IC-7800

HF/50MHz Transceiver

QST Product Review

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ICOM®

PRODUCT REVIEW

ICOM IC-7800 HF and 6 Meter Transceiver Revisited

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A few years ago I had an opportunity to use one of the first IC-7800s for a weekend contest and contribute to a Product Review in August 2004 *QST*.[1] Since that review was published, ICOM has made some changes and improvements to its flagship transceiver (see the sidebar, "What's New in this IC-7800?"). Enough had changed that we decided to test one of the newer IC-7800s, and this time I got to spend a lot more time getting to know the radio.

I feel strange writing a review of a piece of equipment that is so "top-of-the-line." To begin this article I tried asking myself the same questions anyone else would ask. How could there really be anything substantially wrong with gear like the IC-7800? Is it possible that this radio is *that* much better than less expensive radios on the market that I should buy it? Do I want a new car, or a new radio?

I like cars and trucks too. So what? Well, I enjoy reading reviews in the automotive magazines too. The magazine staff writers are in the position of reviewing vehicles that run the spectrum from entry level to exotic sports or luxury car — vehicles valued from about twelve grand to a quarter million dollars or more.

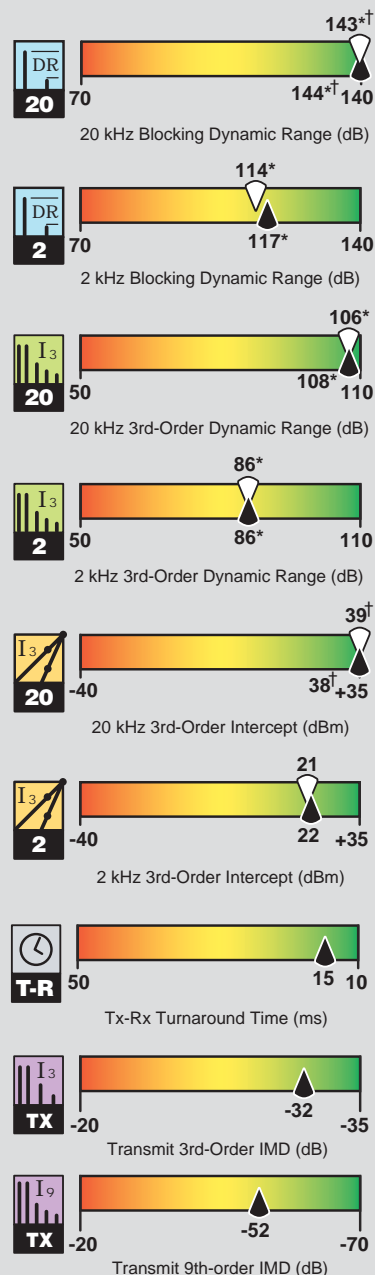Thinking about these reviews, and espe-

cially about the "cheaper car" reviews, there really aren't any junkers in the bunch. Sure some of today's cars have small engines or noisy passenger compartments or look goofy, but it is hard to buy junk. When I read the reviews of high-end cars with a reputation for performance, looks, value and reliability, well, I almost always laugh at the *faults* found by the reviewers. The faults are like these: "The Ferrari's cup holders wouldn't take a 20 ounce bottle" or "the Jaguar's back seat was nearly useless — even for 8 year olds."

Reviewing an IC-7800 is like that. You and I are not going to find a whole lot wrong or unlikable about this radio. To me, this radio is like a top-of-the-line BMW 7-series performance/luxury car. This radio may not be for everyone — you can still work a lot of good stuff with any of ICOM's less expensive radios, just like you can get around in a car a lot less expensive than a BMW 760i. But with the IC-7800, ICOM brings the 7-series equivalent to the amateur market.

The IC-7800 isn't a box of entirely new technology. It's not a box that takes you into a world of operating experiences that no human has ever witnessed (although I really hoped, deep down, that when I tuned around 40 meters I would have such an experience). It *is* a box that offers ICOM's very best performance, styling and features, and there are lots of reasons to want one. In this review I will try to convey some thoughts about the '7800 that pertain to performance, value and ego.

[1] J. Hallas, "ICOM IC-7800 HF and 6 Meter Transceiver," Product Review, *QST*, Aug 2004, pp 64-70. Product reviews are available on the Web at **www.arrl.org/members-only/prodrev/**.

