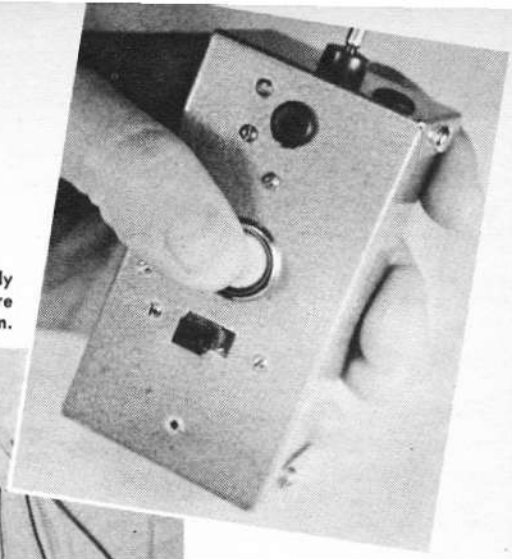
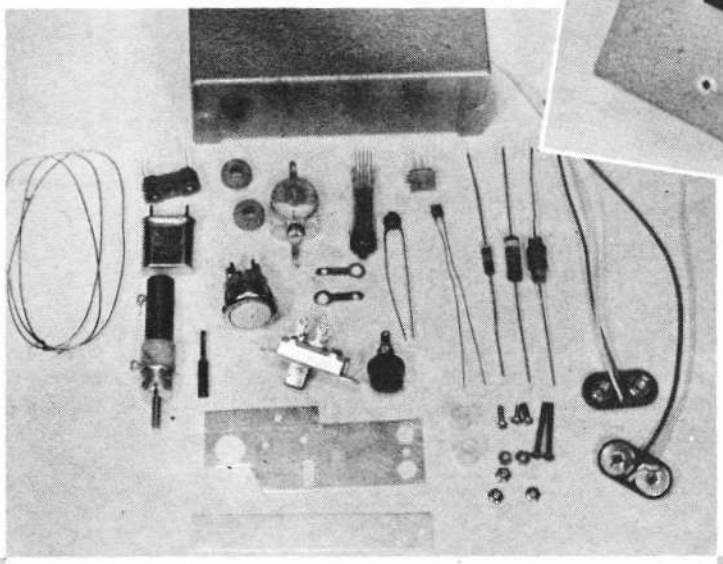
There's no need to carry bulky equipment if you're a single-channel fan—here's a vest pocket rig

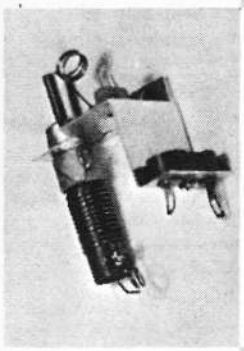
Mini-Transmitter

By Ted Strader

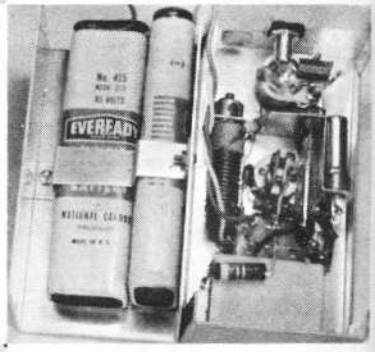


Right: Housed in a Bud Mini-Box, this small transmitter barely makes a handful. A few parts (below) and a little patience are all you need to make this compact and powerful rig your own.

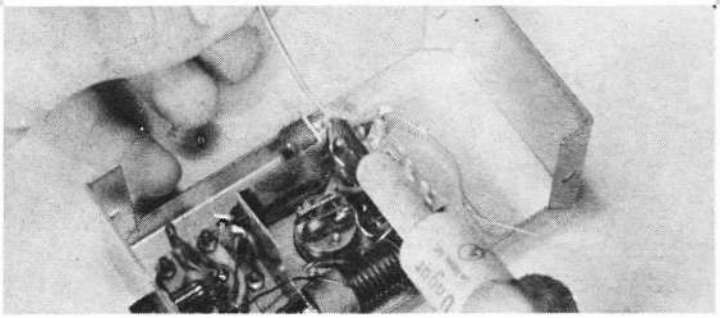




A CTC coil from, some No. 22 enameled wire, and you can easily wind the tuning coil. This mounts on the small chassis along with the crystal and tube sockets.



