TRADE NAME
H. H. Scott Model 311-A

MANUFACTURER

TYPE SET
AC Operated FM Superheterodyne Tuner

TUBES (Seven)
Types 6U8G/7A RF Amplifier, 6UD Mixer-Oscillator, 6AU6 1st IF Amplifier, 6AU6 2nd IF Amplifier, 6AU6 Limiter, 12AT7 (or) 12AX7 AF Amplifier, 6X4 Rectifier

POWER SUPPLY
105-125 Volts AC - 60 Cycles

TUNING RANGE
FM - 88MC - 108MC

RATING
.32 Amp, 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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Operating Manual For

h.h. Scott 311-A FM Tuner

DESCRIPTION

The 311-A FM Tuner incorporates circuit advances which result in performance far superior to that obtained with tuners of conventional design. Outstanding features include:

- 3 microvolt sensitivity for 20 db of quieting. This high sensitivity assures you that even the most distant stations are received with clarity.
- Wide-band design, consisting of 2 megacycle detector bandwidth and 150 kc IF bandwidth. The wide band circuit design simplifies tuning, making it drift free and non-critical.
- High IF selectivity, combined with the wide band design lets you separate stations so close together that you would ordinarily pass right over them.
- Automatic gain control always keeps the tuner adjusted for perfect reception, even though signal strength may vary considerably.

UNPACKING

Remove the tuner from the shipping carton and immediately inspect for any damage. Damage must be reported immediately to the dealer from whom you purchased the tuner. If your dealer shipped the tuner to you, the damage should be reported to the shipping company.

Check the carton for the following:
1. Mounting template
2. Package of four panel mounting screws
3. Warranty card
4. Length of wire for simple antenna

INSTALLATION

CAUTION: The life of electronic equipment is materially shortened if proper ventilation is not provided. If the 311 is installed in custom cabinets, leave the back or one side open, or provide several ventilating holes. If the 311 is installed in its own accessory case, keep the back at least 2 inches away from any vertical surface.

Installing in a custom cabinet or panel mounting:

1. Locate a supporting shelf in the cabinet at the height you wish the tuner to be positioned.
2. With the cabinet panel in position, mark the edge where panel and the upper shelf surface meet.
3. Using the marked line as a guide, place the mounting template in position.
4. Mark the size of the cut-out, and carefully cut the opening as indicated on the template. Use a 5/64" drill to pre-drill the four holes for the wood screws which hold the tuner in place on the panel.
5. Slide the tuner in from the front so it rests on the shelf. The front of the tuner should completely cover the opening.
6. Fasten the 311 to the cabinet panel, using the four wood screws provided.

Note: The tuner MUST rest on a shelf. It should NOT be supported by only the front panel.

Vertical mounting. The same instructions given above should be followed for making the panel cut-out. The back of the tuner must rest on a supporting shelf or block at the bottom of the cabinet. The tuner must be supported, and should not hang from the front panel.

Using the tuner on a shelf or table. A beautiful plastic-covered leather finish case is available from your dealer. This case removes the need for panel or cabinet mounting, and the tuner can be used side by side or on top of other H. H. Scott units to make a very attractive installation. Complete installation instructions are provided with each case.
ELECTRICAL CONNECTIONS

Antenna. For most locations, especially if you are within a few miles of the FM stations you wish to receive, a short length of wire attached to the antenna terminal (the one marked "300 ohms"), will be sufficient.

When receiving signals that are weak (as indicated by a low reading on the meter), slight movement of the antenna wire may help considerably in improving reception. Move the wire around until the meter shows the maximum reading. This will be the best antenna position for the particular station you are tuned to.

When the tuner is used at greater distances from stations you wish to receive, a more elaborate antenna array should be used for best results. A simple antenna that will work well in weak signal areas is the folded dipole. A construction diagram of a folded dipole antenna is shown in the drawing. It is constructed from ordinary TV antenna lead-in wire.

The folded dipole is directional, and on very weak signals a small movement in its position may result in a substantial improvement in reception. The antenna should be moved to the point where the meter reads its maximum value on the station you have difficulty receiving. The best antenna position is usually broadside to the direction of the station.

Your TV antenna may also be used, but it may not give as satisfactory reception as a separate FM antenna. A switch must be provided so that you can switch between the FM tuner and TV set, depending on which set is in operation. Two sets should never be connected to one antenna at the same time or inferior reception may result.

Several high quality 300 ohm antenna arrays are also available for roof or tower installation. These arrays will give the best performance from your FM tuner. These antennas have different characteristics, which range from those working best in a single direction only, to those that will receive well from any direction. The location of the stations you have difficulty receiving will determine which array will work best for you. It is important to remember that with the very directional antennas a slight movement of the antenna may result in a substantial increase in signal strength, as shown on the meter.

Audio Connections: A connection must be made between the OUTPUT connector at the back of the tuner, and the TUNER (or other high-level) input of your amplifier. The proper connecting cable can be obtained from your dealer or from any radio parts supply house.

The audio section of the 311 has a very low impedance output, so shielded connecting cables up to 70 feet (or 1000 mill in cable capacitance) in length between the tuner and your amplifier may be used. If there is insufficient output from this connector to drive your amplifier, you should use the TAPE output jack. This connection has an output voltage of about five volts, while the OUTPUT jack has an output of about 1 volt.

Connection to a tape recorder: The connector marked TAPE OUTPUT on the back of the 311 is for connection to a tape recorder input for "off the air" recording. Most tape recorders have a sufficiently high input impedance so that both the tape recorder and amplifier may be left connected at the same point. This enables you to monitor the broadcast through your sound system as the recording is being made.
**Operating the Tuner**

**Tuning and Station Selection:** The larger of the two tuning knobs (the outer one) is used for quick tuning setting; or for tuning rapidly from one end of the band to the other. The smaller knob provides vernier adjustment, giving very precise control. This is helpful on very weak stations.

