

SERVICE BULLETINFORMODEL 335/LM-35 WIDEBAND MULTIPLEX ADAPTORGENERAL SERVICE NOTES

Service, other than replacement of either pilot lights or vacuum tubes is usually not required. If the adaptor is not operating properly, all external connections should be checked first. Generally, it is advisable to replace the adaptor with a similar device known to be working. The level control should be 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 unit 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 adaptor is capable of.

PRELIMINARY MULTIPLEX TESTS

Use a good Audio Oscillator. Connect adaptor to a Scott tuner as per instructions.

1. Connect the audio oscillator to the test point input on the multiplex section. Adjust the output of the oscillator for 0.25 volts. Set the controls as follows: level to maximum, selector to mono, filter to out, and AGC to mono.
2. Measure the output. It should be 2 to 3 volts with selector switch in either mono or stereo. With selector switch in mono adjust the balance pot (BAL) on the multiplex section so that the Channel A and B outputs are the same within 1 db.
3. Disable the multiplex section oscillator by grounding pin #2 of 12Au7 (V503). With the audio oscillator at 400 cps take a reference reading. It should be down maximum of 2 db at 20 cps., 2-4 db at 2 KC, 7-9 db at 5 KC, 12-14 db at 10 KC. Switch in the stereo noise filter and note additional 5-8 db drop. Switch the filter out and continue to 15 KC -- 15-18 db drop, a minimum of 21 db at 20 KC, and minimum of 44 db at 40 KC.
4. Turn selector switch to Stereo, subchannel filter out. Set oscillator to 67 KC, 0.25 volts output. Adjust L-502 for minimum output from either Channel A or B. The null is quite broad. If necessary increase output of audio oscillator for better null.

STEREO MULTIPLEX SEPARATION TESTS AND ADJUSTMENTS

Equipment needed: In addition to all the equipment mentioned before you will need a Hewlett-Packard 200CD Audio Oscillator or equivalent (with balanced output to ground -- oscillator with unbalanced outputs cannot be used), and the H. H. Scott Model 830 FM multiplex stereo generator.

Equipment set-up: Use the same arrangement described with the tuner alignment procedure, plus: Connect the Audio Oscillator to the 830 (as described in the 830 Instruction manual) and the 830 to the FM generator. Set the FM generator for External Modulation.

1. Set audio oscillator to 400 cps. and 830 for left channel (Channel A) signal only. **IMPORTANT:** The 830 **MUST** be carefully adjusted for input signal and output phase as described in the 830 Instruction Manual. The output phase must be monitored with a scope to check for variances. If the phase is off even slightly, your alignment will cause the tuner to have poor separation when tuned to station.
2. Set all controls on the adaptor for full stereo (level control to maximum, Selector switch to Stereo, subchannel filter out; stereo noise filter out; and AGC switch to Mono). Adjust the tuner to the point on the dial where you are transmitting your Channel A signal. Make sure you pick a point on the dial that does not coincide with a local FM station.
3. Adjust the tuning dial for maximum reading on the tuner's meter. Take a reference reading on the VTVM, db scale. Remove the output cable from Channel A output and insert it into Channel B output. The difference in output should exceed 30 db. Adjust the top of L-501 with a detector alignment tool for maximum separation. Then turn the pot marked "Sep" for maximum separation.
4. Readjust the 830 so it now provides a right channel signal only (Channel B). Repeat step 4, only the output of Channel A should be 30 db down, from Channel B. It often happens that a slight adjustment of BAL pot will increase separation slightly.
5. It is important to realize that maximum meter reading will not exactly coincide with maximum audio output (within 2 db) and maximum separation. However it comes extremely close to both and does give a good combination of separation, output, and low distortion.

#### 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 adaptor is at fault is to substitute another adaptor, ~~known to be working properly. (very often a unit 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 everything if it is left only).
2. Connect an audio cable from Channel A output to an amplifier and a speaker.
3. Tune in the station carefully using the tuning meter. Set the Selector to Stereo, Sub-channel filter out; Stereo Noise Filter to Out; AGC to Mono; Level to maximum.
4. When the announcer begins to talk, he should be barely audible in Channel A or the left channel signal. Carefully retune till 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. For more information, write to:

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