MINI-50

Here's Mac's answer to repeated requests for ham band Mini-Mac

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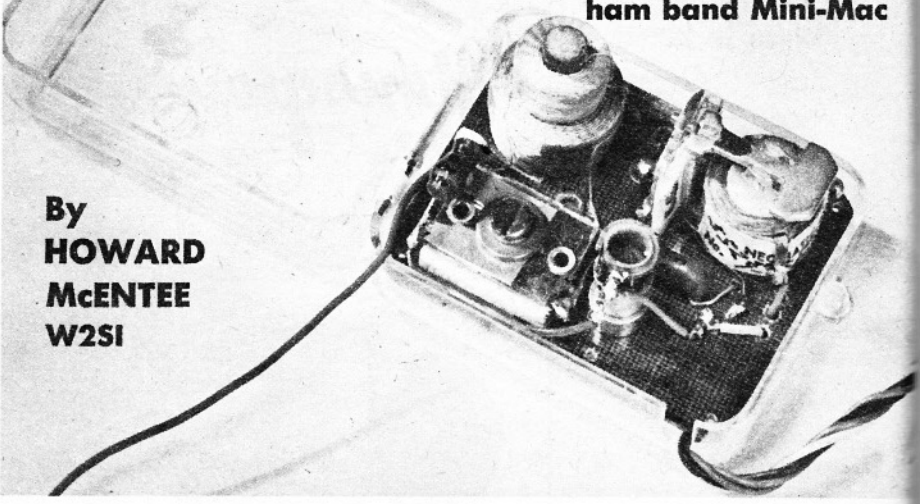


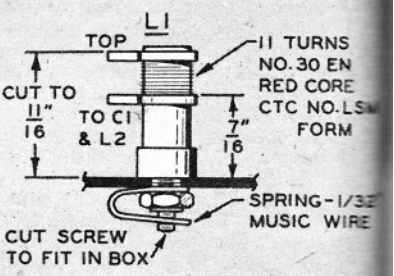
■ As soon as the Mini-Mac appeared, we started to get inquiries as to whether the receiver could be converted to 50 mc., and whether operation there would be as good as it is on 27¼. Since we normally work on 50, this was a problem we had been meaning to investigate for our own use; the job was finally done and here's the answer. Yep—the Mini-Mac circuit does fine on 50! There were a few snags, as there always seem to be in radio. You can't get away with just any arrangement of parts (we found parts placement generally very non-critical on 27¼); things just get considerably more touchy, and it was found advisable to go to another tube, for good results.

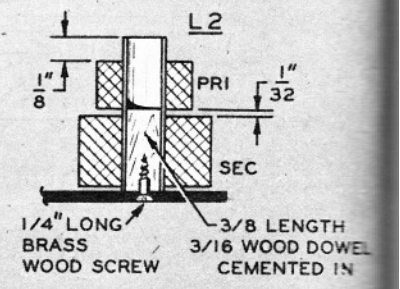
As will be seen from the illustrations, the parts (shown actual size) are put on the base very nearly the same as for the Mini-Mac. We did find that some of them ought to be shifted somewhat, though, and the drawings show what we feel to be the best layout—consistent with the small size of the receiver. It will be noted that the drawings depict the tube in a slightly different position than the photo; the latter is the first version, but follow the drawings for best results.

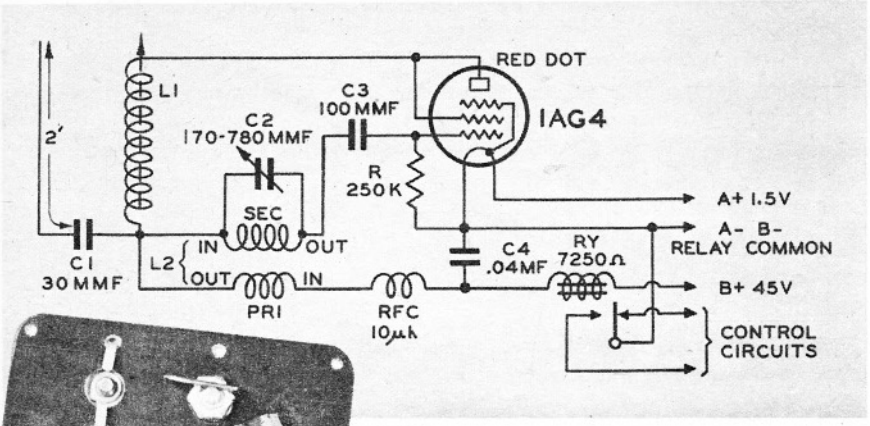
It didn't take long to decide that the CK526—which had worked out so well in the M-M—was not going to do the job on 50 mc. It would operate, but not as reliably as required. A search turned up a splendid tube for the job, the Raytheon 1AG4. While it has somewhat higher filament drain, this is an asset in one way, for it means that the plate current may be run up higher without any damage to the tube. This, in turn, allows the use of the tiny Neomatic relay, so the final receiver is even more compact than the M-M. The 1AG4 works beautifully in the latter receiver, incidentally; however, there is little reason to use it there unless you want to run the plate current up over the 1.8 ma. maximum we suggested for the CK 526.