Left: Use an Ungar pencil iron and resin core solder to get clean and proper connections. There are few parts to assemble and the finished rig is shown above — with batteries.



• Channel Chatter, in the May '57 issue of Flying Models, contained pictures, a schematic and story about a midget transmitter which was the work of **Bob Randolph** of Murray, Ky.

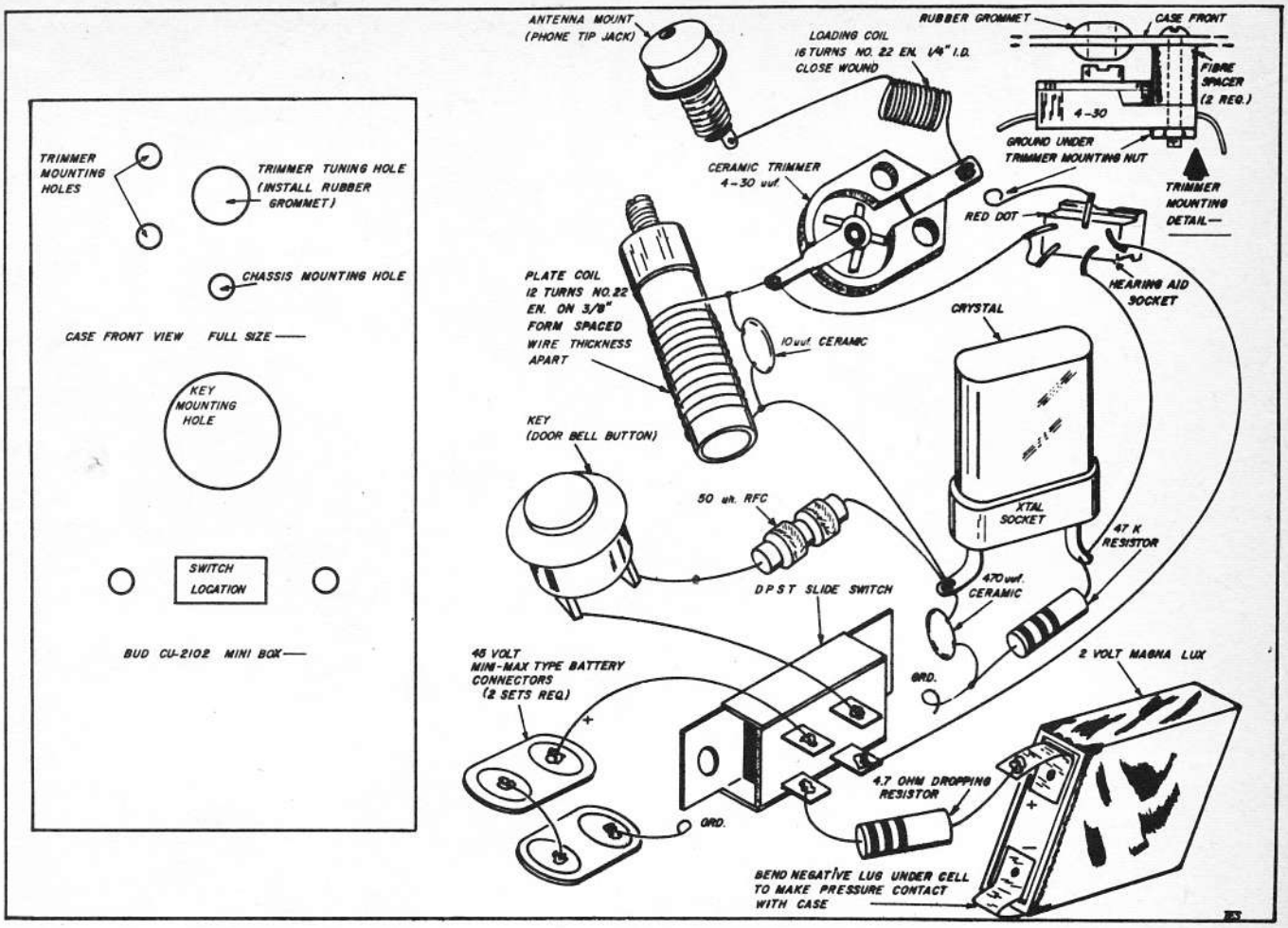
We had run on to Bob and his creation while covering a contest at Marion, Ill. and became quite interested in its possibilities.

