POWER IN . . . and POWER OUT

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Here's a handy mobile/portable power supply designed for use with any one of a number of devices described in G-E HAM NEWS during the past few years—the Emergency-Portable Rig, the Mobile Modulator, the b-Meter Receiver, the s-Meter Transmitter, the b-Meter CD Receiver, and the Mobile Marine Receiver.

This new power supply provides exceptional voltage regulation and incorporates some advanced thoughts in design. It's worth looking over—especially by fellows inclined to focus on selenium and selenium rectifier circuits.

Lighthorne Loopy

The Emergency/Portable Power Supply puts out 300 volts at 300 milliamperes and ——— or volts base—all from a 6 x 5 5/8-inch utility box. Input at full load is 3 volts d.c. at 7.65 amperes. Efficiency is 67%. The supply is light weight, and voltage regulation is exceptional.

Compromising on the 300-volt, 300-milliamperes size gives us adequate design which will not overburden the average battery. The supply to be described evolved after serious consideration of the most frequently observed faults of the customary vibrator-type power supply: Voltage regulation; supply—poor—with tremendous jumps even between half-load and full-load conditions; vibrator life short due to contact failure when self-rectifying type circuits are used; and conversion efficiency surprisingly low—often less than 35%.

Fig. 1—Circuit diagram of the Mobile/Portable Power supply.

C — 30 mm 600-volt plastic buffer
C — 2.2 uf 600-volt (Barnes 2.2)
Vib.—Shunt unit (CD-50 Inters 5214)
X — EP-50 copper waxed
T — Vibrator transformer, Ph.: 6 v. DC. 7.5 A. watt. 350 v.
100 vac. 60 v. base winding. (Inters 536C—or
X — 100 ma 300-volt selenium rectifier (GE-3R1503)
X — 120—selenium rectifier modified to one pole (see text)
The selenium rectifier bridge offers further advantages: improved voltage regulation due to low forward resistance as compared with vacuum rectifiers; and the fact no warm-up time is required—which may be important in some applications.

The transformer used in the supply illustrated has a high voltage winding rated at 380 volts and 100 milliamperes and a bias winding for supplying minus 60 volts.*

The box winding on the transformer is also equipped with a full-wave selenium bridge to provide a continuous bias supply for Class B audio systems and/or d.c. final circuits. This eliminates the C battery normally used in mobile or portable work.

Buffer condenser (C1 in Figure 2) usually is rated at 1500 volts. However, if they should leak, as this one does, the high voltage rating is not necessary. Still, cautious constructors may wish to use a 1500-volt capacitor. We ought not, also, that handbook vibration circuits often call for a resistance of, say, 5000 ohms in series with the buffer condenser to limit the secondary current to a safe value should the buffer break down. Although this was not deemed necessary in the power supply herein described, it is another safety factor that may be employed if the builder wishes.

CONSTRUCTION DETAILS

The power supply illustrated fits into a 4 x 5 x 6-inch utility box with an on-off toggle switch on the front and a 4-terminal barrier-type strip on the back as shown on the front cover of this issue of G.E.-HAM NEWS. All other components are mounted on a plate of 1/16-inch aluminum which just clears the lips of the utility box and stands off 1 inch behind the front cover as shown. Figures 4 and 3 show the layout. The 50-megohm bias filter condenser is mounted under the plate between a terminal lug and one of the grounded lugs at the base of the high voltage filter condenser. Aside from careful placement of the components to get them all in the box, the only critical construction.

Fig. 3—Four-plate rectifier stack is the bias bridge.
The construction of mobile radio equipment requires, in general, a long series of compromises between efficiency and practicality—compromises which start with the power supply and carry right on through to the antenna system. The wonder of it is that we can construct any kind of equipment at all rugged enough to withstand vehicle vibration and bounce and yet capable of converting the prosaic 6-volt d-c intended for lights and ignition to r-f waves which travel hundreds and even thousands of miles.

