

Equipment Review - The ICOM IC-728 HF transceiver

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ARE YOU IN THE market for a budget priced HF transceiver? If so, could I suggest you read this review carefully. The new ICOM IC-728 might be just what you are looking for. Budget prices often mean that some essential features are missing but, on the other hand, are all the features on many of the mid or top-priced rigs really essential or just nice to have from time to time? On the transmit side, does the operator at the other end of the contact really know if your transceiver cost \$1500 or \$5500? In most cases I rather doubt it.

However, this is getting a bit ahead of the subject in hand. What is the IC-728? What does it have to offer?

The IC-728 is an updated replacement for the IC-725. Added features have really transformed the 728 into the top performer in the low priced field.

The IC-725 has been marketed for just over three years, and in that time has been established as an excellent no-nonsense HF transceiver, ideal both for mobile and base station use. It featured a full general coverage receiver, 100-watt transmitter power output and 26 multi-function memories. Perhaps the only features lacking were a speech processor and any form of receiver interference rejection. Well, ICOM has incorporated both in the new IC-728. Not only that, but the speech compressor has a level "set" control which puts it way ahead of the others in the class. The receiver now has "pass band tuning" which gives excellent rejection against unwanted interference. All this in a package the same size and weight as its predecessor.

In weight, the ICOM comes in at 4.6kg. When you consider that it has

a full metal cabinet and a very large transmitter heat sink, this is a very reasonable figure.

Let's take a detailed look at the IC-728.

The 728 measures 241mm wide, 94mm high and 239mm deep. As mentioned earlier, it weighs in at 4.6kg. The finish is typical ICOM charcoal grey. The rig requires an external 13.8 volt DC supply rated at about 20 amps peak. ICOM produces a variety of power supplies capable of doing the job. A DC power cord is supplied with the transceiver, and this is terminated in the now standard six-pin plastic connector.

Frequency and status display is a high-contrast LCD readout which is illuminated by an orange background. Below this is an eight-pin microphone connector. What a pity these do not have standardised connections like the DC power connector mentioned above! One day, perhaps? To the right are three rotary controls that set AF gain, squelch and microphone gain. Under these are five small push buttons and two miniature rotary controls. The push buttons (in order) are for noise blanker on/off, the receiver 20dB RF attenuator switch, the receiver preamp switch which provides about 10dB of extra gain, the AGC fast/slow decay switch and the transmitter speech compressor switch.

The two rotary controls are for compression level and transmitter RF power level. The three vertically placed buttons are for mode selection. The AM/FM button will select AM receive only unless the optional UI-7 is installed. This will then allow FM transmit and receive and AM transmit. The FM mode is usable only above 29MHz.

The main tuning control is typically ICOM. It's large, well weighted and a delight to use. The four buttons to the right of the main tuning control are the tuning step selectors. Push the kHz button and the tuning changes in one kHz steps. With the MHz button selected, the tuning changes in one MHz steps. This would be used mainly to select general coverage tuning ranges.

The band button selects consecutive amateur bands. With the ICOM band stacking register, the last frequency used on an amateur band is retained, a very handy feature which I note is



now being used by a few other manufacturers. Below the "band" button is the lock button which locks all the functions of the main tuning control.

The top right-hand section of the panel is devoted to the memory function controls. Compared with the older 725, these have been improved to a large extent by moving the memory channel up/down buttons to the bottom right-hand corner.

This frees two buttons which are now used for the A=B function, previously accessed via two buttons, and the function button which has been moved up from the bottom corner. A concentric rotary pair of knobs are for the RIT and passband tuning. A couple of buttons on the right-hand side are for RIT on/off and control of an external optional automatic antenna tuner.

The rear panel has a selection of connectors which gives access to the following facilities. The main RF connector is a standard SO-239. A 3.5mm jack connects to an external speaker. A small latching push button selects the CW break-in function, and a rotary control is used to adjust the delay for this. The CW key jack is a standard 6.5mm three-circuit (stereo) type. Two accessory sockets provide connection to a variety of matching ICOM units such as linear amplifiers, automatic antenna tuners and a TNC for data communications. However, if you wish to use a non-ICOM linear amplifier, there are Phono connectors for transmit control and ALC input.

