

PRODUCT REVIEW

Jetstream JT220M 222 MHz FM Transceiver



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After seeing the Jetstream JT220M transceiver, I thought, "I have to try that band some day." In my 36 years of ham radio, I had only made one contact on 222 MHz and that was long ago using someone else's handheld radio.

Our 222-225 MHz (1.25 meter) band is allocated for amateur use only in ITU Region 2 (North and South America), where approximately 40% of the world's radio amateurs reside. It's not available in the big European or Japanese markets, and so manufacturers of amateur equipment have been reluctant to produce transceivers for this band. We last looked at 222 MHz FM mobile transceivers in November 2003 *QST*.¹

Enter Jetstream with its 50 W FM mobile transceiver for 1.25 meters to help fill the void. Best known for power supplies and other station accessories, Jetstream-USA has picked an interesting niche for their first transceiver. The JT220M is manufactured in China, but the design has direct

American influence and is built to comply with Jetstream-USA's specifications.

Out of the Box

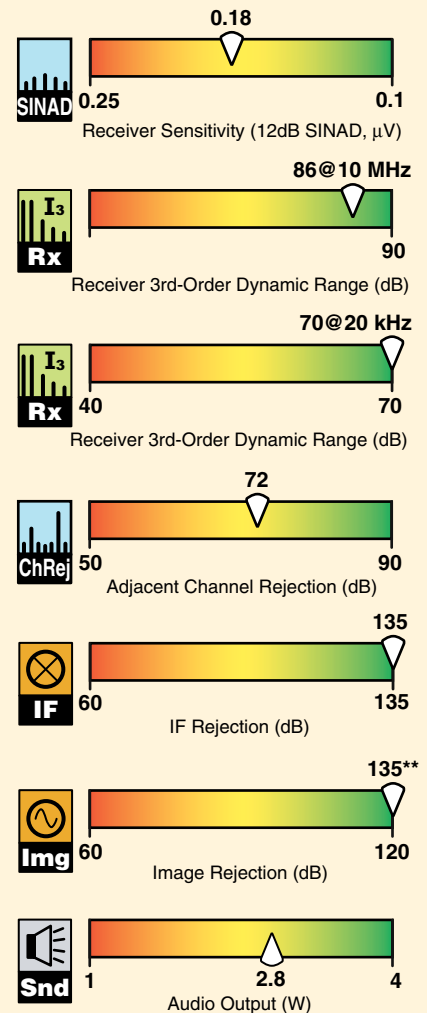
The front panel has knobs for TUNING and VOLUME and seven illuminated pushbuttons that my large fingers could press one at a time. The POWER button is larger than the others and gives the front panel of this radio a bit of flare. The pleasing backlit blue LCD is $\frac{3}{4}$ inches high and nearly 3 inches wide. Along with the pushbuttons, the display can be set to two levels of brightness. There's an eight-pin round microphone connector and a $\frac{1}{8}$ inch DATA jack used for programming channel memories with an optional cable and software.

On the rear panel, the antenna connector is a standard SO-239. There's a $\frac{1}{8}$ inch external SPEAKER jack and an EXTERNAL POWER jack used with an optional cable for an ignition switch on/off function. Unlike the uncovered DATA jack out front, the rear panel jacks have a common rubber cover to keep out dust.

The JT220M comes with a 10½ foot power cord with 15 A fuses on each lead. The power cord has a quick disconnect and can be separated, leaving a 10 inch pigtail that features yet another inline fuse on the positive lead.

The standard hand microphone filled my hand and felt secure. It features a 16 button DTMF (dual tone multi frequency) keypad. The lighted buttons are easy to read and can

Key Measurements Summary



PR045

Key: ** Off Scale

Bottom Line

The JT220M is a handsome, functional 222 MHz FM mobile transceiver that fills a niche in the Amateur Radio marketplace.

