

Fig. 6. The analogue reference oscillator. It covers the range 1 to 2 MHz simultaneously providing a wide frequency swing and high stability. The circuit acts as the reference source for the synthesiser system.

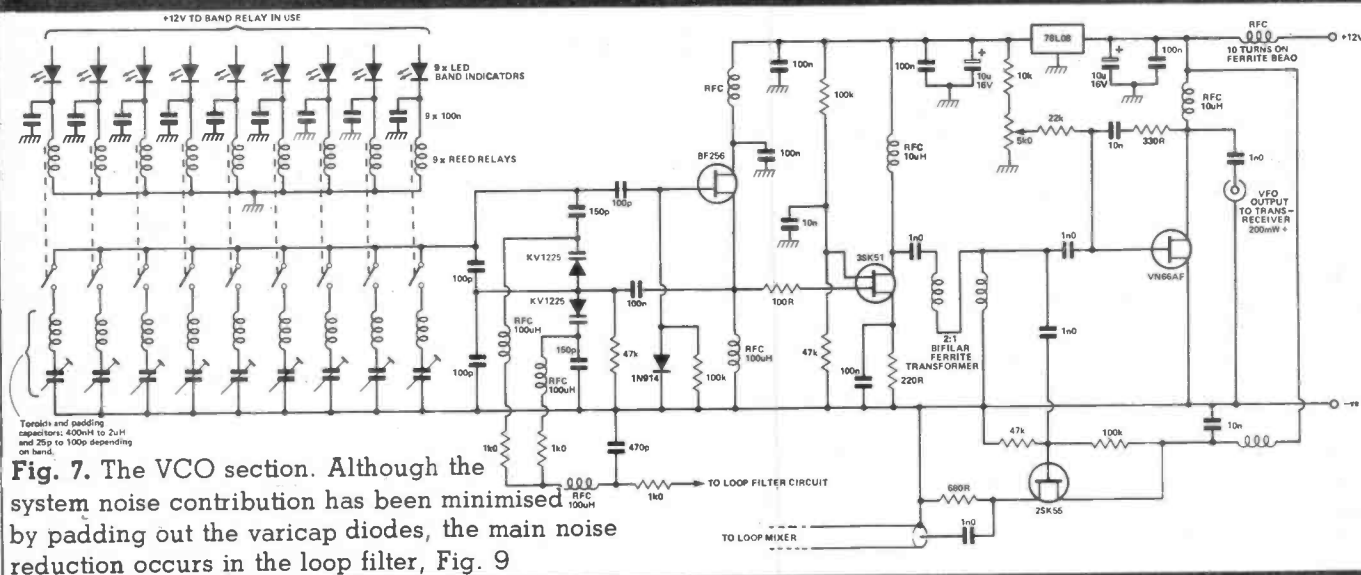


Fig. 7. The VCO section. Although the system noise contribution has been minimised by padding out the varicap diodes, the main noise reduction occurs in the loop filter, Fig. 9

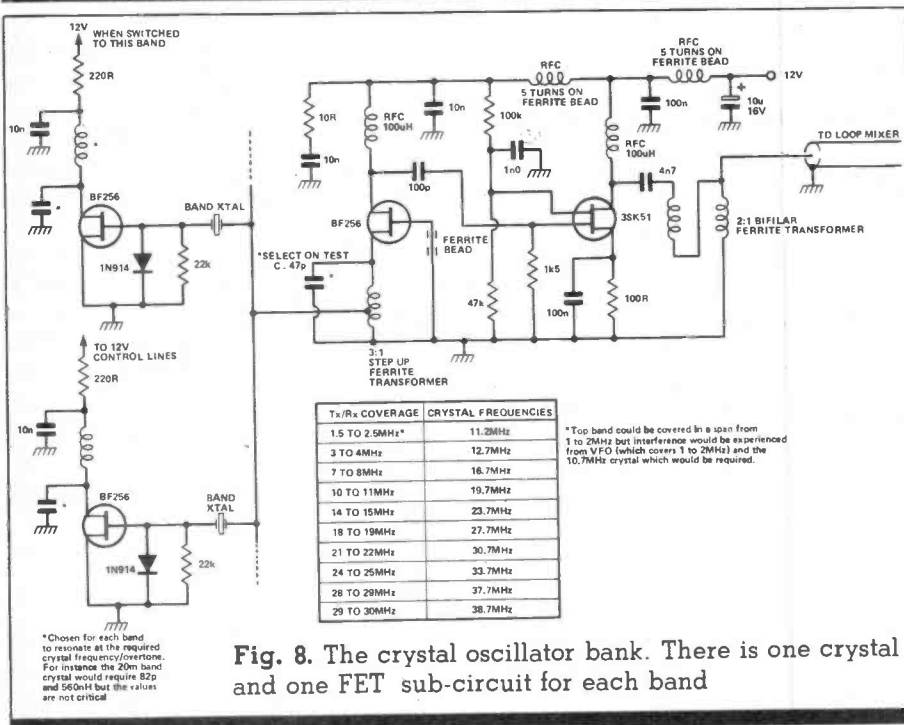


Fig. 8. The crystal oscillator bank. There is one crystal and one FET sub-circuit for each band

as a noise generator? True, if you do not allow for it.

The biggest noise contribution comes from the VCO circuit, particularly if it is one using varicap diodes. Varicaps are awful things and should never be used seriously in free running oscillators. Oscillators using them tend to have noise sidebands stretching out to 100's of kHz at significant levels. They can be cleaned up somewhat if the VCO is only required to operate over a limited range as in the design for this VFO system. The noise contribution is roughly proportional to the percentage of resonated capacitance supplied by the varicap. If all you require is a few hundreds of kHz swing at, say, 20MHz, then the diodes can be swamped by fixed capacitors to the point where 95 per cent of the total capacity is made up externally. Fig. 7, the VCO schematic, shows how the capacity swing of the diodes, normally 25 to 400pF is reduced to the range 60