



Equipment Review

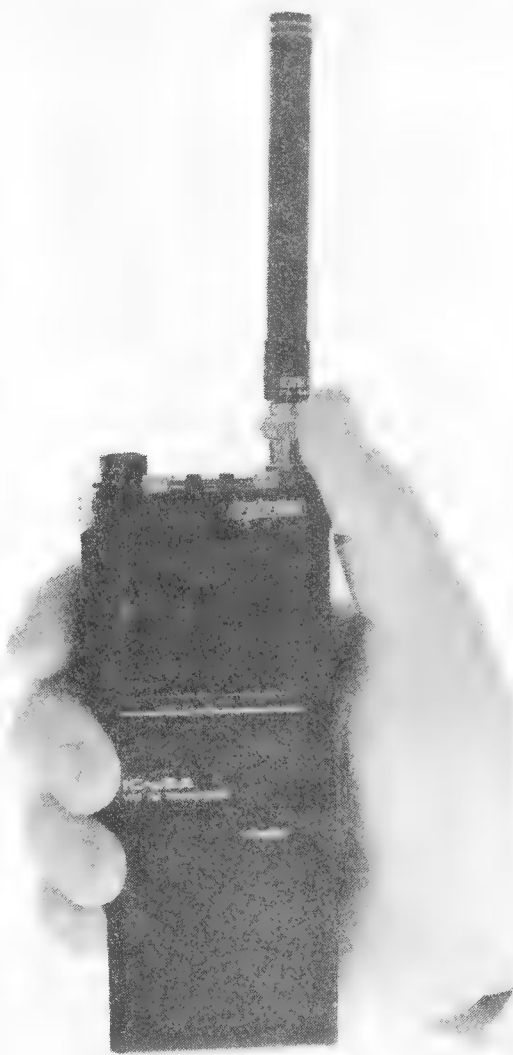
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ICOM MICRO 2A — 2 METRE FM HAND-HELD TRANSCEIVER

It seems that similar to most equipment these days, hand-helds are getting smaller. The first of these to reach our test bench is the new Icom IC- μ 2A. It is not clear at the present if this will replace the long-running IC-2A, which has been around since early 1980. There is no doubt that the 2A is the most popular hand-held ever to have been produced. The new Micro 2A looks set to continue that tradition. When the original IC-2A was released, I stated in the review (September 1980 AR) that 'The size is impressively small. It will fit easily into a shirt pocket and is certainly the smallest two metre hand-held on the local market.' I am not sure if shirt pockets are smaller in 1987 but if so, the new micro will fit with ease.

As a comparison, here are the overall dimensions of each, complete with the supplied antenna and battery pack. The IC-2A: 34.5, 6.5 and 4 cm (HWD). The weight, 470 grams. The Micro 2A is 25.5, 6, and 3 cm (HWD), with an all up weight of 370 grams. Part of the difference is in the use of a shorter flexi-antenna on the new model.

Out are the old thumb-wheel frequency switches, now replaced with three spring loaded up/down scan switches for MHz, 100 kHz and five kHz selection. The basis of operation is via 10 memories, the frequencies for these being selected by means of the three up/down switches. There is then a fourth up/down switch to select the required memory channel. Frequency display is from a small, but very readable LCD display, which also indicates the memory channel number and incorporates an S-meter that doubles as an RF output indicator. The display can be illuminated for night-time operation.



Power output is rated at one watt or 0.1 watts, selectable from a rear mounted slide switch. Also on the rear panel is the simplex, duplex selector switch. Unfortunately, the offset information cannot be entered into the memory. Top panel controls, in addition to the frequency selection

switches, include an audio volume/power on-off knob, a squelch control, CHK button which allows listening on the repeater input frequency and a sub-audible tone switch.

Options available for the Micro 2A include a selection of battery packs to give either extended life or slightly higher power output. The IC-HM9 speaker/microphone, which was usable with the original IC-2A, is compatible with the Micro 2 also. Two headset/microphone units are also available, one with a VOX facility, the other with manual T/R switching.

IC- μ 2A CIRCUITRY

The receiver side of the circuit bears a strong resemblance to the old 2A. It uses a double conversion set-up with a 16.9 MHz first IF (10.7 on the original 2A) and a 455 kHz second IF. A crystal filter is provided at 16.9 MHz and a ceramic filter at 455 kHz. The RF stage and first mixer are both 2SK302 FETs with a bipolar amplifier at 16.9 MHz. As with the 2A, an IC provides the functions of second converter, 455 kHz IF and limiter-discriminator.

