

IRCA TECHNICAL COLUMN

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The ICOM IC-R75 receiver for MW DXing

Some years ago, ICOM manufactured the IC-R71A, a respectable communications receiver (see IRCA reprint R52), but it was finally discontinued about 1996. The IC-R72 (IRCA reprint R68) was a respectable radio, but did not have the DXability of the R71A. The R75 is the most recent communications receiver in ICOM's line-up, and, fortunately for the DXer, it is more of a successor to the R71A than to the R72.



There are some detailed reviews of this receiver, for example on Radio Netherland's website (<http://www.rnw.nl/realradio/icr75.html>), in QST of January 2000, and the DaveZ collection of reviews (<http://members.fortunecity.com/swradios/icr75.html>), but there is little in the reviews that concentrates on the set's MW DX capabilities. I was able to use Guy Atkins' R75 for an afternoon at a Beverage DXpedition at Grayland, Washington, so can only comment on its capabilities for weak daytime DX in a not particularly demanding RF environment. Hopefully, Guy will find time to do one of his detailed reviews of this set in the near future. Note also that this set had four modifications performed upon it, the SSB "Phidelity" mod from the R75 Yahooogroup which improves audio fidelity particularly in SSB mode, the Kiwa synchronous detector modification which improves lock and AGC characteristics, and replacement of the 15 kHz first IF filter by a 6 kHz one, the effect of which is less apparent splatter in AM and S-AM, and perhaps bit better reception in SSB (this mod compromises FM mode and wide AM reception however). The final modification was the removal of the front-end attenuator that affects MW and LW sensitivity.

The set is small, roughly 9x9x4", but has a lot of capability packed into it. It is triple conversion, covers from 30 kHz to 60 MHz, and really isn't missing any control or display that the DXer would want. The mode selections (AM/AM-synchronous CW/RTTY USB/LSB and FM) are separate pushbuttons that toggle through the subselections as the button is pressed while most other buttons toggle through selections. These include IF filters (stock filters are 15, 6 and 2.4 kHz (in both 9 MHz and 455 kHz IF's) with a position for one optional higher quality filter in both IF's; there are 10 bandwidths to choose from), tuning step selection, AGC fast/slow/off, noise blanker, 2 preamplifiers, attenuator and so on. Settings of all these are displayed on the LCD panel, along with tuned frequency, accessed memory, S-meter etc. A "set" button allows access to more detailed settings of various receiver functions; this button also serves as an antenna selector switch for the 50 ohm and 500 ohm antenna inputs on the back of the receiver. If the audio DSP is installed (and in the USA at least, it seems to be stock), then noise reduction and automatic notch filtering are also available using front panel switches

Tuning is by knob/keypad or by access to 100 memories that can be tuned once called up. Other knobs are RF gain/squelch and two separate passband tuning (PBT) controls on a concentric knob, each one controlling a different IF frequency. The receiver can be controlled by a PC and optional software as well. The operator's manual is available at <http://www.icomamerica.com/support/manuals/ic-r75.pdf> and includes details on how all the controls and connectors work.

In spite of this complexity, any DXer who has used a modern communications receiver should have little trouble coming to terms with the operation of the R75. Perhaps the most difficult concept is that the RF gain is maximum at 12 o'clock if it is enabled, then squelch takes over. The control can be set for squelch only with maximum RF gain; initial reading of the manual is important here. People with large fingers may also find some of the adjustments a chore.

Sensitivity did not seem to be an issue with this receiver, though Guy had removed the 10 dB MW attenuator (it takes good eyesight and a steady hand). I wasn't able to hear how the R75 responds to dawn trans-Pacific openings with a Beverage antenna, but it certainly was at least as good as a Drake R8 on weak daytime signals. There is gain to spare in the two preamplifiers which are usable on MW and LW; one is low noise and low gain, the other has higher gain but higher internal noise also; it's intended for use on the higher shortwave bands. Fortunately, when using a nearby loop antenna, MW and LW sensitivity do not seem to be compromised by any emissions from the LCD readout, according to a posting by Steve McDonald on the R75 users group.

Although there were no strong local stations at the DXpedition site, we were using Beverage antennas, and were not able to find any second or third order products from the local radio stations, less than 20 miles away. ICOM claims a 104 dB dynamic range for this receiver in their literature, which is rather good, but does not say how this specification was measured (2 tones separated by 1 MHz gives a quite different response from two separated by 10 kHz for example; the IF passband used also has a bearing on these results). The QST review, which used two tones separated by 20 kHz, found a dynamic range of 91 dB at 3.5 MHz, which is respectable, but not outstanding.

Guy tested the R75 at his home on the tropical bands using a 450 foot Beverage antenna in an area which includes 15 AM stations within 26 miles, the nearest being 1 kW at three miles away. He compared it with an AR7030, and found that the AR7030 had just background noise with some weak images (S1 or less) above 1700 kHz, while the R75 exhibited numerous MW images, from weak up to S7, on all tropical bands. The background noise was always higher on the ICOM, due no doubt to the swamped circuitry from all the RF on the Beverage. To keep this in perspective, he mentions that the MW powerhouses were extremely powerful with such a long wire; a spot check showed two of them at an estimated S9+60dB. In a later test at Grayland by Guy, he noted that his R75 and AR7030 (both modified with better filters and other mods) were consistently equal in sensitivity (both in-line with ARR Beverage preamps and splitters at the communal antenna network and another ARR preamp before a splitter in his mobile equipment case). However, the AR7030 always provided more enjoyable and clean audio quality, and less "monkey chatter" from adjacent channels when DXing the medium wave splits. Both the ICOM and AOR receivers had 1.8 kHz INRAD crystal filters installed; the R75 has them at both IF frequencies, yet the AR7030 was clearly the winner in these toughest of DXing situations. For instance, a tentative R. Fiji 2 on 891 kHz was cleaner on the AR7030 and had less QRM from the domestic outlet on 890. Guy's observations, along with QST's findings, should give a potential owner pause if he plans to use an R75 with an untuned antenna, especially near to local MW stations. (The tropical band only DXer could add a high pass filter to reject BCB, but this review is for a BCB club)