Bottom Line

In the spirit of continuous improvement, ICOM has made some changes to its flagship IC-7800. A 3 kHz roofing filter and other upgrades make noticeable improvements in performance, keeping the radio competitive in its class.

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Performance

Just like with cars and trucks, performance sells in the amateur market. To the active ham, "performance" includes receiver operation, transmitter output power and purity, voice mode characteristics, monitor scope options, front panel layout, ease of use, data mode operations, accessory and computer interfacing, filter and DSP performance, audio output clarity and quality and the list goes on and on. You know what? It all works great.

I recently met a radio that I had never before seen or even heard of, one that's not sold in the amateur market but to commercial users. The manufacturer claims that the receiver can't really be improved until the laws of physics change. Well, I haven't used it yet, but even though I wish and wish, I doubt that when I use it I am going to be transported into a parallel dimension of amateur operating pleasure. I also don't think I am going to have a big fight with my wife over the 50 grand it would take to put one of those alien rigs in my little shack.

A New Roofing Filter

The biggest change in this IC-7800 is the inclusion of a 3 kHz roofing filter in addition to the 15 kHz and 6 kHz choices found on the original. A roofing filter limits the width of the passband early in the receiving chain to attenuate nearby signals that could interfere with the one you're trying to copy. Until a few years ago, transceivers typically used a single roofing filter, say 15 kHz, and then depended on narrow filters and/or DSP functions later in the receiver to sort things out. The wider roofing filters do a good job of minimizing problems from signals well up and down the band, but they don't help with signals within their passband. On SSB and CW, there can be *a lot* of nearby signals within a 15 kHz passband, and so newer receiver designs include multiple, selectable roofing filters to help improve receiver performance in the presence of strong signals on adjacent frequencies.

The ARRL Lab tests reported in Table 1 show some noticeable performance improvements in all of the signal handling tests (blocking dynamic range, two-tone third-order IMD dynamic range and third-order intercept). Although the new version tested slightly better across the board, the numbers at 5 kHz signal spacings show the benefit of the new 3 kHz roofing filter.

The original IC-7800 was no slouch, turning in third-order IMD dynamic range numbers of more than 100 dB at 20 kHz signal spacing. Inside the 6 kHz roofing filter's passband it was a different story, with dynamic range dropping to the high 80s at 5 kHz signal spacing. While that's still

excellent performance compared to most radios, it fell short of the competition's best performers. With the 3 kHz roofing filter, the new IC-7800 jumped to the mid-90s at 5 kHz spacing. Blocking dynamic range is better too, up more than 10 dB to 127 dB at 5 kHz spacing.

Of course the Lab has raised the bar and now reports measurements at 2 kHz signal spacing, once again inside the roofing filter's passband.[2] Here the '7800 measures a very respectable 86 dB IMD dynamic range, better than other radios we've tested with 3 kHz roofing filters. For CW operation, an even narrower roofing filter would improve close-in performance, as demonstrated on a radio from another manufacturer that we recently tested (mid-90s at 2 kHz spacing).

Enough Lab Tests. How's it Work?

Real world operating experience bears out the IC-7800's test numbers. I had a bit of an "ah crud" moment the first night I powered up this rig and listened to hash on TX5T on 80 meter CW. The pileup was from 1 to 3 kHz up and loud and local. The noise was noticeable, but I hadn't gotten into the manual yet and discovered that each band stacking register has selectable roofing filter choices. I hadn't turned on the 3 kHz filter yet. In subsequent operation I have not heard this same interference.

[2]M. Tracy, "ARRL Lab Data Presentation Changes," Product Review, *QST*, Mar 2006, p 64.

During the CQ World Wide DX CW contest I used the '7800 extensively (exclusively on the second day because I enjoyed it so much) and both afternoons I snuggled into frequencies in the ultra competitive lower 10 kHz of 40 meters. I didn't move the VFO during my two hour runs each day down there. Turning on the 250 Hz filter and once in a while adjusting the passband tuning allowed my most enjoyable operating ever on my favorite band. My Yagi was fixed at 52°, but I got a kick out of hearing VK3BXA and JA6BZI calling in via the long path and just marveled at how sensitive this receiver is. Those signals were not loud. I probably could not have heard them on my venerable and much-loved TS-930S (the 1984 Nissan Maxima in car parlance.)

