John Abbott K6YB
PO Box 66
Newhall CA 91322

Cheap Heath Help

Is your HW-101's offset off? Try this four-dollar fix. Without it, you're being cheated out of QSOs.

The original HW-100 transceiver (Photo A) and its cousin, the HW-101, both use a 1-kHz "transmit offset" for CW operation. This of course means that you will transmit on the same frequency (zero beat) as the CW station you are receiving only if you tune the transceiver so as to hear the incoming station with a 1-kHz audio CW note or "offset," as shown in Fig. 1. However, CW operation is generally carried on with a receiver bandpass of 750 Hz or less, which is one of the reasons you can enjoy less QRM and QRN on CW than on SSB.

However, if you tune your receiver so as to hear a tone of less than 1 kHz, you may transmit outside the receiver bandpass of most stations that you call, since you will be transmitting 1 kHz above where you are listening. Thus, if you add an external audio CW filter to your transceiver so that you listen to incoming CW signals at approximately 500 Hz, then with a 1-kHz offset you will transmit 500 Hz higher in frequency than the station you are receiving, as shown in Fig. 2. If this station is also using a 1-kHz offset, he will be trying to receive you at 1.5 kHz, which may be far outside his audio bandpass if he is using a 750-Hz bandpass CW filter for receiving. The result will be very few QSOs!

Photo A. The HW-100 with added Swan dial and audio-response control on the upper right. The small toggle switch on the lower right controls an external antenna relay.

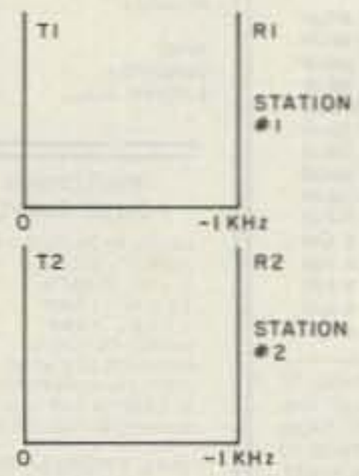

Fig. 1. Two CW stations both using a 1-kHz transmit offset with transmitters T1 and T2 zero beat in frequency. There is no difficulty in communication unless one station reduces his received bandwidth to less than 1 kHz using an audio CW filter.

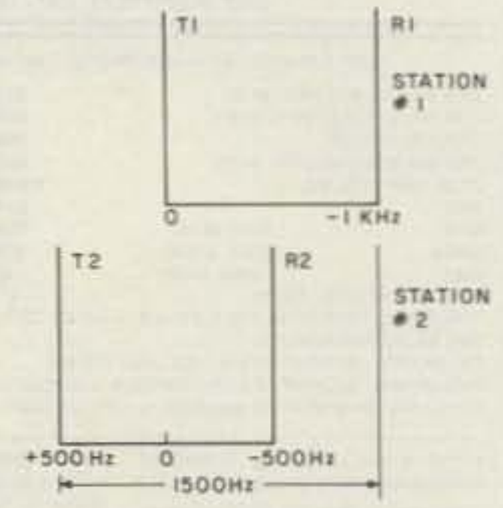

Fig. 2. Two CW stations, both using a 1-kHz transmit offset but with station #2 listening to a 500-Hz tone which places his transmit frequency so that station #1 must listen to a 1500-Hz tone. If station #1 is using a 750-Hz bandpass audio filter, he may not hear station #2.