The stock IF filters were perfectly acceptable, though only the 2.4 kHz one has reasonably deep skirts. Because I didn't use the receiver on split frequencies near strong domestics, I couldn't really make an informed decision about the IF filter abilities. Guy points out that The R75's filter choices are actually pretty varied right out of the box, because the menu system allows quite a lot of

combinations, especially when coupled with an extra filter or two. The area of filter selections is the source of a lot of confusion surrounding the R75, and prospective purchasers should definitely join and read the R75 Yahoo group's archives of messages relating to the filter menu and choices (address below). Many seasoned R75 users strongly believe that no extra filtering is needed, since the PBT controls add a lot of flexibility to the radio. Guy wanted tighter selectivity than 2.4 kHz, and has added 1.8 kHz crystal filters from INRAD at both the 9 MHz and 455 kHz IF optional positions. He feels that these are excellent filters for ECSS tuning and really bring the PBT controls "alive", too.

However, demodulation capabilities are often at least as important as filter skirts when cozying up to domestics and these capabilities seemed quite good. For example, sideband splatter on 810 from 820 kHz was problematic on the R8 using its 6 kHz filter; the R75 definitely gave better audio recovery using its 6 kHz filter. The R8 got better demodulation yet using ECSS and a its 4 kHz filter, but the R75 kept up using a similar procedure. Incidentally, the capability of tuning the R75 to within 1 Hertz makes ECSS tuning easier than on the R8 or other receivers with only 10 Hz resolution. This, in addition to the dual PBT, and good stability, can make MW DXing using SSB demodulation quite flexible and rewarding. Guy's comments above should be heeded if one is DXing split channels, however, as the R75 didn't seem as capable in demodulation compared to the AR7030.

There had been complaints from some users that the synchronous AM setting was no improvement over the regular AM detector; the manual implies that it is intended to be used to enhance already strong signals. Guy uses the Kiwa modified synchronous AM for SW broadcast listening to overcome the effects of selective fading, but I preferred ECSS tuning for medium wave DXing, as did Guy. Note that the synchronous AM detector does not allow selecting of sidebands such as the ICF-2010 did, but when S-AM mode is used with the flexible PBTs, selectable sideband is not really missed.

Audio recovery is aided somewhat by the DSP functions; the noise reduction can take the edge off splatter, though the resulting audio is bassier also. This function has a level setting which controls how vigorously the DSP tries to reduce noise; Guy finds a level of 3 to 5 is most suitable, but I was able to use a bit higher level when reducing splatter. The automated notch seems to work as advertised. Audio quality seemed fairly good overall, but most of my use of the radio was in ECSS and there had been an audio modification to improve the frequency response of SSB. There have been complaints about audio quality in AM mode, but most have compared it with the AR7030, which is a benchmark of communications receiver audio quality.

No AGC decay rates are specified in the manual, but seemed well chosen in that neither the fast nor slow AGC left gaps in the received audio after a splatter burst. A strong static crash caused the slow AGC to de-sense the radio momentarily, but nothing like the multiple second recoveries some other radios have featured in the past. There were no signals with strong sub audible heterodynes heard at the time of the test, in order to check the AGC's action under these circumstances, but the AGC can be switched off and the RF gain controlled if the AGC cannot handle certain circumstances. The S-meter gave surprisingly good response to rapidly varying signals without being too jumpy.

I like to place all 9 kHz channels in memory on DXpeditions, and there's not enough room in the R75 memories for that, unfortunately. More memory banks are apparently available if the ICOM control software is used. The memories can be used judiciously for parallel DXing, but there can be some delay going from a strong to weak station particularly with the strong one using slow AGC; but even with the AGC off there can be a brief delay from one channel to the other. The R8 seemed a bit quicker to go from one memory to the next.

Although I haven't tested this radio under as rigorous DX conditions as I would have liked, it would seem that at the present price at around \$500 in the U.S.A., the IC-R75 is rather good value for the money (the modifications can cost up to another \$200 if you don't do them yourself). The R75

allows the MW DXer a great deal of flexibility in his listening, and although MW sensitivity is mildly compromised in the stock model, it can be modified to get full sensitivity. Some might find it a little short on memories, others may not find the stock AM audio quality to their liking, and signal handling could be an issue for the urban DXer, but this is a very capable little receiver. (Guy concludes that a modified R75 is a serious DXing machine and an excellent value at less than 1/2 the price of the AR-7030 receiver)

There is an active user group at <http://groups.yahoo.com/group/icomr75/> that provides a great deal of information on modifications. You may also test drive an R75 over the web at <http://www.ralabs.com/webradio/>

A PC control program is available as an option from ICOM, and Ergo and Fineware also offer R75 control; another is tk75, available from <http://parnass.org/tk75/>

(the above review is from the upcoming fourth edition of IRCA's [A DXer's Technical Guide](#))