

# IC-22S on Marine Frequencies

Following the construction of an outrigger for selection in 25 kHz steps, between 146 and 148 MHz, problems with my transmission became obvious.

Something amiss was first noticed by Bob VK5ZHR, who commented on my noisy, unstable carrier, and later that same night Colin VK5HI broke in to politely inform me that I had been guilty of tripping his Albany Repeater Monitor Recorder (VK6RTW 144.5 MHz) and also confirmed Bob's previous observations.

Then came the ultimate embarrassment. The phone call from P. and T. Department informing me that VK5ZDD had been heard on a Marine Frequency at Outer Harbour (156 MHz).

Following the checking of my outrigger and power supply the problem was isolated to the 22S at the top end of the band only.

With Bob's help, the first place we checked was the logic of the duplex control circuit. Here the circuit diagram supplied was no use at all. Firstly the circuit diagram supplied could not work anyway and IC7 in the 22S was entirely different to IC7 on circuit diagram.

I have included a circuit diagram of the duplex control circuit obtained from tracing out the printed circuit board. Basically, at Simplex and Duplex "A" operation the frequency programmed from the diode matrix is the same as the output which is fed to the divided IC, but on Duplex "B" transmit, the logic code output is 600 kHz higher.

With this task and with use of a logic probe a faulty IC (IC7) was located and replaced, but the fault did not end here.

With low power setting, and by observing the RF meter on the 22S, it was noted that at frequencies of 146.75 MHz and greater, a reduced power output was occurring and this was displayed by squegging on a CRO. Bob's immediate comment was alignment problems.

Following a visit to Steve's VK5ZNJ QTH, to make use of a newly acquired frequency counter, the problem was overcome when we started adjusting the trimmers around the output stage of the pre-driver. C100 (circuit diagram ident, but unmarked on the board), made all the difference. The reduced power output resulted from a low supply voltage on collector of pre-driver Q19, caused by excessive collector current from an incorrectly tuned driver stage.

Bob then checked his 22S and found that he could be heard at least 200 kHz either side at 147.6 MHz. By peaking all trimmers in final stage of approximately 156.9 MHz resulted in reducing bandwidth within spec. A similar adjustment on my 22S was also needed.

It appeared that both our 22S had been aligned at the bottom of the band (probably since this is where pre-programmed channels are) instead of the centre of the whole band. With all this done and an on-air check with P. and T. Department, I was again smiling.

All these problems highlighted the following points:—

1. Do not assume that all commercial equipment is correctly aligned.
2. On-air criticism given in the right attitude can be very valuable.
3. P. and T. authorities are not the nasty men often portrayed, their attitude and co-operation was most appreciated.

Many thanks for the advice and support freely given by Bob and Steve, and I trust that publication of this experience may help other ICOM 22S owners.

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