**Level Control:** This control enables you to switch between the tuner and other inputs into your amplifier without having to readjust the volume. The level control should be set at that point which gives the same audible volume from the speaker as is obtained when you adjust your amplifier selector switch to Phono or other inputs into your amplifier.

If the 311 power cord is connected to an accessory outlet of your amplifier, the Level control may be set once and left in that position.

The automatic gain control makes frequent manual readjustment of volume unnecessary.

**Meter:** On very weak stations, the meter is helpful in getting optimum station setting. The vernier tuning control should be adjusted until the indicator reads a maximum or until the signal sounds clearest. These two points will be very close to each other.

The meter is also helpful for proper antenna orientation. The maximum indication on the meter means the antenna is properly oriented for the particular station to which you are tuned.

The meter was designed for sensitive action, and it will not be damaged if it moves rapidly or deflects off scale.

**Logging:** A logging scale is provided, marked in linear divisions, so that stations which are often tuned to can be easily remembered. The logging scale also provides a fine calibration which is useful for recording the positions of stations located in between the main points on the frequency dial.

**Service:**

**Replacing pilot light:** First set the tuning dial at "88" so the tuning condenser will be completely meshed or closed. Then unscrew and remove the small tuning knob.

The large tuning knob may then be easily removed. This will give you access to the pilot light, which is a #44 bulb. After the bulb has been replaced, make sure the tuning condenser plates are meshed. Replace the knobs, setting the dial to "88".

**Other Service:** Service other than pilot light or occasional tube replacement usually is never required. If your tuner is not operating properly, be sure to check first all external connections and all amplifier connections to make sure that the difficulty is actually in the tuner. Then, tubes should be checked, preferably by replacing with new ones, one by one. Tube defects often times do not show up on a tube tester.

If the tuner still fails to operate, or does not seem to be working properly, write to Service Department, H. H. Scott, Inc., 385 Putnam Avenue, Cambridge, Massachusetts, giving all details. We will notify you whether you can make the necessary repairs, or whether it would be preferable to return the tuner to us or an authorized service station for servicing.

No attempt should be made to align the tuner unless you have had extensive experience in tuner alignment, and have all the necessary laboratory equipment. Without proper experience, you may seriously damage the tuner and void the warranty.

**Warranty**

Be sure to fill out and return the enclosed warranty card so that your instrument will be registered with us. Complete details on the terms of Warranty are on the enclosed warranty statement.
HERMON HOSMER SCOTT, INC.
## Alignment Instructions II. H. Scott 311-A FM-Tuner

(Refer to circuit diagram for alignment test points)

<table>
<thead>
<tr>
<th>Signal Generator Coupling</th>
<th>Signal Gen. Frequency</th>
<th>Tuner Dial Setting</th>
<th>Connect Scope to</th>
<th>Connect VTVM to</th>
<th>Adjust</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. High side clipped to body of 47 mmf (on grid of 6V8) (B), low side to ground.</td>
<td>10.7 mc 500 KC sweep</td>
<td>109 mc</td>
<td>(C) and ground</td>
<td>(C) and ground</td>
<td>All IF transformers, top and bottom</td>
<td>Connect 2 to 5 mfd paper capacitor between (A) and ground. Adjust for maximum amplitude and symmetry. Use lowest input level to obtain adequate output (maximum 3.5V dc)</td>
</tr>
<tr>
<td>2. High side clipped to grid of 6AU6(V5) (D), low side to ground.</td>
<td>10.7 mc CW</td>
<td>109 mc</td>
<td>……</td>
<td>Crystal probe coupled loosely to plate of 6AU6(V5) (not touching) (E)</td>
<td>Primary of detector transformer (bottom), limiter coil</td>
<td>Adjust for maximum deflection. Connect 1000 ohm carbon resistor between (11) and (1) (secondary), input level between .65 and .3 volts.</td>
</tr>
<tr>
<td>3. High side clipped to grid of 6AU6(V5) (D), low side to ground.</td>
<td>10.7 mc CW</td>
<td>109 mc</td>
<td>……</td>
<td>High to (F) low to junction of two 100,000 ohm resistors</td>
<td>Secondary of detector transformer (top)</td>
<td>Adjust for 0 (zero) deflection. Connect two matched 100,000 ohm resistors in series. Connect this between (G) and ground.</td>
</tr>
<tr>
<td>4. High side through 270 ohm carbon resistor to antenna, low side to antenna ground terminal.</td>
<td>106 mc, 75 KC deviation, 400 eps rate</td>
<td>106 mc</td>
<td>Output Cable</td>
<td>AC VTVM to output cable</td>
<td>All 'Front End' trimmer capacitors</td>
<td>Signal generator output level 6 microwatts. Adjust trimmer for maximum audio output, approx. 2.5 volts on VTVM.</td>
</tr>
<tr>
<td>5. High side through 270 ohm carbon resistor to antenna, low side to antenna ground terminal.</td>
<td>92 mc, 75 KC deviation, 400 eps rate</td>
<td>92 mc</td>
<td>Output Cable</td>
<td>AC VTVM to output cable</td>
<td>All silver plated &quot;Front End&quot; coils by expanding or compressing coil turns</td>
<td>Signal generator output level 6 microwatts. Adjust for maximum audio output, then repeat 4, (approx. 2.5 volts on VTVM).</td>
</tr>
</tbody>
</table>

Note: Alignment to be done with Level Control fully clockwise.

Circuit diagram and connection points shown in instruction book.