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ICOM IC-736 and IC-738 Transceivers

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ICOM IC-736 and IC-738 Transceivers

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When the ICOM IC-736 was introduced in the spring of 1994 it caused quite a stir—it was the first MF/HF/VHF radio to offer, as standard equipment, a built-in power supply, 100 W of output power on 6 meters *and* an internal antenna tuner that operates on that band. Those who have never ventured onto 6 meters can do so for the first time with this radio, and DXpeditioners can add another band to their repertoire without taking an extra radio along.

Those who follow such things will note that the IC-738 is the latest evolution in a series of radios that started with ICOM's IC-737, which *QST* reviewed in August 1993. The IC-737 was replaced by the IC-737A, which added SSB VOX. Next came the IC-736, which added 6 meters; MOSFET finals; internal power supply; receiver RF gain control; 1-Hz tuning steps and display; software-based optional filter installation (rather than throwing switches on the motherboard); a tuning diode to change the carrier oscillator frequency for different modes (rather than diode-switched coils and capacitors); and a redesign of the circuit boards to make heavy use of surface-mount components. Despite these changes, the electrical design is very similar to the IC-737A. Finally, the IC-738 removes 6 meters, the MOSFET finals and internal power supply, but is otherwise identical to the IC-736. The IC-736 lists for $450 more than the IC-738.

Features

In general, features are common to both radios unless noted. Both radios transmit and receive on SSB, CW, AM and FM on the 160 through 10-meter ham bands, and both have general-coverage receivers. The IC-736 adds transmit coverage from 50 to 54 MHz and receive coverage from 45 to 60 MHz.

The IC-736 has a built-in ac power supply and uses MOSFETs in the final amplifier. The IC-738, with bipolar transistors in its final amplifier, is designed to operate from an external 13.8-V dc power supply. Each radio offers adjustable power output from less than 5 W to just over 100 W, except on AM, where they're rated at 40 W carrier power. Surprisingly, the IC-738 fared slightly better in the ARRL Lab's transmitter IMD testing despite its 13.8-V bipolar finals. Its transmitter is very clean compared to some other transmitters we've tested recently.

Dual VFOs are standard, as are 101 tunable memory channels and flexible scanning is offered. The current VFO is selected via the **A/B** button and an **A=B** button sets the second VFO to the frequency of the current VFO.

Standard filters include a 2.1-kHz ceramic filter for SSB and a 6-kHz filter for AM. There's no provision for optional SSB or AM filters. ICOM offers optional 500 and 250-Hz CW filters for the 2nd (9.0106 MHz) and 3rd (455 kHz) IFs. Only one narrow CW filter may be installed in each IF. The review radios had 500-Hz units installed in both IFs.

Filter installation involves removing the radio's covers, plugging the filter(s) into the appropriate socket(s) and telling the radio via software which filter(s) are installed. The filters mount on the bottom of the PC board. The 3rd IF filter is held in place by a spring clip, but the 2nd IF filter is not. During the review period, the 2nd IF filter in the IC-736 came loose from its socket after being carried around a bit.

The front panels of the IC-736 and the IC-738 are the same, except for the **50** (MHz) push-button on the IC-736. The black front panels of the radios are very businesslike, with well-spaced controls. **RF GAIN** and **RF POWER** are tiny knobs. It would have made more sense if the **RF GAIN** control were larger—it could have been swapped with the full-size **SQUELCH** control.

The IC-736/8's passband tuning (**PBT**) knob allows you to narrow the receiver passband from either side of the IF center frequency, but not both sides at the same time. Other buttons allow you to select a 20-dB receive attenuator and or a receive preamplifier. There are miniature red LEDs on some buttons that light up to indicate when those buttons are depressed.

The Bottom Line

The IC-736 and IC-738 are the next evolution in a series that started with the IC-737. They offer most of the basic features hams have come to expect in their radios, although a few features of interest to serious operators are missing. The IC-736 is of special interest because it offers a single package that covers all the amateur bands from 1.8 to 50 MHz and includes a built-in ac power supply.

The LCD on each radio sports black indicators on an amber background and features $^{7}/_{16}$-inch-high digits that can be seen clear across a room. The front panel of each radio also has a large analog meter that, in receive, functions as a signal-strength meter.