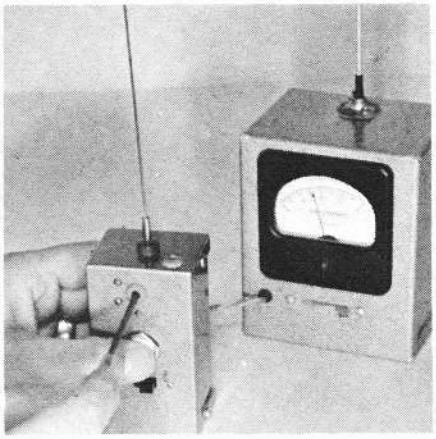
Originally the circuit was housed in a plastic fishing tackle box and used a 3 to 5 foot antenna, depending upon what range you needed. At the time he was using his for bench tuning and suggested that it probably would do the job for boating enthusiasts, if the range could be increased.

This brief meeting started wheels spinning. We talked of how nice a little gadget it would be if enough range could be had for flying. It was decided then and there that if I found a few spare minutes I'd toy with it and see what came to pass. We found the needed opportunity a few months later and built a variation of the original, the schematic of which appeared in the May '57 issue.

The schematic shown here is actually the fourth variation. It is very tolerant to component inconsistancies and easy to tune. The circuit will operate equally well with several different tubes. We have used 1AC5's (and its wire lead counterpart 1V5), 1AG4's and are now using a CK 5672. They all seem to do the same job in each variation and are interchangeable without retuning! Aside from differing plate output and filament drain the only difference, with regard to this circuit, is that the 1AC5 has self-supporting leads while the other three mentioned have wire leads.

So as not to confuse we'd like to point out that the lead photo is of an earlier model (same size) which originally had a special pencil cell battery box, accounting for the unused screw hole just beneath the switch. The rest of the pictures, etc., are of the





Left: Tuning is accomplished with the aid of a milliameter or a field strength meter. Details are covered in the author's text.

latest version and a Magna Lux issued with a dropping resistor for filament voltage.

As for performance, suffice to say we used the Mini-Transmitter all summer, flying planes out until they were a speck in the sky and always under complete control. One set of batteries was used during that time. We did engage the services of a battery rejuvenator to keep them up to strength. Actually, ours has been used far in excess of normal fore we also use it to tune receivers on the bench and it's not uncommon to have operated it continuously for 30 to 40 minutes, three or

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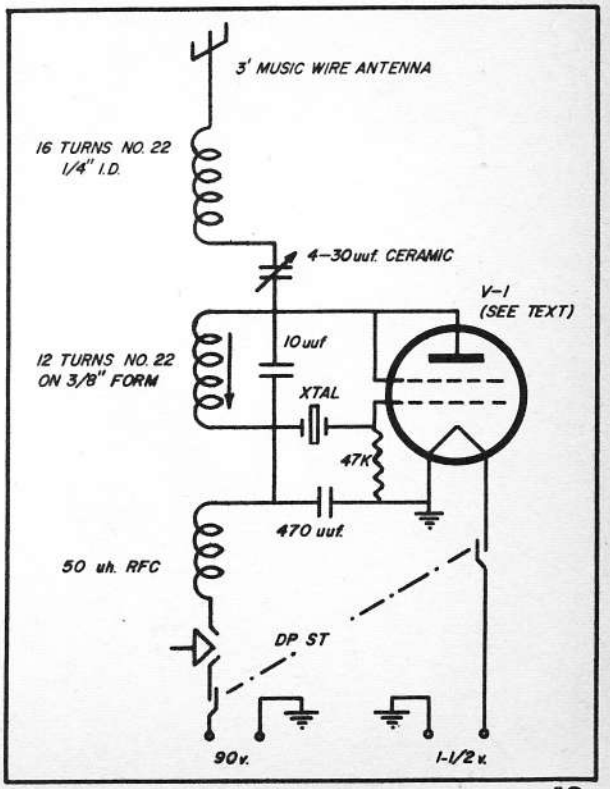

