Received signals should be pure and clean, and the stability of the system excellent.

Using the VFO with a 9MHz i.f.

To use this module with a 9MHz i.f., such as a ZVC or 4CLF design, the crystal frequencies need changing to 1.7MHz lower, and the VCO coverages also need lowering by 1.7MHz. Other than some possible slight changes to C44-53 for correct crystal oscillator tuning, the rest of the construction and alignment is identical.

Digital Frequency Display

The display selected for OMEGA uses a virtually complete LCD frequency counter subsystem, capable of counting to 4MHz. In order to achieve a full frequency readout to an accuracy of 1kHz, the VCO signal is fed through preamplifier and signal conditioning stages (Q1-Q5) and then divided by 10 in a low power Shottky i.c. divider (IC1).

At this point we have a signal 10.7MHz higher than the signal frequency, which has been divided by 10. To get the correct readout, an internal subtractive circuit programmed into the PCIM177 display is used to subtract 10.7 from the reading and thus end up with the received frequency. This system has the advantage that any errors in the crystal oscillator frequencies are allowed for and the actual display does not take care of is the SSB offset from what is a nominal carrier frequency. However, this is common to many far more expensive transceivers and is not a major problem.

The whole unit runs off +5v from an on board voltage regulator fed with +12v.

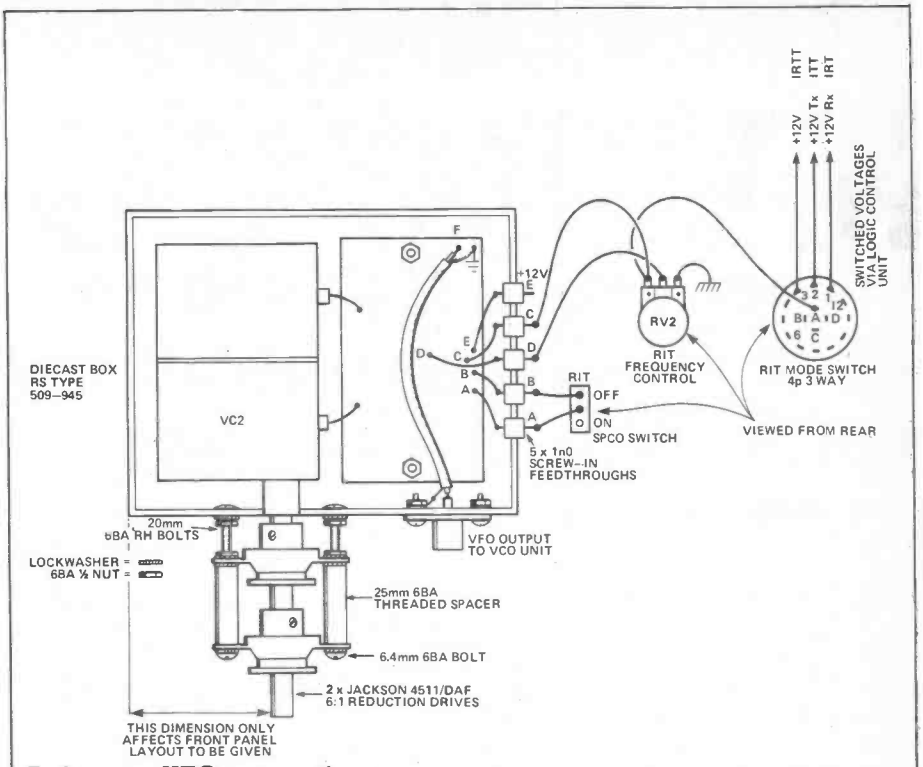
Construction

All circuits other than the display itself are built on one small single sided pcb, onto which the main display is mounted by means of wire links. The unit mounts against the front panel using a bezel attachment, with an aluminium screen around the rear of the unit (details later).

Construction is simple, and all components should be mounted as per the drawing, observing the orientation of the case outlines of active devices.

The display mounts using small pieces of wire (offcuts from the components already soldered in) as shown in the drawing. The wires should be soldered on the display side of the PCIM177 module (they are through-plated to the other side).

No alignment is required — connecting the display to the VCO output via C100 and coaxial cable should show the correct receive frequency. Note that if the system goes out of lock, the display will read a high frequency in excess of 30MHz which is not stable, or a very low frequency.



Reference VFO connections

Receive only SSB adaptor

This is an additional module for those who are building the receive only version of OMEGA, and provides access to the missing sideband not covered by the CIFPU unit.

It is simply a repeat of the circuit around Q12 in the CIFPU (July HRT). It is built on a small pcb and mounted on the outside of the CIFPU box.

It is not advisable to try and modify the Tx oscillator in the CIFPU (Q10/11) for this purpose — it may introduce problems with the noise blanker operation.

Once built, the unit is connected as shown, and the trimmer is adjusted for correct reception of the opposite sideband to that of the oscillator in the CIFPU — switch selected by a rotary or toggle switch. Connections between points N & P on the CIFPU will need to be broken, with injection from the new unit at point M. Applying +12v to point N will then select the CIFPU oscillator.

Odd Points:

In answer to a few queries we have had, Omega will run entirely off +12v (actually 13.8v will be ideal), any other voltages required being generated on board.

With the QRO PA in use, the supply current will need to be 15-20A peak.

The case design is now finalised. Its size is 390W x 320 deep x 130 high. Full details will appear in either the December or January issues, but we hope to get a photograph in before then. It will accommodate all planned modules, except psu-extra modules on the drawing board are an in-line SWR/Power meter and 2 metre TX/RX converter. ●