Battery backup is provided for the memory operation and it is felt that it is worth quoting the following from the instruction manual: "The usual life of the backup battery is one to two years. Monitor the backup battery carefully and replace it if there are repeated cases of display malfunction. Note: Battery replacement should be done by your nearest authorised Icom Service Centre. If the internal backup battery is exhausted, the IC- μ 2A transmit and receive functions will still operate but no frequencies can be memorised in the memory channels." I am slightly concerned that the battery life is quoted at only one to two years. Only time will tell.

One of the nice features of the μ 2A is the special power saving circuit. If no signals are received or switches operated for more than 30 seconds, the receiver drops into a standby mode where the current drain drops to one quarter of normal. If you use the transceiver for monitoring purposes this will result in very greatly extended battery life.

The transmitter final stage uses a 2SC1947 with two driver amplifiers fed from the CPU controlled PLL circuits. Diode switching is used for all transmit receive change-over functions.

ON THE AIR

Whilst the measurements of the Micro presented earlier might not indicate that this transceiver is all that much smaller than its predecessor, it's not until you actually get it in your hand, that its small size becomes apparent. Dialling up the required frequency is very easy.

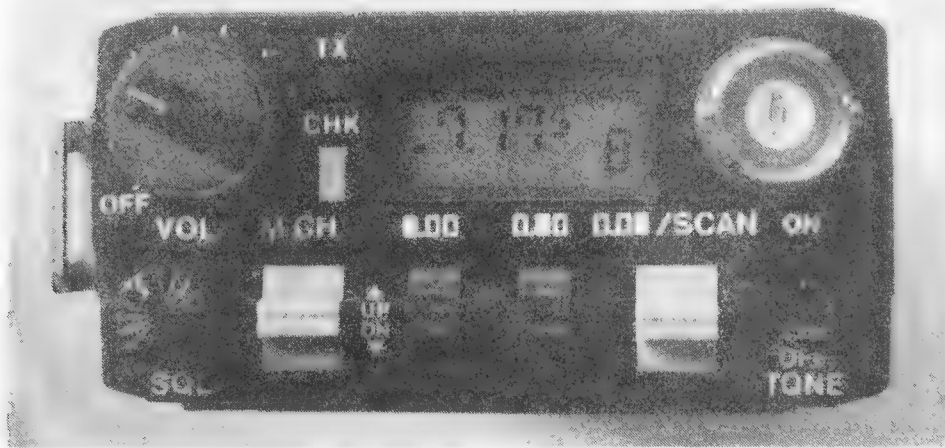
Holding the switch either up or down causes the frequency to scan up or down in one MHz, 100 kHz or five kHz steps. Just release the switch when you reach the required frequency. Once selected, the frequency is automatically entered into whichever memory channel is selected at the time. Perhaps the only criticism is that it might have been easier if the last five kHz position be optionally changed to 25 kHz. This would suit our band plan for FM somewhat better than the present system.

AUDIO OUTPUT

The audio quality from the very small speaker proved to be very good, although audio output was somewhat limited for mobile operation. An external speaker or the HM9 speaker/microphone would be a suitable way to overcome the problem. Reports on the transmitted audio quality were always complementary. The signal had a sharp crisp sound and the deviation seemed to be well set.

ILLUMINATION

One of the nice features was the excellent illumination of the LCD readout. A single push of the light switch located near the PTT bar kept the light on for about four seconds, enough to take in





all the displayed information. In use it was felt that the transmitter was not accessing repeaters as well as expected. As we shall later see in the test section, this proved to be true.

ON TEST

The usual line-up of test equipment was used to produce our test figures. This included a Marconi TF 955A/5 RF Signal Generator, AWA F-242 Noise and Distortion Meter, Daven Terminating Audio Power Output Meter and a Marconi TF-957/1 RF Power Meter.