On the higher ham frequencies, where antennas are smaller, problems involving stability become of first order importance. But on the bands below 10 meters, where stability is easier to lick, the most plaguing problem is perhaps the radiator itself.

60-FOOT WHIP?

On 75 meters—the most popular low-frequency mobile band—a 60-foot quarter-wave antenna nearly just doesn't fit into the design of an automobile! So we compromise again and use a loading coil to keep the quarter-wave electrical length and at the same time reduce the physical length.

For some this is a compromise—in the strictest sense of the word. It solves the physical problem but hinders us radiometrically, which in turn hinders the radiation efficiency of the antenna. And after all, what are we primarily interested in getting is the "soup" out into the air.

But as long as we must keep the antenna height down to 8 or 10 feet, we want to get the best deal we
The coil illustrated is wound on 2-inch polyethylene rod, grooved on a lathe and drilled and tapped at both ends to receive special fittings fabricated to insert the coil in a standard 1-inch, 8-foot antenna whip and spring mount. (The whip and mount illustrated are Ward products.) This particular coil has 53 turns and was originally designed for 2800 kcs work. Coil constants will vary from one installation to another, of course.

The good insulating quality of the poly rod—which contributes to high Q—is maintained in moist weather by use of a 16-ounce round polyethylene bottle as a protective cover. The bottle used in this installation is a Flaspec. Such bottle may be obtained at some drug stores, or from glass and plastic bottle distributors.

Modification of the bottle offers no problems. Simply drill a hole in the center of the bottom to pass the top fitting, and cut off the top so as to leave an opening which will fit snugly—but not airtight—over the bottom end of the coil form.

Tuning a loading coil usually is a nasty job. Some home owners place the coil inside a car's rear trunk to protect it from weather—and then find they must shut themselves inside the trunk to tune properly because the position of the trunk door affects the loading. Taps are tricky to adjust and open the way to contact trouble. Tuning slugs or metal or wire rings work well but are either difficult to manufacture or hard to get at under a protective cover.

![Diagram of tuning coil and strap](image)

**SARDINE CAN KEY TUNER**

The coil illustrated tunes with a sardine can key! A tuning strap of soft copper is simple to make and install as shown. Tuning is even simpler.

After preliminary checks are made to obtain the proper number of turns on the loading coil for the frequency and whip to be used, get the rig putting out the maximum signal with the strap straight down. Then with a field strength meter set up as far away as practical, start rolling up the end of the strap with a sardine can key. Although the sardine can key was left on the model shown at first, the designer soon discovered that it offered an irresistible temptation to children and to other hands. The solution was to break off the end of the key, leaving it fork-shaped for easy removal.

When checking for maximum signal on the field strength meter, you should, of course, remove the key and stand away from the antenna. Although the strap provides relatively fine tuning, care must be taken to avoid using it during the early part of the broadcast schedule.

In rolling the strap, make sure it actually curls and that you are not pulling the entire strap away from the loading coil. For you want to secure it with tape once you have it set—and you will not have the strap bent out to that tightening it with tape will once again change the tuning.

Although the strap lowers the Q of the coil slightly, it has been found the advantages of this construction and the ease of tuning for outweigh the loss of Q.

Of course, those with infinite patience can go on from here with expensive "bats," "whistles," "cans" or "baskets"—and more power to them!

**PARIATICS**

In the schematic of the Mobile Marine Receiver of the July-August, 1952, issue of G-E HAM NEWS two changes should be made: (1) The arm of SW-1A should be grounded; and (2) the connection between the cathode of the 6kB6 mixer and the junction point of R5 and C10 should be eliminated.
TO TUNE A LOADING COIL

To vary a loading coil inductance over a range of approximately 75 kHz, use a single turn of heavy insulated wire wound tightly around the coil. The wire used was G-E Plamen 24 with the ends bared and twisted together. Before final tightening, the shortest turn can be moved up and down the coil. The effect is minimum at the ends of the coil and maximum at the center. Wind your loading coil with several more turns than required to resonate the antenna at the lowest frequency—then move the shortest turn from one end toward the center until antenna resonance is obtained. On loading coils which are spaced wound or employ heavy wire, the shortest turn can be "screwed" up and down to find the resonant point.

