

**SERVICE BULLETIN FOR
MODEL 340B TUNER - AMPLIFIER**

SPECIFICATIONS

(These are minimum-all H. H. Scott Model 340 tuner-amplifiers must meet or exceed these figures)

TUNER (FM-MPX)

Usable Sensitivity (IHFM)	2.2 microvolts
(For less than 3% total noise, distortion, Hum-30 db.)	
Signal to Noise Ratio	60 db below 100% modulation
Total Harmonic Distortion	0.8%
Frequency Deviation	0.02%
Frequency Response	20 to 15,000 cps $\pm$ 1 db
Capture Ratio	6.0 db
Selectivity	35 db
Spurious Response Rejection	80 db
Cross Modulation Rejection	80 db
AM Suppression	55 db
Tuning Range	87 to 109 mc
Accuracy of calibration	0.5%
Separation	Better than 30 db

PREAMPLIFIER

Output

Rated voltage output to tape recorder	0.5 v
Minimum recommended load resistance	100 k
Maximum recommended cable capacitance	1000 mmf
Maximum recommended cable length	40 ft.

Input

Mag. Low - Input impedance	Approximately 50 k
Signal for rated output	3 mv
Mag. High - Input impedance	Approximately 50 k
Signal for rated output	9 mv
High Level Inputs - Input impedance	500 k
Signal for rated output	0.4 v
Frequency Response in flat position	20-20 kc $\pm$ 1.0 db
Treble Controls measured at 10,000 cps, boost or cut	15 db $\pm$ 2 db
Bass Controls measured at 30 cps, boost or cut	15 db $\pm$ 2 db
Scratch filter	(Cuts 6 db per octave over 5000 cps)

AMPLIFIER

Maximum power output each channel at 1000 cycles:

Music waveforms	35 watts
Steady state.....	30 watts
Maximum total harmonic distortion at rated output.....	0.8%
Frequency response.....	20 to 20,000 cycles $\pm$ 1 db
Power bandwidth at rated distortion (IHFM method)	20* to 20,000 cycles
Hum and noise.....	80 db below rated power

(These characteristics are measured at a line voltage of 117 volts rms and line frequency of 60 cycles per second. No significant changes of characteristics should be experienced for normal variations of line voltages or a line frequency of 50 cycles per second.)

Range of line voltage and frequency.....	105-125 volts, 50-60 cycles
Power consumption - 117 volts at 60 cps (A.C. only).....	240-300 watts

All H. H. Scott amplifiers and preamplifiers incorporate a low frequency rolloff which becomes full operative below 20 cycles. This is designed to prevent overload of the output stage and the loud-speaker due to subsonic rumble frequencies and record eccentricity. This means that the full power of the amplifier can be concentrated into the audible range.

TUNER SECTION

GENERAL SERVICE NOTES

Service, other than replacement of either pilot lights or vacuum tubes, is usually not required. If the tuner is not operating properly, all external connections should be checked to make sure that the difficulty is in the tuner. Generally, it is advisable to replace the tuner with a tape recorder or similar device to check out the amplifier performance. If the difficulty appears to be located in the tuner, the level control should be first checked to insure that it is rotated away from its extreme counter-clockwise position. Then, the vacuum tubes should be checked by replacing them with new ones, one by one. The tubes should be tight in their sockets and provided with shields where applicable. Tube defects frequently do not show up in a tube tester. Only operation in the tuner will insure the proper working of a vacuum tube. In replacing tubes, if possible, use exact replacement tubes, available from H. H. Scott or any authorized warranty service station. Other tubes will work, but only exact replacement tubes can give the full performance that the tuner is capable of.