First, the current drain was measured. On receive, with the squelch operating, but no audio output, the current drain was 25 mA. After 28 seconds of operation with either no signal input or control changed, the receiver drops into 'standby mode.' The current drain then cycles between about 4 mA and 10 mA over a one second period, giving an average standby current drain of about 7 mA. Receive audio power was next checked when the external speaker was terminated firstly into an eight ohms load, where the maximum power was 0.375 watts but with 35 percent distortion. At 0.2 watts output, the distortion was down to a more reasonable figure of five percent and at 0.1 watts output, it was an excellent one percent. Output and distortion were also checked with a 4 ohm load, but little notice was noted in the above figures. As can be seen, the total audio power available is rather limited, but not dissimilar to most other hand-held transceivers.

RECEIVER SENSITIVITY

The receiver sensitivity and S-meter calibration

was checked. At 0.16 μV pd the SINAD measured 16 dB. The squelch, when set to the threshold, opened at about 0.1 μV . The S-meter is not actually calibrated in 'S' units which is just as well because the indicating segments bear no relationship to real S-points. For what it's worth, the calibration was as follows:

1st segment	Squelch open
2nd segment	2.0 μV
3rd segment	2.5 μV
4th segment	3.1 μV
5th segment	4.0 μV
6th segment	5.0 μV

Not the greatest S-meter, but no doubt better than nothing. Receiver sensitivity on the other hand is very good indeed.

POWER OUTPUT

Transmitter power output was next measured. In the high power mode, it measured 1.75 watts and when switched to low power the figure was 0.1 watts. This is very similar to the older and larger IC-2A, but it soon became apparent that the transmit capability of the μ2A was well down on the old IC-2A. I therefore decided to check the performance of the helical stubby antenna supplied with the μ2A . The method used was as described in my article, *The Long and Short of Two Metre Antennae for Hand-Helds*, (AR December 1984). It was found that the short μ2A antenna was about 4 dB down on the longer IC-2A helical. While 4 dB might not seem much, in actual

use there is a very noticeable difference. A better antenna is recommended.

CONCLUSIONS

The Icom IC- μ2A performs very well indeed. The compact size is certainly a big feature. Its a pity that the supplied helical antenna is not a bit more efficient, compared with other helical antennas of even the same size, it is well down in performance. Perhaps Icom should consider changing their antenna supplier. The instruction book is, in general, well presented and, in fact, very similar to the IC-2A handbook. A circuit diagram is supplied, but as usual no technical information is included. Surely it should not be asking too much to include a few basic adjustment details such as transmit deviation. Icom service manuals are hard to come by and are usually very late in production.

Our review unit was supplied with a 115 volt battery charger which might not have worked very well on 240 volts. Nevertheless, I found that my IC-2A charger worked fine. Icom assure me that this was due to the review unit being an early model and that all transceivers being distributed are supplied with normal 240 volt chargers.

Our thanks to Icom Australia for the loan of the μ2A transceiver for this review.

EVALUATION AND ON-AIR TEST AT A GLANCE ICOM IC- μ2A FM TRANSCEIVER Serial No 01215

APPEARANCE

Packaging

***Strong carton with foam insert.

Size

****Its amazing how they fit it all in.

Weight

***You will not know you are carrying it.

External finish

***Very pleasing finish.

Construction quality

***Appears to be Icom's usual high standard.

PANEL CONTROLS

Location of controls

**Logical layout.

Size of controls

***Relative to the size of the rig, very good.

Status indicators

**Transmit indicator only.

RECEIVER OPERATION

Memories

**Ten memories with no repeater offset included.

S-meter

*Only just better than nothing.

Frequency Display

***Small but clear. Very well illuminated for after dark use.

Sensitivity

***Very good. See test results.

Signal handling

***Very good for a hand-held.

Internal speaker

**Clear distinct quality, but rather limited output power capability.

Listen on input facility

***Push button listen on input for repeater operation. Does not allow reverse transmit.

TRANSMIT OPERATION

Power output

***Similar output to the old IC-2A in a much smaller package.

Battery drain

***Not excessive on transmit. Overall with low average drain on receive, very good indeed.

Metering

**Output indication only.

Audio quality

***Crisp clean audio.

Antenna efficiency

*Well down on input. See test section.

Battery life

***With the current saver in use. Very good.

MANUAL

Owners Handbook

***Lacks technical information but operating instructions very well covered.

OVERALL RATING

***The overall concept of this little hand-held is very good. If you require a compact two-metre FM transceiver, this one should be at the top of the list.

RATING CODE:

* Poor, ** Satisfactory, *** Very Good, **** Excellent.