On transmit, the meter's function can be switched to monitor power output, ALC level and SWR. The transmit metering functions are displayed briefly on the LCD readout, but there's no *permanent* indicator of the metering function selected. Most of the folks who operated these radios found that they had to press the meter button all too frequently just to find out what the meter was reading at that moment.

Two antenna jacks are mounted on the rear panel of each radio, and you can switch between them using the **ANT 1/2** button on the front panel. The radio can be programmed to deactivate one of the antenna ports (for example, when only one antenna is connected), or the radio can be configured to select the antenna port last used on a band, so that the radio will recall the correct antenna port when you return to that band. There is no provision for a separate receive antenna.

The internal automatic antenna tuner in each radio covers all bands from 160 to 10 meters, matching unbalanced loads from 16.7 to 150 Ω. When the tuner is selected, a **TUNE** indicator on the display lights up. When a load with an SWR higher than 1.5 to 1 is encountered, the tuner automatically adjusts itself for the best match. When the correct match is achieved, the radio memorizes the tuner's variable settings (in 100-kHz increments) and automatically returns to those settings when that frequency is selected again.

The antenna tuner in the IC-736 will match unbalanced loads of 20 to 125 Ω on 6 meters. In this case, the operator must press and hold the **TUNER** button until the tuner begins searching for a match. This same "semiautomatic" antenna tuner adjustment can be executed with either radio, on any band, to inject a low-level CW signal that allows the tuner to find the proper setting.

A built-in CW keyer with a front-panel

Table 1

ICOM IC-736 MF/HF/6-Meter Transceiver, serial no. 01154, and ICOM IC-738 MF/HF Transceiver, serial no. 01553

Manufacturer's Claimed Specifications	***Measured in the ARRL Lab***
Unless otherwise noted, specifications and measurements apply to both the IC-736 and IC-738.	
Frequency coverage: Transmitter: 160- through 10-meter amateur bands. Receiver: 500 kHz to 30 MHz. IC-736 adds 50 to 54 MHz.	As specified. Transmitter range: 1.8-2.0, 3.4-4.1, 6.9-7.5, 9.9-10.5, 13.9-14.5, 17.9-18.5, 20.9-21.5, 24.4-25.1, 28-30 MHz. The IC-736 is the same except it transmits 27.9-30 MHz and 50-54 MHz. Its receiver also tunes 45 to 60 MHz and has usable sensitivity in that range outside the 6-meter band.
Modes of operation: SSB, CW, AM, FM.	As specified.
Power requirement: IC-736, 85 to 135 or 187 to 265 V ac; 80 VA on receive, 500 VA on transmit (max). IC-738, 13.8 V dc ±15% ; 2.1 A (max) on receive, 20 A (max) on transmit.	IC-736 tested at 120 V ac. IC-738 tested at 13.8 V dc; 19.5 A on transmit, 1.7 A on receive.
Receiver	*Receiver Dynamic Testing*
SSB/CW receiver sensitivity (bandwidth not specified, 10 dB S/N, preamp on): 1.8-30 MHz, <0.15 μV (–123 dBm). IC-736: 50-54 MHz, <0.13 μV (–125 dBm).	Minimum discernible signal (noise floor) with 500-Hz IF filters:
AM sensitivity (10 dB S/N, bandwidth not specified, preamp on): 0.5-1.8 MHz, <13 μV; 1.8-30 MHz, < 2 μV. IC-736: 50-54 MHz, <1.6 V.	10 dB S+N/N (signal 30% modulated with a 1-kHz tone, AM filter):
FM sensitivity (for 12 dB SINAD, preamp on): 28-29.7 MHz, <0.5 μV. IC-736: 50-54 MHz, <0.3 μV.	For 12 dB SINAD:
Blocking dynamic range: Not specified.	Blocking dynamic range with 500-Hz IF filters:*
Two-tone, third-order IMD dynamic range: Not specified.	Two-tone, third-order IMD dynamic range with 500-Hz IF filters:*
Third-order input intercept: Not specified.	
Second-order intercept point: Not specified.	IC-736: +59 dBm, preamp off. IC-738: +61 dBm, preamp off.*
FM adjacent channel rejection: Not specified.	At 20 kHz channel spacing: IC-736, ≥73 dB; IC-738, ≥56 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	At 20 kHz channel spacing: IC-736, ≥91 dB; IC-738, ≥88 dB.
S-meter sensitivity: Not specified.	S9 signal at 14 MHz: IC-736, preamp off, 108 μV; preamp on, 34 μV; IC-738, preamp off, 45 μV; preamp on, 14 μV.
Squelch sensitivity (at threshold, preamp on): SSB, <5.6 μV; FM, <0.3 μV.	At threshold, preamp on: IC-736, FM, 0.2 μV; SSB, 1 μV. IC-738, FM, 0.1 μV; SSB, 0.7 μV.
Receiver audio output: More than 2.6 W into 8 Ω at 10% distortion.	Into 8 Ω at 10% THD: IC-736, 2.7 W; IC-738, 2.5 W.
IF/audio response: Not specified.	At –6 dB: CW-N, 579-1076 Hz (497 Hz); CW-W, 482-2003 Hz (1521 Hz); USB, 401-2102 Hz (1701 Hz); LSB, 431-2148 Hz (1717 Hz); AM, 250-2300 Hz (2050 Hz). These numbers are for the IC-736; the IC-738 is similar.
Notch filter depth: Not specified.	≥35 dB.
IF/image rejection (1.8-30 MHz): 70 dB or better.	≥87 dB image; ≥104 dB IF.

