Yaesu FT-2800M 2-Meter FM Transceiver

Reviewed by Joe Carcia, NJ1Q
W1AW Station Manager

Yaesu produces quite a number of mobile FM radios, from single band to quad band units, with all sorts of functions and features. Some amateurs may find that all those additional bells and whistles may be too much given their particular needs. These folks may find the FT-2800M to be a radio of choice.

"A hefty transceiver that appears to be more heat sink than radio!" That's the first impression I got when I pulled the radio out of the box. The '2800M is, as stated in the manual, a "rugged" single band FM mobile transceiver, weighing in at 4 pounds. That was a bit of a jump from my own radio, the Yaesu FT-90R.

Here is a no-nonsense transceiver. It pretty much covers all the basics one would desire in a 2-meter FM transceiver, and those found in many of today's radios. This includes such features as the CTCSS encoding/decoding and DCS tone systems, automatic repeater shift, DTMF operation, programmable memory scan and so on. For those who can't get enough memories, you'll find this radio has a total of 221. (This includes the programmable band scan limits and home channel.) Each memory can have a 6-character alphanumeric label.

First Impressions

The layout is clean, with just six buttons (five backlit), well labeled for viewing ease. Reading left to right you have the Internet Connection, PWR, MHz(SET), REV(DW), LOW(A/N) and D/MR(MW) buttons. The letters in parentheses indicate those functions displayed through a menu procedure, or an additional function when depressing one of the buttons mentioned.

The Internet Connection (WIRES) and PWR buttons are pretty self-explanatory. The MHz(SET) button is used to allow for 1 MHz tuning, activation of the memory tuning mode and activating the menu system. REV(DW) does the old switcheroo with the transmit and receive frequencies, as well as activating the dual watch feature. The LOW(A/N) button is used to switch between the four power levels: 65, 25, 10 and 5 W. It's also used to toggle the display between an alphanumeric tag and the

actual frequency. The D/MR(MW) button toggles between the VFO, memory and home channels. It's also used to activate the memory storage mode.

Three plastic knobs control the VOL, SQL and DIAL functions. The knobs all have a decent feel to them. I did find that using the dial took a bit getting used to. It's detented and is used to control the frequency, memory storage and menu settings, among other things. I found that if I went just a bit too fast, I flew right past a desired menu setting. It's not that the dial is loose; rather it turns very smoothly.

The LCD (measuring about 1 by 3 inches) has clear, easy to read alphanumeric characters against an orange background. The display's brightness level is controlled via a menu setting.

I found the decently sized display could be viewed at many angles. While I was sitting at my desk and looking down at the radio, the display was still quite clear and readable. I actually found myself moving my head about like a bird trying different viewing angles to see when the display would wash out. The display was clearly visible even from across the room. When operating in my truck, I was still able to see the display

Bottom Line

The FT-2800M offers an impressive receiver and 65 W of 2-meter transmit power in a hefty but simple package.

clearly, even with some sun glare. By the way, if you like the ability to separate the display from the transceiver body, you won't find that here—it's all one unit.

A pigtail from the back of the radio terminates to a 2-pin standard locking power plug. Next to the power line is a $1/8$-inch jack for an external speaker or packet radio use. The antenna connector (a standard SO-239) is chassis-mounted and rounds out the back of the radio.

A word about the antenna connector— the cabinet heat sink extends past the connector, with a portion of the heat sink also curved above the connector. I found I could barely get three fingers in there to thread on the antenna connection. You may find it desirable to connect the antenna prior to installing the radio, especially if the area is cramped.

As mentioned above, this radio looks like one big heat sink, and with a maximum output of 65 W, that kind of sinking is necessary. Unlike many other radios, this unit does not come with a cooling fan. The plus side to this is that you needn't contend with a fan that turns on and off at will. However, the radio's cabinet is used to dissipate heat. This has to be a consideration when mounting the radio, either in a mobile or base station application, and the manual describes some basic installation tips.

Notable Features

One of the features I found most interesting was the 10 NOAA weather channels, with the weather alert option

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Brennan Price, N4QX ◆ Assistant Technical Editor ◆ n4qx@arrl.org

Table 1
Yaesu FT-2800M, serial number 2M010815

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Frequency coverage: Receive, 137-174 MHz; transmit, 144-148 MHz.	Receive and transmit, as specified.
Power requirement: Receive, 0.7 A; transmit, 10 A (high power).	Receive, 0.46 A; transmit, 10.6 A. Tested at 13.8 V.
Modes of operation: FM.	As specified.

Receiver	Receiver Dynamic Testing
FM sensitivity, 12 dB SINAD: <0.2 µV.	For 12 dB SINAD, 0.22 µV.
FM adjacent channel rejection: Not specified.	20 kHz channel spacing: 70 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz channel spacing: 70 dB;* 10 MHz channel spacing: 95 dB.
FM two-tone, second-order IMD dynamic range: Not specified.	90 dB.
S-meter sensitivity: Not specified.	Max indication: 8.6 µV.
Squelch sensitivity: Not specified.	At threshold: 0.15 µV.
Receiver audio output: 3.0 W at 10% THD into 4 Ω.	3.2 W at 10% THD into 4 Ω.
IF and image rejection: 70 dB.	First IF rejection, 99 dB; image rejection, 92 dB.