CW is a joy with this rig. Some rigs have issues when you try to use the internal keyer and computer keyer when both are hooked up. This isn't a problem with the IC-7800. I hooked up a Bencher to the front panel jack that controls the internal keyer, and I hooked up another paddle (an Anthony Welsh, Ukrainian-made, brass CT-73 if you must know) through an outboard keyer to the back panel key jack. I also keyed the rig with the computer running *CTWIN* software. They all worked flawlessly for 48 hours. The built-in memory keyer takes care of most everything normally tackled by the outboard keyer, including sequential serial numbers for contests.

I spent a little less time using sideband, but use that mode I did. With a Heil Pro-Set headset and HC-4 cartridge, I had no trouble adjusting my audio to perfect levels with and without compression turned on. Audio reports were fine. The radio's built-in equalizer settings offer a lot of flexibility. The '7800 comes ready to operate on 60 meters and the manual shows how to match the FCC's specified center frequencies. It's easy to put those frequencies into memories.

Two Receivers

The '7800 provides two completely independent identical receiver circuits. Dual receiver capabilities are described in a recent *QST* article that you may wish to look at if you're not familiar with the idea.[3] While ICOM describes this as a DUAL WATCH function, it's important to note that it goes far beyond the DUAL WATCH function of their IC-756PRO series radios. In those radios, the function applies to two frequencies on the same band with the outputs of both combined in a single audio channel.

With the '7800 I was able to listen on both frequencies while operating split chasing a rare one. I could have one signal on each side of my stereo phones and keep track of them separately. I could also listen to a different band on the second receiver — I did that briefly during the ARRL 10 Meter Contest when I parked the second receiver 6 meters to listen for band openings while running the contest on 10. If I grew tired of listening to 6 meter white noise, I could put that receiver on the spectrum scope to watch for openings while I used both ears to concentrate on my 10 meter contacts.

Each receiver has identical sets of controls on the front panel — left button for main receiver and right button for second receiver. And when you are operating split, you know it. A very bright, white LED positioned directly above the screen in the middle of the radio lights up when you push the SPLIT button.

There are, of course, people out there who have evaluated many radios and receivers and will find that this radio, along with most others, will not achieve their high standards in one receiver characteristic or another. Well, that's fine. In real world operating, another dB or two of dynamic range or sensitivity really won't amount to more than a little larger backseat in a supercar. The IC-7800 hears *very* well.

The Front Panel and that Gorgeous Screen

Okay, for all you guys and gals who

[3]J. Hallas, "Dual Receivers — When One is Not Quite Enough," *QST*, Feb 2007, pp 61-62.

Table 1
ICOM IC-7800, serial number 0201528

Manufacturer's Specifications

Frequency coverage: Receive, 0.03-60 MHz; transmit, 1.8-2, 3.5-4, 5.33-5.40, 7-7.3, 10.1-10.15, 14-14.35,18.068-18.168, 21-21.45, 24.89-24.99, 28-29.7, 50-54 MHz.

Power requirement: 85-265 V ac; receive, 210 VA (max audio); transmit, 800 VA (200 W out).

Modes of operation: SSB, CW, AM, FM, FSK, AFSK.

Receiver

SSB/CW sensitivity, 2.4 kHz bandwidth, 10 dB S/N: 0.1-1.8 MHz, 0.5 µV; 1.8-30 MHz, 0.16 µV; 50-54 MHz, 0.13 µV.

AM sensitivity, 6 kHz bandwidth, 10 dB S/N: 0.1-1.8 MHz, 6.3 µV; 1.8-30 MHz, 2 µV; 50-54 MHz, 1 µV.

FM sensitivity, 12 dB SINAD: 28-30 MHz, 0.5 µV; 50-54 MHz, 0.32 µV.

Blocking dynamic range: Not specified.

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

Third-order intercept: Not specified.

Second-order intercept: Not specified.
FM adjacent channel rejection: Not specified.

Measured in the ARRL Lab

Receive and transmit, as specified.

As specified.

As specified.

