

Equipment Review

ICOM IC-Q7A

By Paul McMahon VK3DIP.

What is it?

The IC-Q7A is a low cost dual-band (2 m and 70 m) handheld transceiver, offering about 350mW out on either band, and extended receiver coverage from 30-1300 MHz in FM, AM, and FM Wide, modes. The review set was supplied courtesy of ICOM (Australia) and had a serial number of 01064. The street price of an IC-Q7A is around \$340.

First Impressions

While this review is primarily on the ICOM IC-Q7A, I will be comparing the IC-Q7A to the Yaesu VX-1R a number of times. This is not a full comparison study, nor do I come out with any conclusion as to which is best, however I feel that there are quite a few Hams out there who would be interested in some of the contrasts. Besides, as ICOM don't supply a circuit or block diagram etc, now common practice, it gives me something of substance to talk about in this article.

The first thing that you notice about this set is how much it looks like a small "Transistor" BC band radio. Apart from the rubber ducky and the smallish LCD display the set looks (and feels) like many of the common small AM radios you see around. The second thing you notice (or at least I did as I unpacked the box) was that there is no plug pack charger. In fact the set uses two standard AA cells and while Ni-Cad cells and charger are available as an option there is no mechanism for charging them in situ, or powering the set externally for that matter. The two AA cells are probably in part responsible for the set's shape (58 by 86 by 27 mm) which as you can see from the photos makes the set look and feel a bit more square than the usual handheld form-factor. Having said that, while the set is a bit bigger than the Yaesu VX-1R, which it is obviously intended to compete with, it still fits at least my hand reasonably well. The extra length of the standard antenna (180mm vs 110 mm) can come in very handy over marginal paths. Like the VX-1R the IC-Q7A uses an SMA style connector for the antenna which looks to be the new standard for small handhelds.

Apart from the set itself the package includes the antenna, a carry strap, a belt

clip, and the 40-page instruction book. There is no circuit and virtually no technical detail other than the specifications. There is not even a pin-out or description of the earphone/microphone socket which looks like a standard 3.5 mm type, but on closer inspection appears to be more like that of the Yaesu VX-1R (ie having three conductors plus earth, and being impossible to buy except as a special cable or adapter at great expense). This lack of detail led to a number of difficulties with testing this set.

Technical Bits

As mentioned above, the antenna connection is via an SMA-like connector, I call it SMA-like because it that appears in an effort to increase mechanical strength ICOM have opted for a connector that is somewhat longer than a standard connector. It will depend on what you want to do with the set whether this compromise is a good one or not. If you only ever intend to use either the antenna that came with the set or genuine ICOM accessories, then the increased mechanical strength will come in handy, especially if you opt for a larger antenna. If however you want to connect this set up to some home brew converter etc. then you may have to do a bit of hunting around to find a suitable SMA plug. In my case I was lucky to have two SMA to BNC patch cords each with a different brand of SMA connector. One worked, the other did not. This also, of course, does make interchanging of antennas from one brand to another more problematic, and I would caution anybody looking at buying a third party antenna to try it on the set first to ensure that it both makes reliable connection and looks OK.

There is no technical information, such



Photo 1. The diminutive handful

as circuit diagrams etc, provided with the set other than the standard specification page reproduced elsewhere in this article. Without some idea of which pin was which with the earphone and other connector, I didn't feel brave enough just to try it with a standard plug so actual measurements of S/N etc to verify the ICOM figures were not possible.

I was however able to verify that the set did cover the range continuously and that sensitivity at least from perceived audible quietening seemed on a par with that quoted in the specs. One thing I did notice however while doing this test was an anomaly in the S-meter. Despite appearing to be nine steps on the LCD S-Meter in fact there are only five. The first eight small blocks come on in pairs leading to a somewhat strange effect where your ears can be more effective at judging the relative strengths of similar signals than the S-Meter.

