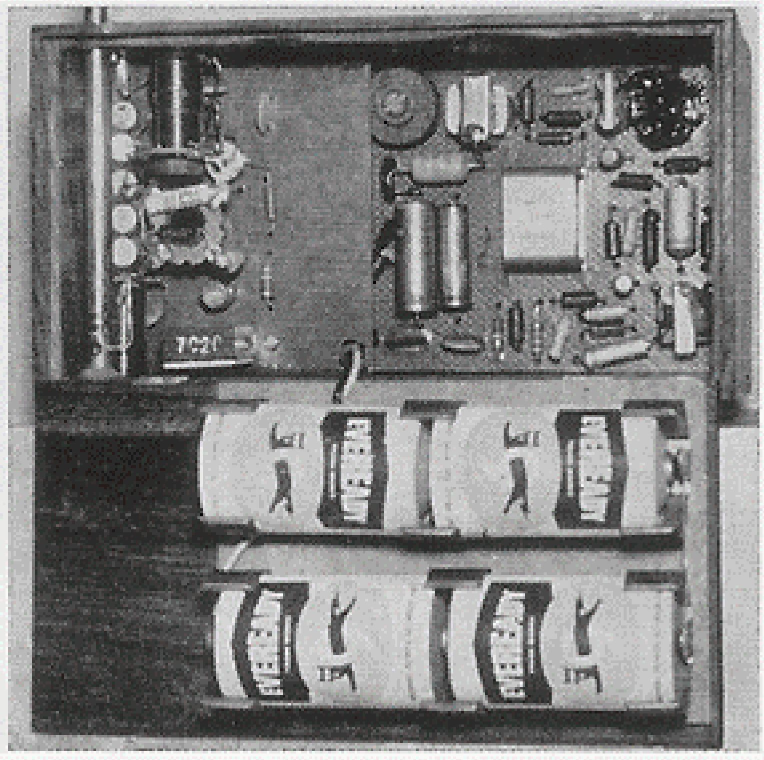
*It's easy to build equipment when you have the appropriate parts, but what do you do when components aren't available? VU2JN has an answer.*

Front view of VU2JN's a.m. and c.w. transmitter.



Rear view of the 500-milliwatt transistor transmitter.

# A Transistor Transmitter From India

## *Making The Most Of Available Components*

BY R. JAYARAMAN,* VU2JN

In the United States it is probably not difficult to obtain parts for a transistor project, but how about in other countries? In a recent article[1] in *The Indian Radio Amateur*, the writer discussed circuit techniques that were dictated by the lack of suitable components. The equipment involved is a transistor, 500-milliwatt, 7-Mc., a.m. and c.w. transmitter. Photographs and schematics of the unit appear on this and the next page.

Referring to Fig. 1, the diagram of the r.f.

* College of Engineering, Trivandrum 16, India.

[1] Jayaraman, "A Miniwatt Transmitter," *The Indian Radio Amateur*, December, 1966.