Right: This simple schematic has all of the technical details you will need in case you like to follow electrical diagrams. A variety of tubes were tried and an explanation of this is fully covered in the copy. All parts are listed to help you assemble this unit.

TRANSMITTER

(*Continued from Page* 19)

four times in one evening. The same set of batteries used throughout.

To date, we have built four models and have happened upon quite a few in the field built from the original schematic. Those who desire can change their original models to the new format with a minimum of effort.

The box used is a Bud CU 2102 Mini-Box which measures 4" tall, 2⅛" wide and 1⅝" deep. We have also built a couple in the next size cabinet; a Bud CU 2103 which is the same height, but 2¼" wide and 2¼" deep.

All dimensions are for the smaller of the two, however, these same figures and the chassis and strap will work without any alterations in the larger box. The front pattern is for the width of the smaller box. If the larger box is used simply place the front pattern directly in the center and mark the holes.

Construction is straight forward, however, a few notes might make the job a bit easier and quicker.

Using the full-size patterns, mark and cut the holes in the top and front of the box. If you don't have a drill the size of the push button or antenna and tuning holes, don't worry, we don't either. These larger holes were made first with a small drill, reamed out with a reamer and if still too small cut to final size with an old X-Acto blade. The Bud Mini-Boxes are of fairly soft aluminum.

Insert rubber grommets and mount the antenna mount (phone tip jack), switch and push button. For ease of connecting later grounds, a couple of solder lugs may be installed under each switch mounting nut.

Cut two ¼" fibre spacers (poly tube may be used) and mount the 4-30 uuf. ceramic trimmer with the tuning slot toward the front. Bolt in place with 2-56 ¾" bolts. Leave the bottom nut loose for the time being so the filament ground wire from the tube socket may later be fastened under it.

Next, cut the chassis and strap to outline from soft aluminum sheet. (Maybe you can misappropriate a cookie sheet!)

Cut out the necessary holes. The chassis pattern shows two concentric holes with a (see text) notation. Use the smaller hole if you use a CTC coil form that mounts with a nut and lock washer. The larger hole is to accommodate the "vibration proof" type of form and is the type we used in the model pictured. Either will do the same job.

Bend the chassis and strap as shown, clamping on the shaded side of the dotted bend lines. With space at a premium we have shown this method and have figured the amount of bend so the parts will fit. (Expansion based upon 1/32" thick aluminum stock.)

Wind the tuning coil, leaving about four inches of the No. 22 enameled wire extending from each solder lug

for later use. Space the winds about the thickness of the wire apart. Solder in the 10 uuf. condenser between the two lugs. Install it in chassis upside down so tuning screw points toward box top when finished. Adjust the slug —generally about half way down the coil for the time being.

Install hearing aid socket, upside down, securing it with the friction ring included. The socket is wired using the connection nearest box front as plate lead. Remember this later when inserting the tube. Using a 2-56 x ¼" bolt, mount the crystal socket in place right side up.

Pas the loose end of the coil wire extension from the coil lug nearest the chassis through the hole near coil mount. Making sure insulation is intact at the point where it passes through hole, measure on about ¼" and scrape the insulation from there to the end.

Mount the chassis and its parts in place using a 2-56 x ¼" bolt.

