



The Icom IC-7400 HF & VHF Transceiver

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

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

144MHz CTCSS tone functions are provided together with a repeater tone burst, memories and scanning options.

To mention all the controls would be very near impossible in the space available here. So I'll concentrate on those of main interest.

The Digital Signal Processing (DSP) is used for the received audio and on the transmit side. The transmitted audio can be changed by selectable transmit audio pass band widths, these are 2.8kHz which gives very full audio, 2.4kHz (which the manual says is useful for operators with very deep voices) and the 2.2kHz setting...good for breaking through DX pile-ups.

The transmitted audio can be further adjusted by the use of what Icom call the **Microphone Equaliser**. This is where the operator can adjust the bass and treble of the transmitted audio. This is all in addition to the compressor which (based on on-air tests and reports) seems to enhance the transmitted audio very effectively indeed.

For my part I felt that the ability to fine-tune the all-

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 s.s.b. 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 sproggy' I found was soon sorted when (by selecting

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



● Rear panel view of the transceiver

of 100W output power on all bands, except when in amplitude modulation (a.m.) 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 ± 9.99 kHz. 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 **Twin Pass Band Tuning (TBT)** function. This electronically narrows the pass band width

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

● **Product**

Icom IC-7400 100W h.f., 50 and 144MHz transceiver.

● **Company**

Icom (UK) Ltd

● **Contact**

Tel Sales: (01277) 741741

● **Pros and Cons**

Pros: I am certain the Icom IC-7400 will be just as popular as the IC-746. It's a relatively compact and certainly portable rig (see below). Due to its very forgiving a.a.t.u. and variable power settings it lends itself to portable working as I experienced when doing the review.

Cons: The rather large current drain the IC-7400 has, even on receive, does not lend it to working from a battery power supply.

● **Price**

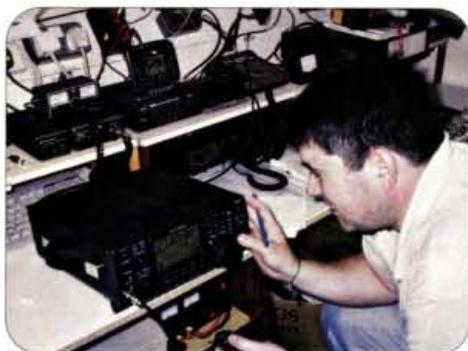
£1568.63 inc. VAT

● **Summary**

Providing you have a good power supply I think that this radio will give you excellent service wherever it is situated. It is, in short, a lovely radio.

● **Thanks**

My thanks go to **Icom (UK) Ltd., Sea Street, Herne Bay, Kent CT6 8LD. Tel: (01227) 741741, FAX (01227) 741742**, for the loan of the review unit.



● Richard GORSN (In his father-in-law's shack) thoroughly enjoying himself on 144MHz using the Icom IC-7400. (Photo courtesy of Terry Wood. G7VJJ/M3TJW)

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.

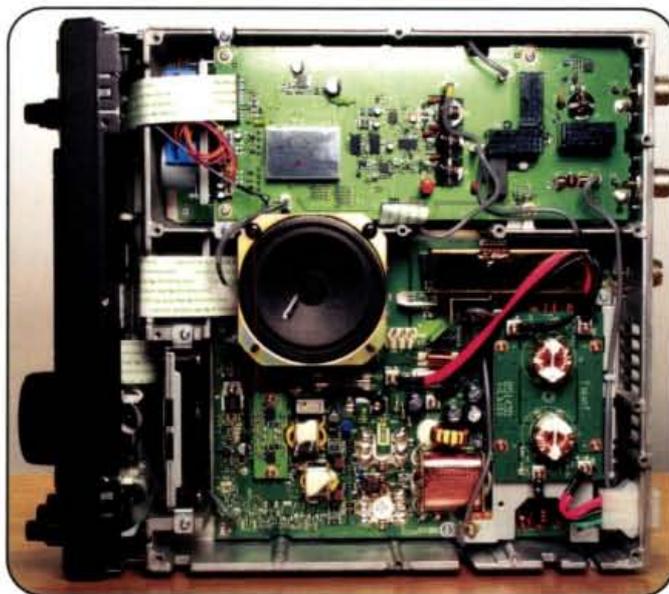
I wasn't sure whether to be impressed or downright scared that the a.a.t.u would tune an antenna system (I use the term in the loosest possible sense) such as my 'Bramshill Bodge'!

The problem then came when I heard **Ray HB9VW** 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!

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.



● Inside top view of the IC-7400.