Reducing the Transmit Offset

The solution to this prob-

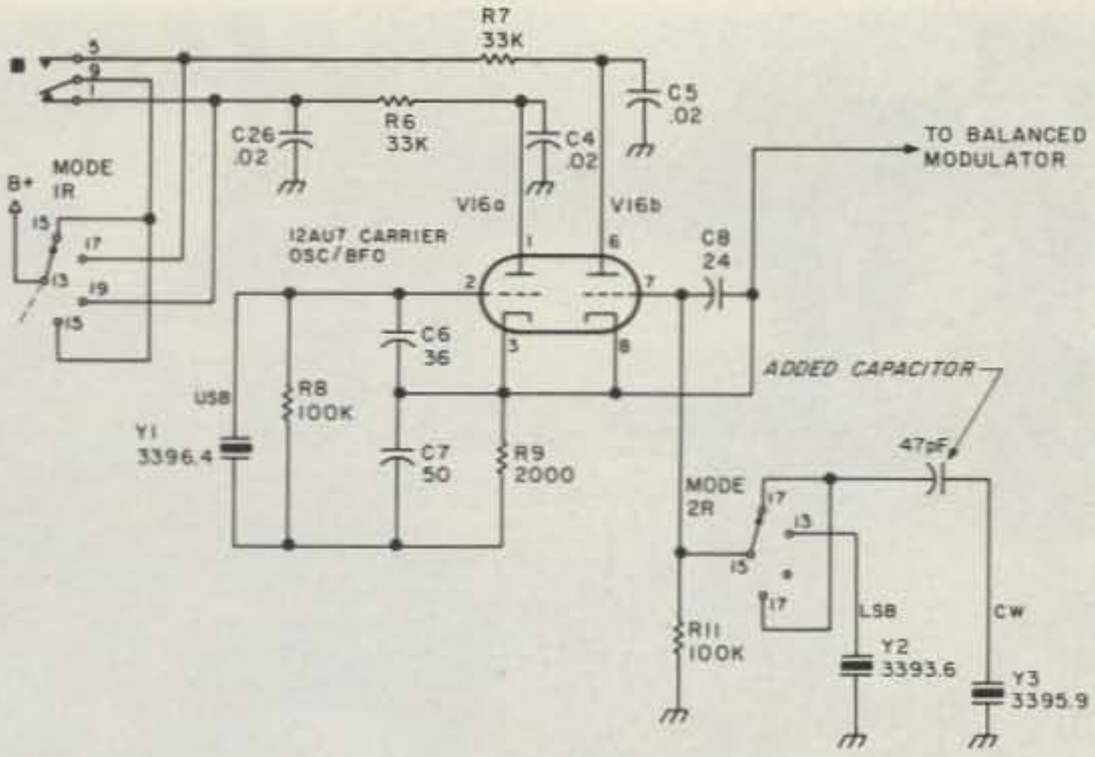

Fig. 3. Carrier-oscillator schematic illustrating added 47-pF capacitor.