Pilot Light Replacement:

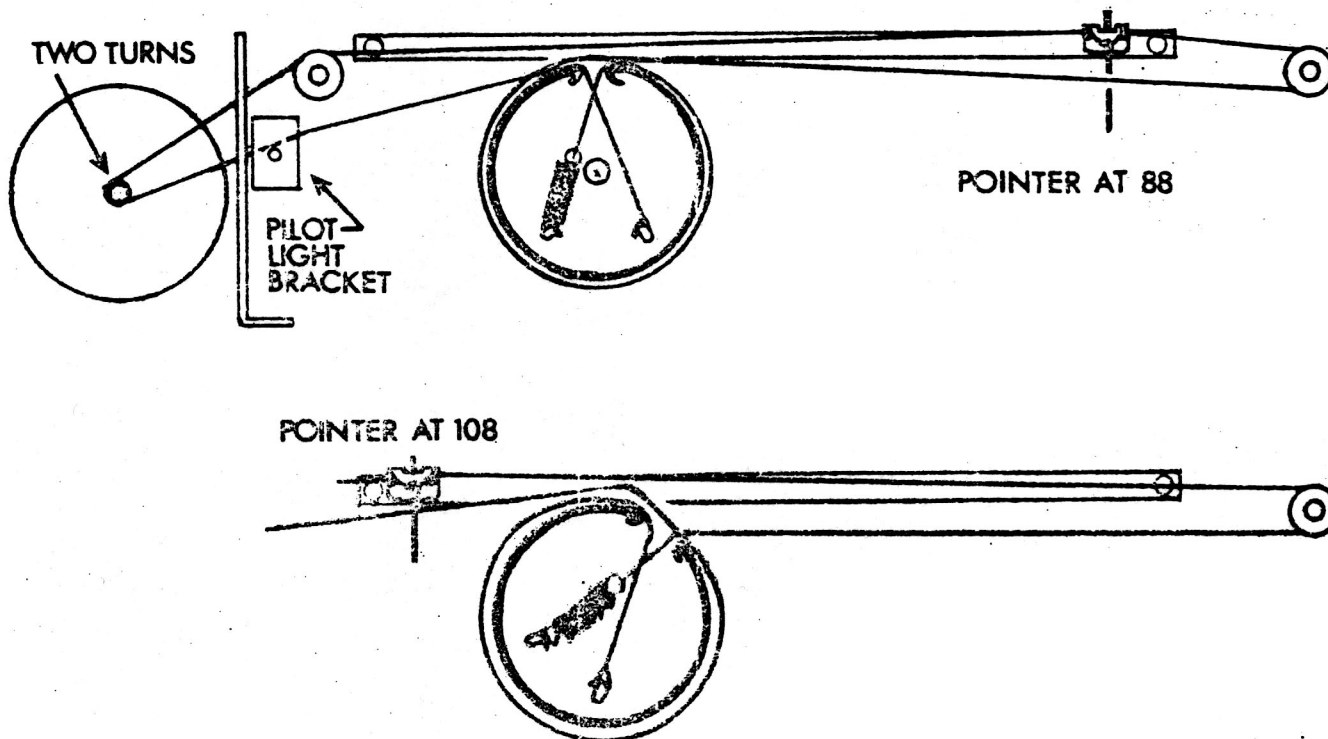
1. Remove the sheet metal screws on top and on each end of the control shield which covers the top, front section of the unit and carefully lift the shield up and backwards. There are wires connected to the shield, so do not pull it too far.
2. Remove the dial indicator lights by squeezing in on the spring clips and pulling backwards. The replacements should be bayonet type #47 bulbs. Be sure to remove the "beam shields" from the old bulbs and re-install them on the new bulbs.
3. If the meter bulb, located on the control shield, needs replacement, it will be necessary to contact the factory for the replacement. When ordering, specify number VPL-47-Blue.
4. Re-install the control shield in the same manner as it was removed and replace all six screws.

