UHF MPA RECEIVER RE-TUNING PROCEDURE

The following is a procedure to move the 20 Mhz received frequency band of a UHF MPA® radio to another portion of the permitted band. For example, the standard 450-470 MHz split can be re-tuned to cover 440 to 460 MHz using this procedure.

There are two basic procedures which can be used to accomplish this end. The first and most accurate of these methods requires the use of a network analyzer. For those not having access to a network analyzer, a spectrum analyzer and signal generator can be used but with less accuracy. And finally, if neither instrument is available the radio can be retuned using SINAD or quieting, although with some compromise in performance.

PROCEDURE

The receiver should only be adjusted after the VCO has been readjusted for the new frequency range. Only the helical filters (FL1 & FL4) need to be readjusted to move the receiver band. Each helical filter is comprised of three cells. The received signal goes thru input helical FL4, RF amplifier A6, and the output helical FL1 (figure 1). The input cell of FL4 is away from A6 and the input cell of FL1 is next to A6.

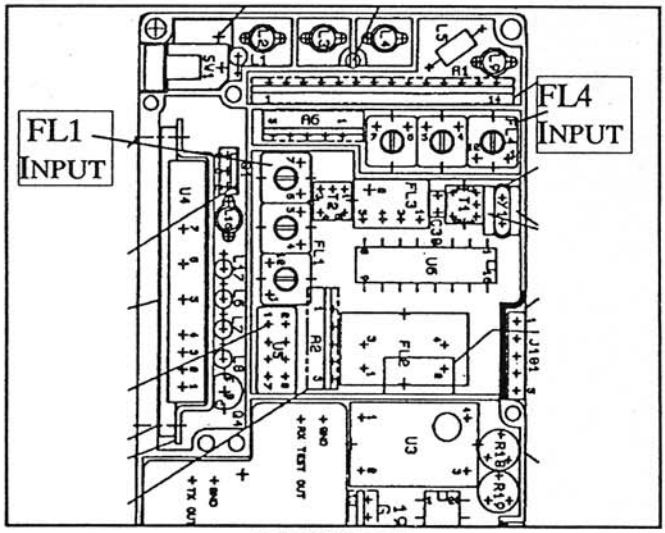

FIGURE 1

NETWORK ANALYZER METHOD

1. Remove the solder mask from the thin run between FL4 and A6 and cut this run.

2. Connect a small coax to FL4 and ground at this point and terminate the antenna port in a 50 ohm load (figure 2).

3. Connect the coax to a network analyzer and tune FL4 for best return loss over the desired receiver frequency range.

4. Connect the coax to the other side of the run cut (A6 input) and ground (such as pin 2 of A6).

5. With the network analyzer maximum output at -30dBm or lower, adjust FL1 for best return loss over the desired receiver frequency range (receiver must be powered up for this adjustment).

6. Reconnect the cut jumper and test the radio over the new frequency range.

ALTERNATE METHOD

This method requires tuning of the two helical filters using a peaking procedure at several different frequencies. Low, mid, and high frequencies should temporarily be loaded into the radio. The preferred method is to connect a small coax to the output of crystal filter FL2 and ground and connect this to a spectrum analyzer tuned to 45 MHz. As a less desirable alternative, the same tuning sequence can be followed while varying the generator level and tuning for best SINAD or quieting (no coax connection is made to the radio).

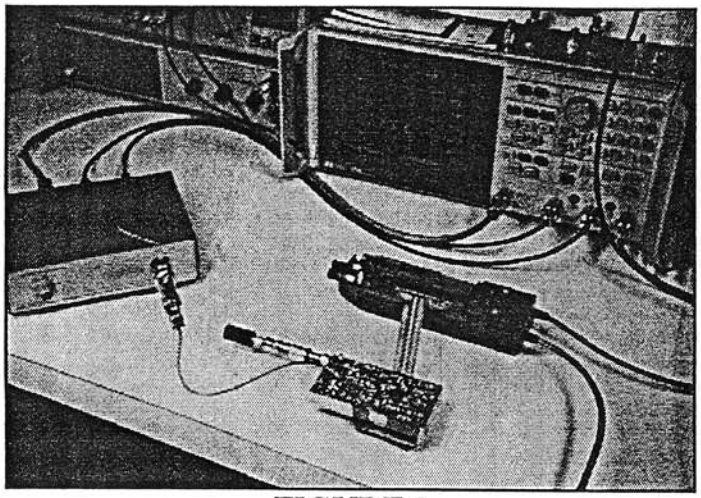

FIGURE 2

1. Set the generator and radio to the lowest frequency of the desired range.

2. Set the generator to -30 dBm and remove the input and output slugs of both helicals.

3. Alternately tweak the two center cells for maximum signal (or sensitivity).

4. Set the generator and radio to the highest frequency of the new range.

5. Put the slugs back into the input cells of both helicals and alternately adjust for maximum signal.

6. Set the generator and radio to the center frequency of the new range.

7. Put the slugs back into the output cells of both helicals and alternately adjust for maximum signal.

NOTE: It is possible that when some limit case tolerance parts are used at their highest frequency, the tuning may be best when certain slugs are left out completely. This is acceptable. Also, any excessively loose slugs should be secured with a drop of adhesive.