AN ENJOYABLE ENCOUNTER

Even though he’s on a training course, Richard Newton G0RSN couldn’t miss out on the chance of trying the latest offering from Icom. And despite antenna limitations... Richard thoroughly enjoyed himself!

The Icom IC-7400 HF & VHF Transceiver

I’ve not been so active since I moved house at the end of last summer and have not yet managed to set up a new shack! So, I was delighted to be asked by PW to take a look at the IC-7400, a new multi-mode transceiver offering general coverage receive and c.w., a.m. s.s.b., RTTY, and narrow band f.m. (n.b.f.m.) on h.f. and also the 50 and 144MHz bands.

The IC-7400 is the successor to the established Icom IC-746 transceiver (which I reviewed for PW back in November 1998). I remember being very impressed indeed by the '746 and so was keen to try the new rig.

Very Similar Looks

Opening the box I saw that the Icom IC-7400 was very similar to its predecessor in looks. The distinctive large screen and wonderful display were there and the controls were laid out in an easy-to-follow and well designed way.

There are two 50Ω SO239 coaxial sockets for h.f./50MHz antenna systems and one 50Ω SO239 socket for connecting the 144MHz antenna together with a grounding connection and 13.8V d.c. power socket.

There are two accessory connections and a mini DIN for a dedicated data connection, and a dedicated connector for the optional external antenna tuner, and straight or bug type (c.w) key and the external speaker jack plug sockets. Phono type coaxial connectors are provided for a linear amplifier to be connected.

The front of the Icom IC-7400 carries the controls for the radio along with sockets for external headphones and an external paddle key to operate the built-in electronic keyer.

All the controls for the main functions are large and well labelled. It’s smart and professionally finished and definitely ‘looks the part’. In operation the controls are positive and the tuning dial spins and turns with a reassuringly well-balanced feeling of weight. Included in the smaller and less accessible controls are...
things such as output power and other adjustments that you might set and then leave. These include functions such as key speed, C.W. pitch and microphone gain which you would want hidden away slightly to reduce the chance of accidental operation.

Those familiar with the Icom IC-706 or IC-746 - will definitely see some similarities here. At this point I have to say that the radio is very 'user friendly'...even for those who are new to the multi-layered menu system. It's so difficult to decide where to start with radios like the IC-7400. The operator is offered so much!

What's On Offer?

So, let's have a good look at what the Icom IC-7400 has to offer. Features include an internal C.W. electronic keyer with memory capability, an internal automatic antenna tuner (A.A.T.U.), a 32-bit floating DSP noise reducer which is extended to a DSP intermediate frequency (I.F.) filter and an auto notch filter. The transmitter is capable of 100W output power on all bands, except when in transmission mode where the maximum is 40W. Power is variable from just less than 5 up to the 100W maximum. Receiver and transmitter incremental tuning (RIT) is provided within a frequency range of ±9.9kHz. On 50 and important transmitted audio was excellent. Although I didn't take a great deal of time setting it up...I still got some great results that I'll share a little later.

The Icom IC-7400 also uses the DSP technology in the Tuning. This electronically narrows the pass band width by shifting the I.F. to slightly outside of the I.F.'s filter pass band to reject interference. Moving both the PBT controls in the same direction has the effect of shifting the I.F. With a little practice this is a very effective tool for use in reducing the interference suffered where a strong adjacent frequency signal is present.

The Icom IC-7400 has three pass band width I.F. filters for each mode. According to the manual the pass band for the SSB and C.W. modes can be set within a range of 50Hz to 3.6kHz. This can be done in 50 or 100Hz steps, and provides a total of 41 pass band widths.

For the RTTY mode the pass band width can be set within a range of 50Hz to 2.7kHz in 50 or 100Hz steps, giving a total of 32 pass band widths. The N.B.F.M. and A.M. modes have three fixed pass band widths which are independently available.

There's also a built-in 100kHz calibrator and the default setting on the model I had was 'On'. So, the strong '100kHz sproggie' I found was soon sorted when (by selecting the appropriate menu) the calibrator was switched off. It's unusual to have it 'on' rather than 'off' though - but if in doubt...read the manual I say!

Demodulator For RTTY

Perhaps the most interesting function I found was the RTTY demodulator and decoder which Icom have built-in. This means that for decoding Baudot an external terminal unit is not required.