Dial Cord Replacement:

1. If the dial cord should break, a replacement may be ordered from our Parts Department by specifying number ADC-1. If a new dial cord spring is required, number ASP-1 should be specified.
2. Remove the control shield as outlined in step number 1 above. Remove the broken dial cord from the unit along with the dial indicator and dial cord spring.
3. Attach the dial cord spring to the new dial cord and rotate the tuning capacitor rotor fully counter-clockwise (as viewed from the rear of the unit).
4. Using the diagram as a guide, feed the "free end" of the dial cord through top half of the pilot light bracket and down through the opening in the tuning condenser rotor. Slip the loop in the cord over the tab provided.
5. Wind the dial cord twice around the tuning knob shaft and feed it up across the pulley and over and around the opposite pulley. Note - be sure to go around the tuning knob shaft in a clockwise direction or the tuning knob and the tuning indicator will go in opposite directions when the hook-up is completed.
6. Wind the dial cord around the condenser rotor by rotating the tuning condenser rotor, fully clockwise. Without going through the opening in the rotor, attach the spring to the rotor tab provided. Now carefully lift the dial cord over the edge of the opening so that it fits into the rotor groove.
7. With the tuning capacitor rotor still fully clockwise, re-install the dial indicator in such a way that the indicator is positioned at the "100" mark on the logging scale at the bottom of the dial. The easiest way to install the indicator is to place the cord

over the left hand tab, under the center tab, and then, pulling gently, over the right hand tab.

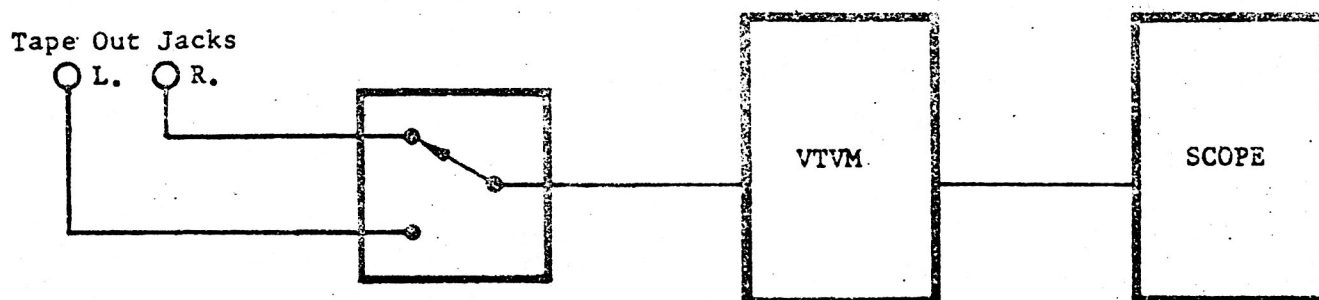
8. Rotate the tuning knob through its entire rotation to make sure that the indicator moves correctly, smoothly, and in the same direction as the knob. The extremes of the indicator should be the "0" mark and the "100" mark on the logging scale. If, when the unit is turned on, the indicator goes to both of these extremes, but the stations seem to be picked up in the wrong places, the alignment of this set should be checked.
9. Re-install the control shield as outlined in number 4 in the above section.



ALIGNMENT INSTRUCTIONS FOR FM SECTION

Note: No attempt should be made to align the tuner or repair it unless the person so doing has had extensive experience in tuner alignment and repair procedures and has the necessary laboratory equipment. Without proper experience or equipment, the repairman may seriously damage the tuner.

1. Equipment required: VTVM (AC), FM Signal Generator (must be Measurements 210AB or equivalent), Oscilloscope, 400 cps null, and insulated alignment tools.
2. Equipment setup: Connect signal generator directly to the 300 ohm antenna input of the tuner using a matching impedance network if necessary. If there is no Distortion Analyzer available, connect the Left Channel (A) tape recorder output of the 340B into the 400 cps null and from the null to the oscilloscope and VTVM in parallel. If no null is available (a schematic for making one of these very simple and useful devices is available from the Engineering Department) the tuner can still be serviced. However, it will not be possible to measure the tuner's "Usable Sensitivity" as per TIA standards, or align the detector. If an analyzer is available, then connect the VTVM and scope to the 340B tape outputs (L & R). The hookup shown works very well.
3. Allow tuner and test equipment to warm up fully before beginning alignment. Adjust line voltage for 117 volts. Remove bottom cover of tuner. Always tune primary and secondary of I.F. transformers at the same time, using one alignment tool in each hand. Set 340B Input Selector Switch to FM Mono, Loudness Control to "0".

