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QST Issue: Mar 1969
Title: Amplifying Low-Level VFO Output
Author: Doug DeMaw, W1CER

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Hints and Kinks For the Experimenter

USING A LEFTOVER ROTATOR-TO-MAST FLANGE AS AN ANTENNA-TO-MAST BRACKET

THE leftover rotator-to-mast flange, CDR part TRA-2, which is not used if an AR-22 or TR-44 series rotator is bolted to a flat plate, as in an in-tower mounting, may be pressed into service as an antenna-to-mast bracket by securing the boom to the flat side of the flange and clamping the flange to the antenna mast. — *Bob Wheaton, W5PKK*

EQUALLY SPACING PANEL CONTROLS

TO lay out a panel so that any number of controls may be equally spaced, let X equal the desired number of controls. Then, as shown in Fig. 1, place a ruler along the lower edge of the panel and slant the right-hand end of the ruler upward until the edge of the panel intersects $X + 1$ divisions on the ruler. Draw a line along the ruler and mark off the divisions. Using a T square, complete the job by drawing a line perpendicular to the bottom of the panel through each division. — *Melvin Leibowitz, W3KET*

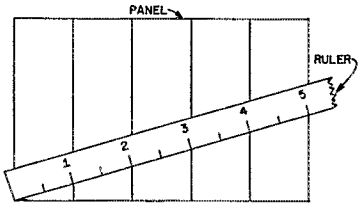

Fig. 1 — Slanting a ruler on a panel makes it easy to equally space any number of controls.

CLEANING THE HEAD OF A SPRAY PAINT CAN

WHEN using a spray can of paint one has to clean the spray head between jobs so that paint won't harden in the head and block the passage. This cleaning is usually done by turning the can upside down and spraying until the nozzle is empty of paint or by removing the spray head and cleaning it by hand with paint or lacquer thinner and a fine wire. The first method is wasteful, and the latter is a messy job at best.

With the use of spray contact cleaner or circuit cooler one can neatly and economically clean the spray heads from spray paint cans. Simply remove the spray head from the cleaner or circuit cooler and substitute the head that is to be cleaned. A couple of squirts of cleaner through the head will clean it thoroughly. — *Loyd L. Shoman, W9EYS/Ø*

ETCH-RESISTANT CIRCLES

EVER have difficulty painting small, nearly perfect etch-resistant circles on copper-clad board? Use a paper punch to punch holes in masking tape and use the tape as a guide. — *Paul Maurice.*

AMPLIFYING LOW-LEVEL V.F.O. OUTPUT

MOST solid-state v.f.o.'s deliver less than 10 volts peak across their low-impedance output terminals. More often than not the output voltage is only two or three volts.[1,2] If the v.f.o. is to drive a vacuum-tube stage in a transmitter, considerably more voltage swing will be needed at the tube grid in order to obtain satisfactory output from the tube stage. If the driven stage does not consume appreciable power from the v.f.o., the typical circuits shown in Fig. 2 can be used between the low-impedance output of the v.f.o. and the normally high-impedance input of the tube stage. Both circuits shown have given good results when amplifying the 3-volt peak output of a test v.f.o. to a suitable level for driving the oscillator stages of several tube-type transmitters.

In Fig. 2A, the v.f.o. output signal is amplified by a 5-watt n-p-n transistor, Q_1, which operates Class A. L_1 is a low-impedance winding on the cold end of L_2, and the combination of the two windings provides a step-up ratio between the transistor output and the vacuum-tube input. The Q of the output circuit, L_2C_1, is determined by the L/C ratio used. Low values of C will result in lower Q and greater bandwidth — useful for QSYing. Unfortunately, a low-C circuit will not discriminate well against harmonic currents, so a compromise should be sought. In Table I typical L and C values, which should be satis-

[1] "A General-Purpose V.F.O.," *QST*, September, 1968.
[2] Hanchett, "The Field-Effect Transistor as a Stable V.F.O. Element," *QST*, December, 1966.

Table I

Tuned Circuit Data

L_1 coils are closewound with No. 30 enameled wire at ground end of L_2 coils (Miller). C_1 capacitors are ceramic or mica.