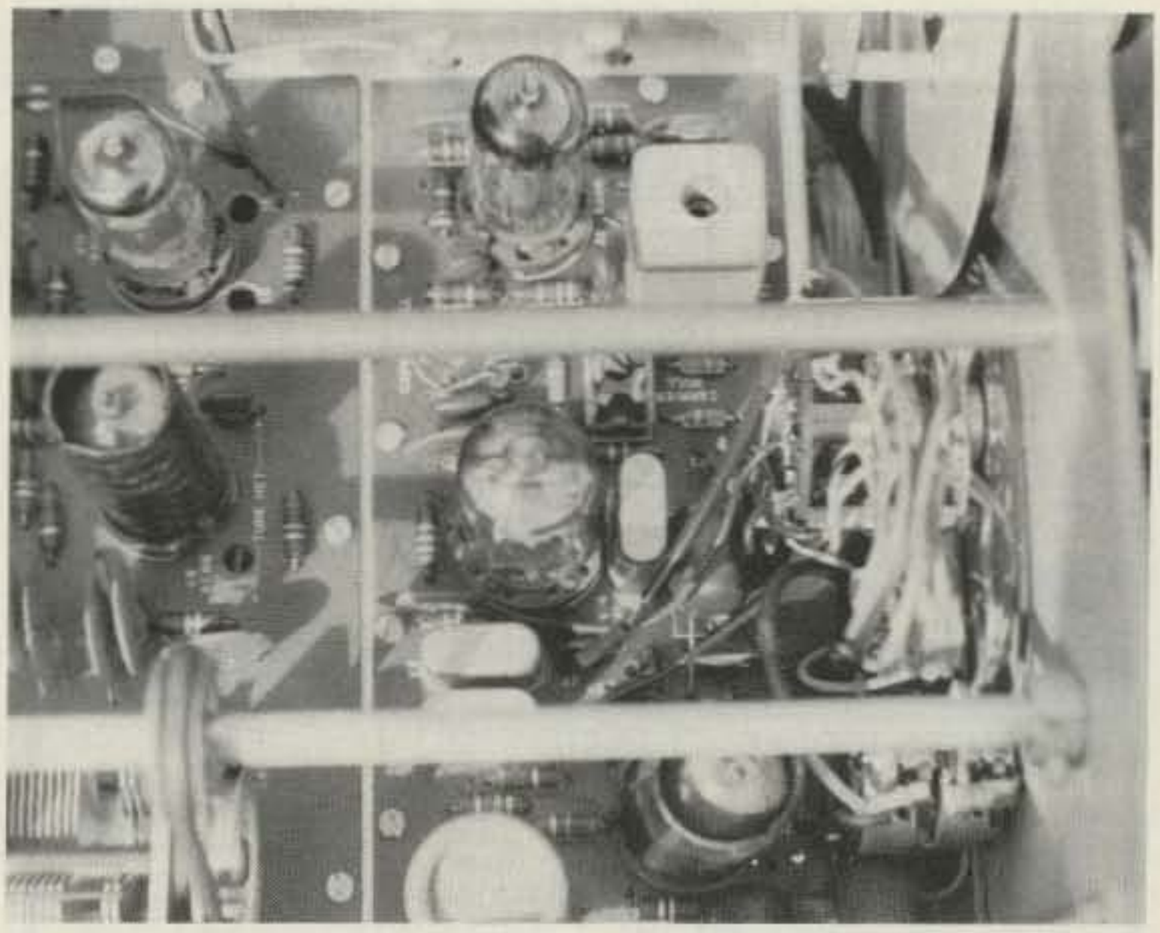

Photo B. The location of the 47-pF capacitor between point "22" on the circuit board near Y3 and the Mode switch.

lem is to change the CW transmit offset from 1 kHz to 500 Hz. I did this very cheaply and easily by inserting a 47-pF capacitor (Radio Shack #272-121) between the front-panel Mode switch and CW transmit crystal Y3 on the modulator circuit board next to V16, as shown in Photo B. I did this by removing the wire to Y3 from the Mode switch and by soldering one lead of the 47-pF capacitor to the Mode switch where the wire to Y3 was formerly located, using a short spaghetti-covered lead. I then soldered the wire from Y3 to the other shortened lead of the capacitor and covered the joint with spaghetti. Fig. 3 illustrates the circuit change schematically.

What I did with this modification was to retune Y3 upward 500 Hz, from 3395.4 kHz to 3395.9 kHz. The transmit offset is the difference between the frequency of USB crystal Y1 used for receiving on CW at 3396.4 kHz and the frequency of Y3 which is now 3395.9 kHz, or 500 Hz. After this simple modification, I had much better luck raising another CW station. Also, I could now go ahead and use a 750-Hz audio bandpass filter for improved CW reception without any problem.

Additional Modification

An additional modification that I made was to change the frequency of the 1-kHz tone oscillator used for CW monitoring and VOX keying to 500 Hz. This modification is a little more difficult. I had to remove the PEC (printed electronic circuit) board (Heath #84-22) on the audio circuit board near V15 and replace it with a homemade PEC. I obtained a printed-circuit experimenters' board (Radio Shack #276-158) and cut a piece of it to the same size as the original PEC. I also obtained five 0.001-uF capacitors (Radio Shack #272-126) and four 470,000-Ohm, ¼-Watt resistors (Radio Shack #271-1354). I mounted them as shown in Fig. 4 on the small board, being careful to locate the three pigtails in the same location as the old PEC pigtails. I then replaced the old PEC with the new one shown in Photo C. Note that V15 is removed so you can see the board clearly.

What I did with this modification, shown schematically in Fig. 5, was to retune the frequency of the audio phase-shift oscillator, V15A, from 1 kHz to approximately 500 Hz so that now when I transmit on CW, the monitor tone I hear is at approximately the same frequency as the CW station I am listening to. This helps me to make sure that I am transmitting at the correct frequency, so I can be zero beat with the received CW signal.

Results

The total cost of these two modifications was approximately $3.90, excluding sales tax. The CW operating benefit, as far as answers to my calls, has been greater than adding a kW

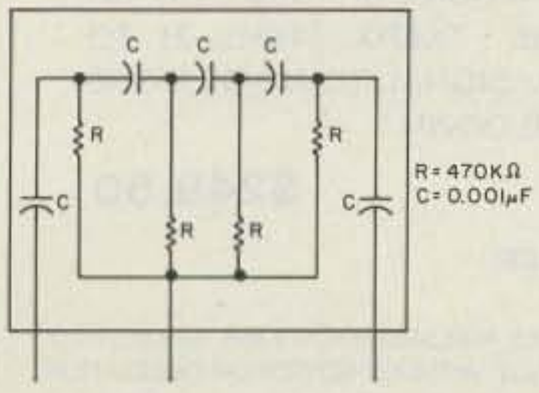

Fig. 4. Homemade PEC.