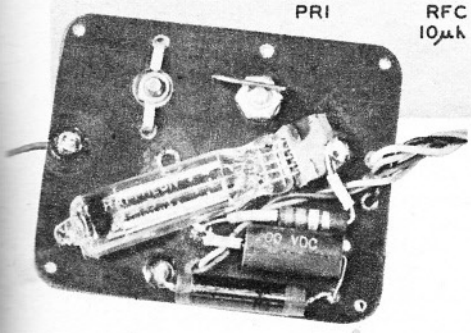
Receiver may be mounted by the time-honored method of four rubber bands stretching from the four corners, or you can put it in a small plastic box as we

Tuning the 2.2 oz. Mini-50 is through holes cut over L1 and C2. Plug and cable carry all battery and control connections; ant. lead separate.









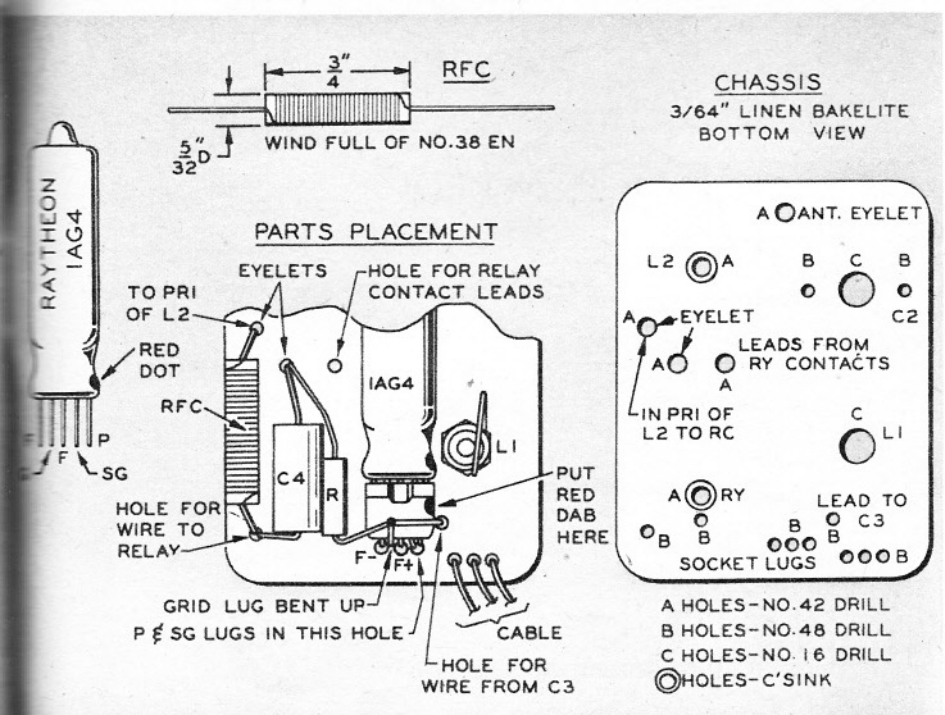
have, and set it in a nest of sponge rubber. This mounting system protects the receiver very well; we have seen planes which were pretty complete wrecks, yet the sponge rubber-protected receiver came through the crash in fine shape. Whether you can use this sort of mounting depends a lot on how much vibration you have in your plane, how much care you take in adjusting the relay, whether you check each prop you use, for balance, etc. It's worthwhile taking a little pains, though, for the sponge rubber mounting has been found very satisfactory, and is coming more and more into use.