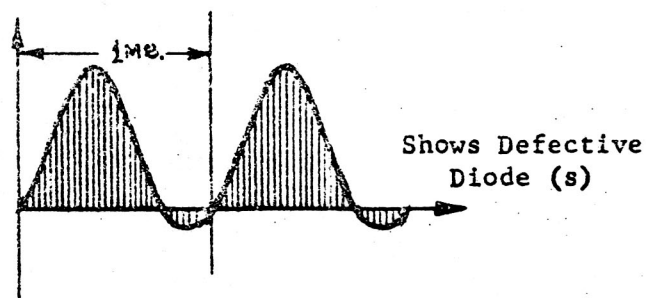
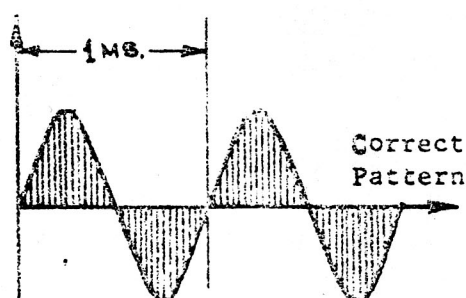


4. Generator Prealignment

- a. Connect Audio Oscillator 400 cps at .25v into test point. Output should be .5 - 1.0v maximum difference between channels 2db. Check pattern of diode bridges (junction of CC-.02 and diodes). Perform Frequency Response in both channels.

Specs:	20 cps	-2db max.
	2 kc	-2 to -4
	5 k	-7 to -9
	10 kc	-12 to -14
	15 k	-15 to -18

- b. At 67 kc, adjust L-502 for minimum output.



5. Generator and tuner to 106 mc (75kc dev., 400 cps mod.) Peak all IF cans to maximum AGC with input as low as practical - about 3 uv. Input to 1k uv, peak detector to minimum noise on secondary (top), maximum output on primary (bottom). Maximum distortion 0.8%.
6. Check usable sensitivity at 92, 98, and 106 mc. Feed in 4.4 uv from generator (which is actually 2.2 uv at antenna), must obtain at least 30 db reduction in output when distortion meter is switched in. Output voltage should be 1-2 volts. Feed in 1k mv Audio output 1.5-3v. Reduce input to zero, note output drop of 15 ± 1 db. If these figures are not met, IF or Front end realignment or both is indicated.
7. Hum (FM). At 12 mc 10k uv input, take reference reading and remove modulation. A minimum of 50 db drop in output should be noted before hum and noise.
8. De-emphasis and noise filter. With 10k uv output of generator, take output reference reading and switch generator modulation to 8200 cps, note a drop of 10-14 db in output.
9. Check calibration against stations - specs = $\pm .2$ mc.
10. Set all controls for Automatic Stereo. Connect antenna and tune 340B to Left channel (A) signal (100 mc).
11. Attach scope probe to pin 7 of V502 and peak L501 and T501 both top and bottom, for maximum output as indicated on scope with calibrated scope pilot level should be between 25 - 60 V.

12. Remove scope probe from V502 and attach to VTVM, short primary of T501 or switch off pilot. Ground pin 1 of V504 and adjust T502 for 0 beat. Remove short and notice signal locks in.
13. Install bottom cover and, with signal source still connected to 340B antenna terminal, tune for maximum L Channel signal. Using tuning meter, take reference reading and switch to R Channel output. With separation pot at maximum CW, adjust L501 for best separation, then adjust separation pot for maximum separation. A minimum of 30 db is required at 400 cps.
14. Switch 340B to Right Channel (B) signal and again note minimum 30 db separation.
15. Adjust Generator output to below 5.0 uv and note tuner switches to mono. Increase Generator output and note unit switches to stereo with about 5.0 uv on antenna terminals.
16. Switch Selector to Sub Channel Filter position and note decrease in separation (7db) ± 2 . with 400 cps modulation.
17. With 1k uv input from signal Generator, adjust tuner for maximum meter indication and note output. Readjust tuner for maximum audio output not to increase more than 2 db.
18. Hum (AC). Insert shorting (shorted) plug in test jack and switch to Sub Channel Filter. Hum is not to exceed 5 mv both channels.

