



# Equipment Review

**ICOM IC-228H**

**Ron Cook VK3AFW**

## Another two metre unit?

Yes, this is another two metre FM unit but with some differences. It is compact, full of features, high powered and, going against the recent trend, has a simple front panel.

Weighing a mere 1.1 kilogram, it is 140 mm (W) x 50 mm (H) x 169 mm (D). This is smaller than most 10 watt units were a few years ago yet it delivers a husky 45 watts to punch through the noise.

The large amber coloured display takes up almost one third of the front panel yet the frequency tuning knob is still a sensible size as are the eight main push-button controls, this making it a unit suited for both mobile and fixed station installations.

## FACILITIES

The transceiver is equipped with 20 memory channels and a call channel. Each memory can retain either a simplex frequency or a repeater frequency and it's offset. These memories can be scanned and one or more can be set to be skipped over during scanning if desired. Alternatively, a segment of the band can be scanned without altering the memories. When the priority watch function is evoked, the receiver checks the priority channel every five seconds. If a signal is detected on this channel then the function display flashes for 15 seconds at which time the receiver reverts to listening in the previous mode, checking the priority channel again every five seconds.

Each time a control is touched the set emits a beep. This tells the operator that a button has been activated, useful when mobile as you can keep your eyes on the road. This facility can of course be turned off.

The main tuning knob functions either as a VFO tuning control or as a memory channel selector, the function being selected by a push button placed above the knob. An additional feature is the provision of a call channel, separate from the priority channel, for your most often used frequency. This is selected by a button near the main tuning control. Separate LEDs are provided to indicate receive or transmit operation. Writing data to the memories is controlled by a push button as is the dial lock facility.

Rapid frequency changes can be achieved by selecting a 1 MHz step for the VFO. A low power (five watts) mode is available. This can be adjusted if the case is removed to give say 10 watts if desired.

The input frequency of a repeater can be checked by pressing the Monitor switch which is connected to the squelch level potentiometer.

The microphone is fitted with buttons to allow the operator to change the VFO frequency or memory channel without touching the front panel. A 16 button keypad is available on the rear of the microphone for audio tone selection (DTMF) if the appropriate option is fitted. Programmed subaudible tones can also be used with the appropriate option. Frequency steps of 5, 10, 15, 20, 25 kHz may be selected.

## INSTALLATION

A DC power supply capable of supplying 13.8 volts ( $\pm$  15 percent) at up to 9.5 amps is required. On receive a maximum of 0.8 amps is used at full audio output and 0.45 amps on standby. Good ventilation is recommended. Both power and antenna connections are made to connectors on short leads protruding from the rear of the set. An external eight ohm speaker can be plugged in if required. An antenna with a low VSWR is necessary for good results.

## ON AIR

The set was easy to use, no doubt a combination of a clearly set out easy-to-read manual and logical function design. The Function Display clearly showed the operating frequency with six big digits, duplex  $\pm$  when selected and signal strength on a wedge shaped graphical 'S-meter' with seven divisions and markings of 1, 5 and 9. This same display also indicated output power level. When low power was selected this was also indicated on the display. Selection of the Priority Watch and 1 MHz step functions also brought up indications on the display. Operation of the memory mode was also indicated along with the memory channel selected and whether it was programmed as a skip channel. The memory channel number is replaced by the letter "C" when the call channel is selected. Repeater offset, beep status, dimmer level band scan edges, tuning steps and subaudible tone frequency (if installed) can all be viewed on the display.

Received audio from the inbuilt speaker was good but to get the full benefit of the 2.4 watts output and best audio quality an external speaker is necessary, as in all units of this type. All controls operated smoothly and positively.

Although no accurate measurements were made, the set appeared to deliver in excess of 45 watts right across the band and was quite sensitive. Selectivity seemed to be as good as claimed and no unwanted responses were detected. Excellent reports were received.

## TECHNICAL DETAILS

The frequency, mode and memory operations are all controlled by a single chip microproces-

sor. The phase-locked-loop (PLL) is also essentially only one IC. The reference frequency is 12.8 MHz.

An integrated block IC power module is used to provide the final power amplification and feeds the antenna via a diode switch and a lowpass filter. Automatic power reduction circuitry provides protection against a less than perfect antenna match. (Any VSWR above 1.5:1 should be avoided and low power used if the VSWR is greater. A VSWR of 2:1 or more is excessive). Frequency stability is claimed to be  $\pm$  10 ppm for temperatures in the range minus 10 to plus 60 degrees Celsius. This should cover most shacks!

Frequency deviation is set at  $\pm$  5 KHz nominal.

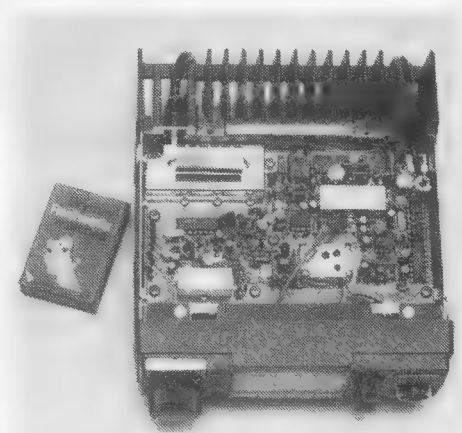
The receiver uses a 3SK174 FET RF amplifier which is protected from out of band signals by a bandpass filter. It uses double conversion, the first IF being 17.2 MHz and the second 455 kHz. Sensitivity is stated as 0.18  $\mu$ V for 12 dB SINAD. Selectivity is stated to be 15 kHz at minus 6 dB and 30 kHz at minus 60 dB.

## SUMMARY

This is a snappy little unit with a big signal which should fit into even today's cars. It combines first class performance, Icom quality, ease of operation and almost every feature required in a modern mobile FM transceiver.

## ACKNOWLEDGMENT

The Icom IC-228H was kindly made available by Icom Australia, 7 Duke Street, Windsor, Vic. 3181, to whom inquiries should be directed.



A top view of the IC-228H, with the cover removed, not only shows the compact size of the unit, but also indicates the relative size of the very adequate heatsink.

—Photograph courtesy Barrie Bunning