Receiver Dynamic Testing

Noise Floor (MDS), 500 Hz filter:

	Preamp off	Preamp 1/2
1.0 MHz	–125 dBm	–135/–138 dBm
3.5 MHz	–124 dBm	–135/–140 dBm
14 MHz	–123 dBm	–136/–141 dBm
50 MHz	–128 dBm	–140/–142 dBm

10 dB (S+N)/N, 1-kHz tone, 30% mod:

	Preamp off	Preamp 1/2
1.0 MHz	3.4 µV	1.0/0.71 µV
3.8 MHz	3.2 µV	0.71/0.45 µV
50 MHz	3.3 µV	0.74/0.60 µV

For 12 dB SINAD:

	Preamp off	Preamp 1/2
29 MHz	1.2 µV	0.28/0.2 µV
52 MHz	1.1 µV	0.3/0.22 µV

Blocking dynamic range, 500 Hz filter:

	20 kHz	5/2 kHz
	Preamp off/1/2	Preamp off
3.5 MHz	143*/143*/140* dB	127*/114* dB
14 MHz	144*/143*/142* dB	127*/117* dB
50 MHz	143*/138*/138* dB	122*/110* dB

Two-tone, third-order IMD dynamic range, 500 Hz filter:

	20 kHz	5/2 kHz
	Preamp off/1/2	Preamp off
3.5 MHz	106*/104*/103 dB	95*/86* dB
14 MHz	108*/104/103 dB	96*/86* dB
50 MHz	101/99/96 dB	88/79* dB

	20 kHz	5/2 kHz
	Preamp off/1/2	Preamp off
3.5 MHz	+39/+27/+16 dBm	+26/+21 dBm
14 MHz	+38/+26/+14 dBm	+27/+22 dBm
50 MHz	+34/+18/+12 dBm	+25/+19 dBm

Preamp off/1/2, +91/+82/+80 dBm.

20 kHz offset, both preamps on: 29 MHz, 73 dB; 52 MHz, 73 dB.

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have giant hands and fingers, I'm warning you now: I'm not going to comment about the specific layout of buttons and knobs, or placement of same on this box. This front panel is full. I love it by the way. If you can't fit a finger in there to push the NOTCH button, well, I know of some equipment that Joe Walsh dropped off at W1AW that will be more to your liking — and that stuff glows.

One of the reasons this front panel is so full is the simply amazing 7 inch color screen. It is so crisp and colorful and versatile, it looks like something that should be found in the dash of a Lexus or hooked up to a Playstation3. I don't have a complaint about this screen, but a comment. For most

people, the normal operating position at a desk makes you look down at the screen at about a 45° angle. For me, that makes the screen's colors look slightly washed out. If I bend over a bit, and look more straight-on, it's like the difference between taking underwater pictures of tropical fish with and without a flash.

There is a video output on the back of the radio for an external monitor hookup. That sounds like a fine idea, but my operating desk is already full. It would be hard to add another full-size flat panel, and for sure it is difficult to get this radio up and sitting at eye level. A really cool solution would be for ICOM to offer a sweet little remote screen that the owner could put anywhere on the

Manufacturer's Specifications

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

S-meter sensitivity: Not specified.

Squelch sensitivity: SSB, CW, RTTY, 5.6 μV;
FM, 1 μV.

Audio output power: 2.6 W into 8 Ω at
10% THD.

IF/audio response: Not specified.

Spurious and image rejection: HF & 50 MHz,
(except IF rejection on 50 MHz): 70 dB.

Transmitter

Power output: HF & 50 MHz: SSB, CW, FM,
200 W (high), 5 W (low); AM, 50 W (high),
5 W (low).

Spurious signal and harmonic suppression:
≥60 dB on HF, ≥70 dB on 50 MHz.

SSB carrier suppression: ≥63 dB on HF,
≥73 dB on 50 MHz.

Undesired sideband suppression: ≥80 dB.

Third-order intermodulation distortion (IMD)
products: Not specified.

CW keyer speed range: Not specified.

CW keying characteristics: Not specified.

Transmit-receive turnaround time (PTT
release to 50% audio output): Not specified.

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

Composite transmitted noise: Not specified.

Size (height, width, depth): 5.9 × 16.7 × 17.2 inches; weight, 55 pounds.

