



Lil Lulu is a small and neat a.m.-c.w. 6-meter transmitter with a v.f.o. A built-in power supply operates either from 117 volts a.c. or 12 volts d.c.

CQ Reviews:

The Lil Lulu 6-Meter Transmitter

A FEW years ago Ed Ladd, W2IDZ, designed and built a compact low-powered a.m./c.w. 6-meter transmitter which had a number of nice features for varied applications. It was not long before other 6-meter enthusiasts, seeing the results obtained with W2IDZ's unit, built duplicate rigs and, in a number of cases, their construction became club projects. Ed had no special name for identifying the transmitter; however, it was soon known as Lil Lulu, since those who used the device so often remarked, "She's a lulu!"

The success and popularity of Lil Lulu prompted the Whippany Laboratories, Inc. to manufacture similar units. In addition, the manufacturer decided to produce them as high-quality pieces of gear.

Lil Lulu features the following: v.f.o. covering the entire 6-meter band; regulated plate and heater potentials for v.f.o.; driver and final

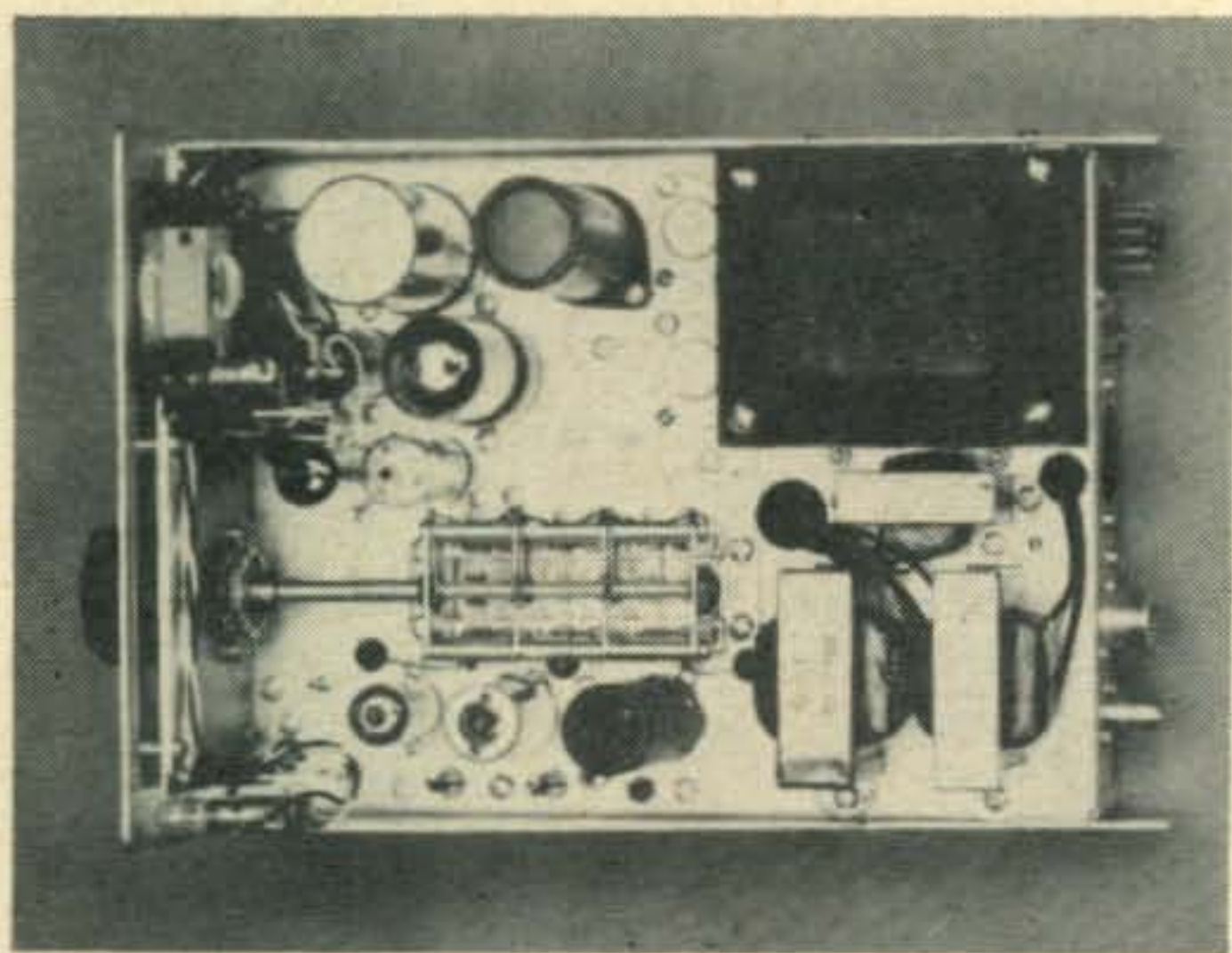
gang-tuned with v.f.o.; 5 watts carrier output on a.m. (20 watts p.e.p.) with 6 watts on c.w.; low-pass output filter; plate modulation; c.w. keying with wave shaping; self-contained power supply for either 117 v.a.c. or 12 v.d.c. operation; two-stage mic amplifier with either carbon or crystal mic input with push-to-talk provision; antenna changeover relay; output meter; power outlet with muting circuit for separate receiver; small size—ideal for fixed or mobile station use and is ruggedly built with the highest quality components obtainable.