Minimum discernible signal (noise floor) with 500-Hz IF filters:

	IC-736		*IC-738*	
	Preamp off	*Preamp on*	*Preamp off*	*Preamp on*
1.0 MHz	–125 dBm	–125 dBm	–125 dBm	–125 dBm
3.5 MHz	–130 dBm	–139 dBm	–130 dBm	–138 dBm
14 MHz	–133 dBm	–139 dBm	–133 dBm	–139 dBm
50 MHz	–141 dBm	–142 dBm	NA	NA

10 dB S+N/N (signal 30% modulated with a 1-kHz tone, AM filter):

	IC-736		*IC-738*	
	Preamp off	*Preamp on*	*Preamp off*	*Preamp on*
1.0 MHz	3.2 μV	3.2 μV	2.7 μV	2.7 μV
3.5 MHz	1.5 μV	0.6 μV	1.4 μV	0.5 μV
50 MHz	0.6 μV	0.5 μV	NA	NA

For 12 dB SINAD:

	IC-736		*IC-738*	
	Preamp off	*Preamp on*	*Preamp off*	*Preamp on*
29 MHz	0.6 μV	0.3 μV	0.5 μV	0.2 μV
50 MHz	0.2 μV	0.2 μV	NA	NA

Blocking dynamic range with 500-Hz IF filters:*

	IC-736		*IC-738*	
	Preamp off	*Preamp on*	*Preamp off*	*Preamp on*
1.0 MHz	116 dB	116 dB	114 dB	114 dB
3.5 MHz	116 dB	118 dB	116 dB	116 dB
14 MHz	121 dB	130 dB	119 dB	119 dB
50 MHz	112 dB	111 dB	NA	NA

Two-tone, third-order IMD dynamic range with 500-Hz IF filters:*

	IC-736		*IC-738*	
	Preamp off	*Preamp on*	*Preamp off*	*Preamp on*
1.0 MHz	92 dB	92 dB	93 dB	93 dB
3.5 MHz	94 dB	92 dB	98 dB	93 dB
14 MHz	95 dB	92 dB	94 dB	94 dB
50 MHz	89 dB	82 dB	NA	NA

	IC-736		*IC-738*	
	Preamp off	*Preamp on*	*Preamp off*	*Preamp on*
1.0 MHz	+12.9 dBm	+12.9 dBm	+14.7 dBm	+14.7 dBm
3.5 MHz	+11.2 dBm	–0.8 dBm	+16.8 dBm	+1.7 dBm
14 MHz	+9.7 dBm	–1.0 dBm	+8.1 dBm	+2.1 dBm
50 MHz	–7.8 dBm	–19.1 dBm	NA	NA

Manufacturer's Claimed Specifications	***Measured in the ARRL Lab***
Transmitter	*Transmitter Dynamic Testing*
Power output: SSB, CW, FM, adjustable 5 to 100 W; AM, adjustable 4 to 40 W.	Maximum power output typically 110 W, minimum power typically 2 W; varies slightly from band to band. On AM, typically 40 W maximum, 2 W minimum.
Spurious-signal and harmonic suppression: –50 dB on 160-10 meters. IC-736, –60 dB on 6 meters.	Worst case: IC-736, 49 dB at 18 MHz; IC-738, 53 dB at 14 MHz. Both radios meet FCC specifications for equipment in their power output class and frequency range.
SSB carrier suppression: More than 40 dB.	≥59 dB.
Undesired sideband suppression: More than 50 dB.	≥60 dB.
Third-order intermodulation distortion products: Not specified.	See Figures 1 and 2.
CW keying characteristics: Not specified.	See Figure 3.
Transmit-receive turnaround time (PTT release to 50% audio output): Not specified.	S9 signal, ≈20 ms.
Composite transmitted noise: Not specified	See Figures 4 and 5.