EMERGENCY MULTIPLEX SEPARATION ADJUSTMENTS WITHOUT SPECIAL TEST EQUIPMENT

The following adjustments should only be attempted if it is impossible to get the proper multiplex test equipment and it is obvious that stereo separation is not satisfactory. The only way to be sure the tuner is at fault is to substitute another tuner, known to be working properly. (Very often a tuner will not appear to have good separation when actually the station or the program material is at fault.)

The primary requirement is to have a local FM station broadcasting multiplex stereo with spoken announcements on one channel only. Most multiplex stations do provide this service at certain times of the day. Call the station and check. If they are among the few that are not broadcasting speech on one channel only, you might point out how valuable it would be to service people in their area if they did.

1. Assume the FM multiplex station is transmitting commercials on the right channel only (reverse the following procedure if it is left only).
2. Connect a cable from the Amplifier's Left Channel output to a speaker.
3. Tune in the station carefully using the tuning meter. Set the input switch to Automatic Stereo, the Selector switch to Stereo and all of the slide switches to their upward positions.
4. When the announcer begins to talk, he should be barely audible in the left channel signal. Carefully retune until you find the point where the sound is faintest (you should be quite close to the maximum meter reading position.)
5. Carefully rotate the "Sep" pot on the multiplex adaptor until the voice is at its faintest. Keep the volume up on the amplifier.
6. If this does not provide sufficient improvement, take the detector alignment tool and insert it into the top of L-501. Rotate slowly for the best separation point. Then readjust the "Sep" pot.

7. If this does not help, the difficulty may be with the station or with some other part of the system.

AMPLIFIER SECTION

GENERAL SERVICE NOTES

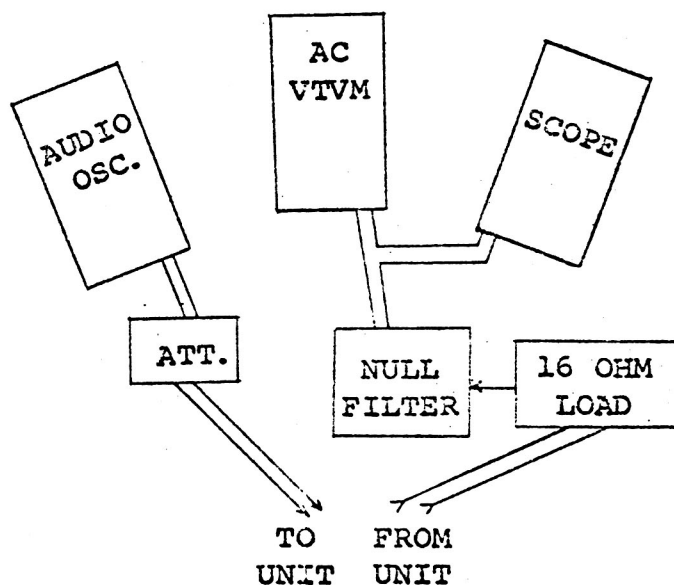
1. Check the tubes, particularly those in the power output stage and the rectifier every year. If the tubes are outside the manufacturer's ratings or show gas, they should be replaced. Gassy tubes may damage other components of the circuit.
2. When the 340-B is being checked yearly, clean the tubes of dust so that they may radiate their heat more effectively.
3. If at any time the hum or noise increased noticeably, check the power tubes, for this symptom is often an indication of gassy tubes.
4. If the 340-B blows fuses frequently, check the line voltage. If it rises above 125 volts, drop the line voltage by means of an auto-transformer or place a voltage regulator transformer between the amplifier and the line. If the line voltage is correct, check the amplifier itself. Do not use fuse sizes other than the fuse size specified.

