QST Product Review
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ICOM IC-208H Dual-Band FM Transceiver

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W1AW Station Manager

Earlier this year, I had fun reviewing the Yaesu FT-2800M 2 meter FM transceiver. So I was quite pleased when the IC-208H presented itself as another radio (this time a dual-band) I got to take home and play with.

Some dual band mobile radios include bells and whistles such as cross-band operation. While some find that of use, this radio is for those looking for basic radio function and corresponding straightforward and intuitive operation out of the box.

Since this rig will probably end up in a mobile setting, its relatively small size (approximately 6×2×8 inches) makes this an easy task. As with most mobile rigs, the '208H comes equipped with a mounting bracket and complete hardware. If you wish to remote mount the body of the transceiver, a separation cable for the control head is included.

As with radios of similar design, the chassis is sturdy aluminum, shaped in the form of a heatsink. Given its small size and 55 W maximum output on VHF (50 W maximum on UHF) you need a little heatsinking to dissipate all that heat!

The Radio at a Glance

Right away, you can see the simplicity of the rig’s design. There’s the standard fare of knobs—VOL, SQL, BAND and so on. The five backlit buttons on the bottom of the display allow for selecting the VFO or memory, scanning, priority, tone (CTCSS), transmit power, offset, monitor and DTMF tones. The five buttons serve dual functions.

The DIAL, VOL and SQL knobs are plastic (non-rubber coated) and have a decent feel to them. The DIAL knob is detented, but the feel is pretty tight, and there’s no concern about flying past a desired frequency. Above and below the DIAL knob you’ll find two buttons. One is for controlling the menu system and the LOCK function, and the other is for memory writing. A release latch for the control head is on the main body of the transceiver, located to the right of the DIAL knob. The PWR button is located between the VOL and SQL knobs. This particular button is not backlit when power is applied, however. In dim light, you may find yourself feeling around for it a bit, at least until you get used to the radio.

Looking left to right on the rear of the radio, you first see the miniature 6-pin DIN connector used for 1200/9600 baud packet (depending on which pin you use). Next, an 1/8 inch jack for an external speaker and the power line pigtail that terminates to a 2-pin standard locking power plug. Next to the power line is the cooling fan. The antenna connector (a standard SO-239) is located on the opposite side of the fan is chassis-mounted and rounds out the back of the radio. The speaker is located beneath the radio, so you’ll want to use the mounting bracket to lift the bottom of the rig for the most audible sound.

The packet, external speaker and antenna connectors have a small part of the radio’s heat sink located above them. However, the close proximity of the heat sink does not impede access to these connectors.

The LCD display is approximately 1×2 inches and displays all the various functions. The display has clear, easy to read letters and numbers. When you first activate the radio, you get a nice amber screen. If you don’t like that color, you can change it to yellow or green. This change is performed as part of the SET function.

And yes, you can change the brightness level as well! As mentioned above, the DIAL knob is also used to change between the bands. Band changing (7 band segments in all) is accomplished by depressing the BAND button, located in the middle of the DIAL. While the small function buttons are always backlit green, the BAND button color changes in step with the display.

Powering Up

When power is applied you’re greeted with the last frequency in use. (This is a good thing, especially if you have a four-year-old interested in radios, such as we do. You’d know if the radio was played with!) In the case of the '208H, the default frequency was 146.010 MHz. A quick glance at the manual on how to change frequency, and I was ready to work my favorite repeater. As long as I was using just a simple ground plane antenna, the station gave me a good report, but noted that the audio seemed just a bit too low—that I almost seemed to be talking far away from the mike. I changed the microphone sensitivity (in the SET mode) to high (the default is low), and this change improved the audio. Her audio didn’t sound that bad either. It was clear and readable. Even with the volume cranked all the way, understanding the station was no problem. Trips to other repeaters (and simplex operation) yielded similar audio results.

This rig operated well on 440 MHz as well as on 146, and the 50 W on that band may be a real plus for some. In this area the

Bottom Line

ICOM offers another easy-to-use VHF-UHF radio, this one with 55 W of punch in a small package.
Table 1
ICOM IC-208H, serial number 0501278

<table>
<thead>
<tr>
<th>Manufacturer's Claimed Specifications</th>
<th>Measured in the ARRL Lab</th>
</tr>
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<tbody>
<tr>
<td>Frequency coverage: Receive, 118-174, 230-550, 810-1000 MHz (cell blocked); transmit, 144-148, 430-450 MHz.</td>
<td>Receive, as specified; transmit, 144-148, 420-450 MHz.</td>
</tr>
<tr>
<td>Power requirement: Receive, 1.0 A (max audio); transmit, 12 A (high power).</td>
<td>Receive, 0.62 A; transmit, 11.4 A. Tested at 13.8 V.</td>
</tr>
<tr>
<td>Modes of operation: FM, AM (receive only).</td>
<td>As specified.</td>
</tr>
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</table>

**Receiver**

AM sensitivity, 10 dB S/N: 118-174 MHz, 0.45 µV; 230-300 MHz, 0.79 µV; 300-500 MHz, 0.63 µV.