Size (height, width, depth): 4.4×13×11.2 inches. Weight: IC-736, 23.1 pounds; IC-738, 19 pounds;

*Dynamic-range measurements were made at the ARRL Lab standard signal spacing of 20 kHz. Blocking dynamic range measurements were noise limited at the values shown. AGC could not be disabled. The second-order intercept point is based on test signals at 6.0 and 8.02 MHz, with the spurious response measured at 14.02 MHz.

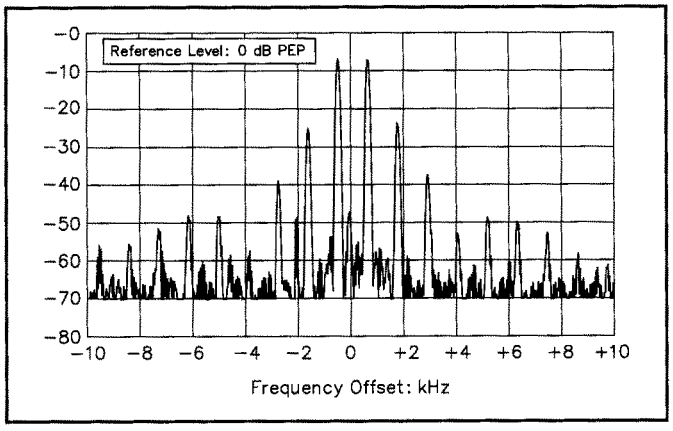

Figure 1—Worst-case spectral display of the ICOM IC-736 transmitter during two-tone intermodulation distortion (IMD) testing. Worst-case third-order product is approximately 24 dB below PEP output, and the fifth-order product is approximately 37 dB down. The transceiver was being operated at 100 W PEP output at 50 MHz.

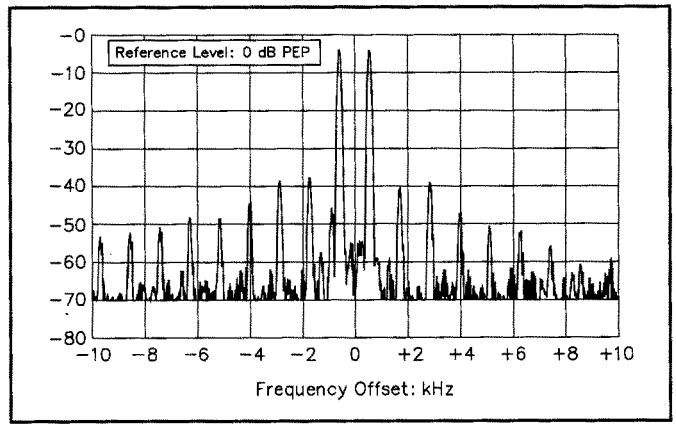

Figure 2—Worst-case spectral display of the ICOM IC-738 transmitter during two-tone intermodulation distortion (IMD) testing. Worst-case third-order product is approximately 40 dB below PEP output, and the fifth-order product is approximately 40 dB down. The transceiver was being operated at 100 W PEP output at 14 MHz.

control can be set from 7 to 41 wpm, but it's not very linear in the upper half of its range. Separate rear-panel jacks accept a three-wire paddle connection for the internal keyer and an external keying device. This is handy if you use a computer to send CW but sometimes want to use a paddle to send manually. Full break-in or semi-break-in are standard. Both radios have VOX for SSB. The VOX gain and delay (for CW or SSB) controls are on the rear panel, though, which is really aggravating if you use the radio for a variety of operating activities.

The radios have receiver and transmitter offset functions, and the amount of offset is displayed. The offset can be cleared by holding the appropriate button down until the offset display changes to Ø. When operating split, you can use the **XFC** button to set your transmit frequency or listen to your transmit frequency at any time. Receive *and* transmit frequencies are displayed at all times. A small arrow points to the receive frequency when receiving; when you transmit, another small arrow lights up to point to your transmit frequency.