The transceiver will decode and display the text on its main display screen, and it has a twin peak meter to assist tuning. This meter changes the receive frequency response by boosting the 2.125 and 2.295kHz frequencies for improving the chances of copying the desired RTTY signal. Obviously, additional equipment to transmit RTTY is needed, but I thought that it was a wonderful idea to include the decoder.

Pre-Programmed Bands

Amateur bands on the IC-7400 are all pre-programmed into a keypad on the front panel. Three memories are allocated to each band - referred to as Stacking Registers and are overwritten on a rotational basis, 'remembering' the last three operational frequencies and modes.

An example: I selected the 14MHz band by pressing the Band button, resulting in 14.325MHz USB being displayed. There was an interesting station...but I wanted to quickly tune the band. I then pressed the same button a second time and used this setting to tune around.

By pressing it a third time I checked around 14.150MHz in RTTY mode, for any teletype activity. Having found nothing I pressed the same button again, and this took me directly to 14.325MHz USB.

You may also be wondering how easy the radio would be to actually operate...but fear not! The IC-7400 is very user-friendly and the manual is extremely easy-to-follow and is well written.

Away From Home

I was keen to see what the Icom IC-7400 could do on the
Richard Gorsn (in his father-in-law’s shack) thoroughly enjoying himself on G7VIUM3T1W) 144MHz using the Icom IC-7400. (Photo courtesy of Terry Wood G7VJJ/M3TJW)

Back & Prepared

The following week I went back to Bramshill prepared and took my 20 metre (66ft) long wire with magnetic balun. This was easily strung from my window to a nearby tree, although it sloped downwards.

Next, I connected the antenna to the IC-7400 with the longer coaxial cable lead that I’d remembered to bring along, and set about tuning around. The a.a.t.u made it almost too easy...and in seconds it tuned up on 7, 14, 18, 21 and 28MHz.

Tuning to 21MHz and heard Vijay VU2VV (India), unfortunately despite his being a terrific signal with me I was unable to break into the pile-up. I was however, impressed at hearing India!

Next, I tuned up the band and found VO1...a callsign I’ve never heard before. The station was Mark VO1ONE from Newfoundland, Canada. Mark was providing a good 5 and 5 and gave me a 5 and 3 report and was running 100W from an Icom IC-706 and a mobile whip from his stationary vehicle. We had a very enjoyable chat until the QSB beat us and he faded away.

Bedtime approached, so I decided to have one more try to strong adjacent frequency signals, but the pass band filter was soon put to good use.

Chris and James both gave me favourable reports on the audio quality from the IC-7400. James said, “The audio is excellent, clear, sharp and punchy”. Chris commented, “It’s superb audio”.

The audio was so good that James even correctly identified that I was trying to keep my voice down, as I’d now noticed the time and expected a sharp bang on the wall from my neighbour at any moment! I thanked James and Chris for their time and went to bed.

Up & Early

Next morning, Spurred on by my first ever contact into Newfoundland and my splendid QSO to Scotland I decided to get up early and try out my luck on 14MHz. I had almost given up when I heard, Chuck WD9GWG, providing a large 5 and 9 signal from Fife. I had some problems due to air. However, I’m away from home at the moment on a course in Bramshill near Hook in northern Hampshire and have a small room in an accommodation block, which is on the third floor.

The IC-7400 was only available for a limited time so I had to find a suitable antenna. My first idea was to borrow a dipole from my father-in-law, Terry G7VJJ/M3TJW.

The Icom IC-7400 was then set-up my room’s desk and I attempted some antenna erecting. Fortunately, there were several large trees outside the 3rd storey window...but it was not going to be easy to support the dipole centre.

Eventually I erected the dipole (10 metres long on each leg) but feel unsure about sharing the following information with you! This is because the antenna ended up with one leg draped around the room, over the wall light, through the high cupboards and ended dangling down into the sink! The other leg I threw out of the window and hoped for the best.

Next, falling to temptation, I put the IC-7400’s auto a.t.u (a.a.t.u) to the test and went on...hitting the tune button and getting onto 7MHz. The IC-7400 whirred and whizzed and soon a 1:1 v.s.w.r was showing on the multi display.