Pass the coil wire extension through the ceramic trimmer rotor lug, solder, and continue on to the two hearing aid scoket leads closest to box front. Solder. These are the plate and screen grid connections which the schematic will show are common.

Solder a wire from the middle socket lead and ground it under the bottom ceramic trimmer mounting nut which we left loose. This may now be tightened.

Wind a 16-turn coil of No. 22 enameled wire using a ¼" dowel (or round pencil) as a form, scrape the ends close and solder between the antenna mount and the ceramic trimmer stator lug. (See exploded view).

Solder a piece of plastic covered wire to the fourth socket lead, pass through chassis hole near socket and insert it in the crystal socket lug nearest the box front. Solder another similar wire to the fifth socket lead, pass it through same chassis hole and solder it to one of bottom lugs on the switch.

Clip the ends of the 47K resistor and solder one end to the crystal socket lug nearest the box front. Clip the ends of the 470 uuf. condenser and install one lead in the crystal socket lug farthest from the box front. Bring the bottom extended coil lead to the same lug, scrape the insulation and pass it through. Install one lead of the 50 uh RFC in the same lug. Solder. Solder the other leads of the resistor and the condensor to the lug under the switch mounting nut. Clip the ends close. Solder the other RFC lead to one side of the push button.

Solder a short length of wire from one of the top switch lugs to other side of the push button.

If a Magna Lux cell is to be used it should be installed at this time. Scrape the negative lead clean and bend it back under as shown. Press it in place as shown in the photo. Solder a 4.7 ohm dropping resistor from the positive battery terminal to the other bottom switch lug as shown.

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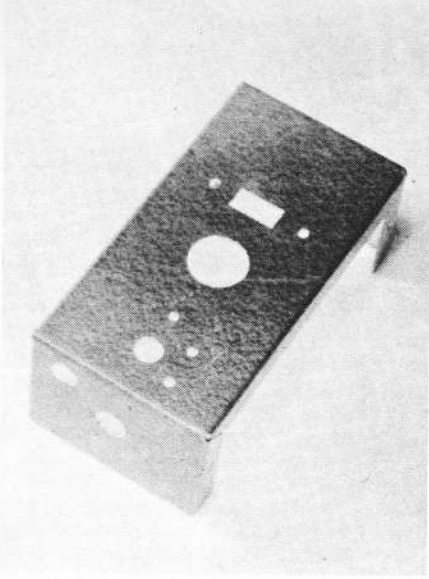


Series connect the two sets of mini 45 v. connectors and solder the positive lead to the other top switch lug and the other to the other solder lug under the switch mounting nut. Cover exposed metal on connectors with plastic tape to insure against shorting to top of box when closed.

Locate the holes for the battery strap in the middle of the back cover and bolt it in place.

CHECK ALL WIRING . . . MAKE CERTAIN THERE ARE NO SHORTS. REFER TO THE EXPLODED VIEW. CHECK ALL SOLDER JOINTS!!

Insert the tube in the socket with the red dot toward the box front. Place the crystal in the socket. Turn on the switch and observe the filament glow. If no glow, check back and see what went a-miss. If the tube glows we're well on our way.

Place the two 45 v. batteries in their holder, connect and then slowly slide the back cover into place. Visually check during operation. Be sure no connections extend beyond the chassis depth when box is viewed sideways.

Cut two metal screws in half and insert them in the side of box where batteries can be seen through holes. (This is not necessary when using the CU 2103 which is deeper)

Solder a phone tip to the end of a 3' length of $\frac{3}{64}$" or $\frac{1}{16}$" steel wire and insert it in the antenna mount.