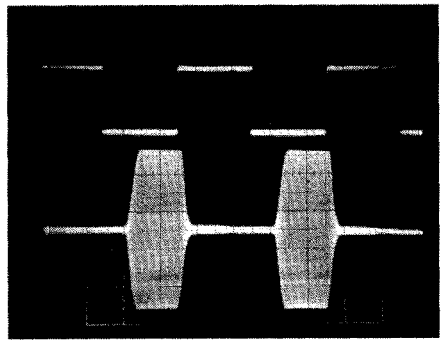

Figure 3—CW keying waveform for the ICOM IC-738 in the semi-break-in mode. The upper trace is the actual key closure; the lower trace is the RF envelope. Horizontal divisions are 10 ms. The transceiver was being operated at 100 W output at 14 MHz. There is no significant shortening of the first transmitted character during semi-break-in operation. Keying characteristics of the IC-738 are similar.

You can preprogram a frequency split, say up 3 kHz, to be recalled automatically merely by pressing and holding the **SPLIT** button until the programmed split appears on the readout. Up to 10 of the 101 memories can store these pre-programmed frequency splits.

A hand mike (supplied) controls frequency or memory channel selections with **UP** and **DOWN** push-buttons. A 6.5-foot-long ac power cable and a spare fuse are supplied with the IC-736. The IC-738 includes a 10-foot-long dc power cable, with two spare fuses. A 1/4-inch stereo phone plug is included (it mates with the CW **ELEC-KEY** jack and the separate **KEY** jack). Omitted are such items as a spare microphone connector and DIN plugs that mate with jacks on the back of the radios. A parts bag filled with various connectors would be a big help at unpacking time, when the proud owner is anxious to get the new rig on the air.

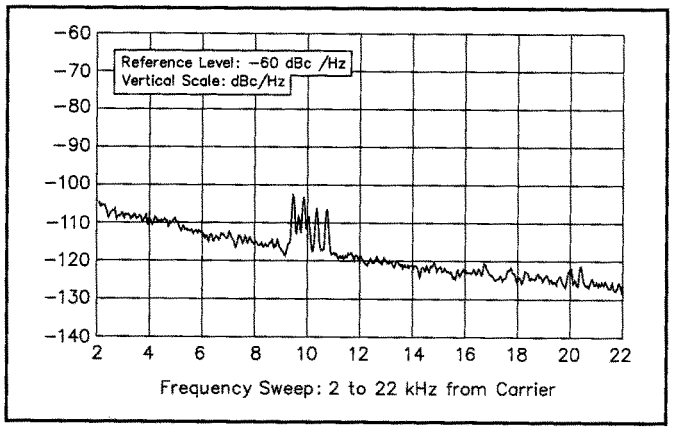

Figure 4—Spectral display of the ICOM IC-736 transmitter output during composite-noise testing. Power output is 100 W at 50 MHz. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

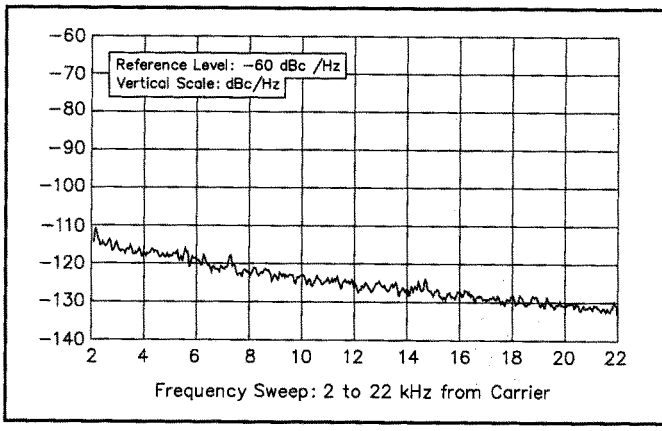

Figure 5—Spectral display of the ICOM IC-738 transmitter output during composite-noise testing. Power output is 100 W at 3.5 MHz. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

Frequency Agility

In addition to the dual VFOs, you may enter a frequency directly on the front panel keypad. To get to 14.025 MHz, key in **FREQ-INP 14.025 ENT**. (You can also do it without the decimal by pressing **FREQ-INP 1402500 ENT**.) Direct band selection is available on the keypad by pressing the desired band key.