Transmitter	Transmitter Dynamic Testing
Power output (H/M/L2/L1): 65 / 25 / 10 / 5 W.	VHF, 65 / 27 / 12 / 5.9 W.
Spurious-signal and harmonic suppression: ≥60 dB	72 dB. Meets FCC requirements for spectral purity.
Transmit-receive turn-around time (PTT release to 50% audio output): Not specified.	S9 signal, 144 ms.
Receive-transmit turn-around time (tx delay): Not specified.	26 ms.

Size (height, width, depth): 2.0×6.3×7.3 inches; weight, 4.0 pounds.

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

(selectable via a menu setting). With one touch of a button (P4) on the microphone, the radio instantly changes over to the 10 available weather channels. The dial or microphone's UP/DOWN buttons are used to switch between them. Obviously, this all depends on whether the microphone buttons are being used with their default functions. If not, then this feature may not be readily available.

The severe weather alert is a feature that SKYWARN folk (or weather monitors such as myself) would find useful. In the event of an extreme weather situation, NOAA will send out a weather alert accompanied by a 1050 Hz tone, and then the following weather report. You can set the FT-2800M to monitor (or scan) the 10 weather channels for this alert tone. If the tone is received, the '2800M will emit a pair of warbling tones. To listen to the weather alert, you merely depress the PTT button on the microphone to silence the tones.

The Smart Search function allows you to load active frequencies automatically. The radio will search (without stopping) a designated bandwidth for any activity and store those active frequencies in a special memory band that consists of 31 memories. While this may be a good feature to have when traveling without a Repeater Directory, you have to be careful when you go to operate on any of these stored memories, as you might not actually be operating on the repeater's exact frequency.

For example, on a relatively quiet night I had the radio perform a single scan above and below the frequency of a repeater about 12 miles from my home. On one sweep, I found four repeaters, but 12 channels were used. The radio noted activity 5 kHz above *and* below the main repeater frequency, and recorded all this activity in memory. Perhaps the squelch was not tight enough. If you use this function and find repeaters, listening to the signal quality beforehand and adhering to the channel spacing prevalent in your area would be appropriate first steps. If you find the audio appears distorted, it may very well be because you're not on the exact repeater frequency.

The memories also appear to be temporary. I found that when I shut down the radio after the scan, the memories were cleared. I found no mention of this in the manual.

Now, suppose you have a repeater system with an odd shift (not ±600 kHz). The '2800M can accommodate for odd shifts without requiring reprogramming of the offset. The user can set up memory channels with the independent transmit and receive frequencies.

The tuning rate is selectable from 5, 10, 12.5, 15, 20, 25, 50 and 100 kHz. The default is 5 kHz. You can change this step via the menu system. The '2800M has direct keypad frequency entry via the included microphone. The tuning rate affects all frequency navigation, however, even direct keypad entry. So if you find that you can't seem to get the radio to accept a particular frequency either through the DIAL or keypad, check the tuning rate.

A Mic of Many Functions

The 16-key DTMF microphone (a stock MH-48) performed as expected.

This particular microphone can be programmed. As such, the non-numeric keys on it are not labeled with a function; they are labeled P1, P2, P3 and P4. Their default functions are Squelch Off, Smart Search, Tone Search and Weather Channel Search Recall, respectively. If you'd prefer these buttons to be used for other things, they can be reprogrammed via the menu system (each button has its own menu setting). The microphone also has the standard backlit (keypad) function, UP and DOWN keys and LOCK switch. (The LOCK switch controls the function keys, not the keypad or PTT switch.) The A, B, C and D keys mimic the functions of the four front panel buttons.

An Impressive Receiver

I used this radio both in my truck and at home. In both instances, I found the receive audio levels to be quite sufficient. Although the speaker is mounted underneath the radio, I heard it without difficulty. If this radio is to be used in a base setting, Yaesu supplies two small plastic feet that can be installed beneath it.

Now, I have to confess I reviewed this radio during a cold New England winter, so I didn't have too many opportunities to have the truck's windows cranked all the way down while operating the radio mobile. In light of this, given road and wind noise (from a slightly cracked-open window) plus a blowing heater fan, receive audio was still clear, even with the volume turned most of the way up.

Something that did impress me was the '2800M's apparent immunity to strong nearby signals. I had this radio installed in place of my FT-90R, using the same antenna and power connectors. I found that sitting in the parking lot of W1AW, I did not hear the station's 150-W signal blast through on a repeater frequency not that far from W1AW's 2-meter bulletin transmission (147.555 MHz). I occasionally experience intermod from W1AW with the FT-90R on that same repeater frequency. Obviously, this is not a comparison between the two, but rather anecdotal evidence of the '2800M's healthy third order IMD dynamic range measurement (see Table 1).

