

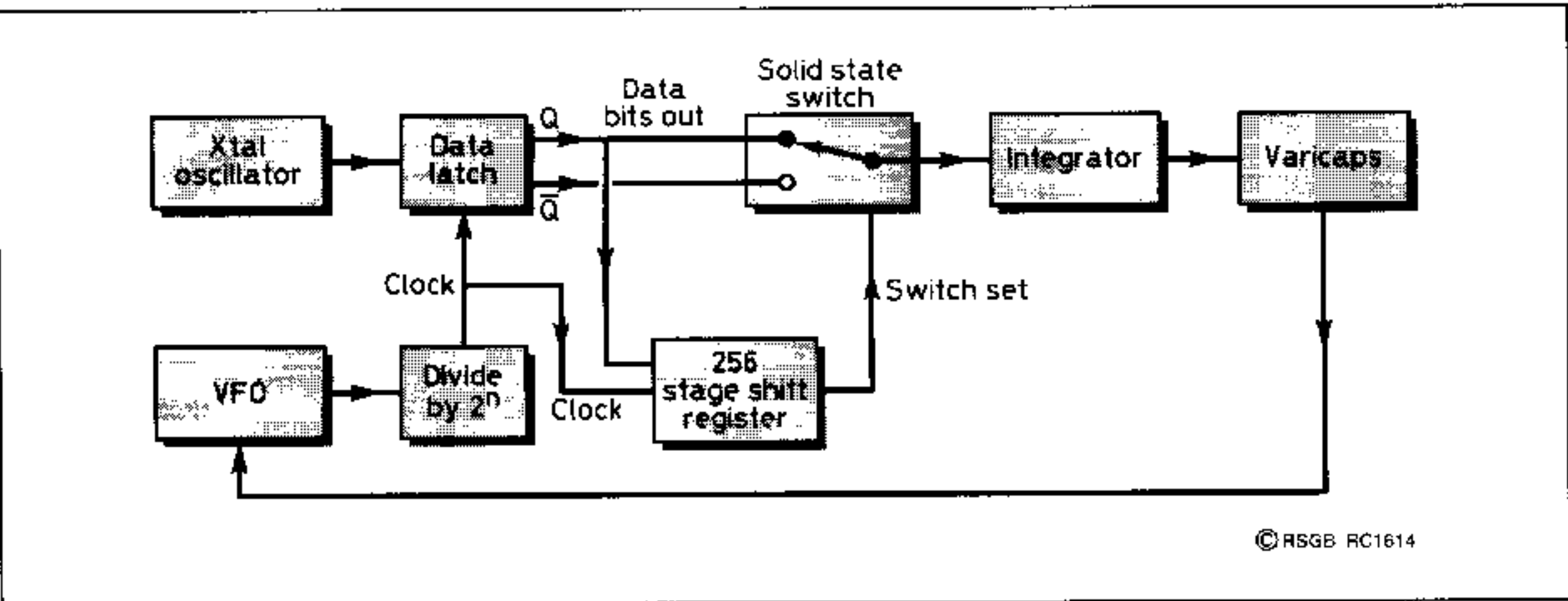


Fig 10: G7IXH's fast Huff & Puff stabiliser, suitable for frequencies up to 30MHz.

THE 'FAST' HUFF & PUFF STABILISER

PETER LAWTON, G7IXH, has recently developed what he has found to be a further improvement on the 'improved' version of the Huff & Puff LC oscillator stabiliser described by Klaas Spaargaren, PA0KSB, in ARRL's QEX, February 1996 (noted in TT, July 1996 with corrections in subsequent issues). G7IXH

has written a detailed account of his 'fast' stabiliser in an article now with the RadCom editors but I feel that a brief outline of the new approach is likely to be of immediate interest to readers. He writes:

"Although PA0KSB's latest version is a great improvement in many respects over his original version, I found it inadequate at frequencies above 20MHz. Too much frequency ripple is put on to the stabilised oscillator.

"On examining the operation of the stabiliser, the limiting factor seemed to be the rate at which the oscillator frequency is sampled and the correction updated. If this sampling frequency could be increased, the excursions of the oscillator about its stabilised frequency would be diminished." Compare this with a thermostat; the more often it checks the temperature the closer it can keep it to a constant value. The improvement in PA0KSB's new version is primarily due to the increased sampling rate. [It is entirely satisfactory at frequencies below about 15-20MHz - G3VA].

"In all published designs to date, increasing the sampling rate increases the incremental frequency 'steps'. However, I have found it possible to increase the sampling rate without increasing the 'step'. Fig 10 is a block diagram of my new 'fast stabiliser', so called because it samples the oscillator frequency and refreshes the corrections at 257 times the rate of the basic stabiliser, resulting in a diminution of ripple to about 1/60th and an increase in its drift-correction by about 20 times.

