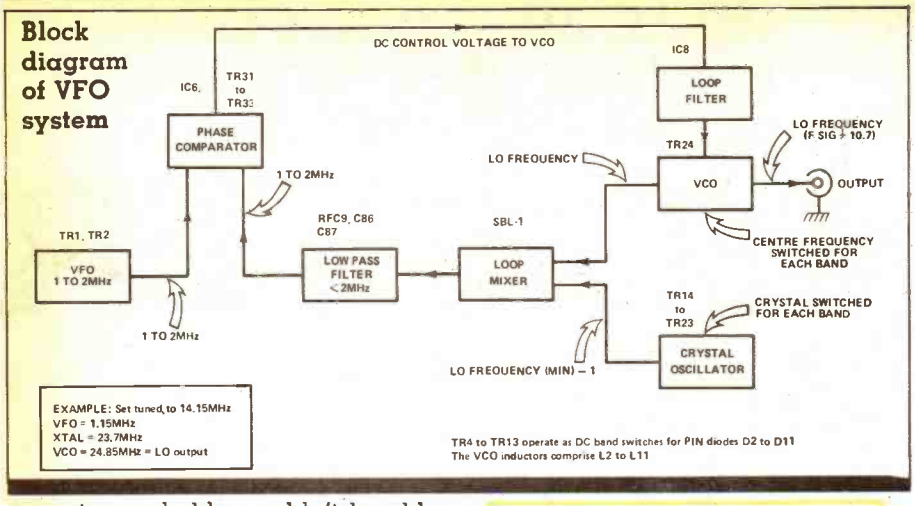
Block diagram of VFO system



operator probably wouldn't be able to copy anything less that an S4 signal even though the receiver had a paper specification suggesting that it would be able to.

Synthesisers

Most commercial gear now uses digital synthesis techniques because of the operating versatility which this type of system allows. It offers fast/slow tuning, complex memory facilities, 'multiple' VFOs and a large number of other 'desirable' things. What it is very bad at providing is a decent RF performance ie, its prime function. This is because the cleanliness of any phase locked loop synthesiser system is largely dependent on the individual channel spacing.

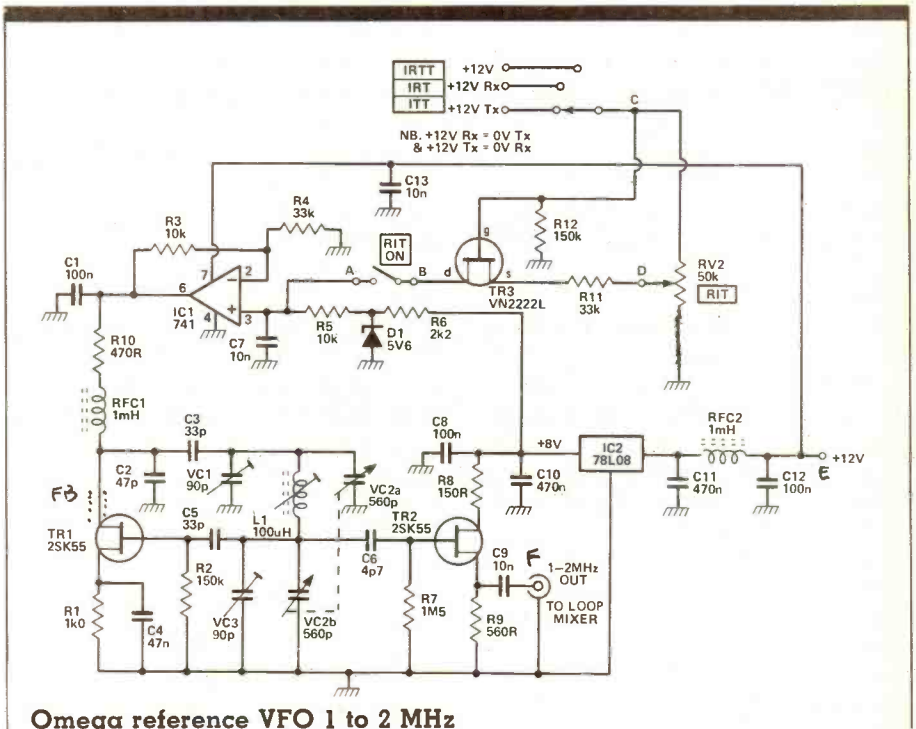
Generally speaking, the PLL can only produce a 'clean' RF spectrum within the bandwidth of the loop but — this is the whole point — the bandwidth of the loop will be typically less than half the channel spacing of the basic synthesiser system. When directly synthesised channel spacings are down to 10Hz, the minimum frequency increment when you turn the front panel tuning knob, the noise performance of the LO signal will be almost totally determined by the characteristics of the VCO's circuitry. These can be improved somewhat on the basic varicap tuned arrangement by narrowing the frequency coverage, but they will always be a horribly noisy type of circuit, certainly not the kind of device for generating LO signals with unless the output is cleaned up dramatically.

The Omega synthesiser

The VFO/LO module produces a spectrally pure LO signal on all ten amateur HF bands (10m is regarded as two) at a user defined IF offset above signal frequency. Coverage is in a one megahertz sweep. Thus the 80m band is covered over the range 3 — 4MHz and the 15m band in a sweep from 21 to 22MHz. The module has a high level output capable of delivering some 100mW. When used with mixing systems such as the SBL-1, MD108, a 10dB attenuator pad should be included. As well as cutting down the drive power to a safe level, the pad provides a resistive return loss path for out-of-band mixing products produced by the Schottky ring mixer. This kind of mixing device must 'see' a resistive termination at one of its ports at least an octave beyond any of its operating frequencies (both higher and lower) if its full intercept performance is to be realised. Since it is easy to produce surplus LO drive power, the resistive pad can be fitted in series with this port without any sacrifice of signal to noise ratio.

Low noise

The Omega synthesiser depends on an exceptionally wide control loop bandwidth for its low noise performance. The bandwidth of the loop is such that the servo action of the control voltage applied to the VCO can 'clean' out the inevitable noise sidebands up to 100kHz away from the nominal carrier frequency. When combined with a relatively quiet VCO arrangement and exceptionally clean reference signal



Omega reference VFO 1 to 2 MHz