

M 52-1-1

# HQ-180 AGC Mod

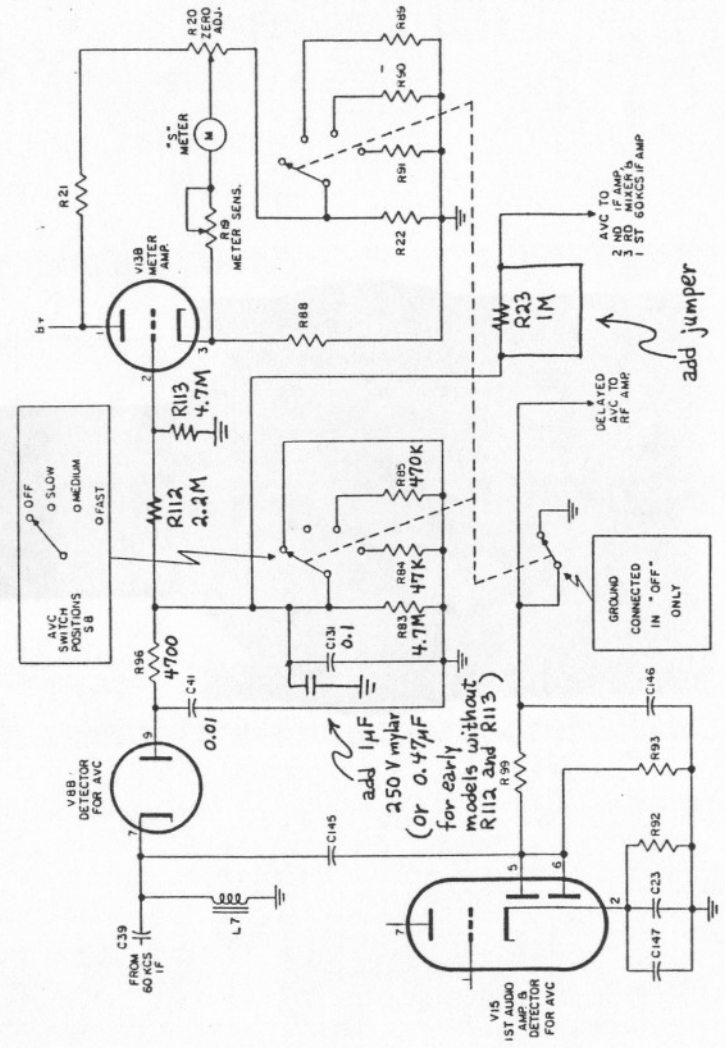
Dr. Dallas Lankford\*  
 Mathematics Department  
 Louisiana Tech University  
 Ruston, LA 71272

Recently when I measured the HQ-180 AGC attack and release times I was surprised by the bad overshoot on attack. *AGC overshoot* is the term applied to an AGC for which the AGC line voltage goes beyond (decreases below for a negative voltage AGC system like the HQ-180) the steady state voltage when a sudden increase occurs in the input signal. Overshoot is caused by the time constant capacitor overcharging, which in turn may be caused by incorrect circuit design or various other reasons. Overshoot in the HQ-180 is caused by the 1M ohm AGC line resistor R23 which prevents the control grid capacitors (C135, C130, C17, C136, and C137) from charging fast enough. Overshoot in the HQ-180 (and other receivers) manifests itself by an audible thump at the start of an SSB transmission, or by a harsh sound on CW. You can even see the overshoot on an HQ-180 S-meter when the calibrator is turned on.

The cure for HQ-180 overshoot is simple. Add a jumper across R23. After that was done, the HQ-180 attack looked fine on a scope, and sounded fine.

According to conventional wisdom, and I agree, fast SSB release should be about 500 milliseconds (mS), and slow SSB release should be about 2 seconds (S). In addition, for graveyard MW DXing and for strongly fading SW signals, a 2 S release improves AM audio quality significantly over a 500 mS release. Perhaps one reason why Hammarlund did not set the HQ-180 SLOW release time at 2 S is because quick bandscanning is not really feasible with a 2 S release time. A 2 S AGC release does not release quickly enough for a quick listen to weak signals in between strong signals. However, quick bandscanning in MED is fine, and you can switch to SLOW for improved audio quality whenever you wish. Another reason may be that AGC controlled tubes with gassy or otherwise defective grids can seriously degrade a 2 S release time. I have found two 5749 (6BA6W) tubes which decrease a 2 S release to about 500 mS.

The value of the capacitor you should add in parallel with C131 to obtain a 2 S SLOW release time depends on the S-meter circuit in your HQ-180(A); see the following simplified schematic. You should use a 0.47  $\mu$ F 250 volt mylar (or similar metal film type) capacitor for early model HQ-180(A)s (which do not contain R112 and R113), or a 1  $\mu$ F for late model HQ-180As (which do contain R112 and R113). Radio Shack sells a suitable 1  $\mu$ F capacitor marked 200 volts on the package. Depending on the component layout in your HQ-180(A) you may need to unbolt the 8 Henry filter choke (L8) and move it aside to install the capacitor. Measured SLOW release time for a late model circuit was about 2.7 S, which is in good agreement with theory considering the 10 - 20% tolerance of components. For the MED and FAST positions the release times were about 500 mS and 50 mS respectively. Attack times were better than 3 mS for all three AGC speeds.



V15 "6X6" METER CIRCUITS