AN AR SPECIAL: EQUIPMENT REVIEW — THE ICOM IC22S

The ICOM IC-22S is the latest in the ICOM 22 series to be marketed in this country by VICOM of Melbourne. The 22's have built up an enviable reputation in the two metre FM field over the years probably due to several very good reasons. Firstly they have been usually available from stock or at the worst on very short order. Secondly there has always been a good supply of crystals available for the various repeater and simplex channels, and last but perhaps the most important, they have proved to be highly reliable in service. If, however, trouble did occur, VICOM always had the required spare parts and expertise to put things right.

The 22S is fully synthesized. That is, unlike its earlier relations, it does not require a set of crystals for each channel. In place of the crystal board is a diode matrix board with the capability of programming 22 channels. As supplied, it is set up for repeaters one to eight and simplex channels 40, 50 and 51. Appearance is almost identical to the earlier IC-22A. The colour has been changed from jet black to a dark charcoal grey and a duplex A, duplex B, simplex switch has been added.

The addition of the frequency synthesizer has added to the complexity of the unit to a marked degree. The original 22 had 23 transistors, 3 FETs, 3 ICs and 16 diodes, where the new 22S has 34 transistors, 7 FETs, 13 ICs and up to 128 diodes. Most of the additional components are required for the new frequency determining section.

Most of the general specifications for the 22S are the same as the earlier models, but it is interesting to see that the spurious output of the transmitter is now a specified item at —60 dB down on carrier level.

Even with all of the new circuitry the overall current drain from a 13.8 volt source is still the same at 2 amps on transmit and 400 mA on receive when squelched.

One new feature is the addition of a substantial heat sink at the rear for the final output transistor, another is some positive high SWR protection in the form of an SWR detector in the final output circuit and an amplifier to provide cut-off for an earlier stage.

The IC-22S sold here in Australia is set up so that channels can be programmed at 25 kHz intervals. However, other versions are produced in Japan to suit both the American and European channel spacing plans. The English version is known as the IC-240.

IC-22S CIRCUIT DESCRIPTION

In general the 22S is similar to the earliest models and readers are referred to the review of the IC-22 in the December 1974 issue of Amateur Radio. Perhaps the most significant change in the receiver section is the new ceramic discriminator. This will provide better long term stability. The receiver RF stage is still a 3SK40 and the first mixer has been changed from a single gate FET over to the dual gate 3SK40. In practice no difference in performance was detected but cross modulation characteristics should be slightly better. The transmitter starts off at 10.7 MHz and this is mixed with the output of the synthesizer to produce the required output frequency. The same synthesizer frequency is fed to the receiver first mixer to produce the first receiver IF of 10.7 MHz. Diode switching is used throughout as with the earlier models, hence there is no audible click when changing from transit to receive or vice versa.

THE 22S ON THE AIR

It took a little while to get used to the operation of the duplex/simplex switching. There is no indication of duplex operation other than the position of the switch. It is hard to understand why an LED indicator was not included to give a warning. However, once mastered operation became very simple and by using the facilities provided by this switch some unexpected operating features were found. When working on a repeater it is possible to switch to reverse so that transmit and received frequencies are changed over. This enables one to check other stations working into the repeater to see if simplex operation is possible. This also means that repeater channels not in use in the area can be used for simplex contacts. Taking this one stage further, a repeater input frequency can be used for simplex operation without using the transmitter offset at all.

In all, it was difficult to pick the difference between the 22S and a 22A that happened to be in the shack at the time. Although the 22S uses a smaller loud speaker than the 22 or 22A, no difference could be detected in the received audio qualitly.

Full details are included on the method of programming additional channels and plenty of spare diodes are included with the transceiver. It appears that an accurate match is needed for the transmitter output. We found that if the SWR exceeded 2 : 1 when operating in the low power (1 watt) position that an audio howl appeared on the transmitted signal. It also seems that after some 22Ss have been operating for a long period of time, they are subject to a slight drift higher in frequency. Some units have been noted to shift up to 3 kHz. It should be noted that this only appears in isolated instances and this amount of shift is not serious.

THE IC-22S ON TEST

A few quick checks were carried out to see if the unit was up to spec. It was. Transmitter output was measured on a Horwood power meter. It was 11.5 watts in the high power position and 0.75 watts in the low power position. On receive the mute opened at .2uV, an excellent figure.