As a matter of interest, while again I could not do any absolute measurements, I did try to do some comparisons with the

IC-Q7A SPECIFICATIONS

GENERAL

Frequency Coverage:

Transmit:

VHF: 144-148 MHz

UHF: 430-440 MHz

Receive:

30 - 1309.995 MHz

(specifications guaranteed 30 - 1300 MHz)

Mode: FM, AM (receive only), WFM (receive only)

Number of memory channels: 200

Useable Temperature Range: -10°C to +60°C

Tuning steps (kHz): 5, 6.25, 10, 12.5, 15, 20, 25, 30, 50 and 100 kHz

Power supply requirement: 2 x AA(R6) Ni-Cd or alkaline cells (negative ground)

Current Drain (VHF/UHF; at 3.0 V DC):

Tx (max. power): 440 mA/380 mA (typical)

Rx (rated audio): 170 mA (typical)

Rx (standby): 95 mA (typical)

Rx (power saved): 38 mA (typical)

Antenna connector: SMA (50 ohm)

Dimensions (projections not included): 58(W) x 86(H) x 27(D) mm

Weight: 170 g; 6 oz. (with antenna and battery)

MIC / SP connector: 4-conductor 3.5 (d) mm (.125 in); 2 k / 8 Ohms

Transmitter

Modulation system: Variable reactance

Output power (at 3.0 V DC):

VHF: 350 mW typ.

UHF: 300 mW typ.

Maximum frequency deviation: ±5 kHz

Spurious emissions: Less than -40 dB

Receiver

Receive system: Triple conversion superheterodyne

Intermediate frequencies: 1st: 266.7 MHz;

2nd: 19.65 MHz; 3rd: 450 kHz

Sensitivity (except spurious points; typical values):

FM (at 12 dB SINAD)

30 - 117.995 MHz / 0.32 μV

118 - 174.995 MHz / 0.16 μV

175 - 246.995 MHz / 0.32 μV

247 - 329.995 MHz / 0.32 μV

330 - 379.995 MHz / 0.32 μV

380 - 469.995 MHz / 0.32 μV

470 - 749.995 MHz / 0.32 μV

750 - 999.995 MHz / 0.32 μV

1000 - 1199.995 MHz / 0.32 μV

1200 - 1300.995 MHz / 0.32 μV

WFM (at 12 dB SINAD)

76 - 108.0 MHz / 1.0 μV

175 - 221.995 MHz / 1.0 μV

470 - 770 MHz / 5.6 μV

AM (at 12 dB SINAD)

118 - 136.0 MHz / 0.56 μV

222 - 246.995 MHz / 0.79 μV

247 - 329.995 MHz / 1.4 μV

Squelch sensitivity:

0.18 μV (144 - 148 MHz)

0.22 μV (430 - 450 MHz)

Selectivity:

FM, AM More than 15 kHz / -6 dB, less than 30 kHz / -60 dB

WFM More than 150 kHz / -6 dB

Image rejection ratio: More than 60 dB

Audio output power (at 3.0 V): 100 mW (typ. at 10% distortion with an 8 Ohm load)



Photo 2. Icom left, Yaesu right

receiver in the VX-1R. While there was no real noticeable difference between performance within the Ham bands, to my ear, the IC-Q7A did seem to be noticeably more sensitive with a more uniform frequency response outside the Ham bands. This impression is reinforced by a look at the manufacturers specifications where on 2 metres the sensitivity for 12 dB SINAD is identical at 0.16 μV, the VX-1R is a bit better at 70 cm, 0.18 μV vs 0.32 μV (or about a 5 dB difference), and outside the ham bands the IC-Q7A is claimed as more or less flat at 0.32 μV while the VX-1R has spots where it needs 15.8 μV (a 33 dB difference) for the same 12 dB SINAD. All of these figures are of course for the normal FM mode, FM wide and AM have similar though not identical relations.

TX power was measured, at least within the limitations of my power meter, and with a newish set of Alkaline Batteries, to be in line with the specifications of around 0.3 to 0.35 watts for UHF and VHF respectively. Again for contrast the VX-1R gives around 0.5 Watts on battery or about 1W when externally powered. The difference in antenna size probably goes most of the way towards closing this gap, so again in practice there is little difference. I would however like to have seen what effect on the output power the slightly lower volts of a pair of Ni-Cads (2.4V vs 3V) had. However I didn't have a set to hand and again there is no easy way to externally power the set.

Operation.

