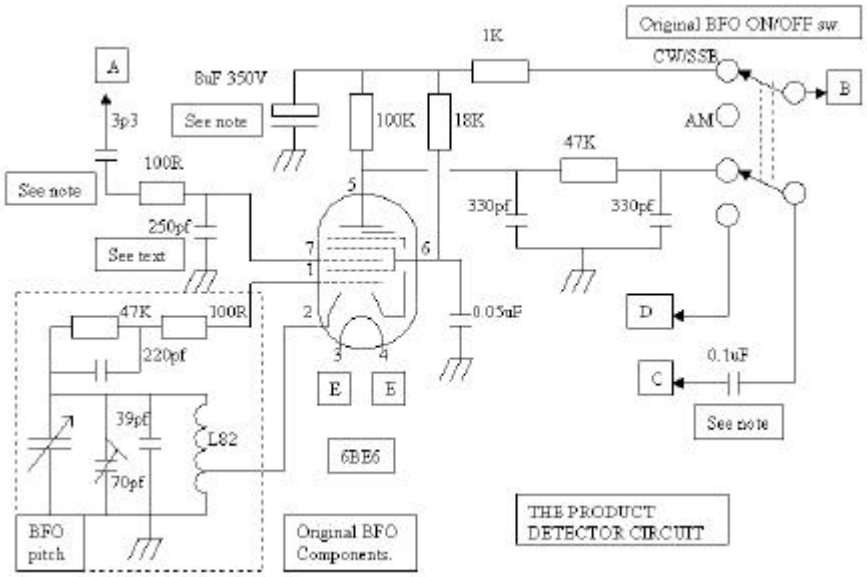
# *Modifications to the RA17L for SSB Reception*

***David Sylvester G3RED***

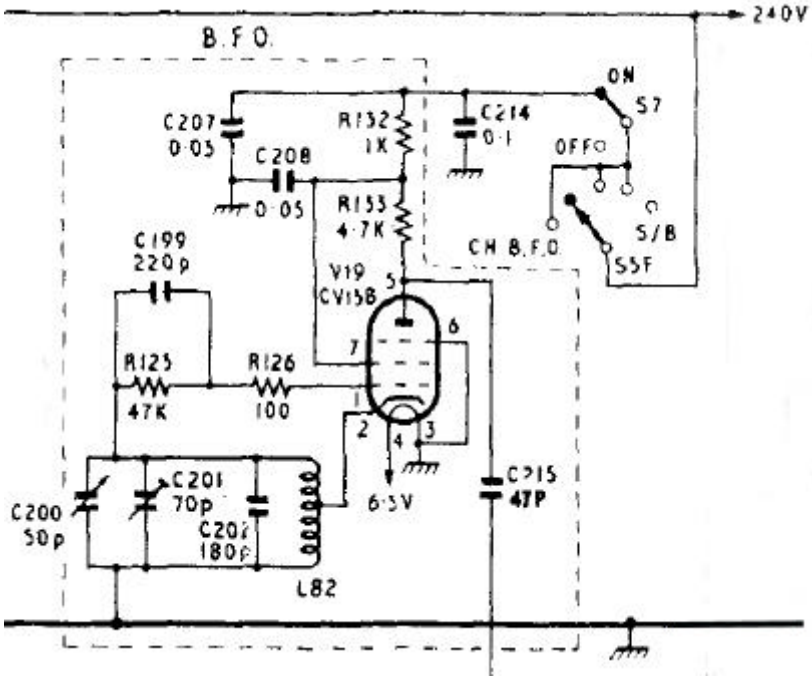
I have been fortunate to get my hands on three RA17L's. One of them was in poor condition, but after lots of cleaning up and fault finding it worked as per the original specification. Although the BFO injection for CW reception is at a high level, ssb signals could only be resolved by the usual turning off of the AGC and backing off the RF gain.