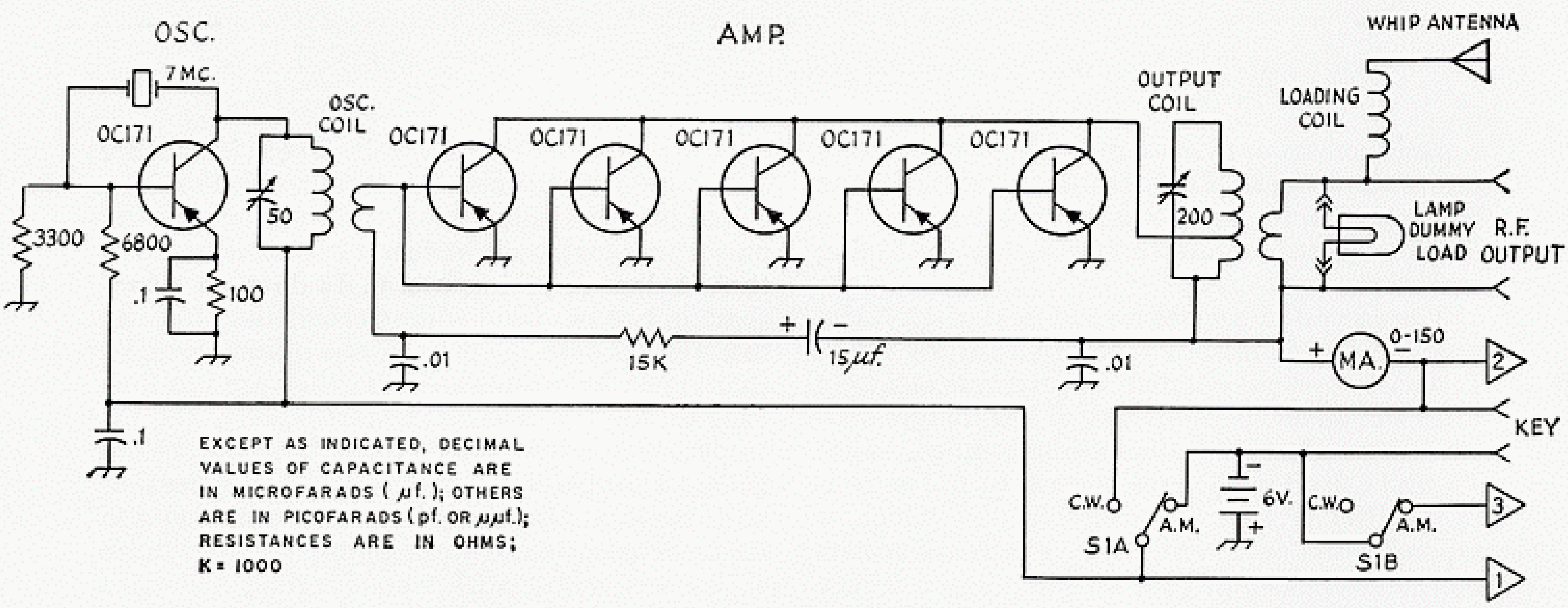



Fig. 1—Schematic diagram of the 500-milliwatt r.f. section.

Oscillator coil—35 turns No. 26 enamel wire, close-wound on ½-inch dia. form, with link of 25 turns No. 26 enamel wire, close-wound at cold end.

Output coil—30 turns No. 22 enamel wire, close-wound on ½-inch dia. form, with link of 14 turns No. 22 enamel wire, close-wound at cold end.

Loading coil—48 turns No. 26 enamel wire, close-wound on ½-inch dia. form (for 40-inch whip).

Lamp dummy load—6-volt, 0.05-ampere pilot bulb.

$S_1$—D.p.d.t. toggle switch.