MILROY E. GOUGH, VEGIR

A "STAND-BY" SOLDERING IRON

To prevent a 100-watt soldering iron from overheating, I use a normally-closed micro-switch which cuts a 100-watt lamp into the circuit when the iron is placed on the stand. The stand, lamp socket and switch are all mounted on a small square of wood together with a female ac receptacle for the iron cord. When the stand is hinged with a strap of metal at one end, while the other end is joined to the micro-switch terminal "NO," the iron keeps fairly hot and is ready for use a few seconds after being lifted off the switch. When the iron is in continuous use, a small block of wood is slipped under the free end of the stand next to the micro-switch to keep the switch from burning—thus maintaining full voltage on the iron.

CHARLES K. GASHLER, W5CLJ

SCHEMATIC TRACING AID

Whenever it is necessary to copy a drawing or print, darken the paper with a few drops of lighter fluid. This makes the paper sufficiently translucent so the drawing can be traced—but leaves no ring or spot when the fluid evaporates.

HARVEY MULLER

HANDY SOLDERING IRON STANDS

Instead of throwing away empty solder or fuse wire spools, we bend the wire over to make soldering iron stands. They take up less space than the regular stands, and there is always a backing of cotton.

HARRY J. MILLER

SOLDERING IRON SLEEVE

When soldering in close places, wrap an asbestos sleeve around the iron to protect nearby parts. The sleeve can be wired in place just medium-tight so that it can be slipped back off when not needed.

HARRY JOHNSON

SOLDERING TAPS ON COILS

The problem of soldering taps on coils where the turns are close together, without shorting to the adjacent turns, is a tough one. Alice several unsuccessful tries on an 80-meter 75-watt tank coil, I put strips of aluminum foil through the coil on each side of the place to be tapped. The type solder for foil-wrapping is ideal, and enough thicknesses can be folded together to make a snug fit between turns. After soldering, the aluminum slips out without trouble, leaving a neat and solid joint. A big advantage of the foil is that it can be bent back easily to allow good contact between iron and joint.

CARY F. ZIMMER, W7XKPZ

OILING MAST PULLEYS

Put about a foot of the antenna rope or cable in a pan of oil for a minute or so—then quickly pull the rope up through the pulley and see how the oiled section around the pulley until you see the oil splashing out.

MICHAEL ROGERS

How did you solve that last problem that almost had you stumped? Next time it's about bearings, motors, etc., Lightweight Larry would like to tell the rest of the hams about it. Send it in! For each "brick" published you win $10 worth of G.E. Electronic Tubes. Mark your letter "Entry for Tricks and Topics" and send to Lightweight Larry, Tube Department, Ely, 387, General Electric Company, Schenectady, New York, or in Canada to Canadian General Electric Company, Ltd., Toronto, Ontario. The Companies shall have the right, without obligation beyond the above, to publish and use any material submitted to this column. No entries returned.
Ham radio is growing by leaps and bounds. Chairman Paul A. Walker of the Federal Communications Commission reports that licenses now number about 115,000. This means an increase of more than 40% since the year immediately following World War II. Such swift growth is a sobering fact. Let's pull switches and think about this a few minutes.

It is a fact that participation in rule-making—making our wants and needs known to the FCC—as an important part of ham radio as calling CQ or building a VFO.

We hear much talk these days that citizenship as a vital, living force has been on the downgrade—that citizenship too often is taken for granted. The percentage of qualified voters who actually cast ballots has in recent years, at least until the last election, been disgracefully low.

Let's not complain publicly the existence of ham radio for granted. Our frequencies are valuable—and we have them because we are deemed important to civilization.