As a further means of protection, the set is housed in a plastic box. This adds .45 oz. to the total weight, but we feel the weight penalty is not as important as the extra security afforded the receiver. The box has a couple of strips of heavy plastic cemented in, to form a ledge on which the chasis rests. Several thicknesses of modelplane windshield plastic will do here. Things are really pretty tight, if you use the same sort of box we did; the chassis is positioned just high enough above the bottom inside surface of the box to allow the tube to fit in. This in turn allows just enough space *above* the chassis for the relay and the quench coil. In fact, a shallow groove was cut out of the top so that there would be positive clearance for the upper contact of the relay!

Chassis is of 3/64" bakelite, and we give the full size here, with all holes properly placed. The tube socket is mounted just as in the Mini-Mac, by the lugs. It is placed as shown on the drawings—rather than as it was in the M-M—for a very good reason, to get it away from the bottom of the quench coils. There is no tube clamp; the tube is simply squeezed between the case and the chassis.

As we mentioned with the Mini-Mac, the quench coil does not like any metal in the center, so a very short flat head brass screw holds it by means of a stub of dowel cemented into the core tube. The latter must be cut off top and bottom; we left the top about 3/32" long and it projects through a hole in the top of the plastic case. It was felt this might save the quench coil from being torn loose in a bad crash, since the coil is really held at both ends.

Quench coil is a new type having solid wire on both windings. While the litz-wound unit we utilized in the M-M will doubtless work just as well, it has been found very (*Continued on page* 91)



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difficult to get a reliable connection to every strand of the litz—and if you don't, the set will act queerly. The single-strand wire on the new quench coil is of a type that does not have to be scraped; just hold it against a soldering iron and the coating will disappear! On some of these quench coils it has been found that the windings are a little loose on the core tube, and may be slid to and fro (this fact makes it easier to cut off the tube without cutting the wire too). Gap between the two windings should be about 1/32", for proper results.

Clip off the lugs of the trimmer condenser C2, and attach it to the chassis with the two little projections. Run a soldering iron over the cut ends of the lugs to make sure all of them are in good contact.

We used the same RF choke and the same coil form as in the M-M, but the winding on the latter should be as shown; follow carefully the placement of the winding on the core. It will be seen that the form is cut off short, to go in the plastic case. The end of the core screw is also cut off, but this should not be done until you check tuning, and find out about where the core will have to be in the coil. A 1/32" music wire spring bears against the core screw to hold it tight against vibration.

You will note when wiring up that the circuit is just about the same as that of the Mini-Mac, except that the RF choke has been moved to the other side of the quench coil primary. Some of the circuit values are different, of course. Those specified are about optimum for use on 45 V. The receiver will do fine on higher voltage, but if you want to raise the voltage to get higher relay current, it is wise to use the next lower value of trimmer, C2 (Arcs #468). We strongly advise builders of this receiver to read carefully the article in the Feb. '54 issue of Air Trails, covering the Mini-Mac; the operating instructions are just the same for both receivers, as are the hints on getting proper results. The Neomatic relay we used was set to operate at 1.8 ma. and release at 1.1 ma. On 45 V., the plate current runs at about 2.2 ma., and drops to .75 on a rather weak signal. With 60 V., the plate current range will be about 3.1- 1.0 ma. Sensitivity seems somewhat better with the higher voltage. Total weight with case, tube, cable and plug, is 2.2 oz.

Parts List

L1—CTC type LSM coil form with red core (see dwg.). L2—10 microhenry RF choke (or make as shown): Control Research. L3—quench transformer; ESSCO (solid wire type). Ry—Neomatic Type 5529, 7250 ohms. C1—30 mmf. ceramic, CRL type D6. C2—170-780 mmf. trimmer; Arco type 469. C3—100 mmf. ceramic; CRL type D6. C4—.04 mf. paper; Aerovox P83Z. Tube—Raytheon 1AG4; ESSCO. Socket—sub-min. 5 prong. R—250,000 ohm ½ W carbon. Base material, wire, cable plug. Box—2⅛" x 1⅝" x 1".