I had the opportunity to chat through some local repeaters, as well as with a few hams on simplex. All the signal reports indicated the transmit audio sounded clean. On one occasion there was a report of white noise on my signal. I merely
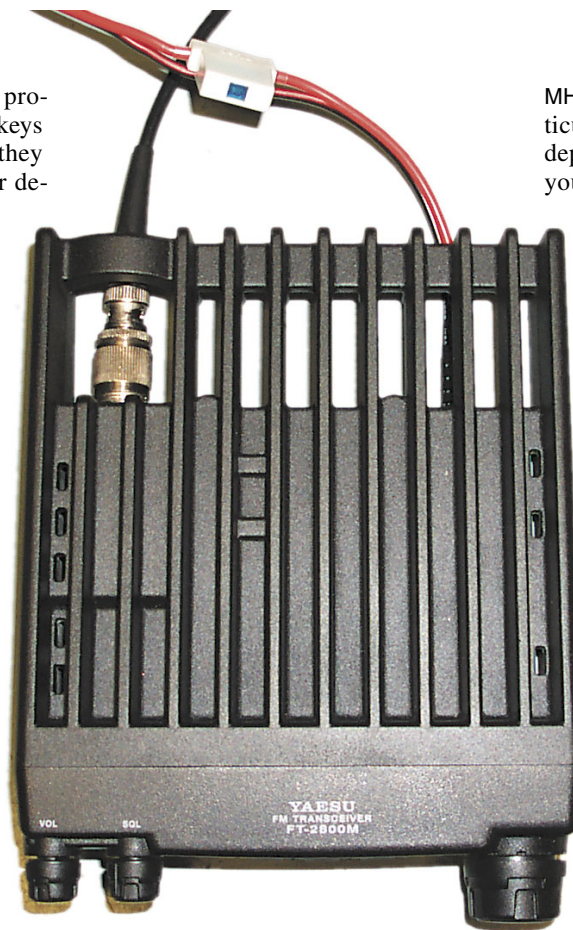

Figure 1—A top view of the Yaesu FT-2800M on the test bench of the ARRL Lab. Note the sizeable heat sink and the location of the antenna connector. Users with cramped quarters may wish to consider connecting the antenna before installing the radio.

bumped up the power to 10 W, however, and that seemed to clear it right up.

The '2800M is capable of 1200 baud packet (9600 baud is not available in this radio). I quickly wired up a connection between the radio's microphone jack and my MFJ-1278B multimode controller. The audio to the TNC is handled via the radio's external speaker jack. I had to adjust the volume properly to avoid swamping the TNC. Once I jumped these hurdles, I found packet operation to be easy. I was able to connect to the local nodes and a few of the local BBSs.

The Automatic Power-Off and Time-Out Timer functions performed as expected. The Power-Off is adjustable from 1 to 12 hours, but this feature is turned off in the radio's factory default setting. The Time-Out Timer is adjustable from 1 to 60 minutes, in 1-minute increments, and can also be disabled. The factory default is 6 minutes.

Menus Can Be Fun!

To activate the menu system (there are 33 menus), you hold down the MHz(SET) key for one second. You select the menu number using the dial. When you need to change a menu setting, you depress the

MHz(SET) button again to select a particular setting. I found that you have to depress this button quickly; otherwise, you may take yourself right out of the menu system. This is not uncommon —just something the user needs to be aware of before menus are changed and programming steps are performed.

Programming memories was not difficult. In the VFO mode, you select the desired frequency, CTCSS tones, power level, shift, etc. You press and hold the D/MR(MW) key for a second until a memory number (channel) appears. If the number is blinking, then it's empty. Use the dial to select the desired channel. Next, press the D/MR(MW) button again to write the memory contents.

As mentioned above, determining the amount of time needed to depress a button can be a bit of a challenge. I found that on a few occasions I'd miss writing the contents simply because I didn't hold the button down for the correct amount of time. But once you get used to programming, it's a breeze.

Your Buddy—The Manual!

The 57-page manual is laid out in an easy to read format. You start off with a table of contents, followed by a list of the rig's popular features. Pictorials of the display, front and back panels and microphone follow a few pages later. The manual familiarizes the user with all the basic functions before hitting the advanced ones. The later pages are devoted to menu functions and programming.

There is the installation section toward the front of the manual. There are also a few pages that are devoted to safety issues. Reviewing these pages to refresh one's memory never hurts.

A Nice Package

I was quite pleased with the performance and look of this radio. For the user looking for a simple 2 meter FM transceiver with just enough bells and whistles, this rig fits the bill. I also like that Yaesu did not crowd the front panel with all sorts of control buttons and that the display does not get too busy. While this approach requires a number of functions to be set using a variety of menu settings, it's a good trade-off.

Manufacturer: Vertex Standard USA, 10900 Walker St, Cypress, CA 90630; tel 714-827-7600; **www.vxstdusa.com**. Price: $159.95.