"The differences lie in fewer stages of VFO division, resulting in the faster sampling rate

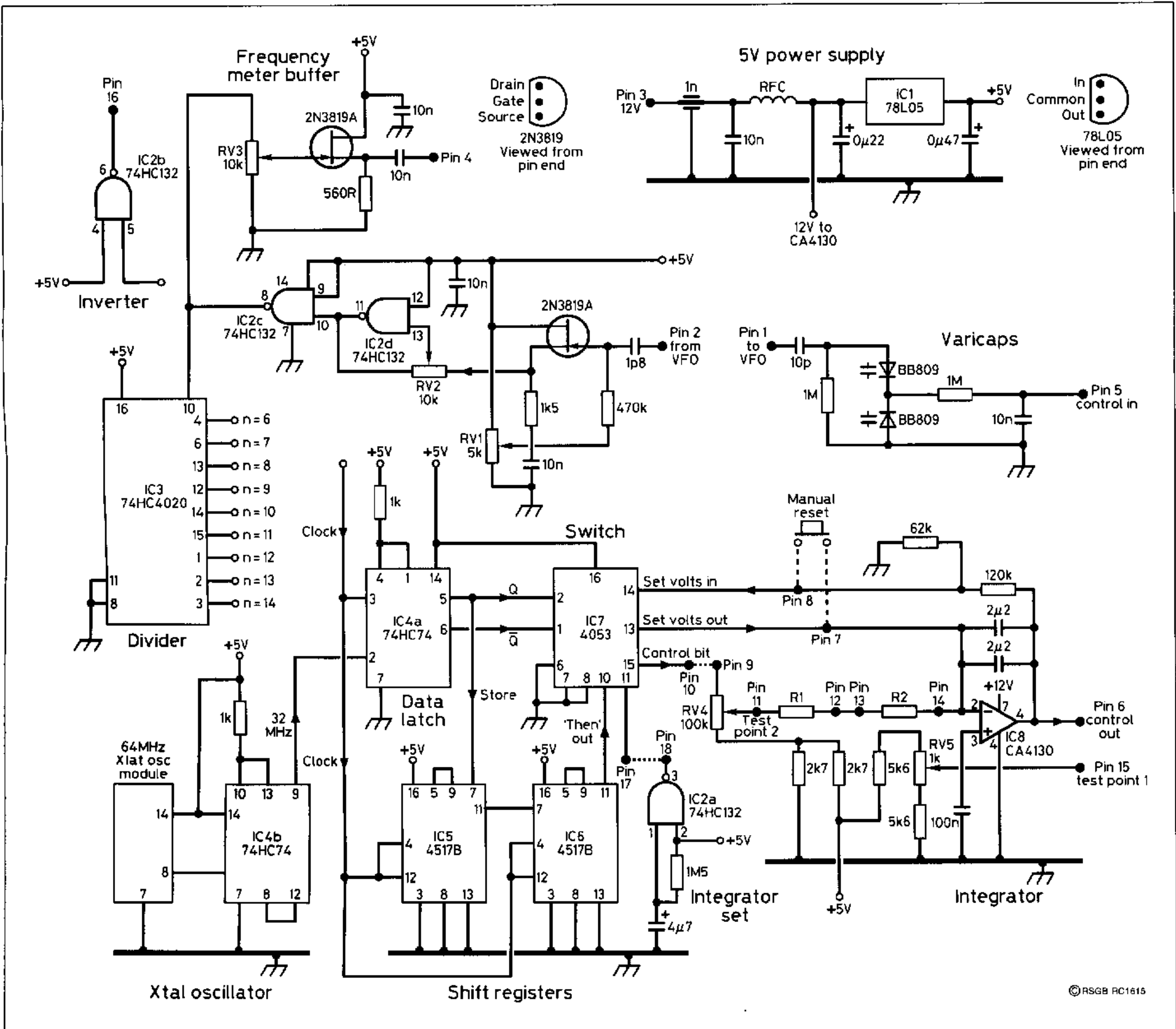


Fig 11: The fast stabiliser. Each IC is decoupled by a 10nF capacitor from Vcc to ground.

and in the decoding circuitry after the data latch. Data from the latch is stored temporarily in the 256-stage shift register and it takes 256 sample periods for it to emerge.

“By the time it does emerge, sufficient time has elapsed for it to be used along with the bit just emerging from the data latch at that instant to determine the direction of correction without increasing the step. So although the two pieces of data used for each correction are separated sufficiently in time to keep the ‘step’ as small as in the basic version, the corrections are refreshed at a much greater rate. The ‘fast’ Huff & Puff could be considered as 257 synchronised stabilisers working simultaneously on the same oscillator; although the circuit is no more complex than that of the basic stabiliser.