I decided that I would investigate the possibility of putting in a product detector for better reception of ssb. The original BFO unit is on it's own little chassis which I removed from the main chassis. Using a temporary plate fixed to main chassis, I re-mounted the BFO unit in such a way as to leave access to the components and short leads back into the receiver. Various attempts were made to use the existing EF91 as a product detector. Good results could be obtained, but the audio output level was to small or a high audio output level with lots of distortion.




I decided to try a 6BE6 as a product detector, this valve has a B7G base, no need to change the holder on the BFO chassis.. The following circuit proved to be satisfactory, giving good audio at a high enough level to drive the single valve audio stage of the RA17L.

The RF from the final IF stage is very large and has to be attenuated by the 3p3 and 250pf capacitors. The value of 250pf connected to pin 7 of the 6BE6 was found by trial and error in order to get a similar audio output between the AM and SSB modes. I have checked the level of the IF output signals on my other RA17L's, they are not identical therefore it may be necessary to change the 250pF capacitor to suit.




***Notes :-***

The 8uF 350V decoupling capacitor is to large to fit into the BFO chassis had to be fitted on the main chassis.

The 0.1uF capacitor from switch to point C is external to the BFO chassis.

The 3p3 capacitor is external to the BFO box and is mounted close to point A.

Point A is connected to the junction of C193, pin5 of V16 and last IF transformer.

Point B is the original 220v H.T. connection to BFO.

Point C goes to the top connection on the AF gain control.

Point D is connected to C218; that is the AM detector output that was connected to the top of the AF gain control.

Point E is the original heater wiring.

***AGC modifications***

The AGC characteristic of the RA17L is not good for SSB reception, the attack and decay times are of similar length. This is perfectly OK for AM reception. With the AGC in the fast position, SSB reception OK but for the annoying fast recovery to noise that you get between spoken words or phrases. In the long position, the attach time is far to slow resulting in initial loud busts of audio at the beginning of words until the AGC has caught up.

A much improved result was obtained by a few simple modifications to the AGC circuit.

The first modification to the AGC circuit is to replace the 1uF capacitor connected to the AGC time constant switch, with a 0.22uF capacitor. This is a good starting point value. If you prefer a longer time constant, then try some larger values.

Short out the 82K resistor R127, this reduces the attack time. This did not seem to have any effect on the RF level from the last IF stage.

Disconnect C182, the 0.1uF AGC time constant capacitor.

Disconnect the two wires going to the common of the AGC time constant switch. Place a short bit of sleeving on one of the wires, then solder the wires together and slip the sleeving over the joint. Push the wires out of harms way.

This means that when the switch is set to short, the time constant diode V18 is no longer bypassed.

Move the two wires on the “short” contact of AGC time constant switch to the common of the switch.

With the switch in the FAST position, the “short” contact is connected to nothing. In the SLOW position, an extra 0.22uF is added to the AGC line to ground.

The time constant diode is now always active, when the cathode goes more negative than the anode, the capacitors of the AGC line are quickly pumped up. When the cathode is more positive than the anode, the capacitors discharge through the high value resistors connected to the AGC line.

***Conclusion***

I have run the modified RA17L for some time now and performance on SSB is dramatically better, the AGC mode makes it pleasant to listen to. I have compared the audio quality with that of my Kenwood TS950SD, I think the RA17L sounds better. The RA17L is used on the 3KHz selectivity and the BFO set to 1.5KHz low for LSB and 1.5KHz high for USB.

The 100KHz calibration points can only be heard in the AM mode. The BFO pitch can still be heard in the CW/SSB mode.

Using the plus or minus 1.5KHz BFO settings for SSB makes reading of the actual frequency on the main film scale easy. You add 1.5KHz to the reading for LSB and subtract 1.5KHz for USB.

None of these modifications require drastic changes to the structure of the RA17L, and can be reversed to restore the receiver to original.

I would be interested to hear from any other members who have carried out modifications to the RA17L.