A second latching push-button switch selects either of ICOM's AH-3 or AT-160 auto ATUs. Finally, there is a connector that can interface with your PC for full remote control of the transceiver. It seems that ICOM has thought of just about everything.

The IC-728 on the air

Like most modern solid state rigs, the 728 is easy to get on the air. Of course, a suitable power supply is needed, and I already had an ICOM PS-15 which is compatible with most ICOM transceivers, including this one. By the way, AC power switching to the PS-15 is controlled via the power switch on the 728. Plug in the microphone or CW key and an antenna with a 50 ohm impedance and you are on the air.

First thing noted was the smooth

tuning control. There is a screw adjustment on the front panel to set the tension on the knob. I must say I prefer it in the free spinning position, but that's up to you. The display is very clear, with black lettering against the orange background. I would have liked a slightly larger meter, but it is adequate and the illumination is good. Meter functions are limited to "S" meter on receive and relative power output on transmit; fairly spartan, but an indication of ALC action is given by the transmit indicator LED next to the meter.

Band selection is very easy to get used to. It is, of course, done with the "step" buttons and the tuning knob to step through the bands. The system has been used by ICOM for many years on most of its HF transceivers.

Tuning around the amateur bands, the receiver sounded very lively with the preamp switched on. AGC action was excellent on SSB in the slow position, although I would have preferred it a little slower in its decay time. There is no provision to switch the AGC off, which might be a concern to some dedicated CW operators.

The received audio quality was not to my liking at all. It appeared to be lacking in both high and low frequency response, which gave it a very hollow sound. Suspecting the internal speaker, I connected a good quality external unit and the difference was amazing. The audio now came to life, proving that the audio section of the receiver was, in fact, first class. I was also amazed at the amount of audio output the IC-728 produced. Even under very noisy mobile conditions, I am sure there would be plenty of acoustic output. The 728 does not have an RF gain control, in common with some other low-priced rigs. I must say I do like to have an RF gain, and feel unhappy about its omission.

My solution to this would be to make the squelch control a preset on the rear panel and substitute an RF gain for the squelch control on the front panel. After all, the squelch is generally only used with FM operation and, as the FM board is an option, why not sell the squelch control with this? Well, that's my idea anyhow.

Tuning was as expected, very smooth. At normal tuning speed, the rate is two kHz per revolution. At a

faster rate of knob rotation this speeds up to about 10 kHz per revolution. However, if neither of these suits your taste, you can custom set the tuning rate to 10Hz steps (normal), 20 Hz steps — which gives 4 kHz per knob revolution — or 50 Hz steps, which gives 10 kHz per knob revolution. With AM mode selected, the normal tuning rate is in 1 kHz steps, which I think is a bit fast. However, it is simple to select any of the above steps in the AM mode if required. These features are not available on any other of the budget priced transceivers.

I checked the frequency stability and read-out accuracy and found both to be first class. Our review transceiver had a small problem with the lower sideband carrier oscillator drifting slightly. This took about 15 minutes to stabilise and, during that time, moved about 100 Hz. This was, in fact, the major part of the drift that I measured, and I suspect would go unnoticed by most operators. The above drift notwithstanding, you can specify as an option a high stability master oscillator which should bring the total drift down to ± 0.5 ppm.

The new band pass tuning worked very well. When selected, you can actually narrow down the selectivity either from the top end down or from the low end up. This is a better system than IF shift where the selectivity remains the same but is shifted relative to the received signal. In the latter case, you can move into interference on one side, while escaping it on the other! The noise blanker works very well on ignition-type interference, which is probably where it would be most needed. The blanking level is non-adjustable so you have to take it as it comes. Its action on power line noise was only fair; however, it produced very little cross-modulation on received signals.