A block diagram is shown in fig. 1. The v.f.o. uses a 6BH6 pentode electron-coupled oscillator, the plate section of which doubles into the 50 mc band using a broadly tuned circuit. This is followed with another 6BH6, an amplifier/buffer, which drives the final to an output of approximately 5 watts. An unusual feature is that the v.f.o., the buffer and the final are gang-tuned together, thus eliminating the need for retuning as the frequency is varied. Regulated B plus and heater potentials are used for the v.f.o.

The final amplifier is link coupled to the antenna circuit through a series-tuning capacitor which serves as a loading control. Another feature is the inclusion of an excellent low-pass output filter to minimize the possibility of TVI.

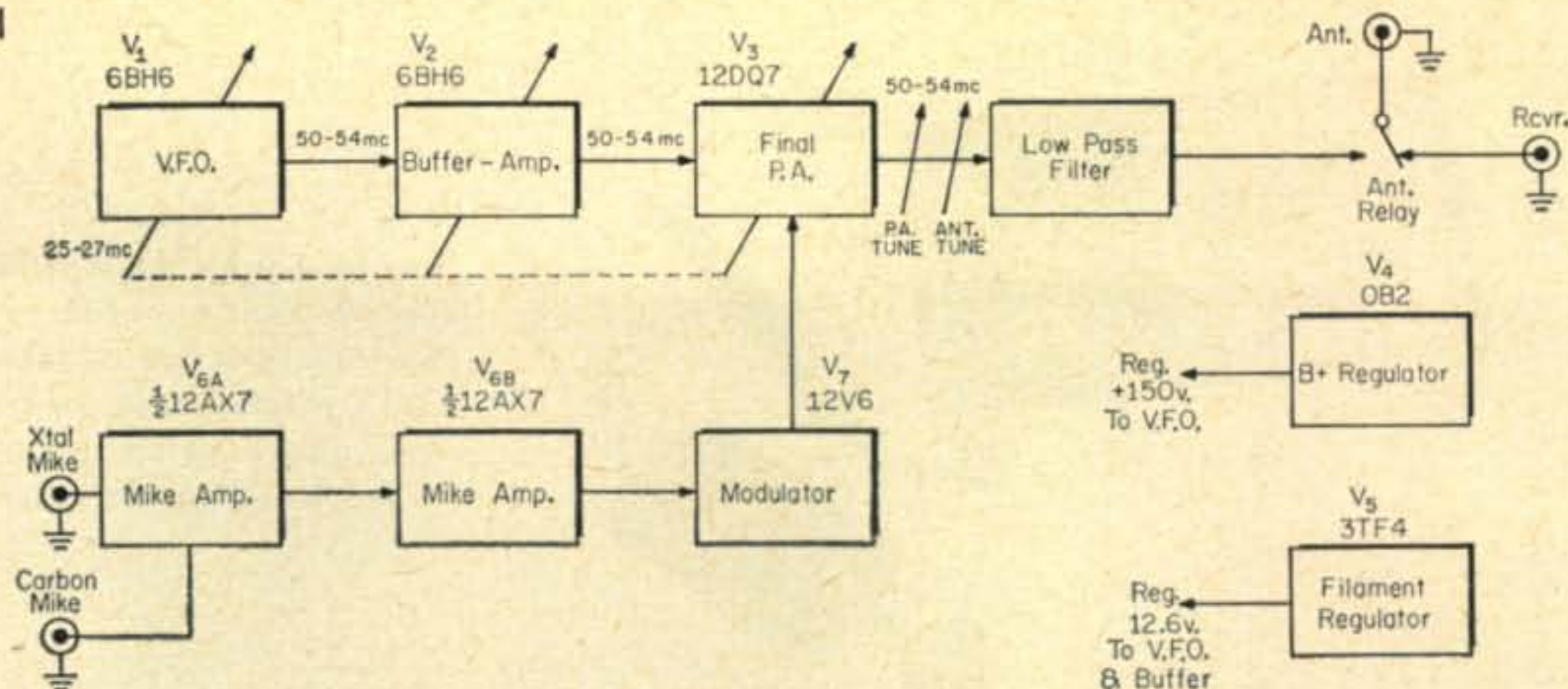
A changeover relay switches the antenna to the transmitter or to a coax receptacle on the rear apron for receiver use. A standard type PL-259 connector is used for the antenna and a type BNC is used for the receiver connection. The two different type connectors make it easier to identify the desired one, especially with mobile installations where it often is necessary to feel around in the dark for the right terminal.

For a.m. the final is plate modulated by a single 12V6 which is preceded with a two-stage speech amplifier consisting of both sections of a 12AX7 dual-triode. Two mic jacks are provided. One feeds directly to the grid of the 1st



Top view of Lil Lulu. Note the neat layout. The three-section variable capacitor tunes all stages together with the v.f.o., eliminating the need for retuning with frequency changes. The power transistors, for 12-volt d.c. operation, are in front of the power transformer.