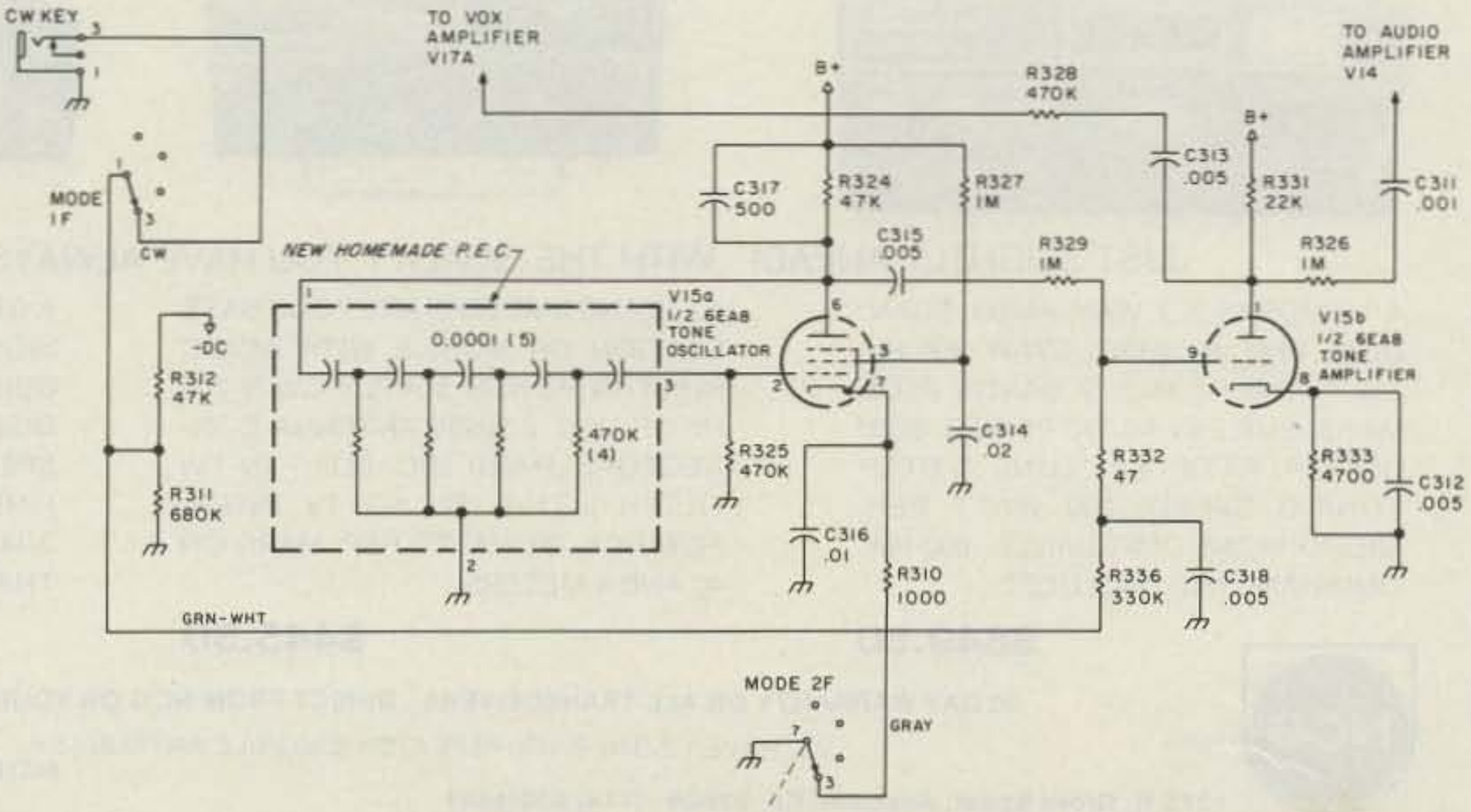

Fig. 5. Tone-oscillator schematic illustrating new homemade PEC.