Chairman Walker put it this way in his remarks at the presentation of the 1962 Edison Radio Amateur Award in Washington recently: "Almost every day amateurs are called upon to provide emergency communication.... They are active in the military and civilian defense effort. They talk to the police, the armed forces, the fire department. They contribute to the advancement of the art and of the industry.... They are an important factor in making for better international good-will and understanding.... They have the best wishes and the blessing of the Federal Communications Commission."

Sweet music, yes. But it is up to us to continue to justify such praise.

Some of the fellows complain that one must be a lawyer to keep up with proposed rules changes these days. The point is good. Rules have been coming fast and furious over the past few years. We'd wager a couple of kilowatts to a millivolt that you could count on your fingers and toes the number of Ws and Xs who right now could rattle off correctly the precise frequencies on which they are allowed to operate.

But that is the price we pay for civilization. As society and science become ever more complicated, as must the average human brain speed up—but the individual be left by the wayside. Crying for a return to the "good old days" is no solution; history shows that "good old days" never return.

Ham organizations—from rational associations to local clubs—have an increasingly important job these days. They can and must intensify their efforts to help members keep informed of rules and regulations—new and proposed. Of course, most clubs do this as a matter of course. But in many clubs a little revitalization of such activity would be a big help—perhaps by setting up special committees to analyze and report on new rules and regulations—instead of having the job to already-overburdened club secretaries.

What say, club officials? Get any good ideas on the subject? If so, we'll try to pass them along.

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The individual ham has an even more important job. The FCC wants to hear from you—wants to hear what you think of proposed regulations, wants to get your suggestions on how to best use the ham bands. Don't think your voice is like a cry in the wilderness. For public officials pay considerable attention to individuals—especially when they hear from a lot of individuals.

And right now is a good time to speak your piece. For we are in a period of transition from the old Class A, B, and C system to a new order encompassing classifications for Novices and Technicians as well as General and Extra grade hams.

Just what the FCC is aiming for remains somewhat of a mystery at this writing. The present Amateur Extra Class license now carries no special privileges. And many hams say: "Why slave for a college degree if it won't get you above the dishing level?"

The question is pertinent, but perhaps a little short-sighted. We think it is reasonable to assume that eventually Amateur Extra ticket holders will get some special privileges. Thus, working for that "college degree" now may pay dividends in the future.

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The important point, however, is that every ham simply must put down his soldering iron and grid dip meter once in a while and write to the FCC—making known his thoughts on proposed regulations, preferably even before they are proposed. Final recognition is for everyone. But the suggestions from all of us must get to the FCC members if rules and regulations are to represent majority interests. This democratic process takes time and effort by all of us. But it's our way of life.

Here's the address: Federal Communications Commission, Washington 25, D. C.
DON MULLICAN, W3PHP

Operating almost continuously for five days, Don served as the sole link between rescue HQ in Bracey and devastated Jubeinia in the Arkansas inundation of last March. Traffic to and from the station was handled through his ARC-5 on 75 meters.

Don was able to get his 75-meter relay set to a payphone inside the wall to link his station to rescue HQ. THe set was transmitted for the award by W3EY who operated an emergency station at Jubeinia with a crew that relied on the W3PHP link.

Don is 20, a biology student at Harding College—and you may hear him as a ZB or OQ in another year or so because he plans to become a missionary. He received a trophy, a wrist watch and a trip to Washington and New York City.

Special citations went to:

W4JZM—TVI research and development.

W4JZP—Outstanding traffic handling to servicemen overseas.

W4P1W—Developing radio course for the blind.

W4WLE—Handling traffic to Arctic weathermen.

The 1952 Edison Radio Amateur Award was sponsored by the G.E. Tube Department. Judges were: G. L. Dowland, ARRL president; G. E. Stierling, FCC commissioner; and E. H. Harriman, Red Cross president.

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