

improving the HT-37 ssb transmitter

The Hallicrafters HT-37
is still around
and has many
excellent features —
here are some ideas
for upgrading this
venerable old rig

Of all the equipment manufactured by the Hallicrafters Company, perhaps the most popular was the HT-37 transmitter-exciter. It uses the phasing system for single-sideband generation, which is a good method if the phase-shift networks are properly adjusted. Once set, however, these phase shifters rarely need adjustment. The rig is as stable as a rock and the ssb audio quality compares well with that from filter-type circuits.

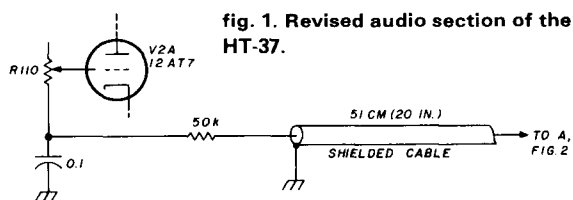


fig. 1. Revised audio section of the HT-37.

This article is presented for HT-37 users who might wish to improve its operation with some minor modifications. For the purist who wants better sideband suppression, an easy modification appears in reference 1, which shows how to install a filter-type sideband generator. If you're happy with the as-built HT-37 sideband generator but wish to make a couple of other simple modifications to improve efficiency and increase power-transformer life, you might be interested in the comments that follow.

Automatic Level Control (ALC) allows you to operate at higher audio levels without overloading the transmitter, which causes interference to nearby stations. With an ALC circuit added to the HT-37, more emphasis is given to lower-frequency speech components, and the higher dynamic range (louder) speech components won't overdrive the final-amplifier stage. Such overdriving creates splatter, "buck-shot," and a broader signal.

You'll need the following parts for the ALC-circuit addition:

resistors	type
quantity 1	50k composition, 1/2 watt
1	1 meg composition, 1/2 watt
2	10k composition, 1/2 watt

capacitors	type
quantity 2	0.1 μ F paper, 200V working
1	0.25 μ F paper, 200V working
1	0.001 μ F ceramic 200V working

miscellaneous	description
quantity 2	1N2070 or 1N2071 silicon diodes, 400V PIV
2	solder-lug terminal strips
90 cm (3 ft)	small plastic-covered shielded cable

procedure

1. Remove both top and bottom halves of cabinet.
2. Remove side rail from chassis left side.
3. Remove cover from the audio section to gain access to the audio gain control, R110.
4. Remove the direct connection between R110 and ground. Install a 0.1- μ F capacitor between these points.

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5. Solder one end of a 50k resistor to the former grounded terminal of R110, then connect the center wire of a 51-cm (20-inch) length of small shielded cable to the other end of the 50k resistor. Ground the cable shield to a convenient point inside the audio compartment. The revised audio section will then be as shown in fig. 1.

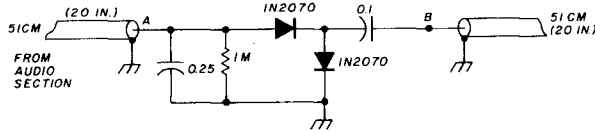


fig. 2. The ALC circuit built from instructions in the article.

6. Feed the free end of the shielded cable through a hole in the audio-section cover shield. Replace the cover shield onto the chassis.

7. Replace the side rail removed from the chassis.

8. Using a solder-lug terminal (4 or 5 lugs), build the ALC circuit shown in fig. 2. Be sure to use a terminal strip with a grounded mounting lug at one outer end.

9. Solder the outer end of the shielded cable coming from the audio section to point A in fig. 2. Attach another piece of shielded cable, about 51-cm (20-inches) long, to point B in fig. 2.

10. Remove the nut from one of the four machine screws securing the antenna coax fitting to the chassis rear apron. Mount the ALC assembly just constructed on the machine screw, replace the nut, and tighten securely. Of course, a grounding lug should be used to mount this assembly onto the coax connector.

11. Near the bottom of the final-amplifier 6146 tube sockets you'll find a solder-lug strip where R19 (1k) is connected to rf choke L13, which in turn is connected to the 6146 grids.

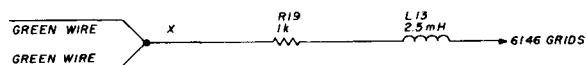


fig. 3. As-built appearance of the HT-37 (see text).

Before performing the next step, note that two green wires are connected to R19 as shown in fig. 3. Now proceed as follows:

12. Remove both green wires from point X in fig. 3. Leave them free for now.

13. Mount two 10k resistors and a 0.001- μ F ceramic bypass capacitor on a 4-lug terminal strip, as shown in fig. 4.

14. Next mount the assembly just completed under one of the self-tapping screws that hold the lid onto the shield can next to the 6146 sockets. (This is mere-

ly a suggestion; use any mounting position that seems convenient.)