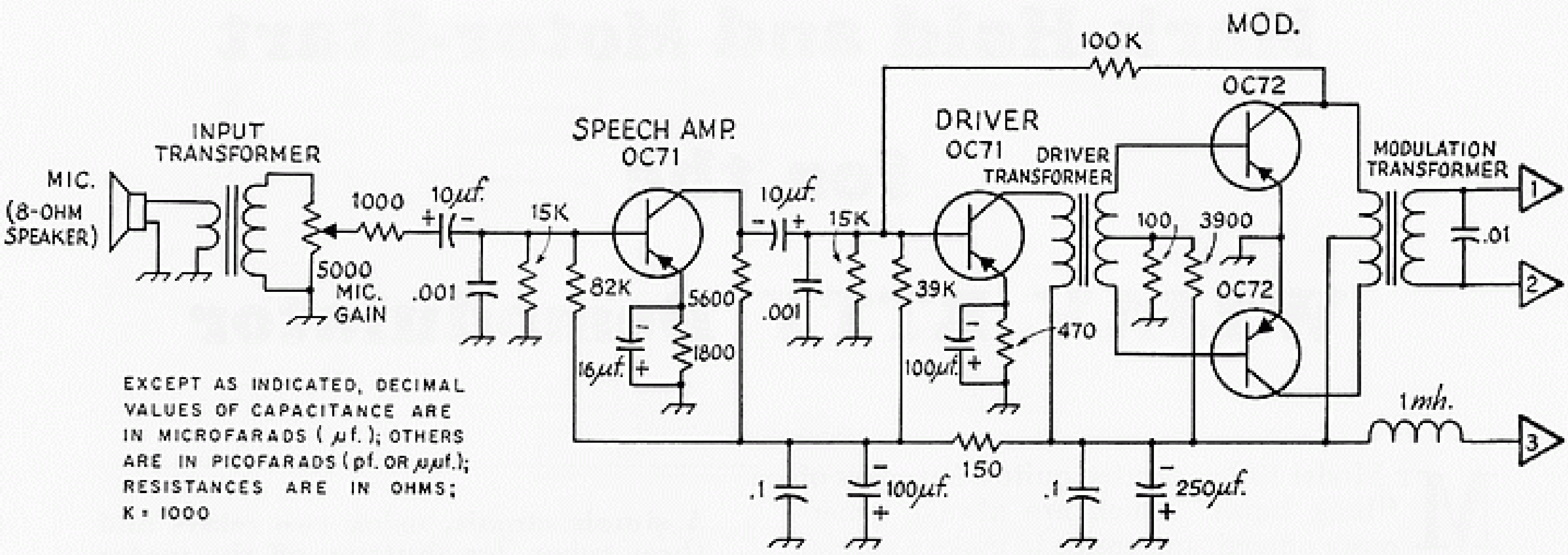



Fig. 2—Schematic diagram of the 250-milliwatt modulator. The d.c. resistance of the r.f. choke as well as the d.c. resistance of the modulator-transformer secondary should not exceed 5 ohms.

section of the transmitter, the five parallel low-level r.f. transistors in the amplifier stage handle an input of 500 milliwatts. This configuration probably looks rather preposterous to the American amateur who can easily purchase a single transistor that will replace five or even fifty OC171s, but r.f. power transistors are not yet available here in India. So the writer had to do the next best thing under the circumstances.

It's no easy trick to parallel five transistors. All the units have to be closely matched by measuring their collector leakage current, $I_{CBO}$, and gain, beta; otherwise the load current will not be shared equally by the transistors and one or more units might be destroyed. This problem can be lessened somewhat by not connecting the transistor bases directly together, but then individual coils are needed to allow the adjustment of drive to each transistor.

In order to obtain the desired output with available transistors, the writer found it necessary to slightly exceed some of the ratings of all the transistors in the r.f. section of the rig. Although this is not a recommended procedure, what more can be said since there have been no transistor failures in the transmitter?

A quick glance at the photographs reveals nothing unusual except the absence of external controls: both r.f. stages are fixed-tuned to the 7-Mc. band. But wait a minute, why is there a speaker in the cabinet? Fig. 2, the schematic of the modulator, tells the answer: the speaker is being used as a microphone. Since an appropriate step-up transformer wasn't available to match the impedance of the speaker to the input impedance of the speech-amplifier, the writer used an ordinary transistor output transformer connected in reverse.

Finally the writer's ingenuity was called upon to come up with a suitable modulation transformer. In this case, a miniature transistor push-pull output transformer was taken and the secondary rewound so that the desired modulator impedance of 75 ohms could be obtained.

The complete transmitter is built inside a 8 × 4¼ × 3¾-inch rosewood cabinet with a sky-blue Perspex panel. Although the unit has been miniaturized to the extent possible, the writer thought it wise to include an amplifier collector current meter for getting a timely warning in the event of an impending breakdown of the transistors! Also as a safety measure, the lamp dummy load is left permanently in its socket. It is removed only when operating with a matched 7-Mc. antenna.

The writer is glad to state that these circuit innovations have paid off in contacts. QSOs have been had with most of the active Ceylonese and South Indian 7-Mc. phone stations. The best DX was 450 miles, a rather respectable distance for 500 milliwatts.

It is hoped that this article will inspire many amateurs to build and experiment with transistors, even though suitable parts may not always be available. A great deal can be done with very little!

## Strays

When the news concerning "incentive licensing" broke, it caught a large number of ham club bulletins at a time when they were just going to press. Lots of club bulletin editors were screaming "Stop the press" and one, Harold Smith, WA2KND, editor of *The RaRa Ray* (Rochester Amateur Radio Association) solved the problem of fast and accurate reporting by reproducing in actual size the official notification of the matter from ARRL General Manager W1LVQ.

To bridge the fifteen-month gap between Jamborees-on-the-air, Scout and Scouter hams will hold a low-pressure QSO party December 9 and 10, 1967. No certificates, no awards, no logs to submit and no report to write — just meet other scouts of all nations on the air and talk about Scouting. Call CQ Scouts somewhere near 3950, 7290, 14290, 21290, or 28990 kc. phone; 3696, 7145, 14095, 21095 or 28495 kc., c.w. (*from Boy Scouts World Bureau Circular 25/67.*)