

THE ICOM IC-900A MODULAR MULTI BAND FM TRANSCEIVER

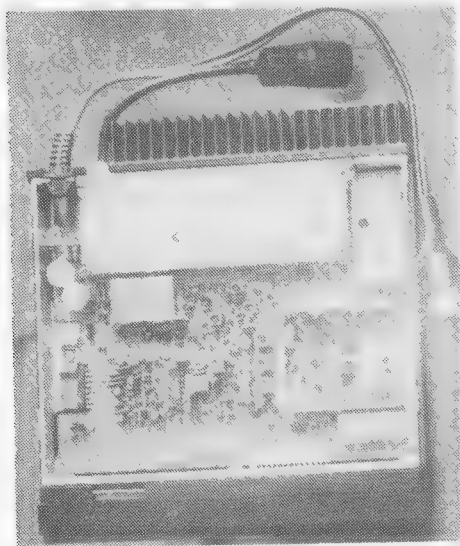
RON FISHER VK3OM

"GAALANUNGAH" 24 SUGARLOAF ROAD BEACONSFIELD UPPER

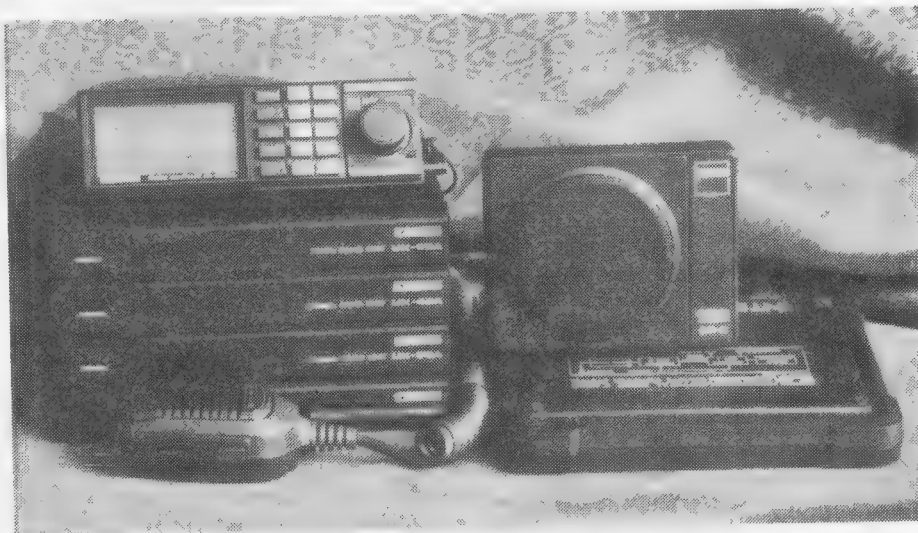
First of all, let me wish you luck in the WIA80 competition. I hope you win this wonderful rig. Having used it for the last couple of months, I don't like giving it up. However that's one of the problems of being an equipment reviewer. There is no doubt about it, the IC-900 is one of the most unusual rigs that I have come across. I rather get the idea that ICOM engineers decided to try out a few innovative technical thoughts that they might later use in other applications.

The transceiver actually comes in several pieces with a very small control panel that can be placed in any convenient position. This is then connected by a very thin cable to the interface unit which can be mounted under the car seat or tucked up under the dash board. The standard ICOM PTT microphone is also connected to this unit as is the separate loud speaker. There are, in fact, two speaker sockets, so you can also have one for the back seat passengers. There is a long DC cord attached to the interface unit, nearly seven metres long. ICOM must think that we all drive buses or something but, if you are like me, I always run out of cable at the wrong time. Now, if you thought we had covered all the units, you are wrong, there are still some to go.

There is a second interface unit that is connected to the first, via five metres of



Interior view of the 2 metre "Band" unit.
Photo - John Friend VK3ZAB



The complete set up. Ready to go. Photo - John Friend VK3ZAB

fibre optical cable, and on the back of this are the connectors for the various "band" units. Our prize unit is supplied with three of these for use on the 50, 144 and 430 MHz bands. These, along with the second interface unit, can be stacked away in the car boot or some other out-of-the-way place. Just as a thought, a longer interface connecting fibre optic cable is available as an option. This might enable you to use the whole thing as a base station with the control unit mounted in the shack and the "band" units mounted near the antenna to reduce losses in the feeder. In fact, I note in the latest ICOM news letter that the remote principle is being used in a new marine transceiver. The possibilities are endless.

The "band" units are actually separate transceiver units for each band with a power output of ten watts on six, twenty five watts on two, and twenty five watts on 70 cm. They are all the same size and appearance. There is also available a unit for the ten metre band which again is for FM operation only. As you can see, this system needs quite a bit of thought and effort to install. It's not the sort of thing that you can throw into the car five minutes before setting off on a trip. However, once installed, you have a versatile thief proof, all-band, VHF/UHF set up.

