the 10.7-MHz (Mc) IF amplifier board. 
   NOTE: Connect ground lead of generator to ground near Test Point 501 and ground of scope closest to the scope input.
   (3) Adjust generator output voltage and frequency to observe IF response curve. Use as low a generator output as possible.
   (4) Turn top core of Z302 on IF amplifier board fully out. (5) Align top and bottom cores of Z302, bottom core of Z305, and top and bottom cores of Z301 on IF amplifier board, and core of L506 on front end for maximum gain and symmetry (see Figure 3). Repeat alignment until maximum gain and symmetry are obtained.
   (6) Align top core of Z302 on IF amplifier board for maximum gain and symmetry (see Figure 3). Repeat alignment several times until accurate alignment and maximum gain are obtained. Keep the generator output as low as possible during all adjustments.

6. (1) Disconnect Test Point 501 on front end from ground. (2) Connect 10.7-MHz (Mc) signal generator to Test Point 501 on the front end. Connect scope's vertical input to Test Point 301 on the 10.7-MHz (Mc) IF amplifier board. 
   NOTE: Connect ground lead of generator to ground near Test Point 501 and ground of scope closest to the scope input.
   (3) Adjust generator output voltage and frequency to observe IF response curve. Use as low a generator output as possible.
   (4) Turn top core of Z302 on IF amplifier board fully out. (5) Align top and bottom cores of Z302, bottom core of Z305, and top and bottom cores of Z301 on IF amplifier board, and core of L506 on front end for maximum gain and symmetry (see Figure 3). Repeat alignment until maximum gain and symmetry are obtained.
   (6) Align top core of Z302 on IF amplifier board for maximum gain and symmetry (see Figure 3). Repeat alignment several times until accurate alignment and maximum gain are obtained. Keep the generator output as low as possible during all adjustments.

7. (1) Disconnect Test Point 501 on front end from ground. (2) Connect 10.7-MHz (Mc) signal generator to Test Point 501 on the front end. Connect scope's vertical input to Test Point 301 on the 10.7-MHz (Mc) IF amplifier board. 
   NOTE: Connect ground lead of generator to ground near Test Point 501 and ground of scope closest to the scope input.
   (3) Adjust generator output voltage and frequency to observe IF response curve. Use as low a generator output as possible.
   (4) Turn top core of Z302 on IF amplifier board fully out. (5) Align top and bottom cores of Z302, bottom core of Z305, and top and bottom cores of Z301 on IF amplifier board, and core of L506 on front end for maximum gain and symmetry (see Figure 3). Repeat alignment until maximum gain and symmetry are obtained.
   (6) Align top core of Z302 on IF amplifier board for maximum gain and symmetry (see Figure 3). Repeat alignment several times until accurate alignment and maximum gain are obtained. Keep the generator output as low as possible during all adjustments.

8. (1) Disconnect Test Point 501 on front end from ground. (2) Connect 10.7-MHz (Mc) signal generator to Test Point 501 on the front end. Connect scope's vertical input to Test Point 301 on the 10.7-MHz (Mc) IF amplifier board. 
   NOTE: Connect ground lead of generator to ground near Test Point 501 and ground of scope closest to the scope input.
   (3) Adjust generator output voltage and frequency to observe IF response curve. Use as low a generator output as possible.
   (4) Turn top core of Z302 on IF amplifier board fully out. (5) Align top and bottom cores of Z302, bottom core of Z305, and top and bottom cores of Z301 on IF amplifier board, and core of L506 on front end for maximum gain and symmetry (see Figure 3). Repeat alignment until maximum gain and symmetry are obtained.
   (6) Align top core of Z302 on IF amplifier board for maximum gain and symmetry (see Figure 3). Repeat alignment several times until accurate alignment and maximum gain are obtained. Keep the generator output as low as possible during all adjustments.

9. (1) Disconnect Test Point 501 on front end from ground. (2) Connect 10.7-MHz (Mc) signal generator to Test Point 501 on the front end. Connect scope's vertical input to Test Point 301 on the 10.7-MHz (Mc) IF amplifier board. 
   NOTE: Connect ground lead of generator to ground near Test Point 501 and ground of scope closest to the scope input.
   (3) Adjust generator output voltage and frequency to observe IF response curve. Use as low a generator output as possible.
   (4) Turn top core of Z302 on IF amplifier board fully out. (5) Align top and bottom cores of Z302, bottom core of Z305, and top and bottom cores of Z301 on IF amplifier board, and core of L506 on front end for maximum gain and symmetry (see Figure 3). Repeat alignment until maximum gain and symmetry are obtained.
   (6) Align top core of Z302 on IF amplifier board for maximum gain and symmetry (see Figure 3). Repeat alignment several times until accurate alignment and maximum gain are obtained. Keep the generator output as low as possible during all adjustments.
POWER AMPLIFIER CENTER VOLTAGE ADJUSTMENT

(1) Connect two 10k ± 1% resistors in series across capacitor C13 (13000 uF). Connect the common lead of a DC VTM to the junction of the two resistors.
(2) Connect DC VTVM to the junction of resistors R827 and R829 (1 ohm) on the left channel portion of the dual channel power amplifier module. Adjust Center Voltage Adjust Pot. R813 on left channel predriver/driver board for reading of 0 ± 0.5 VDC on DC VTVM.
(3) Connect DC VTVM to the junction of resistors R858 and R859 (1 ohm) on the right channel portion of the dual channel power amplifier module. Adjust Center Voltage Adjust Pot. R813 on right channel predriver/driver board for reading of 0 ± 0.5 VDC on DC VTVM.
(4) Disconnect two 10k ohm resistors.

SERVICING INTEGRATED CIRCUITS

Integrated circuits are used in the tuner section of this unit to provide the theoretical maximum of AM suppression and limiting. The U8703C integrated circuit used in the 10.7-MHz FM IF amplifier and in the meter and muting circuit contains the equivalent of 5 transistors and 2 resistors. The TR8507J integrated circuit used in some models of the 10.7-MHz amplifier contains the equivalent of 10 transistors, 7 diodes and 11 resistors.

Both the U8703E and the TR8507J integrated circuits are high-reliability devices and should require a minimum of servicing. However, troubles may occur that will require servicing of these devices. In such an event, the integrated circuits should be serviced the same as a transistor. The preferred troubleshooting procedure is to first isolate the trouble to one stage using AC signal tracing methods. Once the suspected stage is located, the integrated circuit can be checked by measuring the DC voltages at the input and output pins of the integrated circuits using a DC VTVM. These DC voltages are the most accurate indications of the operating condition of the integrated circuit.

WARNING: Do not use an ohmmeter to check continuity with the integrated circuit on the printed circuit board; forward biasing the internal junctions within the integrated circuit may burn out the transistors.

When replacing an integrated circuit, the following precautions should be observed:
(1) Do not replace a defective integrated circuit until the cause of the trouble is found. All external resistors, capacitors and transformers should be checked first to prevent the replacement integrated circuit from failing immediately due to a trouble in the connecting components.
(2) solder and unsolder each lead separately using a pilfer or other heat sink on the lead to prevent damage from excessive heat.
(3) Check that the leads of the replacement integrated circuit are connected to the correct locations on the printed circuit board before turning the set on.