Price: IC-7800, $10,600.

Third-order intercept points were determined using S5 reference.

*Measurement was noise-limited at the value indicated.
**Default values; bandwidth and cutoff frequencies are adjustable via DSP.
***Varies with PBT and PITCH control settings.

Measured in the ARRL Lab

20 kHz offset, both preamps on:
29 MHz, 77 dB;* 52 MHz, 78 dB.*
10 MHz offset: 52 MHz, 110 dB.

S9 signal at 14.2 MHz: preamp off, 52 μV;
preamp 1, 14 μV; preamp 2, 6.8 μV.

At threshold, both preamps on: SSB, 0.83 μV;
FM, 29 MHz, 0.08 μV; 52 MHz, 0.12 μV.

2.6 W at 10% THD into 8 Ω.

Range at –6 dB points, (bandwidth):**
CW (500 Hz filter): 448-916 Hz (468 Hz);***
USB: 215-2737 Hz (2522 Hz);
LSB: 215-2741 Hz (2526 Hz);
AM: 134-3180 Hz (3046 Hz).

First IF rejection, 14 MHz, 120 dB;
50 MHz, 79 dB; image rejection,
14 MHz, 123 dB; 50 MHz, 79 dB.

Transmitter Dynamic Testing

HF: CW, SSB, FM, typically 205 W high,
<2 W low; AM, typ 52 W high, <2 W low;
50 MHz: CW, SSB, FM, typ 185 W high,
<2 W low; AM, typ 44 W high, <2 W low.

HF, 63 dB; 50 MHz, 67 dB.
Meets FCC requirements.

As specified on HF, 61 dB on 50 MHz.

74 dB.

3rd/5th/7th/9th order (worst case band):
HF, –32/–49/–52/–52 dB PEP;
50 MHz, –33/–48/–57/–58 dB PEP.

6 to 48 WPM.

See Figures 1 and 2.

S9 signal, 15 ms.

SSB, 10 ms; FM, 9 ms.
Unit is suitable for use on AMTOR.
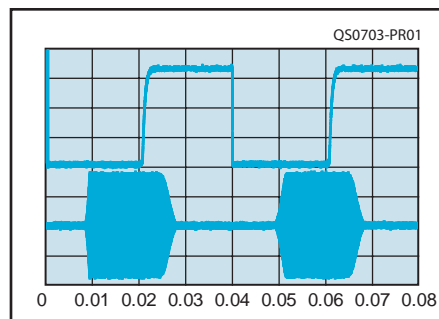
See Figure 3.

Figure 1 — CW keying waveform for the ICOM IC-7800 showing the first two dits in full-break-in (QSK) mode using external keying. Equivalent keying speed is 60 WPM. The upper trace is the actual key closure; the lower trace is the RF envelope. (Note that the first key closure starts at the left edge of the figure.) Horizontal divisions are 10 ms. The transceiver was being operated at 200 W output at 14.2 MHz.
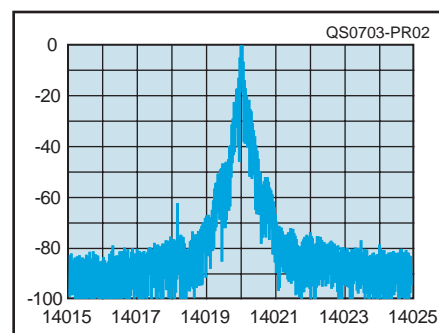

Figure 2 — Worst-case spectral display of the ICOM IC-7800 transmitter during keying sideband testing. Equivalent keying speed is 60 WPM using external keying. Spectrum analyzer resolution bandwidth is 10 Hz, and the sweep time is 30 seconds. The transmitter was being operated at 200 W PEP output at 14.2 MHz.
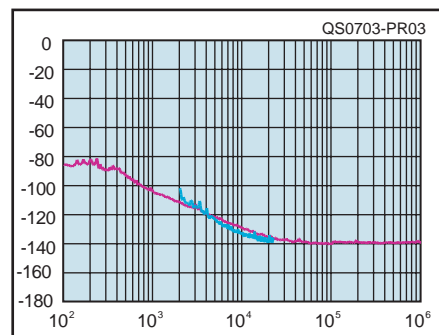

Figure 3 — Worst-case spectral display of the ICOM IC-7800 transmitter output during composite-noise testing. Power output is 200 W at 14.2 MHz. The short blue trace shows the composite-noise test results from the original IC-7800 with a correction factor applied. (See May 2006 *QST*, p 70, for more information on the differences between the old and new test procedures.) The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 100 Hz to 1 MHz from the carrier.

desk. ICOM provides feet extensions to give the rig a few more inches of authority, and I use them. The rig also comes with rack handles if you want to install them.