15. Connect the two green wires lifted in step 12 to point C (fig. 4) and run a new wire from point D (fig. 4) to R19 (point X in fig. 3).

16. Connect point E to the shielded cable coming from point B in fig. 2. The final-amplifier wiring will now appear as in fig. 5.

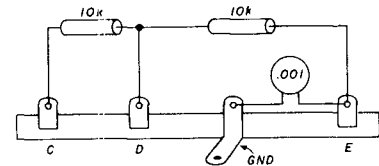
17. Dress the new shielded cables as close as possible to the chassis. Check all wiring for errors. This completes the installation of your new ALC circuit.

A schematic of the complete ALC circuit is shown in fig. 6. I suggest you recheck the 6146 bias voltage to ensure it hasn't changed. It should be -49 Vdc.

power-transformer protection

The HT-37 seems to have a history of power-transformer failure. I've talked to several HT-37 owners

fig. 4. More construction details for the ALC addition to the HT-37 final-amplifier section.



who have had to replace the transformer because of a short circuit either in the secondary windings or between primary and secondary windings. It's pretty hard to find an exact replacement for the HT-37 power transformer today, although at least one source of help appears in the amateur ads in which a transformer rebuilding service is offered.

In any event, it's possible to preclude catastrophic failure of the power transformer by simply adding an autotransformer, such as a Variac, in the primary voltage circuit of the HT-37.

HT-37 owners will note that, when the OPERATION switch is turned from OFF to STANDBY, a distinct "thung" sound will be heard if the peak of the ac primary voltage occurs at time of switch turn-on. This means that a surge of voltage is presented to the power transformer primary at the instant of switch turn-on.

Why not eliminate this surge by using an autotransformer in the transformer primary? With the OPERATION switch in the OFF position, turn the autotransformer to zero, then gradually advance the autotransformer control until the proper ac input voltage is presented to the power-transformer primary. An ac voltmeter should, of course, be connected across the power-transformer primary.

Another cause of power-transformer failure, according to many HT-37 owners, is sheer carelessness

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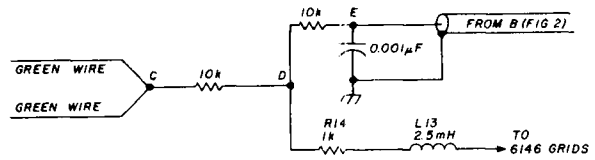
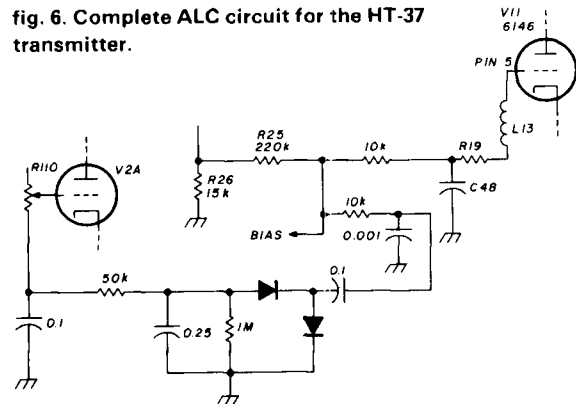


fig. 5. Schematic showing modified wiring in the HT-37 final-amplifier section.

during operation. The HT-37 instruction manual stresses that, when switching to STANDBY from any of the operating modes (MOX, VOX, or CAL), it's important to wait for a few seconds before switching the set OFF. There must be a message here. According to other HT-37 owners, it's a dead cinch that the power transformer will blow if the set is rapidly turned from one of the operating modes to OFF and back on! It's easy to do this with this equipment, especially during the heat of a contest. A Variac won't help in this case, of course, because during operation the Variac will be adjusted for full input primary voltage.

fig. 6. Complete ALC circuit for the HT-37 transmitter.



So if you value your HT-37 power transformer, respect the precautionary advice in the instruction manual for the OPERATION switch. The HT-37 is a great rig, even by today's standards. But if you can't replace a blown power transformer, you may as well try to sell the rig for junk.

acknowledgment

The material on adding ALC to the HT-37 was taken from a paper by W0NCK and K0TYO. This paper was included with the instruction manual for my HT-37, which I purchased second hand. I built the circuit and it is an improvement over the original HT-37 design. Any credit for this improvement should go to W0NCK and K0TYO.

reference

1. Milton L. Pokress, W3CM, "Increased Sideband Suppression for the HT-37," *ham radio*, November 1969, pages 48-51.

ham radio