

Product Review

Yaesu FTM-200DR C4FM/FM Mobile Transceiver

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The FTM-200DR is a VHF/UHF mobile transceiver compatible with both analog FM and Yaesu System Fusion digital mode (C4FM). This dual-band radio has only one receiver; even if it has two VFOs, it can receive only one signal at a time. It can deliver up to 50 W of RF transmit power, and its internal speaker provides up to 3 W of clear and crisp audio, perfect for a mobile installation. It has a nice 2-inch front color display combined with an easy-to-operate menu system. The frequency color can be changed between blue, white, and red. It also incorporates many features like GPS and APRS, band scope, Wide-coverage Internet Repeater Enhancement System (WIRES-X) functionality, and Bluetooth with the optional BU-4 unit.

Overview

The FTM-200DR is impressive considering its small size and functionalities. With its detachable faceplate, it's perfect for a mobile installation and easy to detach from the included mobile bracket, but it's also a good radio to use in a home station. It features all of the C4FM digital communication functions, such as Automatic Mode Select, Digital Group ID, and Smart Navigation. It's also capable of doing WIRES-X operations with the portable digital node (PDN) function that lets you have a personal WIRES-X digital node at your station using a PC. In other words, it can become a WIRES-X digital hotspot.

Its receiver is wide and can receive from 108 to 137 MHz (AM mode and air band), and from 137 to 999.99 MHz (US cellular blocked) in FM and C4FM modes.

Included with the radio is a DTMF microphone (model SSM-85D), a mobile mounting bracket, a bracket for the faceplate (controller), a 10-foot control cable, a USB cable, and a dc power cable.

Operations

When you turn on the FTM-200DR for the first time, you will be prompted to enter your call sign. It can be



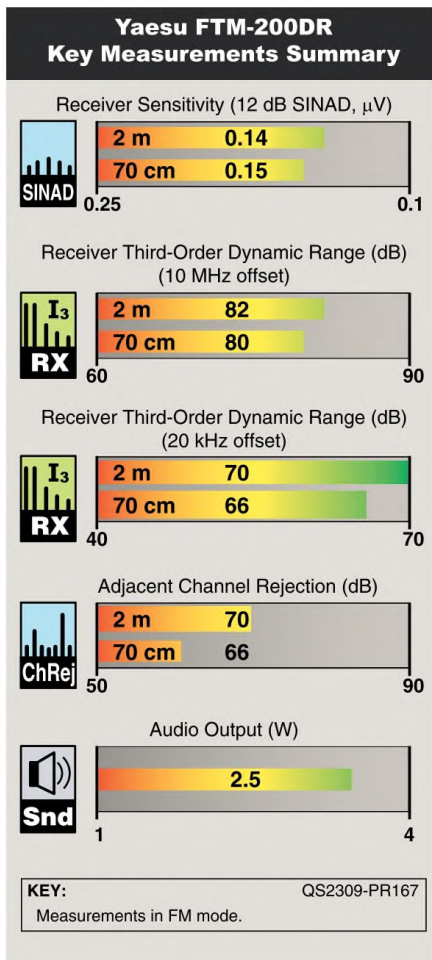
done with the rotary knob (right knob) and the alphanumeric menu displayed. The call sign input is important if you intend to use the radio to operate in the C4FM digital mode. The programmed call sign will be shown every time the radio is turned on.

Once the call sign is entered, the radio will be in VFO mode. From that point, the operation is simple. I was able to operate the radio with ease, with only quick references to the manual. The front panel incorporates the common controls that are comprehensible for most operators. On the front panel, you will find two main knobs, one on each side; the volume is on the left, and the rotary knob (VFO/multi-function) is on the right. The button layout is clear and self-explanatory.

I was able to program my local repeater and start operating in FM mode within just a few minutes. When I rotated the VFO knob, the radio automatically set up the correct VHF frequency shift. I adjusted the power from the menu to the appropriate power level and started transmitting. In the latest VHF and UHF transceivers, Yaesu ensured that their design is easy to operate. It's intuitive and well thought out. It's especially easy to operate this radio in FM mode straight out of the box. For someone who has never tried the C4FM digital mode, this means that you can enjoy this

Bottom Line

The FTM-200DR is impressive, with its small size but with great versatility. It's easy to operate and very intuitive, and if you wish to explore the C4FM digital mode at a lower price point, the portable digital node function can turn the radio into a WIRES-X hotspot.



radio immediately upon reception and learn the advanced features later if you wish.

For faster VFO frequency change, you can press the rotary knob once to change the frequency step to 1 MHz. The MHz digits that are part of the displayed frequency will blink to show the operator which numbers will be changed with the rotary knob.

The **V/M VFO** button can be used to toggle between memory channels and VFO modes.