The RIT control has a range of ± 1.2 kHz in 10 Hz steps. ICOM has included a most useful facility with the RIT. Let's say you are offset 250 Hz. Push the "function" button, then the RIT button, and you are transmitting on the offset frequency which now becomes your normal receive and transmit frequency. However, with the RIT in use, there is no indication of what your received frequency is. Not even the main display changes. This appears to

be an oversight which I am sure could be easily corrected.

The memory functions are extremely well thought out. The 26 memories, I think, are plenty for most applications. All the memories take frequency and mode, and two allow for separate transmit and receive frequencies such as operating through a 10m FM repeater. Another two can be programmed to set upper and lower limits for band scanning. Talking about scanning, there are two different memory scan modes. Firstly there is the normal memory scan where all channels are scanned in succession. Additionally, it is possible to scan only those sharing a common mode. The instruction book also describes some modifications that can be made to change certain scan parameters such as scan speed.

Transmitter operation

Before transmitting, it is essential that a suitable power supply should be obtained. All of my tests were carried out using an ICOM PS-15 power supply which is rated at 20 amps peak output. Output power was checked on all bands and found to be in excess of 100 watts with steady carrier output. SSB was up to 120 watts PEP output on all bands except 10 metres, where it was a fraction less.

Actually these tests created a slight problem, as there is no way that steady carrier can be produced by using any of the front panel controls. You have to actually plug in a key, or at least a shorted plug into the key socket on the rear panel. I wonder why the key socket doesn't have a shorting contact in it? SSB tests were in the first instance carried out with the hand microphone supplied with the IC728. Reports indicated the quality was acceptable, with perhaps a slight emphasis on the high end of the audio scale. The tests were repeated with the compressor switched in. This made a startling improvement with the audio response filling out in the low end and producing excellent audio quality.

Adjustment of the compression control is a bit "hit-and-miss" as no metering of the compression is provided. I found that with the compressor knob at the one o'clock position it was just about right. Microphone gain is set so that the "transmit" indicator (just left

of the meter) just starts to blink. I repeated the tests using an SM-6 desk microphone. Results were much the same but with a little more sparkle in the high audio end.

Back on the subject of power output, while there is no problem with the maximum output, there might be a few with the minimum. This is 10 watts. However, the QRP operators require a maximum output of five watts. Give that some thought, ICOM. No doubt a suitable mod will be available in the near future.

CW operators have not been forgotten in the design of the IC728. While no VOX is included for SSB, a VOX system is available for CW. While it's not full break-in, it's nonetheless very good. The delay to return to receive is adjustable on the rear panel. The transmitter keyed very nicely with a sharp-sounding note.

Two sharp CW filters are available as options. These are 500 Hz, the FL-100, and a 250 Hz, the FL-101. CW reception is actually quite good using the standard SSB filter with the band pass tuning wound in to produce a 1 kHz pass band. Not perfect, and not as good as using a proper CW filter, but certainly not bad, either.

The IC-728 Instruction Book

As an operations manual, the IC-728 instruction book is first class. There are plenty of drawings of both the front and rear panels, with clear descriptions of all control functions. Several pages

are devoted to maintenance, adjustment and the installation of optional extras. Adjustment data include PA idling current setting, RIT adjustment, BFO adjustment, CW sidetone level preset, installation of diodes for alternate scan functions, frequency calibration and the main tuning control brake adjustment.

There is also information on fuse replacement in the DC power cable and an interesting one in the PA unit which could be a little hard to find without the manual. Full marks to all of this. Now if there were only a few pages of technical description, I would give ICOM 10 out of 10. In its absence I would award only seven out of 10.

The ICOM IC-728 conclusions

With the improvements that ICOM has incorporated in the IC728, it has become the leader in its field. Receiver performance is first class except for the muffled audio from the internal speaker. The IC728 is compatible with a wide range of ICOM optional equipment, which includes at least three automatic antenna tuners, a linear amplifier, two power supplies plus many smaller items such as microphones, speakers and interface units. As ICOM says, "Count on us!" You sure can! Thanks to ICOM (Australia) Pty Ltd for the loan of the IC-728 used in our review.

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