A **GENE** button places the receiver on a general-coverage frequency you have stored in memory. Front panel **UP** and **DOWN** pushbuttons change the frequency in programmed steps and can be set from 1 kHz to 1 MHz. These buttons also select the memory channel when in that mode.

The tuning speed of the main dial knob can be set for incremental steps of 10, 20, or 50 Hz, and a quick-tuning function enables frequency changes in fast (1-kHz) or slow (1-Hz) steps. The main tuning knob is speed-sensitive, too. Like the IC-737, the VFOs in the IC-736 and IC-738 store only frequency, mode and filter selection, not such things as tuner or AGC settings.

Another way to navigate the spectrum is via the 101 memories. The instruction manual devotes eight pages to describing memory and scan functions, and it's hard to conceive of a situation not covered by features such as frequency transferring, scan-edge memory, split channel memory, programmed scan, and so forth. You can select either VFO or memory operation via the **VFO/MEMO** switch. The memory channel (**M-CH**) knob is used to step through the memories. One neat feature: If a memory has not been programmed yet, the memory channel number will be displayed along with the word **BLANK**.

And there's more—a "memo pad" that allows frequencies and modes to be written in and recalled, independent of the 101 memories. These store information on a last-in/first-out basis. For instance, if you come across four stations you want to return to, press the **MP-W** (memo pad-write) button as you tune to each one. Later, you can press the **MP-R** (memo pad-read) button to recall each one in the order that you first entered them. Either 5 or 10 memo pads can be made available for storing interesting things such as rare DX pileups, as you tune around the bands.

With the aid of ICOM's optional CT-17 (CI-V) level converter and appropriate software, you can control these radios from a personal computer.

Software Switches

At power-on, 15 parameters are user-definable. You can program these "values, conditions or functions" via a setup mode that ICOM calls the "Set Mode Operation." Four of these parameters are used for setting up the radio for use with the CT-17 computer interface. In addition, you can define things like the number of memo pads available (5 or 10), the configuration of the dual antenna ports, CW filter selection, and whether the tuner is in automatic mode or not.

The setup process begins with the radio off. By holding in the **FREQ-INP** and **ENTER** buttons, and also pressing the **POWER** button in at the same time, the radio comes on in its setup mode. After you have selected the various options you desire, you must turn the radio off to exit the setup mode. When you turn the radio back on, the options you selected are in force.

On the Air

We used these radios for a variety of activities (contesting, DXing, casual operating, and general coverage receiving), and on several modes (CW, SSB, FM and RTTY). They were used in diverse settings (urban, suburban and rural) and with various antennas (tribanders, quads, dipoles, verticals, and long wires). These radios saw a lot of action, and they held up just fine.

Both radios were used for some casual CW operating and for a bit of CW contesting. We found both radios to be adequate, but not stellar, contest performers. If optional CW narrow filters are installed, a second press of the **CW** button selects the CW narrow filtering. The CW narrow filters worked well, but it would be nice if ICOM allowed the installation of more than one narrow filter at each IF, with corresponding flexibility in filter choice.

There were instances when a close-in station got past the pair of 500-Hz filters. It would have been nice to be able to press a switch and bring a 250-Hz filter into play, but a tweak of the passband tuning knob allowed the operator to copy the desired station just fine. Note that passband tuning works in the CW-narrow mode only if filters are installed at both IFs.

We also found that the notch filter was effective in eliminating QRM. Unlike other radios in this class, however, it is an audio notch filter, rather than an IF notch filter. And the AGC has only fast and slow options, with no AGC-off position.

The CW offset is fixed at about 740 Hz and it's *not* adjustable. A CW pitch of 300 to 400 Hz is where most serious CW operators prefer to listen. Why listen at the lowest pitch you're comfortable with? For one thing, the ability to separate tones by ear is greater at lower frequencies. For another, in the presence of static, a lower pitch stands out from the QRN better. We think that any radio in this price class should have an adjustable CW offset.

The CW sidetone level and the front panel display brightness are internal adjustments that require removal of the covers. An access hatch, or at least access holes for these infrequently adjusted controls, would have been nice.