Fig. 1—Block diagram of Lil Lulu.



a.f. amplifier for use with a crystal or high-impedance dynamic mic. The other jack is for use with a carbon mic and is connected in the cathode circuit of the 1st stage from which current also is obtained for the carbon unit. Both jacks are the three-way type and provide push-to-talk operation with the mic button.

The cathode of the final is keyed for c.w. A wave-shaping circuit is used which improves the keying characteristics and eliminates key clicks which might otherwise cause TVI on adjacent channels. The key jack is located on the rear apron.

A frequency-spotting switch enables the operator to "zero-in" on frequency without swishing a signal over the band on the air. A panel meter indicates the transmitter output and so is used during tuneup.

The built-in power supply operates from either 117 volts 60 cycle a.c. or 12 volts d.c. When a.c. is used, the line power is fed directly to primary No. 1 on the power transformer. For 12-volt operation the d.c. is converted to a.c. by means of a transistorized switching circuit and is fed to primary No. 2 on the transformer. Two separate power cables are supplied, one for 117 v.a.c., the other for 12 v.d.c. With the latter, either a positive or negative grounded system may be used, for which the interconnections on the cable plug must accordingly be made. Power for a separate receiver also is available from a rear apron receptacle and is transferred between receiver and transmitter through auxiliary contacts on the antenna relay.