When pressed once in VFO mode, the **BAND GROUP** button will let the operator switch between air band, 144 MHz (2 meters), 174 – 400 MHz (receive only), 440 MHz (70 centimeters), and 480 – 999.995 MHz (receive only). When the memory mode is selected, the operator can choose from the Memory Auto Grouping (**MAG**) function to access

Table 1

Yaesu FTM-200DR, serial number 2C010805, FCC ID# K6620615X40

Manufacturer's Specifications

Frequency coverage: receive, 108 – 999.99 MHz (USA cellular blocked); transmit, 144 – 148, 430 – 450 MHz.
Modes: FM, FM-Narrow, C4FM, AM (receive only).
Power requirements: transmit, 11 A at 50 W RF output; receive, 0.5 A at 13.8 V dc (no operating voltage range was specified).

Receiver

Sensitivity: FM 12 dB SINAD: 137 – 150 MHz, 0.2 μV ; 150 – 174 MHz, 0.25 μV ; 174 – 222 MHz, 0.3 μV ; 222 – 300 and 336 – 420 MHz, 0.25 μV ; 420 – 540 MHz, 0.2 μV ; 540 – 800 MHz, 0.8 μV ; 800 – 900 MHz, 0.4 μV ; 900 – 999.99 MHz, 0.8 μV ; AM: 10 dB S/N, 108 – 137, 300 – 336 MHz, 0.8 μV ; BER 1% (digital mode), 0.19 μV ; cellular blocked (USA only).

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

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

Adjacent-channel rejection: Not specified.

Squelch sensitivity: Not specified.

S-meter sensitivity: Not specified.

Audio output power: 3 W into 8 Ω at 10% THD.

Transmitter

Power output: Hi/med/low power, 50/25/5 W.

Spurious emission: ≥ 60 dB.

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

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

Size (width, height, depth): Control head: 5.47 \times 2.09 \times 0.7 inches, without knob; radio body: 5.47 \times 1.66 \times 5.2 inches, without fan.

Weight (approx.): 2.43 pounds (radio body, control head, and control cable).

*Test results shown are for standard FM mode. Sensitivity, adjacent channel selectivity, and dynamic range increased by 0.5 dB to 1 dB in FM narrow mode.

†Measurement was noise limited at the value indicated.

Measured in the ARRL Lab

Receive: as specified.

Transmit: as specified.

As specified.

At 13.8 V dc: receive, no signal, max. audio and backlights, 560 mA; lights at min, 500 mA; transmit (hi/med/low): 146 MHz, 8.0/6.0/3.0 A; 440 MHz, 9.0/6.0/3.0 A.

Receiver Dynamic Testing*

FM, 12 dB SINAD, 146 MHz, 0.14 μV ; 440 MHz, 0.15 μV ; 162 MHz, 0.14 μV ; AM, 120 MHz, 0.65 μV .

20 kHz offset: 146 MHz, 70 dB,† 440 MHz, 66 dB†; 10 MHz offset: 146 MHz, 82 dB; 440 MHz, 80 dB.

146 MHz, 84 dB; 440 MHz, 106 dB.

146 MHz wide receive, 70 dB;† 440 MHz wide receive, 66 dB.†

At threshold: 146 MHz and 440 MHz, 0.12 μV , 0.25 μV (maximum).

For five bars: 146 MHz, 2.1 μV ; 440 MHz, 3.3 μV .

2.5 W at 10% THD, THD at 1 V_{RMS} , 1.9%.

Transmitter Dynamic Testing

At 13.8 V dc, hi/med/low power: 146 MHz, 53/24/5 W; 440 MHz, 49/23/4.7 W.

146 MHz 66 dB, 440 MHz 73 dB; meets FCC requirements.

Squelch on, S-9 signal: 146 MHz and 440 MHz, 2 – 3.3 ms.

frequencies programmed on different bands.

The **F MENU** button, when pressed once, brings the operator to the new Custom Function List (**CFL**). The CFL function consists of a shortcut of the 10 most frequently used func-

tions that can be recalled by the operator. Eight functions can be chosen and modified by the operator within the 124 functions available in the main menu.

If the **F MENU** button is pressed and held, the main menu appears and is

clearly categorized with self-explanatory names. The included manual is comprehensive and explains all of the necessary details for every function.

The **DISP** button can be used to change the display view. It toggles between the backtrack view, the frequency view, and the band scope.

The **DX** button is used to activate and operate the WIRELESS-X functionalities (more on this later).

The **SQL BACK** button lets the operator adjust the squelch level or return to the previous menu or page when navigating in the menu or page system.

Finally, the **PMG PW** button is used in the Primary Memory Group (**PMG**) function. It lets the operator register the channel or frequency in the PMG, which is monitored when the function is activated. The display shows the RF signal level received of the registered PMG channel in a spectrum view, and can switch automatically to the channel when activity is detected.