¹J. Garcia, NJ1Q, "QST Compares: 222 MHz FM Transceivers from ADI, Alinco and Kenwood," Product Review, *QST*, Nov 2003, pp 79-83. QST Product Reviews are available on the Web at www.arrl.org/members-only/prodrev/.

be shut off by engaging the LOCK button. You can also disable the DTMF function to prevent accidentally airing tones while transmitting.

Features

The JT220M has many of the features you would expect from a single band mobile FM transceiver. What sets this radio apart from previous 222 MHz transceivers is its 50 W power output capability, up from 25 to 30 W in the previous generation.

The transceiver can be set to two bandwidths — FM (25 kHz) and NARROW FM (12.5 kHz). Bandwidth should be adjusted to accommodate local repeater spacing, which can vary from 15 kHz to 60 kHz (check *The ARRL Repeater Directory* or your local frequency coordinator for spacing in your area).

The JT220M features 99 memory channels and 1 call channel. Memory channels can be programmed manually, or you can download free software from Jetstream's Web site and use the optional JTPRG1 programming cable to connect the radio's DATA jack to your PC's serial port. Each memory channel can be programmed for frequency or alphanumeric display. If the radio is programmed for alphanumeric display, you can press the FUNC button momentarily to display the frequency for 5 seconds.

The JT220M has the usual features such as memory/programmable scanning and flexible channel stepping. It's equipped for tone encode/decode and scanning — both CTCSS (continuous tone coded squelch system) and digitally coded squelch (DCS). Also included are tone burst and a DTMF autodialer.

The radio has some rather unusual features, too. One interesting feature is the burglar alarm. The optional JTAL1A cable (with JTAL1B extension if needed) wraps around the steering wheel or other anchor point, connects to the transceiver's DATA jack, and must be disconnected before the radio can be removed. If the alarm cable is disconnected by an intruder, a shrill 2 kHz tone alarm blasts out of the speaker for 10 minutes and no knob or button will kill it (you'd have to cut the power cord). While the alarm is blasting away, the receiver turns on and switches to memory channel 99. If a signal is received on memory channel 99, from a nearby handheld, for instance, the alarm will shut off.

Supply voltage can be displayed by pressing and holding the FUNC button and then pressing the SQL button. Repeating the procedure turns the display back to normal. A voltmeter is always a good feature to have, especially in an emergency situation with limited battery power.

The transceiver's menu gives access to many of the features mentioned previously. Notable features include a flexible time-out timer, something I've wished for in the past. It can be set for up to 450 seconds in 30 second increments. If you are unlucky enough to ex-

Table 1
Jetstream JT220M, serial number 0904C1176

Manufacturer's Specifications	Measured in ARRL Lab
Frequency Coverage: Receive, 216-280 MHz; transmit, 222-224.995 MHz.	Receive and transmit, as specified.
Modes: FM/narrow FM.	As specified.
Power requirements: 11.7-16 V dc; receive, <600 mA, transmit, <9 A (high power).	Receive: standby, 211 mA; no signal, maximum volume, 470 mA. Transmit (high/med/low), 7.5/4.8/3.3 A Measurements at 13.8 V dc.
Receiver	Receiver Dynamic Testing
FM sensitivity: 12 dB SINAD, 0.25 μ V.	For 12 dB SINAD, 0.18 μ V.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset: 70 dB; 10 MHz offset: 86 dB.
FM two-tone, second-order IMD dynamic range: Not specified.	71 dB.*
Adjacent-channel rejection: Not specified.	20 kHz offset: 72 dB.
Spurious response: Not specified.	IF rejection, >135 dB. Image rejection, >135 dB.
Squelch sensitivity: Not specified.	At threshold, 0.14 μ V.
Audio output: 2 W at 10% THD into 8 Ω .	2.8 W at 10% THD into 8 Ω . 1.4% THD at 1 V _{RMS} .
Transmitter	Transmitter Dynamic Testing
Power output: 50 W high, 25 W medium, 10 W low.	With 13.8 V dc (high/med/low): 50.4/24.0/10.2 W
Spurious signal and harmonic suppression: >60 dB.	>70 dBc. Meets FCC requirements.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, 200 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	155 ms.
Size (height, width, depth): 1.9 x 5.7 x 7.5 inches; weight, 2.65 pounds.	
Price: JT220M, \$250; JTPRG1 programming cable, \$30; JTM220BM antenna, \$30	
*Measurement was noise limited at the value shown.	

ceed your own time-out timer, the radio will automatically stop transmitting. There's also a time-out resume time that can be selected from 1 to 15 seconds, allowing your friends to get a word in edgewise.

