310-B
FM Broadcast Monitor Tuner

DESCRIPTION
The H. H. Scott 310-B FM Tuner incorporates unique design features which insure the best FM reception possible. These features include:

- The most important development in FM tuner design, "wide-band" circuitry. The wide-band design insures virtually noise-free reception of very weak signals, even when strong interference is present. Stations stay "locked" in place without the need for troublesome AFC circuits. Tuning is made non-critical.
- Three stages of IF amplification make it possible to separate stations closely adjacent to each other in frequency.
- DYNAURAL Interstation Noise Suppressor, continuously variable from the front panel, reduces annoying PM "roar" between stations. The control is easily adjusted for different noise levels.
- Calibrated illuminated tuning meter insures precision selection of very weak signals and proper antenna orientation.
- Automatic gain control prevents distortion on strong local signals and makes manual control of sensitivity unnecessary.
- Three stages of full limiting.

DO NOT Operate This Equipment Until These Instructions are Read, or Serious Damage to Your Tuner May Result.

UNPACKING
If there is any damage to the tuner, it must be reported immediately to the dealer from whom you purchased it. If THE DEALER SHIPPED THE TUNER TO YOU, DAMAGE MUST BE REPORTED DIRECT TO THE SHIPPING COMPANY. Failure to report damage immediately may void any claim against the shipping company.

Check the carton for the following:
- Panel mounting template
- Four rubber feet and screws to hold them
- Warranty card
- Warranty statement
- Folded dipole antenna
- Output cable

INSTALLATION
Installing in accessory case: If the tuner is to be installed in its own case, be sure to leave at least two inches between the back of the tuner and any vertical surface it may be near. The case openings must not be covered; also air circulation under the tuner should not be impeded. Failure to leave adequate space for circulation of air will result in materially shortened equipment life.

Panel Mounting or Custom Installation: If the tuner is to be panel mounted or installed in custom cabinetry, be sure to leave one side or the back of the cabinet open for adequate ventilation. Detailed instructions for panel mounting are given below:

1. Locate a supporting shelf in a cabinet at the height at which you wish the tuner positioned, and mark the edge at which the upper surface of the shelf meets the panel.
2. Using this line as a guide, place the mounting template in position.
3. Mark the size of the cutout and carefully cut the opening as indicated on the template.
4. Slide the tuner in from the front so it rests on the shelf. The front panel should completely cover the opening.
5. Fasten the tuner to the shelf, using the method shown on the mounting template. NOTE: The tuner must rest on a shelf, and should not be supported by the front panel.

Vertical mounting: The same instructions should be followed for making the panel cutout. The back of the tuner must rest on supports. No weight should be carried by the front panel. Due to poorer ventilation, avoid vertical mounting if possible.
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, that is supplied with the tuner.

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. If there is excessive output from this connector to drive your amplifier, you should use the TAPE output jack. This connection has an output voltage of about one volt, while the OUTPUT jack has an output of about 5 volts. The proper connecting cable is included. Longer cables may be obtained from your dealer.

The audio section of the 310-B has a very low impedance output, so shielded connecting cables up to 70 feet (or 1000 ufd in cable capacitance) in length between the tuner and your amplifier may be used.

Connection to a tape recorder: The connector marked TAPE OUTPUT on the back of the 310-B 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 time. This enables you to monitor the broadcast through your sound system as the recording is being made.

Power Connections: The 310-B is designed to operate on 105-125 volts, 50-60 cycles. The unit is turned ON or OFF with the Suppressor control on the front panel. If your amplifier has an auxiliary a-c power outlet which is switched on and off with the amplifier, you can connect the tuner power cord to that outlet.

OPERATING THE TUNER

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

Level Control: This control is used for matching purposes between tuner and amplifier only, as the 310-B contains complete automatic gain control circuitry making frequent manual readjustment of volume unnecessary. When the 310-B is connected to the amplifier this control should be set so that approximately the same volume level is maintained when switching from tuner to phono or other inputs. If the LEVEL control has to be turned to a setting of 3 or lower for proper volume matching using the OUTPUT jack, the lower level TAPE OUTPUT jack should be used and the LEVEL control advanced as stated above. If the amplifier has a Level control for its tuner input, this Level control should be adjusted, and the 310-B Level control left at maximum.

Meter: On very weak stations, the meter is helpful in getting optimum station setting. The vernier tuning control should be adjusted until the indicator either 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.

DYNAURAL Interstation Noise Suppressor

This control permits you to tune to stations without hearing the annoying interstation "roar." The proper setting will depend on the noise level in your area, and also on the signal strength of the weakest stations you wish to receive. Once the control is set, it is usually unnecessary to readjust it, unless the noise level changes because of local conditions.

To set the control tune to a point on the dial where there is no station. Turn the control slowly counter-clockwise until the noise just disappears. This is the proper setting for the existing noise conditions.

For reception of very distant stations, whose signal strength is comparable with the noise level, the noise suppressor can be completely disabled by setting it at "10." If the 310-B power cord is connected to an accessory AC outlet of your amplifier the suppressor control may be set once and left in that position.

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". The meter pilot light (#47) can be replaced by removing the clip located directly behind the meter.

Other Service. Service, other than either 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 full 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.
<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>High side clipped to body of 15 mwaf (on grid of 6U6) (B), low side to ground.</td>
<td>10.7 mc 500 KC sweep</td>
<td>109 mc</td>
<td>(C) and ground</td>
<td>All IF transformers, top and bottom</td>
<td>Connect 2 to 5 mil 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>
<td></td>
</tr>
<tr>
<td>High side clipped to grid of 6BN6(V6) (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(V7) (not touching) (E)</td>
<td>Primary of detector transformer (bottom), limiter coil</td>
<td></td>
</tr>
<tr>
<td>High side clipped to grid of 6BN6(V6) (D1), 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></td>
</tr>
<tr>
<td>High side through 270 ohm carbon resistor to antenna, low side to antenna ground terminal.</td>
<td>106 mc, 75 KC deviation, 400 cps rate</td>
<td>106 mc</td>
<td>Output Cable</td>
<td>All &quot;Front End&quot; trimmer capacitors</td>
<td>Signal generator output level 4 microvolts. Adjust trimmer for maximum audio output, (approx. 2.5 volts on VTVM).</td>
<td></td>
</tr>
<tr>
<td>High side through 270 ohm carbon resistor to antenna, low side to antenna ground terminal.</td>
<td>92 mc, 75 KC deviation, 400 cps rate</td>
<td>92 mc</td>
<td>Output Cable</td>
<td>All silver plated &quot;Front End&quot; coils by expanding or compressing coil turns</td>
<td>Signal generator output level 4 microvolts. Adjust for maximum audio output, then repeat 4, (approx. 2.5 volts on VTVM).</td>
<td></td>
</tr>
</tbody>
</table>

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

Circuit diagram and connection points shown in instruction book.