Freq. in MHz.	L_1 *(turns)*	L_2 *(μh.)*	C_1 *(pf.)*	*Miller No.*
1.8 to 2.0	30	138–238	50	4410
3.0 to 4.0	22	74–124	30	4409
5.0 to 6.0	15	33–66	22	4408
6.6 to 7.5	15	33–66	22	4408
7.5 to 9.0	10	16–29	15	4407

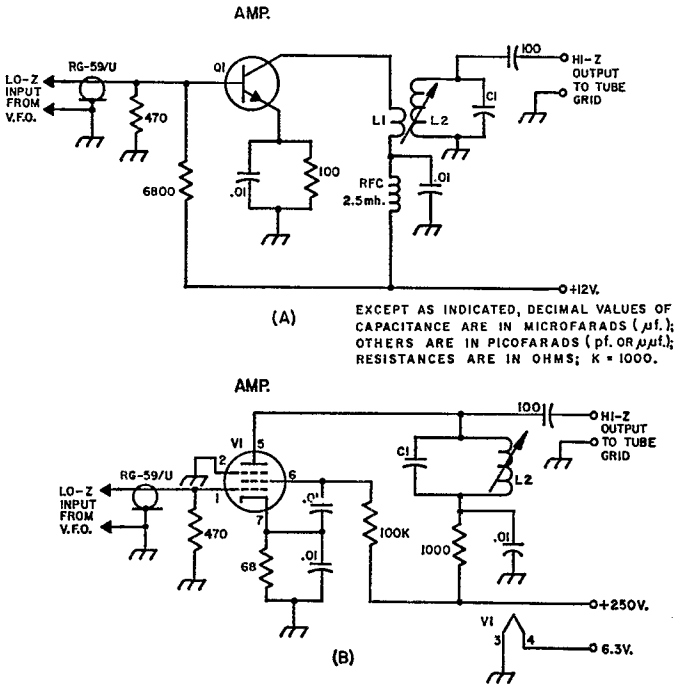

Fig. 2—Two circuits for increasing the output from a solid-state v.f.o. Resistors are ½-watt composition. Capacitors are ceramic.
C_1—See Table I. Q_1—2N2102.
L_1, L_2—See Table I. V_1—6BA6.

factory for most applications, are given for some of the popular v.f.o. tuning ranges.

In the circuit of Fig. 2B, a vacuum-tube Class-A amplifier, V_1, is used between the transistor v.f.o. and the input to a tube stage. The grid circuit of V_1 uses a 470-ohm resistor to afford an impedance match to the v.f.o. output terminals and to load the v.f.o. output circuit to minimize interaction between the amplifier stage and the v.f.o. The signal is taken from the high-impedance end of L_2 and is capacitively coupled to the grid circuit of the stage to be driven. Since the vacuum-tube amplifier does not produce harmonic currents of the magnitude that the circuit of Fig. 2A is capable of generating, it is not important in this instance to strive for a high-Q output tuned circuit for the purpose of harmonic reduction. The higher the Q, however, the greater will be the peak output voltage available from these two circuits.

In the v.f.o. amplifier circuits shown, it's OK to substitute other types of transistors and tubes provided they have electrical characteristics similar to the ones specified in the schematic caption. It is important that the amplifiers be well shielded and bypassed to prevent transmitter r.f. from affecting their performance. The coupling cable (RG-59/U) from the v.f.o. to either of these circuits should be as short as possible, and the v.f.o. amplifier should be located near the stage being driven and preferably on the same chassis. — *W1CER*

EASY TRANSFORMER MOUNTING

THE cumbersome task of having to saw or file comparatively large rectangular holes for power transformers, chokes and the like can be dispensed with by the use of four spade bolts. As shown in Fig. 3, mount a spade bolt at each end of two of the four existing screws that sandwich together the transformer's laminations and metal cover. Feed the spade bolts through four small holes drilled through the chassis, and then secure the bolts with lock washers and nuts on the underside. Finally, drill a hole for the primary and secondary leads and, of course, fit it with a grommet. — *John E. Maass, K7JKZ*

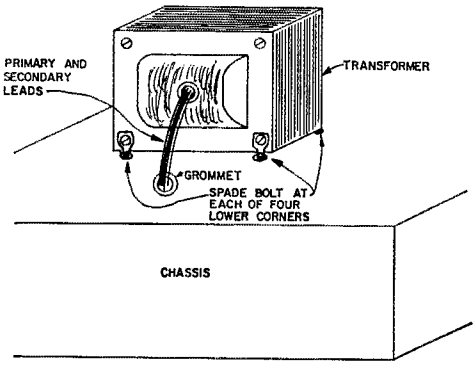

Fig. 3—By mounting a transformer as shown, much chassis work is eliminated.