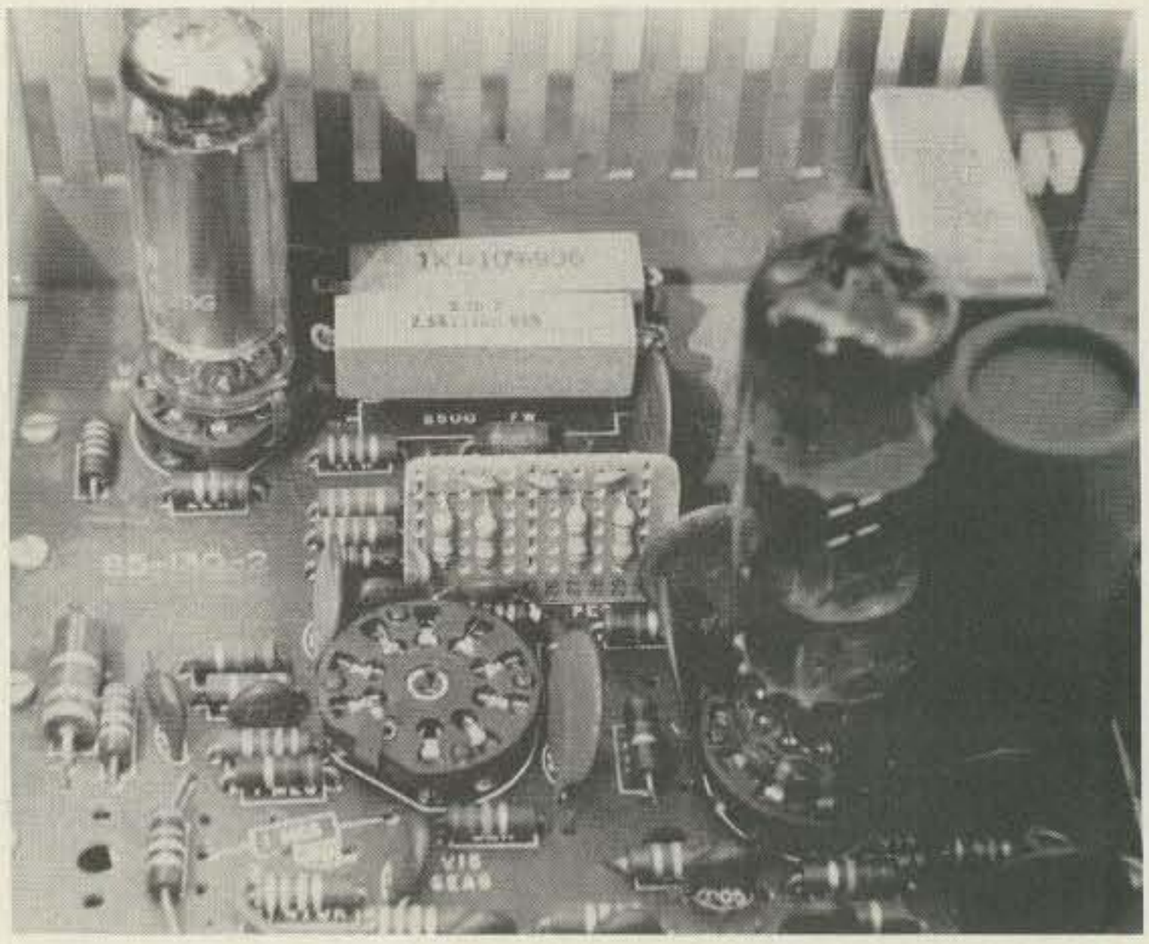

Photo C. The location of the homemade PEC board behind the socket for V15 (V15 being removed).

linear to the transceiver—which would have cost much more than $3.90!

A modification to the audio response of the HW-100 that I made several years ago that is also applicable to the HW-101 is described in an article entitled "Variable A.F. Bandwidth for the HW-100," in the June, 1970, issue of *CQ*. The knob on the upper-right portion of the front panel to the left of the meter, as seen in Photo A, is part of this modification. I will accommodate anyone desiring a copy of this article upon receipt of an SASE.■