

AUDIOCLINIC??

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AM receiver alignment

Q. What is the correct procedure to be followed when aligning an AM superheterodyne receiver? William Clifford, Chicago, Ill.

A. No single procedure will satisfy the alignment requirements of all receivers. Therefore, the following information should be used only in an emergency. When possible, consult the service notes for the receiver to be aligned.

Figure 1 shows a top view of a typical superheterodyne receiver, including the locations of some of the trimmers and slugs needed for performing the alignment.

You will need an r.f. signal generator whose minimum coverage should be 455-1400 kc. It will be convenient if the generator can be tone modulated. If it cannot, you will need a VTVM, which should be connected across the a.v.c. line. Some receivers have a built-in v.t.v.m.—a tuning eye. If, however, you can use tone modulation, you may connect an output meter across the speaker terminals or you may use your ear to determine sound output. I have found that the ear gives as good results as the meter.

Alignment Procedure: 1. Connect the ground side of the generator to the receiver chassis. 2. Connect the hot side of the generator to the grid of the mixer through a low-value capacitor. 3. Ground the receiver to a radiator or waterpipe. (Omit this step if the circuit is one of the AC-DC types. Failure to observe this caution can result in a blown line fuse and/or

damage to the receiver.) 4. Allow the generator to warm up for 15 minutes. 5. Short the oscillator stator to ground with a heavy wire. This will cause oscillations to cease, preventing beats which could result in aligning the i.f. stage at an incorrect frequency. 6. Set the generator to the correct i.f., which is probably 455 or 465 kc. If you guess wrong, the error will probably not show up at all. Advance the volume control of the receiver to its maximum clockwise position. 8. Set the r.f. attenuator on the generator to a point where deflection of the meter pointer or the tuning eye just begins or the tone becomes just audible. 9. Starting from the detector, adjust all i.f. trimmers or slugs for maximum reading on your measuring instrument. If the i.f. stage or stages are severely out of alignment, it may be necessary to reduce the gain on the r.f. attenuator in order to prevent overloading the receiver and the measuring instrument. This completes the alignment of the i.f. stages and we now proceed to the front end.

10. Before making any adjustments here, see that the pointer sweeps the dial scale properly. 11. Remove the hot lead of the signal generator from the mixer grid and loosely couple to the antenna terminal of the receiver through a 3- μ f capacitor. If the receiver uses a loop antenna and has no external terminals, place the hot lead of the generator close to the loop. In all likelihood, this will provide sufficient signal injection to enable you to complete the alignment. 12. Remove the jumper from the oscillator stator. 13. Set the receiver

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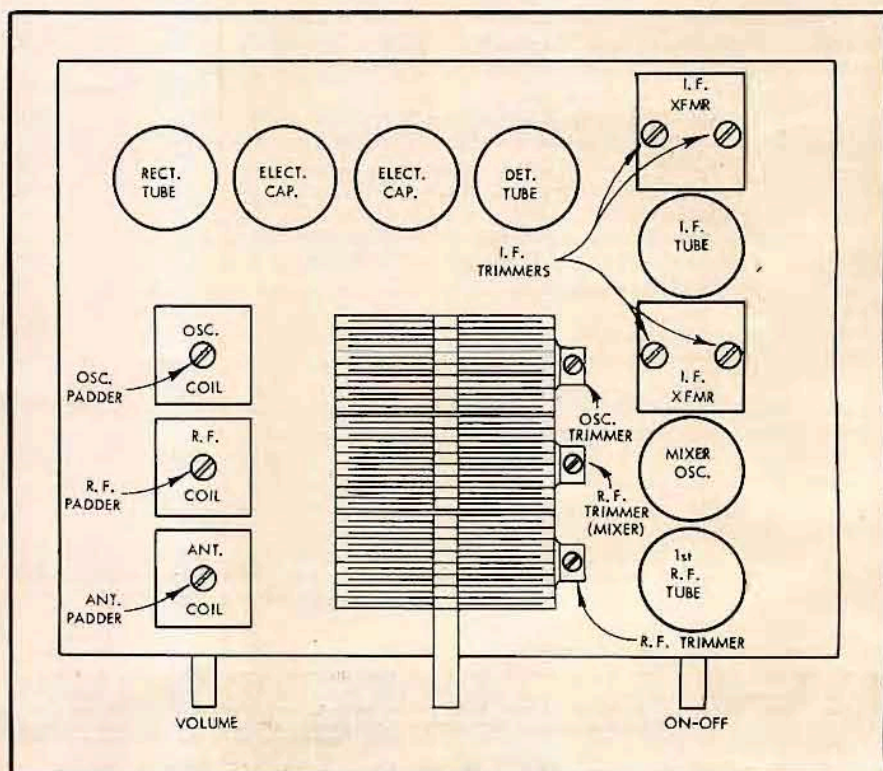


Fig. 1

and signal generator dials to 1400 kc. 14. Adjust the oscillator trimmer for maximum indication. 15. If your receiver has an oscillator padder or if the oscillator coil is slug tuned, set the dials to 600 kc and adjust the padder or slug for maximum deflection. 16. Repeat steps 14 and 15 until the dial is correctly calibrated at these points. 17. Reset both dials to 1400 kc and adjust all r.f. and/or antenna trimmers for maximum indication on the meter. 18. If there are adjustment screws, either padders or slugs, for the low end of the r.f. and antenna circuits, reset the generator and receiver tuning dials to 600 kc and adjust the r.f. and/or antenna circuits for maximum reading. 19. Repeat steps 17 and 18.

More often than not, the low end cannot be tracked except by bending stator plates of the variable capacitor. This tricky business will not be discussed in detail.

Shortwave Bands. No definite method of aligning these extra bands can be given here because many of them are tracked at one point in the center, others at the high end only, and still others, at both ends of the tuning range under adjustment.

Some engineers believe that it is best to align the receiver with a steady d.c. voltage substituted for the normal a.v.c. voltage. They hold that, because of the Miller effect, the receiver will be misaligned when weak signal generator voltages are used, together with the small amount of a.v.c. voltage which would be developed under these conditions. The d.c. voltage to be substituted must, therefore, be made equal to the normal a.v.c. voltage which would be created when receiving strong, local broadcast signals. I do not subscribe to this view since errors introduced by this method do not become significant until frequencies greatly in excess of those normally encountered in standard receivers are reached.