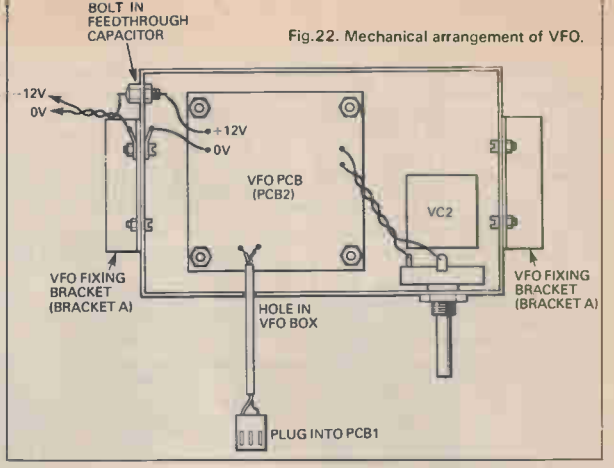

Fig.22. Mechanical arrangement of VFO.

This is applied to a smooth and clean front panel and is much more straightforward than painting. Rub-on lettering can be used to label the controls and a layer of clear Contac carefully applied over the top of the lettering to protect it from scratches.

The dial can be finished off neatly by applying the Contac to the front of the dial, then transferring the calibration marks from the rear to the front. Lettering is then applied showing the tuned frequency and finally a transparent layer applied over the top to protect the lettering.

A sheet of clear plastic, with a vertical line marked on it, can be glued over the front panel cut-out, through which the dial is viewed. Finally, feet should be stuck onto the bottom of the chassis to prevent scratching of any surface the receiver is placed on.

In Use

The receiver is very simple to use. It requires a stabilised 12 volt power supply of at least 120mA current capability. Connect an antenna, set the RF gain and volume to about one quarter from minimum and adjust the peak control for maximum noise. As signals are resolved, the peak control will need adjusting for maximum signal strength and RF gain setting to prevent any overloading. The tuning rate is slow enough to make tuning of SSB signals easy without the need for a fine tune control.

The results obtained will obviously depend somewhat on the quality of the antenna, but I have had great success with only a few metres of wire. A ground connection will also help to improve reception. In the daytime the 3.5MHz band tends to be occupied by nets of G stations "ragchewing", whereas in the evening many mainland Europeans and signals from further afield appear. Dawn and dusk, especially in the winter, are good times to hear US stations around the 3.8MHz mark. Detailed predictions of band conditions can be found in many radio magazines.

The internal loudspeaker is suitable for most signals, but headphones may be needed to resolve very weak ones.

Other Bands

The receiver can be used on other amateur bands in one of two ways:

★ by modifying the tuned circuits which are specific to the frequency range being covered, that is T1/C1 amd T2/C14, and changing the VFO frequency range;

★ by constructing a converter for each of the new bands which output in the range 3.5-4.0MHz.

The first option will probably be acceptable up to the 14MHz band, but at higher frequencies two difficulties will be encountered: firstly, it will be difficult to construct a stable VFO, and secondly, image rejection of the receiver may be inadequate because of the comparatively low intermediate frequency of 455kHz. Both of these problems could be overcome by raising the IF to 10.7MHz, which has the effect of lowering the VFO frequency (as long as the VFO frequency is set below the band to be received) and, of course, greatly improves image rejection. With such a high IF, however, the CIO frequency would need to be set by a crystal, rather than a simple LC circuit which gives acceptable results at 455kHz. In total, considerable modifications could be necessary to operate the receiver on a different band.

The second option, the use of converters, has many advantages: the basic receiver does not have to be modified; converters can be built as needed and when finances permit; and image rejection of a converter working with the receiver will generally be good since the IF between the converter and the receiver is 3.4-4.0MHz.

Fig.23 shows the block diagram of a typical converter. An input bandpass filter selects the band of interest, and passes the signals to an RF amplifier stage. A mixer circuit, similar to the one used in the basic receiver, then converts a 500kHz segment of the band received to 3.5-4.0MHz, which is selected by an output bandpass filter. This output at 3.5-4.0MHz is input to the main receiver.

The conversion process is controlled by the output of a crystal oscillator, whose frequency is chosen to give the desired frequency shift. For example, to convert the 14.0-14.5MHz band to 3.5-4.0MHz, a 10.5MHz crystal could be used. An alternative crystal for this conversion is 18MHz. In general, there are always two crystal frequencies which will give the desired conversion. One will result in sideband inversion, whereas the other will maintain the sideband, of the original signal. If a range of converters is planned for the receiver, it is worthwhile making the frequency of the CIO switchable between 543.5kHz and 456.5kHz, thereby accommodating either sideband. In this way, the converter crystals can be more easily chosen for availability and to minimise the chances of spurious responses.

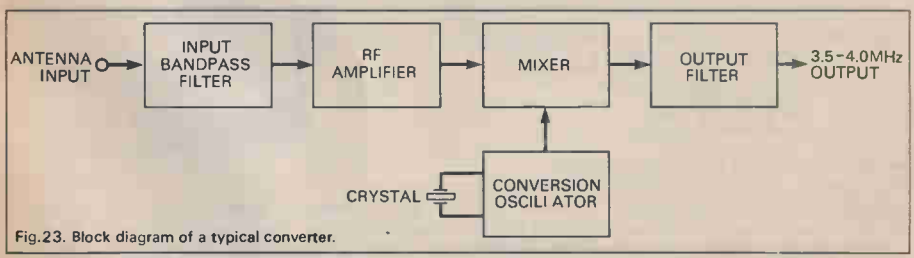

Fig.23. Block diagram of a typical converter.