FM sensitivity, 12 dB SINAD: 118-174 MHz, 0.18 µV; 230-300, 500-550 MHz, 0.32 µV; 300-500 MHz, 0.22 µV; 810-1000 MHz, 0.45 µV.

FM adjacent channel rejection: Not specified.

FM two-tone, third-order IMD dynamic range: Not specified.

FM two-tone, second-order IMD dynamic range: Not specified.

S-meter sensitivity: Not specified.

S9 indication: 146 MHz, 1.8 µV; 440 MHz, 2.2 µV.

Squelch sensitivity: < 0.13 µV.

Receiver audio output: 2 W at 10% THD into 8 Ω; 3.2 W at 8.5% THD into 8 Ω. 1

Spurious and image rejection: 60 dB.

20 kHz channel spacing: 146 MHz, 63 dB; 440 MHz, 66 dB.

40 kHz channel spacing: 146 MHz, 64 dB; 440 MHz, 66 dB; 10 MHz channel spacing: 146 MHz, 92 dB; 440 MHz, 78 dB.

Transmitter

Power output (H/M/L), 144 MHz: 55/15/5 W; 430 MHz, 50/15/5 W.

Spurious-signal and harmonic suppression: 60 dB.

Transmit-receive turnaround time (PTT release to S9 signal, 146, 440 MHz, 164 ms.

Bit-error rate (BER), 9600-baud: Not specified.

Receive-transmit turnaround time (tx delay): Not specified.

Bit-error rate (BER), 9600-baud: Not specified.

1 Volume control is stepped; next higher step produced 12% THD.

Activity level on 440 didn’t allow exhaustive testing, but contacts through the local 440 repeater yielded good reports.

I operated mobile for a few days and found the rig performed as expected. Even with sunlight streaming through the windshield, I was still able to read the LCD screen, although glare was there.

I did notice that the viewing angle was a bit critical. I found that while I could see the display clearly when looking down at it or head on, it appears to wash away when viewed from an angle. The user might take this into consideration when mounting the radio in a vehicle. When operating mobile, I found receive audio was relatively clear. Tooting about on the highway with the window opened didn’t affect my hearing other stations too much.

Running at 5 W (LOW) the heat sink got just a tad warm. In my truck, I noticed it got warmer still running at a slightly higher power (there are three power levels—55 [50 on UHF], 15 and 5 W). Since the top of the radio consists of nothing but small heat sink fins, the heating will probably be of little consequence, assuming there’s good airflow.

The cooling fan should take care of any additional heat buildup. I did find the operation of the fan to be just a tad annoying. As stated in the manual, the fan has two settings: “on all the time” and automatic. The former is pretty self-explanatory. However, when set to automatic, the fan starts at the beginning of a transmission, and will continue to run for two minutes or until the internal temperature reaches a preset level, whichever

Note: Unless otherwise noted, all dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.

*Measurement was noise limited at the value indicated.

**Table 1**
comes later. So if you key the rig for five seconds, the fan runs for two minutes. Consequently, if you transmit for, say, five minutes, the fan will run all that time, including the two minutes after, and probably any additional time thereafter until the temperature has settled down.

While no one commented on hearing the fan during transmissions, you can hear it, especially if the outer operating environment is open or lacks noise. It would be preferable if the fan had more settings. On the other hand, overcooling minimizes the possibility of burnout.

Since heat buildup can be an issue no matter what the fan settings, this should be a consideration when finding a mounting location for the '208H. The operating manual talks about proper mounting procedures to reduce heat build-up.

Speaking of mobile operation, something I like to do on occasion when reviewing radios is sit in the parking lot here at ARRL Headquarters and perform a casual test for IMD. I’ll tune the radio to a repeater frequency not that distant from W1AW’s 2 meter code practice/bulletin frequency (147.555 MHz) to see if the station blasts through. Measuring and specifications aside, sometimes real life applications offer the best insight. As expected, I didn’t hear W1AW’s 150 W signal on the repeater frequency. I took this as a sign that the radio’s apparent third order IMD dynamic range is quite good. The results from the ARRL Lab are given in Table 1.

What’s your Function?

Some might call me lazy, but I like the Auto Repeater function (often referred to as ARS, or automatic repeater shift, but not in this radio). While it defaults to on, this function is user-changeable. The radio is shipped with the certain frequency offsets (based on the band plan) already programmed. For example, in the US, the shift is generally ±600 kHz on 2 meters. Depending on the part of the band, the shift can be either +600 or −600 kHz. As long as this function is on, the '208H will automatically determine the correct shift to use. This is pretty handy, especially if you are repeater hopping—as long as you are using machines with standard shifts.