Equipment Needed

H. P. Audio Oscillator
H. P. VTVM
R.C.A. Oscilloscope
Triplett VOM
Load Box
Attenuator
400 cps null filter

Set front panel controls to the following:

Input selector	Extra
Stereo switch	Stereo
Tone controls	Flat ("0")
Loudness control	Max
Stereo Balance	"0"
Tape-Monitor switch	OUT
Speaker switch	ON
Scratch filter	Out
Rumble filter	Out
Loudness Volume switch	Loud



CAUTION - DO NOT "BURN" B+ VOLTAGE WHILE TROUBLE SHOOTING, TO PREVENT DAMAGE TO SILICON RECTIFIER

1. Bias and Balance adjustments

Connect 16 ohm load to 16 ohm speaker taps. Remove both phase splitters. Adjust B.C. or bias pots for minimum reading on VTVM. Do this for both channels. Connect ohm meter to test points and adjust bias pots to read 70 ma - both channels.

2. Sensitivity Check

Connect audio oscillator, through attenuator, into the EXTRA input jack L channel. Set audio oscillator to .40v output at 400 cps. Output reading on VTVM should be 12v (20 watts), undistorted. The input voltage of .40v should be adjusted ± 2 db to obtain the 22v output.

3. Distortion Check

Using 400 cps null filter, distortion must be no greater than 0.6% as read on VTVM.

4. Tone Control Check

	Bass (50 cps)	Treble (10 kc)
Boost	15 db	11 db
Cut	15 db	15 db $\pm$ 2 db

Be certain that electrical zero agrees very closely with Mech. zero.

5. Frequency Response Check

Reference Odb at 1 kc. Sweep between 35 cps - 15 kc. Maximum allowable variation +1db. Sweep from 15 kc - 20 kc. Maximum allowable variation +1, - 2db. The low end 3db down point (from reference) should fall between 17-23 cps.

6. Scratch and Rumble Filters (Odb - 3 volt scale)

- At 5kc, scratch filter to "in", note 3 $\pm$ 1db drop.
- At 100 cps, rumble filter to "in", note 3 $\pm$ 1db drop.

7. Stereo Balance Pot. Check

Turn Stereo balance pot to L channel and note no loss of signal. Turn to R channel and note complete loss of signal.

8. Pre-Amp Gain Check

Turn controls back to original settings. Oscillator at 1kc. Adjust for Odb on 3 volt scale. Turn Input selector to Phono. Plug input into Mag Low and attenuate input 44db. Output should be "0" db on the 3 volt scale $\pm$ 1 db. Plug into Mag High, output should be -10 db $\pm$ 1.5 db. Plug into Crystal input, note additional 26 db loss of signal, $\pm$ 2db.

Return to Mag Low input, Odb 3v scale.

9. Pre-Amp frequency response check.

Audio osc.	Output change
1 kc	0
10 kc	-12 db $\pm$ 2db
100 cps	+15

10. Repeat Step #3 Distortion Check

11. Hum Checks

	<u>Selector Switch</u>	<u>Loudness Pot.</u>	<u>Max Hum</u>
A.	Extra	0	3mv
B.	Extra	10	10mv
C.	Phono Low	10	35mv
D.	Phono High	10	40mv

12. While checking hum in R channel, obtain Lissajous pattern on scope and observe phase reversal when Phase sw. is switched to "Reverse" position.

13. Repeat Steps 2 through 12 for R Channel.

When unit has met all specifications, seal necessary pots.

14. Check Function Lights

<u>Position</u>	<u>Light</u>
Extra	Extra
FM (Mono, Auto., and filter)	Tuner
Phono	Phono
Monitor "IN"	Monitor

Adjust neon bulbs over holes so that all 4 lights have equal brightness.