Overall I found the menus easy to work with. Navigating throughout is painless, and the menu choices are in English and for the most part intuitive without constant reference to the manual. It seems that you are always just a button push or two away from being back to "home" on the screen. I think the number of fixed buttons and functions that are one push away is just right. For lesser used options it seems ICOM put a lot of thought into how far they are programmed into the menu buttons — mostly not very far. Certainly one of the advantages of the large box is that more front panel controls are possible.

Digital Modes

I spent a lot of time with the '7800 on RTTY. Old mode, new transceiver, yeah, that's ham radio. But, what a joy it is to use thanks to the built-in transmit and receive features! All I had to do was borrow a USB keyboard and plug it into the back of the radio. I did need to open the owner's manual again and figure out how to get to the RTTY decoding screen and then how to program four of the eight RTTY memories.

I then learned to push the 1/4 tuning button (reduces the user-selectable tuning rate) so that it was even easier to line up the RTTY

Figure 4 — The IC-7800's RTTY and PSK decoder and tuning indicator make operating digital modes a joy. Just plug in a keyboard and give it a try.

signals on the screen's built-in *waterfall* display, and I filled that log up fast. For split RTTY operation the 1/4 tuning function can also be turned on for the second VFO. The F12 button on the keyboard toggles the transmitter on and off and chewing the rag on RTTY becomes a trivial exercise.

If operating RTTY is not your sole reason for living, and you just like to play with RTTY (or PSK) once in a while, you can go ahead and sell the interface box, the cables, the computer and all that other stuff.

Reading the Owner's Manual

Come on, how many of us have read the owner's manual for the family sedan? It is easy to get on the air immediately with this radio, especially if you are familiar with ICOM radios. But there are so many features that reading the manual is beneficial — and this manual is excellent in most respects. Not only are the instructions good, there are explanations describing most of the operations and break-out boxes with little tidbits that hit the mark.

I will admit to floundering for a while when I was trying to hook-up my Beverage receive antenna's feed line. The manual is not clear on how to do this particular task. I expected to find the instructions in the "Functions for Receive" section but eventually found it under "Antenna Tuner Operation."

When I first decided to try hooking up a separate receive antenna, I did the usual girding-of-my-loins in dread of having to wire a DIN plug or some other complicated method of breaking the receive line. But it turned out to be incredibly easy. ICOM uses

the ANTENNA 4 connector on the back of the rig exclusively for the RX antenna — if you have one. I didn't even have to dig up a phono plug or a BNC connector — just a normal jumper from my shack's antenna patch panel to the back of the rig. Then, a few minutes figuring out how to program the memories and it was done. Now, whenever I switch the rig to 160 meters the rig automatically selects ANTENNA 4 for listening and ANTENNA 1 for transmitting (it shows up as ANT 1/4 on the screen.) Each band register can be programmed to remember antenna port settings.

I haven't figured out an easy way to listen on the transmit antenna yet, other than pushing the front panel's ANTENNA selector button three times to get to ANTENNA 1 for transmit and receive. If you want to insert a bandpass filter or an external preamp, ICOM has provided a couple of inputs on the back of the rig. These use BNC connectors and are normally jumpered. (The radio's built-in preamp works very well with my Beverages, though, so I didn't try this.)

After I tried all the menu options, operating the radio is truly straightforward, and honestly, fun. I got a real kick out of trying the different text fonts appearing on the screen and really enjoyed trying out the different forms of S-meter. The emulation of a traditional analog meter is stunning because it is so lifelike, but in the end, my favorite is the "edgewise S-meter."