I enjoy monitoring the NOAA broadcasts. As with many recent VHF Amateur Radio offerings, this radio has 10 preset NOAA channels and a Weather Alert option. The '208H can monitor selected weather channels for the emergency tone alert broadcast by NOAA during severe weather situations. This function can be turned off in the SET menu.

The '208H also has the standard fare found in many transceivers: automatic power off, time-out timer (for those long-winded folk), priority watch monitoring and channel skip. If you like playing around with Menu functions, this rig’s got 28 in all. You can change nearly everything from the Dial Step (5, 10, 12.5, 15, 20, 25, 30, 500, 100 and 200 kHz) to the CTCSS tone. The scanning function is accomplished by setting band scan limits, memory scan or programmed scanned frequencies.

If you wish to clone the programmed information from one IC-208H into another, this function is performed via the external speaker jack using the OPC-474 Cloning cable and CS-208 Cloning software.

**Programming**

Programming the radio or memories can be a bit tedious at first. For example, to program in a memory channel, you first make sure you’re in VFO mode. You select your frequency, including any CTCSS tones, shift and so on. Next, you depress the S.MW/MW button (located beneath the DIAL knob). The M indicator and a channel number will blink. Rotate the DIAL knob until you reach your desired memory channel. Press the S.MW/MW button again for at least a second to read the data into memory.

While memory programming is pretty simple, other functions require a bit more “button pressing.” So a good familiarization of the manual is the order of the day.

**And about those Memories?**

The '208H offers 512 memory channels. There are 500 channels assigned to 10 banks (A through J). The justification for these banks is ease of memory management. They’re also part of a system ICOM calls the Bank Link System. You can pick and choose banks of memory for scanning.

The 12 other channels consist of 5 pairs of scan edges and 2 call channels. This does not include the weather channels since these particular frequencies are not user changeable within the radio. (You can program in a generic NOAA frequency if desired.)

You can assign an alphanumeric title to a memory channel. Selecting the letters and numbers is accomplished by using the DIAL knob and MW button. You get the full complement of uppercase letters, numbers and some punctuation marks.

**The Versatile Microphone**

The supplied microphone is the multi-function ICOM DTMF HM-133. Despite the fact that it feels like thin plastic, it seems pretty sturdy. The keypad allows for direct frequency entry, in addition to a whole host of other functions. (In fact, most of the radio’s functions can be controlled via the microphone.) Unlike some radios where you can simply begin punching in numbers, on this particular microphone you need to depress the ENT C button first. Otherwise, you’ll either change a setting or two, or have the rig beep at you. A way around this is to lock the mic buttons (with the exception of the two function keys) in the menu. With the exception of the two function keys, this microphone is not programmable. However, the IC-208H can use microphones that can be programmed, such as the HM-118N. The buttons are backlit (green) all the time.

The coiled microphone cable extends a good 5 feet. Both ends of the cable terminate into RJ45 plugs. One plugs into the rig and the other into the microphone. (It’s not a molded cable.) The mic jack (located on the front of the transceiver’s main body) is a bit recessed, so thick-fingered folk may have a bit of a time connecting the mic.

Since receiver coverage goes beyond the regular 2 meter/70 cm spread, your entire operating frequency must be keyed in. For example, unlike some older rigs, the 14x.xxx/44x.xxx is not automatic. If you don’t wish to use the microphone for frequency entry, you can of course use the DIAL knob.

The lettering on the mic buttons is red, black and green, depending on the function. Various buttons mirror the function buttons located on the transceiver. In some instances, you need to use the microphone buttons to program one function or another. In cases such as these, the manual will indicate a mic button is needed through the use of a small picture of the microphone next to the programming description.

**Manual**

The 80 page manual is laid out in an easy to read format. The manual starts off with the basic functions and leads the user into the more advanced features. The later pages are devoted to menu functions and programming. As long as users take the time to familiarize themselves with the manual, there should be little problem operating or programming the rig.

The initial installation section is a bonus, too. A few pages are devoted to such issues as RF field exposure, antennas and safety. Reviewing these pages beforehand will not hurt.

What I found interesting was an additional manual that contained nothing but “Ham Terminology.” For example, if a ham is uncertain about the term “Baud,” she can quickly look up this term in this manual. The plus side to this is that the operating manual is not crowded with additional pages devoted strictly to user terminology.
Nice, Simple, Powerful

I like that the IC-208H is not so overwhelmed with additional features that it is intimidating to use. Those extra functions are great for hams who enjoy using them. But, for the average ham who is looking for a simple dual-band FM transceiver with just enough bells and whistles, this rig fits the bill. And the 55 W capacity on VHF is welcome in a relatively small radio.

As an aside, I’m also glad to see more radios are including (as a matter of course) weather channels. Given that many hams are involved with SKYWARN and other similar activities/operations, the weather alert function (used in conjunction with the priority watch function) further enhances a ham’s ability to get the job done in times of need.