Let's look more closely at the physical

aspects of the "band" and interface units. The "band" units measure 175mm deep / 175 mm wide and 25mm high. The six and two metre units are fitted with flying lead SO-239 antenna connectors while the 430 MHz unit is fitted with a flying "N" type connector. Each is fitted with a DC power connector. Perhaps it should be made clear that no controls are fitted to any of these with all control functions coming from the remote control unit. This measures only 153mm wide, 50mm high and 38mm deep. With a weight of only 200 grams it would be quite feasible to secure it to the car dash board with double sided sticky tape. This unit contains a three by five push button matrix for frequency and memory selection.

A green illuminated LCD multi purpose display takes up most of the left half and a channel selector knob is to the right. Audio volume and squelch are controlled by rocker switches with the volume/squelch slowly increasing or decreasing as you hold the button down. This is very neat but of course there is no way of knowing where each is set until the rig is turned on. With separate modules for each band full duplex operation is possible.

The control unit display shows both the main transceiver frequency plus the sub-band which can be selected simultaneously for receive. A small button near

the tuning control allows the sub band audio to be selected on or off independently of the main receiver audio level. If you were to connect a second speaker, it is possible to have main and sub band audio from separate speakers. There are ten memories for each band and repeater off-sets can be programmed with the memory. Also high or low power can be selected for each unit.

A single push of a button can interchange the main band and the sub band, so if you are transceiving on two metres and suddenly hear a call on 70 cm which is set up as the sub band, one push and you are talking on 70, another push and you are back on two metres. Also direct access to a call channel is easily available. All of this magic is available to the operator via a CPU contained in the control unit. There are even two 'S' meters but as we shall later see they are typical for VHF FM transceivers - almost useless.

The IC-900A On The Air

Over the last few years I have operated an ICOM IC-28A in the car and consider it to be one of the easiest FM rigs to operate. The 900 is somewhat more complex and it takes time to get used to all the facilities. I did not attempt to set it up in the car but instead spread it around the shack floor. Luckily I have a dual band antenna for 146 and 430 MHz, along with a diplexer, but so far no antenna for six. My on-air tests were therefore confined to 2 metres and 70 cm. I was able to check out the six metre unit on the test bench though.

Receiver sensitivity on two appeared to be good, but when compared directly with the IC-28A it was found that the 28 was, in fact, slightly better. However, to balance this, the received audio quality on the 900 sounded better. Transmitted quality was rated as good, but with a very small amount of synthesizer noise audible to close stations. Deviation was rated as just right. One thing noted was

that the modules got rather hot after a period of testing. If you decide to mount the 'band' modules in the boot, don't throw your travel rug over them or pack the grocery shopping too close. An optional cooling fan is available but even with this, some space around the unit would be necessary. I guess the heating problem would be more pronounced if you like to use the duplex mode. However, as far as I can hear, this type of operation is not all that common as yet.

The IC-900A On Test

As I mentioned earlier, I did not have an antenna for six metres and at the other end, I do not have a signal generator that goes up to 430 MHz so some educated guesses had to be made.

Receiver sensitivity was first checked on the 50 and 144 MHz units. For 12dB sinad, 50MHz was 0.15uv and for the 144 MHz unit it was 0.16uv. It was noted that the squelch would open well below these figures. Next, receiver audio output power was measured at both 8 and 4 Ohms and was found to be rather higher than usual at about 3 watts for 8 Ohms and just over 4 watts at 4 Ohms. Received distortion at 5 kHz deviation was just about 4% for both bands. This amount of distortion is not as good as many current FM transceivers but quite satisfactory for speech transmission. Transmitter power output was checked on all bands using my usual dummy load power meter. In all cases the measured output exceeded the specified output by a small margin. The following results were recorded

	6 metres	2 metres	70cm
High	11 watts	26.5 watts	25.5 watts
Low	1.2 watts	5.2 watts	4.5 watts

All of these were measured with 13.8 volts DC input to the transceiver. The last and most important measurement was the "S" meter calibration. It was almost the same on both six and two metres. Both had a total range of about one normal 'S' point, that is about six dB. In other words it will tell you if you are

hearing a signal or not. I should say that this is fairly typical for modern FM transceivers and is something that manufacturers should have a close look at.

As I mentioned earlier, results of performance on the 430 MHz receiver had to be subjective. I compared the receiver with a four year old transceiver that I have used intermittently over the years and found that the IC-900A performed in a similar manner.

The Instruction Book

I must admit that I was rather disappointed with the manual. As the IC-900A breaks new ground in amateur equipment, I feel the least that ICOM could have done would have been to explain how it all worked. This is, after all, the beginning of a new concept, and I am sure we will see more of it in the future. The actual operating and hook up instructions are well covered. I would strongly suggest that the new owner take time and read the book through several times, before connecting it all up and starting to try and get it on the air.

The IC-900A Conclusions

I wonder when ICOM might see fit to produce a control head and interface unit to remote control an HF SSB transceiver mounted in the boot of the car. I feel that this must come in the very near future, and the sooner the better. This system proves that it can be done. After all it is still possible to mount a two metre transceiver inside a car (just), but I don't know of any modern car that will take an HF transceiver under the dash board.

However, back to the IC-900A. I can think of many ways that it could be used both as a mobile and fixed station setup. If you happen to win it please let me know what you do. I will be waiting with interest.

Our sincere thanks to ICOM Australia.