Operation and Performance

Lil Lulu is easy to tune up. This is done for a maximum output reading on the meter, after which the transmitter is ready to go on any frequency to which the v.f.o. is set. Tracking of the ganged circuits is remarkably close, with constant output maintained as the v.f.o. is tuned across the band.

With a.m., the setting of the panel gain control determines the percentage of modulation. There is no sure method for checking the degree of modulation, although the instructions specify the mic level to be raised to the point where the output meter starts to flicker. It was found that considerable over-modulation was required before the meter responded noticeably. With a crystal mic the gain setting will be around 9

o'clock. In any event, it is best to check the modulation level with an oscilloscope.

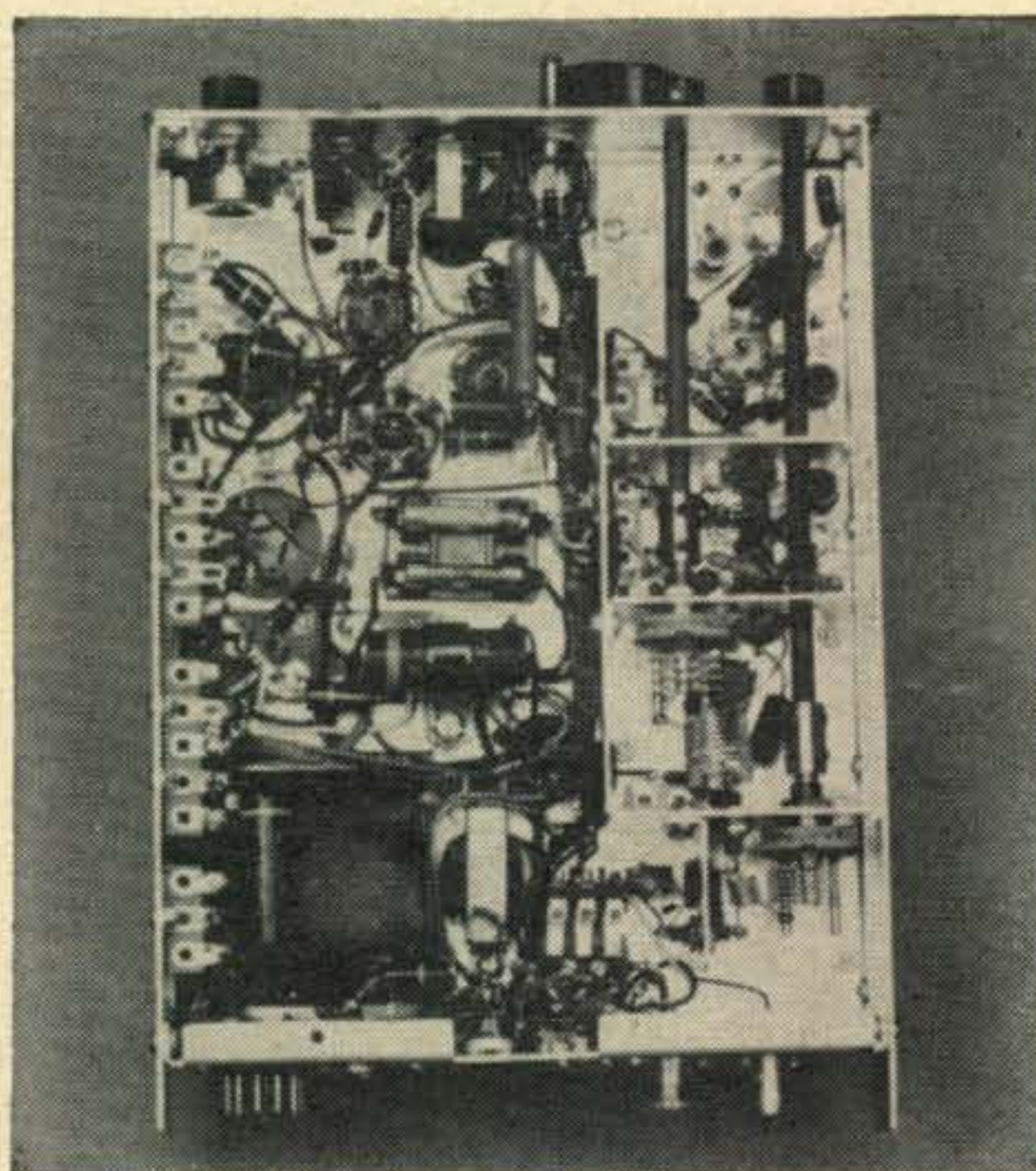
Such visual observations indicated that the modulated r.f. envelope tended to square off above 90 per-cent modulation; however, splatter was not noticeable at the 100 per-cent level where the a.f. quality sounds clean, is pleasant and carries a good punch. The carrier output was measured about 15% lower than the manufacturer's rating.