Lab Testing

Overall, the JT220M performed well at the ARRL Laboratory. The spectral purity exceeded FCC requirements, with spurious signal and harmonic suppression greater than 70 dB below the carrier level. Output power measured as expected. At 11.7 V dc, the lowest specified operating voltage, the transceiver still operated but maximum power output dropped to 43 W.

Receiver performance is good, in line with current 2 meter FM transceivers. What makes this radio stand out is the JT220M's image and IF rejection, both as good as we can measure. Audio output was higher than rated and delivers 2.8 W.

The Road Trip

Fellow Lab Engineer Mike Gruber, WIMG, convinced me to vacation on Cape Cod to see

historical sites such as the former Marconi and RCA Maritime Shore Station, WCC, the French Undersea Cable Station, and several lighthouses. The timing was perfect as I had just finished testing the JT220M in the ARRL Lab and was ready to try it on the air. Using the optional programming cable and free software, I found the spreadsheet type memory programming easy and intuitive to use. I soon had more than half of the 99 memory channels loaded with repeaters in Connecticut, Rhode Island and eastern Massachusetts.

With the radio in the car and a Jetstream JTM220BM magnetic mount antenna on the roof, we left home in Coventry, Connecticut, on a late September afternoon. Mesmerized by the early New England fall foliage, I forgot about the radio entirely until my copilot, Kathy Allison, KA1RWY, grabbed the microphone at the Connecticut/Rhode Island border. A friendly ham came back to her on the Scituate, Massachusetts repeater and a long and pleasant contact ensued.

I was skeptical that the audio quality would be acceptable with the built-in downward facing speaker, but that feeling evapo-

rated with the first words received over the air. As a long time television audio and test engineer, I can say that the sound quality is very good, especially if the station transmitting sounds good to begin with.

Out on North Truro on Cape Cod, where there are no 1.25 meter repeaters listed in *The ARRL Repeater Directory*, I was able to hit three Boston area repeaters at distances of up to 70 miles (a good 30 miles of it over Cape Cod Bay). One evening, I settled into a rag chew with the JT220M using its full 50 W output. After I nearly timed out the repeater after several long transmissions, the transceiver's heat sink was just barely warm to the touch. I was very happy to hear from several stations that my transmitted audio sounded good.

A radio is as effective as its antenna, so I'll comment on the JTM220BM magnetic mount

whip. The antenna stands 22½ inches from the surface it's mounted on and has a spring coil part way up. Its overall length and coil suggest that this is a 5/8 wave antenna. The smooth surfaced magnet is about 3¼ inches in diameter and has fairly good sticking power. SWR measured 1.2:1 or better across the entire band. Overall, the antenna did a very good job and it was barely noticeable on top of Kathy's white car.

The Manual

At times I was slightly confused by the manual and its English translation from Chinese. Rereading sentences is necessary at times.

Also in the manual, the burglar alarm cables are listed as a supplied accessory. This is not the case; it's an option. On the flip

side, the programming software, listed as an option, is actually *free* for download. Overall the manual is thorough but could use some editing. It's available as a free download from Jetstream's Web site

Conclusion

It was interesting and fun to use the 222 MHz band regularly for the first time with the Jetstream JT220M. It is a handsome, functional FM mobile transceiver that fills a niche in the Amateur Radio marketplace. Jetstream-USA was wise to introduce this model as their first transceiver. It will be interesting to see what they come up with next.

Manufacturer: Jetstream-USA, 100 Hancock Ave, Hamilton, OH 45011; tel 513-868-1353; fax 513-868-6574; **www.jetstream-usa.com**.