As can be seen from the photos the set has only a small number of controls, in fact there are only nine buttons and one knob, most of which perform more than one task. The multitasking of the buttons is fairly complex and I must admit I did find it difficult to remember which functions required which combinations of buttons to be held down. This is not helped by the set only having the prime role marked on the button and only memory or the manual to guide you to the other secondary or tertiary functions.

I also found the mix of methods used to access some of these functions a bit difficult. In some cases you have to hold the button down for greater than two seconds, in others you have to hold down the function button while pressing the feature button, and in yet others it is a combination of the two. Undoubtedly a regular user would quickly get used to this but I don't like the idea of having to press the function and feature button simultaneously. With the function key being a small button on the side of the set just below the PTT and the rest of the buttons on the front this means that, for example, to start the radio doing a simple scan (which requires pressing the function key and either the up or down volume button at the same time) requires the use of two hands, and an awkward positioning of the set to try to see both the side and the front of the set at the same time.

While many of the common features are accessed by the combination of button presses described above there are also a large number of actions that require using the set or menu mode. This is entered by pressing the VFO/Memory button for longer than two seconds. Once in set mode, rotating the dial knob steps through a number of options such as receive mode, tuning step, duplex/simplex, etc. When the required option is selected, the value can be set by holding down the function key while rotating the dial knob.

Apart from the above minor user interface irritants, the set worked fine on the air with quite reasonable TX reports on both 2m and 70cm. Received audio quality and volume were very good with quality on the FM broadcast band (using FM Wide of course) being equal to any (mono) commercial set I have heard. The basic functions of frequency and volume setting are straight forward, and the LCD display, though smallish, is clear and easy to read.

In terms of memories and other features the IC-Q7 has two banks with 100 memories each plus two call channels. These memories can save the frequency, mode, repeater offset, and tone settings, but do not have the option of setting an alphanumeric label. Normal scan options and a tone squelch pager type functions are also included.

As mentioned above, power for the set is via two AA cells which are fitted in a manner similar to most consumer portable devices these days (as can be seen from the photo). There is one small addition that is worth noting. One problem with the common form of sliding plastic battery cover is that over time the catches tend to wear and the cover can become useless. To try and prevent this ICOM have added a sort of plastic hinged clip-on latch to lock the cover in place.

This seems to work well when new but only time will tell how wear will affect this mechanism and I suspect you will ultimately end up with the same problem. This will of course be exacerbated if you choose to use Ni-Cads and thus have to be continually opening and closing the cover to swap them. The manual gives no guidelines for battery life other than current consumption and while I did manage to flatten one set of alkalines in use over a day, I didn't do it under the sort of controlled conditions that would allow any real conclusions to be drawn. About all I can say is that the current consumption figures would tend to suggest at least a couple of hours use out of a set of rechargeable Nicads.

The 40 page manual is on the whole well



Photo 3. The battery compartment

written and clearly explains the standard functions. I am a little worried by the fact however that there at least two things that I am aware of that are not even mentioned in the manual. For most amateurs these sorts of omissions would not be a problem, but if you are like me then having paid a reasonable sum of money for a new toy you like to know all the things it can do not just the common ones.

Just for the record I found two items by accident. The first is the little tune the set plays when the batteries are starting to get flat. I think this is just an audible warning. This is a good thing, but can be disconcerting when the manual doesn't even mention it. The second is that I can only assume that there is some sort of computer control of the set or downloading of memories available. A couple of third party vendors are advertising compatible software systems for the PC which as far as I can see must connect via the four way mic/ear plug in a similar manner to the VX-1R. If you have access to the internet then you can see an example of this at the RT-Systems pages at "http://www.rtsars.com/icq7_cloning_software.htm". Again there is no mention even of the possibility of doing something like this in the ICOM manual.

Conclusion.

While the IC-Q7A is obviously made as a low cost set with a couple of design compromises to achieve this, the excellent wide band receiver goes a long way towards

balancing this out. In terms of a comparison with the VX-1R and which would I recommend, I'm afraid I'll have to wimp out and say that it is a horses for courses thing. If you want something that you could sticktape to a beam for fox hunting then I would clearly go for the IC-Q7A. In other situations its not quite so clear cut and individual preferences would come in to play. On the whole however the IC-Q7A has quite a bit to offer at a price that we have not seen for quite some time. I can only hope other vendors follow suit.

73, Paul McMahon VK3DIP

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