

HUFF & PUFF OSCILLATOR

A NUMBER OF comments and ideas continue to come in from readers regarding both the original and the improved versions of PA0KSB's VFO stabiliser (*TT*, June, July, September 1996). Those who have tried either version seem to agree with the comment by G3DXZ that a Huff & Puff stabiliser should now be considered a standard addition to an LC-type VFO. One result, as Peter Lawton, G7IXH, points out, is that a stabilised oscillator forms an effective replacement for the low-frequency VFO plus crystal oscillator mixer configuration "with all their horrible unwanted frequencies".

G7IXH was one of those who have experimented and implemented the original type of PA0KSB stabiliser, before the appearance of the improved version in which the divided VFO clocks the crystal rather than the reverse. He found the earlier system most satisfactory, although he agrees that the new arrangement

offers useful advantages (see PA0KSB's comments in *TT*, December 1996).

G7IXH writes: "G3ROZ's material on building a Huff & Puff stabiliser for the KW2000-series (note in *TT* December 1995, p73) enabled me to build stabilisers for a solid-state receiver as well as my KW2000A and these do an excellent job. The VFOs remain locked for indefinite periods after only a few seconds warm up, lock is regained immediately on retuning and no saturation of the stabilisers has been noted.

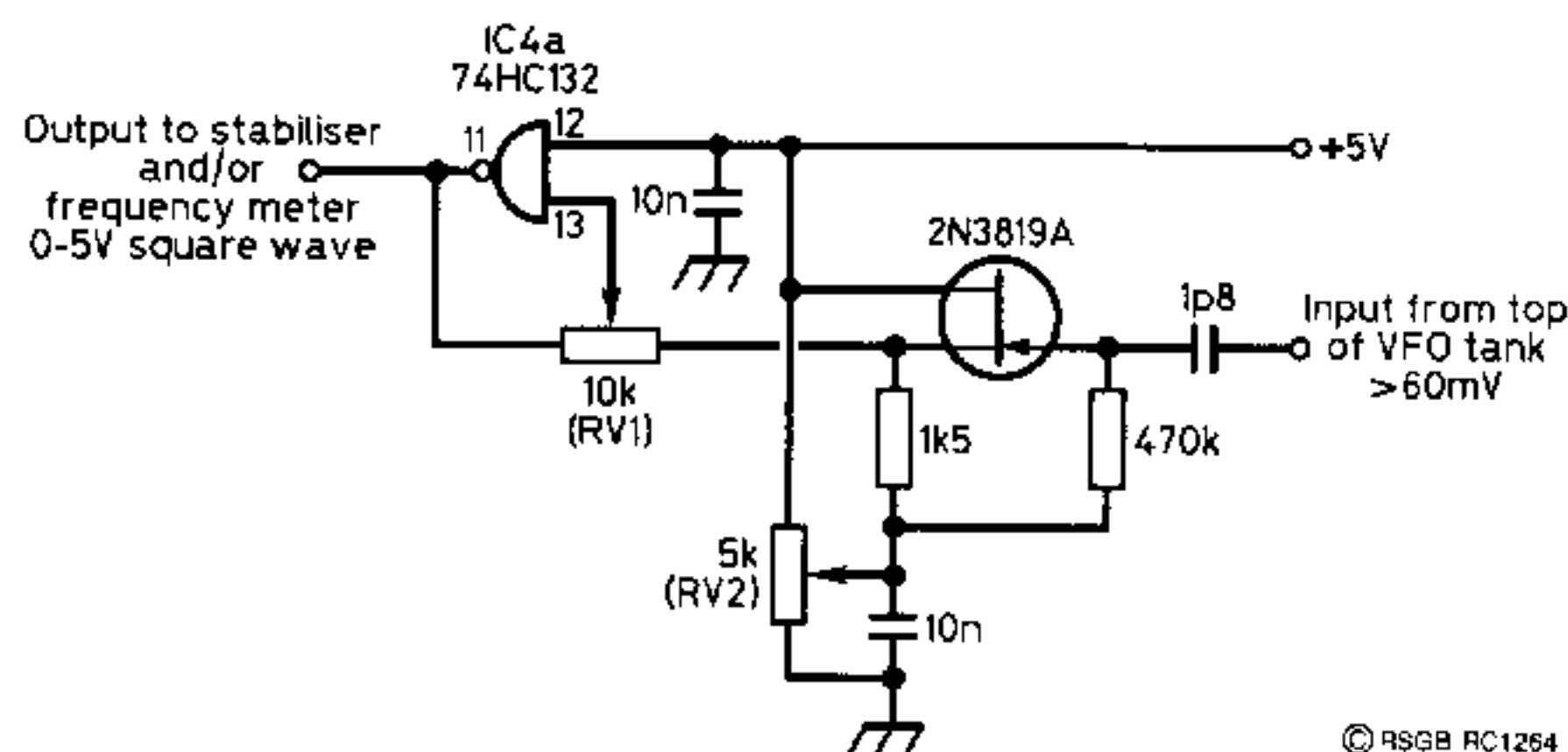
"Fig 7 shows the circuit I developed for the input to the stabiliser from the VFO and this may be of interest to others. It combines high sensitivity with a high degree of isolation of the stabiliser/frequency-meter from the VFO. The input capacitance is only 1.8pF and at 5MHz it produces a 0 to 5V approximately square wave at the frequency of the VFO from an input as low as 60mV pk sine wave. It will work up to 30MHz with reduced sensitivity. A frequency meter can be connected to measure the oscillator frequency with very little effect on the frequency although in practice I include a further source-follower after the gate to improve isolation even further. At 5MHz, the change on connecting the meter is only a few Hertz.

"The output from the 2N3819 source follower is applied to one of the inputs of the

74HC132 Schmitt trigger NAND gate. Since the hysteresis of this gate is reduced by the feedback via RV1, then with careful adjustment of RV1 and RV2, a very small input change is sufficient to turn the gate on or off. To set up, adjust RV2 until the gate oscillates. Then adjust RV1 until oscillation ceases. Repeat this process until there is only one position of RV2 at which oscillation occurs. Then back off RV1 into the non-oscillating region and the circuit is ready."

G7IXH has also tried the original form of stabiliser at frequencies up to 20MHz and found it perfectly effective. However, he found that his transistor oscillators gave a rather rough note at these higher frequencies, possibly due to input capacitance variations during the course of a cycle. The cleanest note was from the Kallitron push-pull oscillator as described in the current RSGB Handbook (p6.45) and originally stemming from G4DTC's 'ultimate' receiver (*TT*, December 1987, and *Technical Topics Scrapbook*, 1985-89, p211, with subsequent notes on the origin of this type of oscillator for HF and VHF).

G7IXH continues: "One would expect input capacitance variations partially to cancel with a push-pull oscillator. The varicap diode(s) of the stabiliser also increase the roughness of the note at these frequencies. Back-to-back diodes are better, and this arrangement can also cope with higher oscillator voltages before rectification occurs. I built my stabilisers before the new version appeared in the June 1996 *TT* and PA0KSB's comments in the December *TT*. The 'universal' stabilisers I have built are modules which need only one connection to the VFO, a power connection, an earth and an output for the frequency meter. The modules will work with any VFO, simply by altering an internal resistor according to a formula which takes account of the VFO tank capacitance and frequency and ensures optimum operation. I feel that a stabiliser should now be a standard addition to any good VFO."



© RSGB RC1264

Fig 7: G7IXH's input amplifier for use with a Huff & Puff oscillator stabiliser.