These radios are the first to offer the display of the 1-Hz digit in an amateur transceiver, although other radios offer 1-Hz tuning steps. We found the 1-Hz step most useful when wanted to really scour the CW portion of a band, looking for signals. The **TS** button is normally used to select the default tuning step size for the VFOs (10, 20 or 50 Hz). Holding the **TS** button in until the radio beeps *twice* sets the tuning step size to 1 Hz *and* displays the (1/4-inch-high) 1-Hz digit. The memories will store and recall frequencies with 1-Hz resolution, but there's no provision for entering a frequency to 1-Hz resolution via the keypad.

One Saturday, Glenn used the IC-738 in the North American QSO Party to make a few hundred phone QSOs. All of these contacts were made using the stock hand mike and several remarks of "good audio" were received during the contest. The audio speech compressor added plenty of punch to the transmitted signal. The compression level is set by a knob on the rear panel, and there is no SSB signal monitor.

The contest began in the afternoon, with activity on 10, 15 and 20 meters. The stock 2.1-kHz SSB filtering was fine during the early part of the contest, when stations on the higher bands seemed fewer and farther apart. Later in the evening, the activity picked up as the action moved to the lower bands. Now things were different.

Attempting to make contacts on 40 meters, with the bone-crunching signals of European broadcast stations pounding into New England, made us wish for something more than just passband tuning! Alas, there are *no* filter options for SSB. The passband tuning shifts only one side of the IF bandwidth, which helps in reducing QRM. On SSB, however, it can be handy to be able to reduce QRM on *both* sides of your frequency (admittedly, at some loss of received voice quality). Passband tuning wasn't much help in this case.

The dual antenna ports on the rear panel *were* helpful. This was a low-power event, so Glenn used the IC-738 barefoot during the contest. He connected a triband antenna for 10, 15 and 20 meters to one antenna jack, and a low-band wire antenna to the other. The radio was configured for "automatic" antenna port selection. As he made band changes, looking for multipliers in the contest, Glenn did not have to worry about which antenna he was on. The radio took care of *all* antenna switching. This is a neat feature, especially if you have two antennas that cover all of your favorite bands, and you don't intend to use an amplifier.

If you do run high power, you will need to feed one of the outputs from the radio to the input of your amplifier. In this case, with the IC-736 you might use one port for HF and the other for 6 meters. For those who require more than one or two antenna ports to do the job, ICOM offers the optional EX-627 antenna selector, which automatically selects from up to nine antennas, as you change bands. The EX-627 has a maximum input power rating of 1000 W PEP.

We used the radios for some HF DXing on the low bands and found that split frequency operation is intuitive and very easy to use. When you press the **SPLIT** button, the word **SPLIT** lights up on the LCD and a second, smaller, frequency readout appears to the right of the main (receive) frequency readout. When you transmit, a small arrow lights up to point to the transmit frequency. This split-operation frequency display feature won nearly unanimous praise during the review period.

One weekend we made a few RTTY contacts. The 10-Hz tuning-step resolution was fine for general tuning and allowed a KAM multimode processor to lock onto RTTY signals. When nearby interference became a problem, the passband tuning usually cut out the interference. For most RTTY operation the passband tuning knob was used in its fully clockwise (or narrow) position when the radio was tuned to (LSB) RTTY signals. Unfortunately, the narrow IF filters are not available in the RTTY mode; this would be a welcome addition.

Propagation didn't allow for any DX contacts on 6 meters during the review period, but we did enjoy using the IC-736 for some local 6-meter SSB and FM contacts. Even if the band isn't open for DXing, you'll meet hams (as we did) who have a wide range of interests and experience. On SSB, for example, we met a relative newcomer to the hobby, excited about testing his newly rebuilt 6 meter antenna—a dipole, 15 feet off the ground. At the other end of the scale, we met an op who was working on his *second* set of 100 DXCC countries on 6 meters!

When the IC-736 was used on 6-meter FM, the rear-panel-mounted fan would occasionally turn on to keep things cool. On the rare occasions when this fan came on, it was whisper-quiet. (There are actually *two* cooling fans; one is internal.) The optional UT-30 programmable tone encoder unit is necessary to gain access to FM repeaters that require subaudible tone access.

One word describes the operation of the internal antenna tuners in these radios: *smooth!* Since the tuner memorizes 100-kHz portions of a band, it doesn't spend a lot of time hunting for a match. The result is that you hardly know the tuner's in line as you flit around on any band.