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 VU2VVP** (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 prefix 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

on 7MHz and found **James GM4MKU** and **Chris GM4ZJI** in QSO on 7.056MHz. I called in and they were kind enough to allow me into their contact...James was a 5 and 9 signal from Lossiemouth in Morayshire and Chris was 5 and 7 from Glenrothes near Fife. I had some problems due

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 8 signal from

Osceola, Polk County, 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 where exchanged 5 and 9 reports. I was running about 80W and Terry his maximum 10W from his Icom IC-706 Mark II into his wire dipole. The distance from Bramshill to Terry's QTH in Bournemouth is about 97km (about 60 miles).

Terry complimented the IC-7400, saying that it was "A beautiful signal, baritone audio, very listenable to". He also commented that "It really is lovely audio Richard".

In Bournemouth again I decided to enlist Terry's help in the next phase of the testing for the Icom IC-7400 on 50 and 144MHz so I asked Terry if I could use his shack and of course he was keen to help. We connected the transceiver to his 3-band antenna for 144, 50, and 430MHz. We had no luck at all on 50MHz, and running out of time decided to concentrate our efforts on 144MHz.

Our first contact was on 145.475MHz n.b.f.m. with **John G8UXW**, in Woodfalls just outside Salisbury, a distance of about 40km (25 miles). He was using a Yaesu FT-726R with a GP15 tri-band antenna at 10 metres (30 feet)...a good signal with us and he said that the audio from the IC-7400 was "quite punchy".

The next contact followed immediately when **John G1WSN** from Ibsley, Hampshire, in the New Forest, called us. He was about 20km

(12 miles) away and using a hand-held with a telescopic whip and was trying out his Kenwood TH-75E, having first called us on the 500mW low power setting.

John increased his power to 5W and we exchanged favourable reports before his batteries failed. The fact that we had made the contact with John and his low power (and telescopic whip) has got to be a testament to both his transceiver and the IC-7400!

Next, a good friend of mine, **Steve Rann G1YNY**, called from his QTH in Mudeford near Christchurch, Hampshire, a distance of about 12km (7 miles). We reduced our 100W to a more reasonable 20 and exchanged good signal reports with Steve commenting that "The audio is good".

Terry and I then decided to try our luck on 144MHz s.s.b. A "CQ" call brought a reply from **Martin G8OFA** in Laverstock near Salisbury about 45km (25 miles) away. We went to 144.285MHz and had an extremely enjoyable contact with Martin receiving comments "Beautiful signal" and..."The audio is excellent, natural and well modulated". He then tuned either side of us while we were transmitting and reported, "The signal is very tight" (on bandwidth). Incidentally, Martin was using an Icom IC-706 MkII.

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.

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 with a linear amplifier and providing 1.5kW into a 14-element beam! This was a fitting end for a very enjoyable and all too quick encounter with the latest rig from Icom.

PHU

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).	

Mode	c.w., 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 that less than ± 1 ppm/hr at 25°C
Frequency resolution	1Hz
Power supply	13.8V d.c. ± 15% negative ground (Transmit) max 23A
Current drain	(Receive) Standby 2.2A, 3A (at max audio out)
Dimensions (mm)	287 x 120 x 316.5 (WHD)
Weight	9kg
Transmitter	
Output power (Watts)	
Continuously adjustable	<5W to 100W (a./m. 5 to 40W)
Modulation systems	
s.sb.	PSN modulation
a.m.	Low power modulation
n.b.f.m.	Phase modulation
Spurious emissions	50dB (h.f.) 60dB (50/144MHz)
Carrier suppression	40dB
Unwanted sideband	55dB
Microphone impedance	600Ω

Receiver

Receiver Type	Triple conversion superheterodyne
Intermediate frequencies	1st 64.455MHz 2nd 455kHz 3rd 36kHz
Sensitivity	
SSB/CW/RTTY	0.16mV (1.8 – 29.990MHz)
Pre-amp on (10dB S/N)	0.13µV (50MHz) Pre-amp on 0.11µV (144MHz) Pre-amp on
AM (10dB S/N)	13µV (500kHz – 1.799MHz) 2µV (1.8 – 29.990MHz) Pre-amp on 1µV (50/144MHz) Pre-amp on
NBFM (12 dB SINAD)	0.5µV (28-29.990MHz) 0.25µV (50MHz) Pre-amp on 0.18µV (144 MHz) Pre-amp on
Selectivity	
SSB (BW 2.4kHz)	>2.4kHz/-6dB <3.6 kHz/-60 dB
CW (BW 500Hz)	>500Hz/-6dB <700 Hz/-60dB
RTTY (BW 350Hz)	>360Hz/-6dB <650Hz/-60dB
AM (BW 6kHz)	>6kHz/-6dB <15kHz/-60dB
FM (BW 15 kHz)	>12kHz/-6dB < 20kHz/-60dB
Spurious image rejection ratio (Except i.f. through on 50MHz)	>70dB >60dB (144MHz)
Audio output	> 2W (at 13.8V d.c. with 8Ω load)

Antenna Tuner

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