If you are vision impaired, this rig was made for you. The rig beeps at the band edges, and a slick voice synthesizer announces frequency, mode, S-meter readings and more. If you are hearing impaired, the

RTTY and PSK screens provide visual communications. The radio doesn't decode CW, though. Could a CW decoder screen or an audio transducer for touch decoding of CW be the next "bell and whistle"?

The Magic Band

The 6 meter band is a lot of fun. When it's open! Well, even when it's technically closed, the band is still useful for moonbounce and meteor scatter at all hours using new digital modes.

I have spent a lot of time on 6 meters using my JRC JST-245, which I have always thought was an excellent rig for this band. But during contests and major band openings, some of the loud locals here in New England will really put a hurtin' on my JST, sometimes even desensing the receiver up and down the entire band.

During the ARRL September VHF QSO Party I used the '7800 for several hours and was amazed to tune across a neighbor of mine who is about five miles away. I didn't know he was on the band till I found him! Normally the JST will start hissing and smoking when he transmits and I sometimes move the antenna to null his signal so I can hear a little better. This was not a problem with the '7800.

It struck me during the contest how nice it would be to have a matching ICOM PW-1 amplifier for 160 through 6 meters. That is a nice combination. The '7800 does put out a robust 200 W — enough to work most of what you hear. Hooking up most any other amp to the '7800 is pretty trivial — a cable with phono plugs does the job for relay and ALC.

While I am near the paragraph mentioning the JST-245, a radio known for terrific sounding receiver audio, I can say that the JST sounds a bit better than the '7800 to my ears. The IC-7800 certainly sounds okay and I don't detect much of anything objectionable. But on CW I seem to always want to adjust the pitch lower, and on phone I sense a slight tinny sound. After talking with others who have used this rig and other DSP radios, I think this seems to be a characteristic "sound" of DSP rigs. It's just a little bit different. After using the rig for a while, I am accustomed to the sound — the signals I want to hear sound just fine.

Value and Ego

A frequently discussed concept at HQ has been "what does the non-ham think when seeing a ham station for the first time?" The issue frequently starts because we hear about a non-ham responding to a media blurb about an upcoming hamfest or swap meet and going there to learn about ham radio. Sometimes the non-ham is

shocked to see tables of 486 computers and old, smelly radios. And probably there were no modern stations to look at.

Well, my mail carrier was here a couple of days ago to drop off a package of eBay goodies for my wife, and because he had expressed interest in my antennas during prior visits, I invited him to see the shack. Fortunately I had spent a day cleaning and organizing after installing a new operating desk, so he didn't see the stack of TS-930s and broken MLA-2500 amps. But he did see this IC-7800, and his gaze was drawn immediately to the screen with its RTTY waterfall flowing and the band scope bouncing. He told me that this was not what he expected, and in fact he was thinking more along the lines of a military type installation. He was also drawn to the many accessory boxes that switch antennas and the rotor control boxes and all of the glowing LEDs.

This radio does for the ego what needs to be done. I think this rig is dripping with quality and delivers an operating experience that is fitting for the price tag. With the IC-7800, the issue of overpaying is strictly a personal one. This radio does just about everything and does it well. It has a list of features that would take a whole magazine to go through point-by-point. I had the advantage of using this rig for several months. Every time I turn it on, I marvel at something cool about it, or discover something else to try. I have been an avid operator for over 30 years now, and while I am not an engineer, nor will I ever fool anyone in that regard, I am in awe of this rig. It is simple to use, it is fun to use, it is nice to look at, and it has quite a few accessories packed into one large box. Okay, here's my Ferrari complaint: *The rig is big and heavy!* So, get a bigger desk.

This also needs to be written: This review is not about price. Yes, you can buy 2 or 3 or 15 lesser priced rigs for the $10,600 price of this one. So what? The fact that ICOM and other Amateur Radio equipment manufacturers are investing the time and effort and money to build high end rigs like the '7800 is important. It shows that there is strength and viability in this market. Innovations that make the '7800 special will benefit other classes of equipment, and apparently the manufacturers see that. We all buy what we need, and what we can afford. Those who can will buy the top-shelf equipment, and the companies will keep making and improving other products for everyone. For me, well, I think my wife and I are going to have a little fight…

Manufacturer: ICOM America, 2380 116th Ave NE, Bellevue, WA 98004; tel 425-454-8155; **www.icomamerica.com**.