QST Senior Assistant Technical Editor Dave Newkirk, WJ1Z, noted that the radios suffer from receiver-audio intermodulation distortion (IMD). Audio IMD causes received signals to sound "muddy" on strong SSB signals. The effect on CW is somewhat different: All the audio tones you can hear from the various signals in the passband intermodulate and create audio IMD spurs that don't follow the rhythms of the individual signals. This makes it extremely difficult to pick out one signal in a CW pileup, even with a pair of 500-Hz filters installed.

An Expedition Radio

We weren't able to take one of these radios on a DXpedition, but someone else did. Ken Silverman, WM2C, was one of the first to purchase an IC-736. He wrote about it in the September-October 1994 issue of the *National Contest Journal*, in "The Quest for the Perfect Contest Expedition Rig." Among other things, Ken had this to say after a trip to the Bahamas for the CQ World-Wide CW Contest: "At C6AHX we had my IC-736 and two other HF rigs. The thing that I liked about the IC-736, and still do, is that it's an everything-in-a-box DXpedition radio." Ken then goes on to explain that the IC-736 allows you to operate on 10 different amateur bands with a single radio, and that it includes a built-in power supply (which is selectable for operation from 120 V or 220 V ac mains), meaning one less box to lug through Customs! To set up your station from a DX location, you would need a keyer paddle, some coax, antennas and a laptop PC (for logging). If you visit an existing DX station but wish to use your own radio, all you need to bring is your IC-736 and you'll be on the air, on all modes, from 1.8 to 50 MHz!

Instruction Manual

The *Instruction Manual* shipped with both radios is the same and ICOM inserts separate loose schematic pages for the appropriate model. The 62-page manuals are exemplary, progressing from basic functions through advanced features. Clear diagrams cover the details associated with the controls and connectors on both the front and rear panels. Detailed tables document such things as the accessory jacks. The manuals also include plenty of drawings of the main LCD readout, which are useful when dealing with operations that affect what you'll see on the display. Note: Early versions of the IC-736 had their own, separate, instruction manual. Recent radios, however, come with a single, combined, instruction manual that covers both the IC-736 and the IC-738.

Conclusions

The introduction of the IC-736 has generated a lot of interest here in the US, particularly since it offers both 100 W power output and an internal antenna tuner that operates on 6 meters.

The IC-736 offers the possibility of a simplified station design. Because of its built-in power supply, there's no need for a separate power supply. Simply plug the rig into a wall outlet, attach a good ground, some antennas, and that's it—you're on the air, on up to 10 amateur bands, with a single radio!

ICOM deserves praise for including some good features in both the IC-736 and the IC-738—the dual, user-configurable, antenna ports, the handy memo pads, the smooth antenna tuner, the useful split-frequency function—*and* the ability to display the radio's 1-Hz tuning resolution! Not so deserving are the audio IMD problems we noted, along with AF (rather than IF) notch filtering, AF (rather than RF) speech compression and the fixed CW offset.

Demanding operators such as contesters and DXers may wish they had features such as selectable CW offset, optional SSB filtering, an SSB speech monitor, or the ability to select narrow filtering in any mode. You may not find *all* of the features you might want in a single radio, but some combination of these, and more, can be found in competing radios. For instance, you'll find much more flexible filter selection in the Kenwood line, or an SSB transmit IF shift circuit in some Yaesu offerings. And you'll find selectable CW pitch in competing radios.

While the IC-738 and IC-736 do not have a profusion of high-tech features, this may be what some operators (those who follow the KISS principle of "keep it simple, stupid!") will *like* about these radios. If you've been looking for a full-size radio that offers good performance and a reasonable number of bells and whistles, the IC-736 or IC-738 may just be what you've been searching for.

Thanks to the following hams for their contributions to this review; Dave Newkirk, WJ1Z; Larry Wolfgang, WR1B; Bill Kennamer, K5FUV; Warren C. Stankiewicz, NF1J; Glenn O'Donnell, N3BDA; and Mike Gruber, WA1SVF, in the ARRL Lab.

Suggested retail prices: IC-736, $2385; IC-738, $1935; FL-52A 500-Hz 2nd IF filter, $178; FL-100 500-Hz 1st IF filter, $96; IC-PS15 dc power supply $330; UT-30 tone encoder, $40; CT-17 computer interface, $123. Manufacturer: ICOM America Inc, 2380 116th Ave NE, Bellevue, WA 98004, tel 206-454-8155; fax 206-454-1509. QST