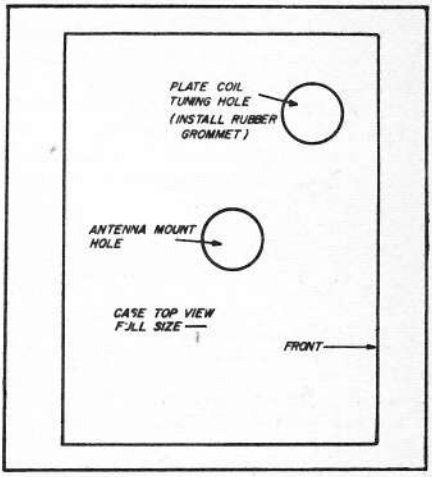
If you tune the transmitter with a MA meter, open the case, break the B-plus line and extend it out the case. Then, close the case before tuning. This is necessary because if the rig is tuned with the case open it will have to be returned with the case closed because of a difference in capacitance to ground. For those using a MA meter the drop should be approximately 6 ma.

We have tuned ours both ways. Those using an FS meter will simply have to forget about the case removal procedure.

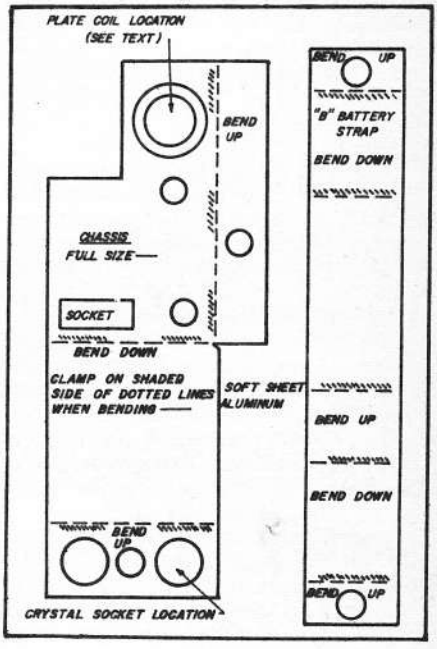
Actual tuning is the same for both methods.

Using an insulated tuning wand, screw the trimmer until a rise is noticed on the FS meter (or drop on Ma meter).

As is the case with all transmitter circuits of this type, turning the trimmer one way will result in a gradual rise on FS meter (or drop on Ma meter) to a point and then a sudden



drop (or rise). This is the best direction to turn the trimmer. The other direction will operate in reverse and the FS meter will suddenly rise fast and then slowly drop off. Use the other direction. Turn slowly until the FS meter rises to its peak and drops sharply. At the point it falls, stop and back up just the slightest until the meter jumps and begins to back slowly down. This is the spot you want. Now screw the slug for maximum and



you're in resonance and on frequency.

One final check. With the set turned on and button depressed, touch the antenna with the other hand. It will either show a complete cessation in outoscillation or a decided decrease in output. This is normal. When the hand is removed from the antenna the set should immediately resume operation. If the FS meter shows no reading (or MA meter shows increase in drain) then it will be necessary to re-adjust the set. Backing off the trimmer a

slight bit more will correct this.

The four models we have made have never failed to resume oscillation, however, it could happen and it's best you know how to correct it, if it should.

BILL OF MATERIALS
(as specified)

1—Bud CU 2102 Mini-Box (or similar size)
1—27.255 mc crystal
1—Crystal socket
1—CK5672 tube (or 1AC5, 1V5, 1AG4)
1—hearing aid socket (1AC5 requires special socket)
1—3/8" slug tuned coil from
1—4-30 uuf. ceramic trimmer
1—Antenna mount (phone tip jack)
1—Phone tip
1—50 uh RFC (National)
1—Door bell button
1—DPDT slide switch
1—47 K 1/2 watt resistor
1—4.7 resistor
1—470 uuf. ceramic condenser
1—10 uuf. ceramic condenser
2—sets 45 v mini connectors
3' no. 22 enameled wire
2—small rubber grommets
6" no. 22 plastic covered wire
6—2-56 x 1/4" bolts
2—2-56 x 3/4" bolts
8—2-56 nuts
2—solder lugs

Small piece of 1/32" soft sheet aluminum; drills; pliers; solder; reamer; screw driver; tuning wand; batteries; fibre spacers; 3' music wire antenna; 0-10 MA or FS meter for tuning; patience.