C.w. keying produces no sign of key clicks, but some keying chirp was evident.

As far as drift is concerned, the frequency stability was found to be 3 to 5 kc (depending on the starting ambient temperature) for the first 15 minutes of operation and approximately 1 kc per hour thereafter, this being close to the manufacturer's specification. Subjecting Lil Lulu to vibration indicated frequency flutter which would not be of serious concern with a.m., but might be objectionable with c.w. during mobile operation.

When 12-volt primary power was used, it was found that performance did not equal that ob-

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Bottom view of Lil Lulu. High-quality components are used throughout in an easy-to-reach arrangement. The r.f. stages are shielded from one another. The v.f.o. section, which has its bottom cover removed, is at the upper right. The low-pass output filter is in the lower right section.

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local oscillator to make tuning less critical.

The antenna at W6DNG is a sight to behold. It consists of three home-brew long yagis phased 120° apart with the elements forming three spokes in a circle. By proper phasing this array produces the circular polarization required for moonbounce work.

The antenna at OH1NL's QTH in Nikkila is shown in the photograph. Len uses 2 × 26 elements for transmitting and 6 × 12 dipoles, series coupled, for receiving.

Bill recently acquired a Pacific Semiconductors Hi-Q Varicap® for use in a new parametric amplifier. This should permit him to break through bigger and better v.h.f. frontiers.

DX—Although it's rather old news, by now, flatland easterners may be interested in scatter tests between Northern and Southern California.

The ham club at Stanford (W6YX) in Palo Alto has been successful in working many stations in the bottom end of the state. W6PJA, W6NGX, WA6MLX, K6HMS, W6NLZ, K6LZC are among the many hams successful in punching a signal through into Northern California. Considering the obstacles, this feat is comparable to working Florida, on two meters, from Maine without the aid of a band opening.

That circularly polarizes us for another 30.

For now, 73, DE W6TNS

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tained with 117 volts a.c. power. A minimum of 13 volts d.c. was needed. In most cases mobile operation is conducted while the car motor is running, so the supply potential will be at least 13 volts from the battery charging system and peak performance can then be realized.

Lil Lulu is "well built" with heavy gauge material and she uses the highest-quality components for her makeup. She cuts a neat figure in a satin-finished aluminum panel with black knobs and lettering. Her fickleness is easy to see on the nicely lit v.f.o. dial with calibrations every 100 kc from 50 to 54 mc. She is clothed in a sturdy perforated dark gray case. Dimensions?—5⅜" H × 8" W × 9⅞" D. Weight?—16 lbs. Lil Lulu can be had with a one-year warranty for \$225, complete with a.c. and d.c. power cables, from Whippany Laboratories, Inc., 1275 Bloomfield Ave., West Caldwell, N.J.

—W2AEF

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now underway in an effort to raise gain, drop the primary power requirement still further, and decrease intermodulation distortion. While these problems are complex, progress is being made, but it now appears that a 1963 launch date may be too optimistic unless a "breakthrough" is made in the design of the transistorized linear amplifier, or the power supply. As it now stands, the package is designed to function with either a "one shot" battery supply (with an approximate

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