I wasn’t sure whether to be impressed or downright scared that the a.a.t.u would tune an antenna system (I use the term in the loosest possible sense) such as my ‘Bramshill Bodge’!

The problem then came when I heard Ray HB9SVW from Bern in Switzerland on 7.066MHz. What a massive signal...so throwing all caution to the winds I called him, and we had a very enjoyable chat and received a 5 and 6 report. Ray was 5 and 9 + from his home 32km (20 miles or so) North West of Bern. Success!
Wisconsin in the USA. He was running 400W from a Yaesu FT-1000. You know the great thing about Amateur Radio is the terrific people you ‘meet’ on the air. Chuck and I had a wonderful talk...so interesting I almost missed breakfast! Chuck reported that the audio from the IC-7400 was “Really good and ‘Rather mellow’”. He then complimented the rig for “doing a really good job” and sounding “nice and crisp”.

Later that day I had a sked with my Father-in-Law Terry, G7VJJ using his new M3 call sign, M3TJW on 7.067MHz sounding “nice and crisp”. I almost missed breakfast!

Our first contact was on 144.285MHz and had an extremely enjoyable contact with Martin G8OF0A in Laverstock and all too quick encounter with Rudy K2MVW from Princetown, New Jersey in the USA on 21.320MHz. We heard Rudy K2MVW from Princetown, New Jersey in the USA on 21.320MHz.

Rudy gave us a 5 and 6 report and the comment...“Very nice audio, no problem at all” - without using his pre-amplifier on his Icom IC-781 which was running 125W into his wire dipole and providing 1.5kW into a 14-ohm element beam! This was a fitting end for a very enjoyable and all too quick encounter with the latest rig from Icom.

Final HF QSO

Terry and I decided to take a final look at 21MHz before wrapping up the tests. We heard Rudy K2MVW from Princetown, New Jersey in the USA on 21.320MHz.

Manufacturer’s Specifications

These are for the Europe version intended for use in Great Britain, Germany, Sweden, The Netherlands, Austria, Luxembourg, Finland and Ireland.

**General Frequency coverage in MHz**

- **Receive**
  - 0.500 – 29.999
  - 50.000 – 54.000
  - 144.000 – 146.000

- **Transmit (All Amateur bands 1.8 to 144MHz)**
  - CW, SSB, AM, PSK, NBFM, and RTTY

**Mode**

- cw, a.m., s.s.b., n.b.f.m. and RTTY

**Memories**

- 99 regular, two scan edge and 1 call

**Usable temp**

- -10°C to 60°C

**Frequency Stability**

- Less than ± 7 ppm from 1 min to 60 min after power on. After that less than ± 1 ppm/hr at 25°C

**Frequency resolution**

- 1Hz

**Power supply**

- 13.8V d.c. ± 15% negative ground

- (Transmit) max 23A

- (Receive) Standby 2.2A, 3A

**Dimensions (mm)**

- 287 x 120 x 316.3 (WHD)

**Weight**

- 9kg

**Transmitter**

- Output power (Watts) Continuously adjustable
  - <5W to 100W (a.m. 5 to 40W)

**Modulation systems**

- s.s.b., a.m., n.b.f.m.

**Spurious emissions**

- 95dB (h.f.)

**Carrier suppression**

- 40dB

**Unwanted sideband**

- 55dB

**Microphone impedance**

- 60(k2)

**Intermediate frequencies**

- 1st 36kHz
- 2nd 455kHz
- 3rd 3kHz
- 650Hz

**Audio output**

- >2.4kHz/-6dB

**Carrier suppression**

- >2kHz

**Phase modulation**

- >1kHz/-60dB

**Low power modulation**

- >1kHz/-60dB

**Unwanted sideband**

- >1kHz/-60dB

**Selectivity**

- >2kHz

**CW (500Hz)**

- >2kHz

**RTTY (350Hz)**

- >2kHz

**FM (15kHz)**

- >2kHz

**Spurious image rejection ratio**

- (Except i.f. through on 50MHz)
  - >70dB

**Audio output**

- >2W (at 13.8V d.c. with 8Ω load)

**Antenna Tuner**

- Matching impedance
  - HF Bands: 16.7 to 150Ω unbalanced
  - (less than v.s.w.r. 3:1)
  - 50Ω
  - 20 to 125Ω unbalanced
  - (less than v.s.w.r. 2.5:1)