INSTRUCTION MANUAL

The manual provides most of the informa-

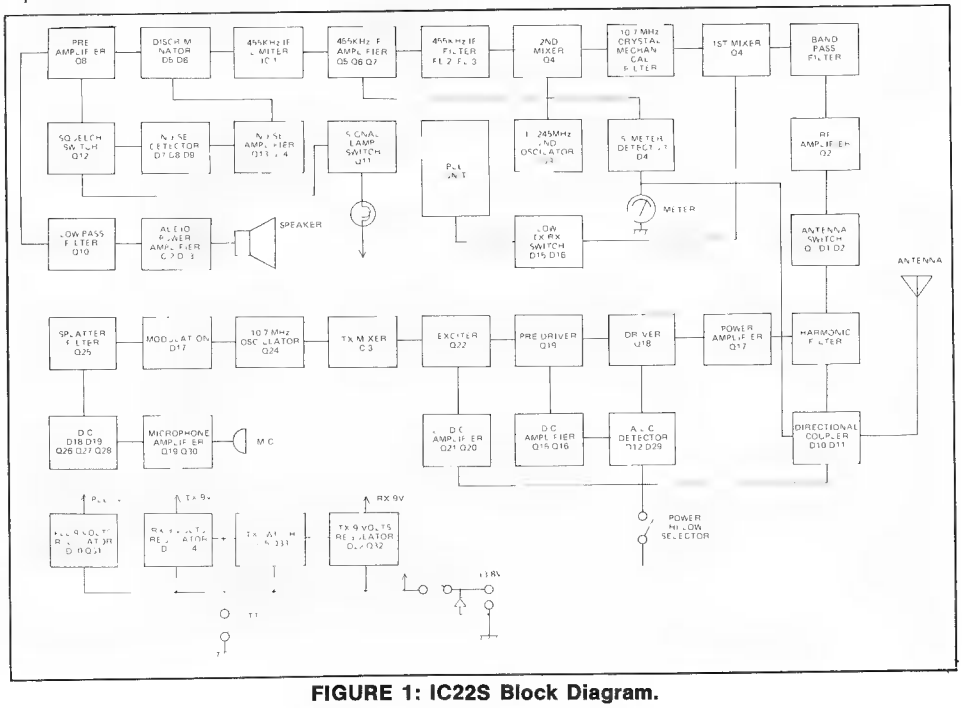
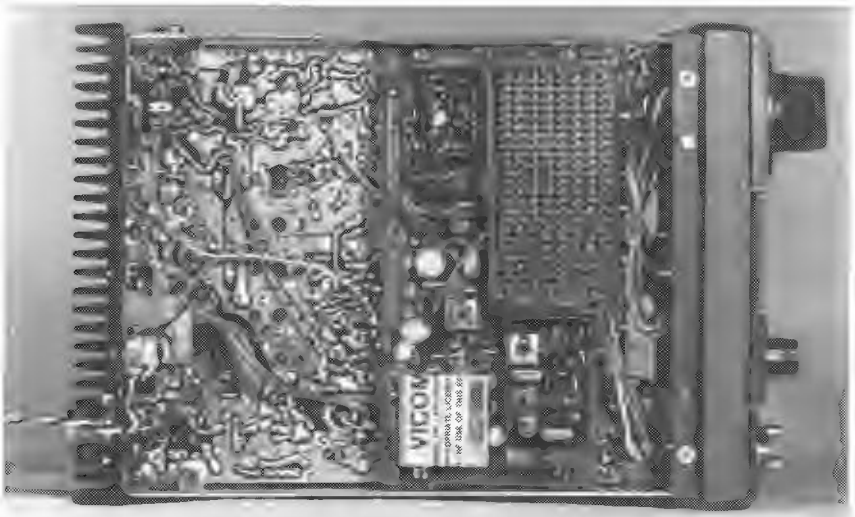


FIGURE 1: IC22S Block Diagram.



tion needed. The operation aspect is well covered and clear photos indicate most points that could require adjustment. A large scale circuit diagram is included which is a great improvement over the miniaturised version in the earlier books. Also new is a complete voltage chart for both transmit and receive conditions.

At the current list price of $279.00, the 22S represents excellent value. Considering the channel capability it is actually cheaper than the model it supersedes and as sales have proved, it appears to be the way most amateurs want to go.

Our test unit was supplied by VICOM International, to whom all enquiries for the IC-22S should be directed. ■

The Versatile IC22S with cover removed showing programming board.
(Photo by Reg Goudge)