“The new stabiliser has proved entirely satisfactory at 30MHz. The crystal oscillator is a Maplins 66MHz unit, divided by two to give a unity mark-space ratio. Although the circuit diagram (Fig 11) may seem rather complex, much of the apparent complication represents refinements to ensure reliable operation and ease of setting up. The basic arrangement remains simple, as indicated in the block diagram.”

In his detailed article, G7IXH reports on computer predictions, discusses the factors affecting the power of a stabiliser, provides a detailed explanation of the operation of the fast stabiliser, choice of components, and setting up. He also points out that the fast method can be applied to the less powerful crystal clock type of stabiliser in which the positions of the

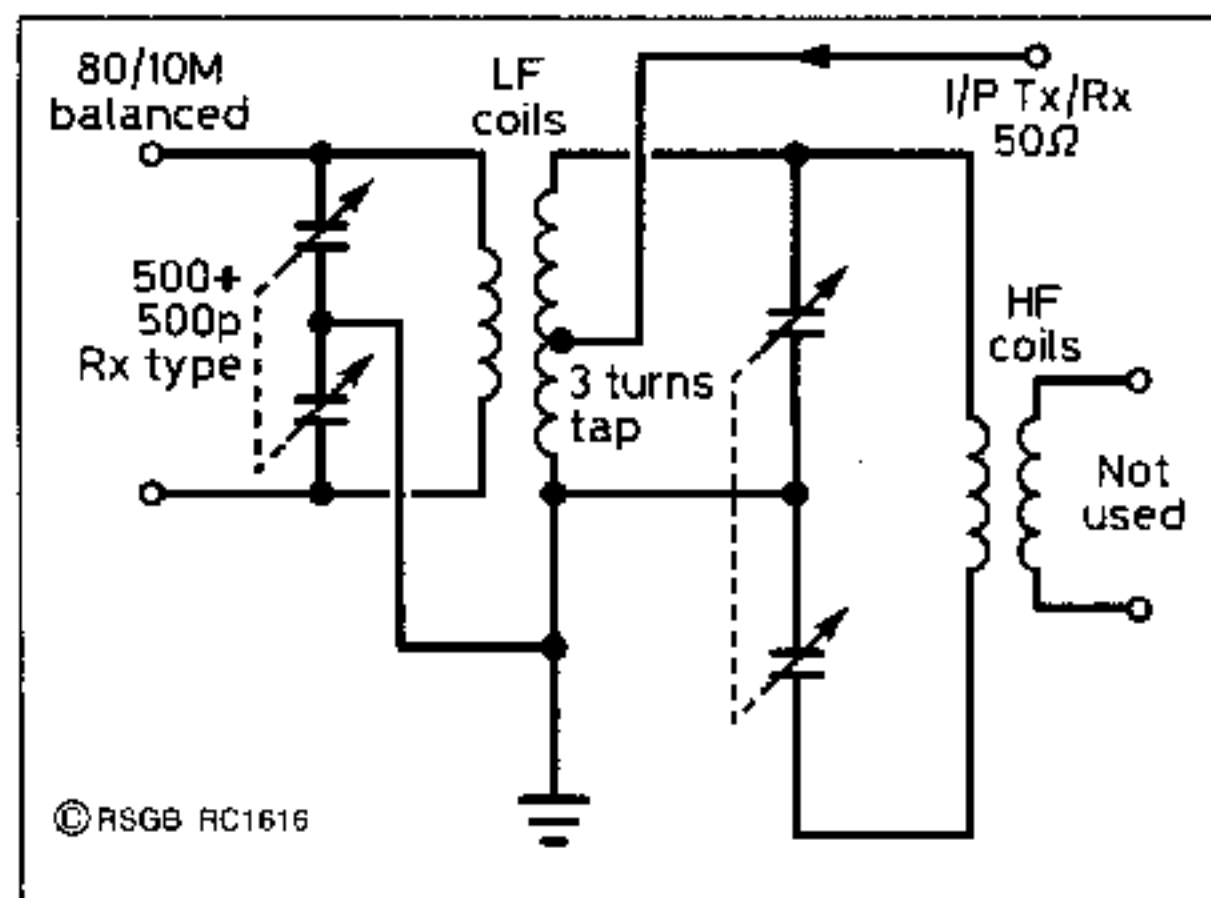


Fig 12: 9H1FQ's modified Z-match ASTU.

VFO and the clock are interchanged. It is to be hoped that it will prove possible for G7IXH's full article to be published before too long.