changed less than 1 dB over the range from 3.5 to 4 MHz; the Seiler output varied slightly less than 2 dB. This is a pretty small difference.

Vackar oscillator design

As with the Seiler circuit, design of the Vackar is very closely akin to Colpitts design. Since the frequency of oscillation is determined essentially by the value of the variable capacitor and C2, these variable capacitors may be taken as the total tank-tuning capacitance. With this in mind, the tank-tuning capacitance and inductor are chosen by the same method we used for the Seiler circuit. Capacitors C2 and C3 are found from the following formula:

$$C2 = C3 = 3000/f \text{ (MHz)}$$

According to Jordan, this formula yields about optimum oscillator stability compatible with other requirements. Capacitor C1 is adjusted so that the transistor operates essentially class A and is not driven into cutoff or saturation. In the circuit in **fig. 8,** with 10 pF at C1, the peak-to-peak voltage at the junction of the variable capacitor and the inductor was 1-1/2 times the B+ supply. This is a good rule of thumb to go by when you're designing an oscillator of this type.

Most of the authors who have described transistorized Vackar and Seiler VFO's have noticed a tendency for these circuits to oscillate at audio frequencies. Since the feedback loop from the collector to the base of the transistor is through the power supply, the base-bias resistors should be decoupled from the collector resistor by a bypassed resistor as shown in **fig. 8.** Another precaution used by Jordan was to bypass the emitter for both audio and rf, although this may not be necessary.

summary

Both the Seiler and Vackar circuits are similar in design and, from my experiences with the FET versions, similar in stability and output. The original tube-type Vackar circuit used high-C tuning whereas Seiler designed for low-C tuning; the high-C was provided by a large trimmer across the main tuning capacitor. There **may** be some advantages to the Vackar circuit for very wide tuning ranges and some advantages to the Seiler when the low-C approach is used, but for amateur VFO's I doubt if there is any significant advantage with either circuit. With both of these circuits, stability is independent of the LC ratio, and not very dependent upon the transistor used.

All of the designers of the circuits shown here have indicated exceptional performance and stability with them. If you have done any experimenting along these lines, I would certainly like to hear about it—both of these circuits have been buried in the literature long enough. They seem ideal for transistor work, easy to design and a good choice the next time you're thinking about a new VFO.

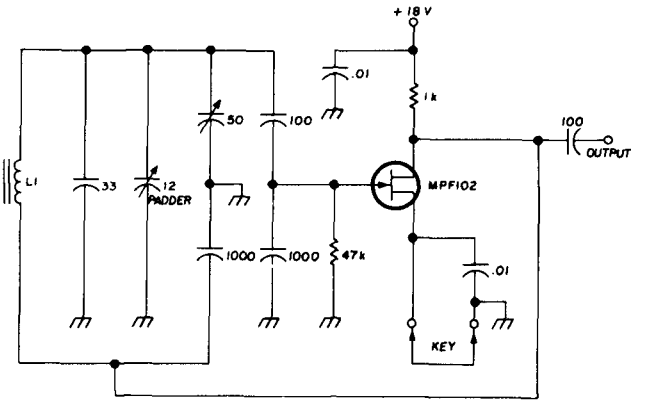

fig. 9. FET version of the Vackar oscillator is extremely stable. L1 is 48 turns number 30 on a 1/2" ferrite core (Amidon T-50-2)

references

1. G. B. Jordan, "The Vackar VFO, a design to try," *The Electronic Engineer,* February, 1968, p. 56.