Functionalities

GPS

The FTM-200DR incorporates a 66-channel GPS receiver, which is highly sensitive. It was able to receive a GPS signal without any issue when installed in my home station. The receiver is enabled when the radio is turned on, and an icon shows its status at the top of the display. It requires at least three satellites to be able to find the location coordinates.

In digital mode (C4FM), GPS information is transmitted simultaneously with the voice/data (**DN**) mode. When the digital Voice Wide (**VW**) mode is used, the GPS information won't be transmitted, as the data bandwidth is used for the wider voice mode. Using the backtrack display mode (available from the **DISP** buttons), the screen shows a compass indicating the direction and the distance between you and the other station if it also transmits its position.

Memory Channels

The radio has 1,104 memories that can be programmed, each with up to 16 alphanumeric labels. Memory can be categorized with the **MAG** function on each band. It organizes the memory channel by bands, with the label **M-ALL** for navigating along all memory, **M-AIR** for listing the channel on the air band only, **M-VHF** for channels in the VHF band only, **M-UHF** for the channel in the UHF band only, and **OTHER**. With this quantity of channels, it would be interesting to give operators the ability to create their own groups.

Recording

The FTM-200DR incorporates an SD card slot that lets you record the received audio and back up the radio setting with the programmed memories.

APRS Data Communication

The FTM-200DR has a built-in modem capable of transmitting and receiving 1200 and 9600 bps APRS data. It can also display the receive station's information on the radio screen. The radio also supports SmartBeaconing with your position.

Channel Band Scope

The radio offers band range of up to 61 channels and displays the level of received signals adjacent to the active frequency. In VFO mode, it can monitor 61 or 31 channels, and in memory mode it can monitor 21 or 11 channels around the selected channel. The rotary knob can be used to change the central frequency or the central channel. The scan speed is fast, and the audio stays tuned on the current selected frequency/channel.

Custom Function List

The **CFL** lets you choose which function from the menu can be accessed in the 10 items of the **CFL** menu. By default, the **CFL** menu comes with 10 pre-programmed functions. The first two are frequency input and home, which are fixed and cannot be changed. The eight other functions can be selected from the main menu.

To select a function to put in the **CFL** menu, you must enter the main menu by pressing and holding the **F MENU** button. When you are in the main menu, choose the selected function you want to put in the **CFL** menu by rotating the rotary knob. When you've made your selection, press and hold the **F MENU** button again. The **CFL** menu will appear, and the new function name will be displayed. Rotate the rotary knob to choose the location where you want to put the function in the **CFL** menu. When the location is selected, press the rotary knob to confirm. If a function was already programmed at that location, it will be replaced by the new function.

Programming the FTM-200DR Using the ADMS-15 Program

The FTM-200DR can be programmed in two different ways. You can use an SD card or the optional SCU-20 USB cable (sold as an option). Like many other radios on the market, Yaesu makes the radio entirely programmable. All parameters and channels can be set up using the ADMS-15 PC software to program the

radio (available for free download on the Yaesu website). For more information, you can also download the FTM-200DR manual on the Yaesu website.

Portable Digital Node Modes

This function is interesting. Yaesu made this function available for all of its WIRES-X-compatible products. It lets you use a compatible C4FM radio to act like a network radio or a hotspot to access the Yaesu WIRES-X network directly. It can be done using two different modes:

- The PDN mode is capable of internet communication with digital stations only.
- The portable HRI mode is capable of internet communication with both analog and digital modes.

The main difference between the two modes is that the portable HRI mode supports internet communication in both C4FM and analog modes. A complete connection between the radio and the computer must be made using the optional SCU-58 kit, which includes two cables, the SCU-56 data cable and a second one for the audio. The data cable connects to the data port on the radio's rear panel (see Figure 1).

I did the test in portable digital mode. I used a compatible Windows computer running WIRES-X software connected to the FTM-200DR, using the SCU-58 cable kit.

This transceiver can use two different types of WIRES-X access, "direct access" and "access point." Direct access needs a direct connection between a computer and the FTM-200DR to be used like a network radio. This means it can receive and transmit on the WIRES-X network using the internet from the computer, and in this mode no RF signal is transmitted or needed. This access method could be useful for operators who are unable to install an external antenna due to local restrictions.



Figure 1 — The Yaesu FTM-200DR rear panel.

The access point mode is a more familiar and versatile type of access. This mode turns the FTM-200DR into a hotspot. To access the WIRES-X network, you can still use the FTM-200DR directly with its microphone and speaker, or use another C4FM radio, like the FT5DR, remotely via RF. When using this access mode, the FTM-200DR will transmit the WIRES-X signal through RF and transmit the received RF to the WIRES-X network via the internet. If you used a good outside antenna on the FTM-200DR in PDN mode, you could then extend the access to your node using another radio, like a repeater. This means that you will be able to access your node when you're on the move and within reach of your station. Also, everybody monitoring the simplex frequency in use (please select an appropriate one for your region) will be able to hear the connected node communications in and out of the WIRES-X network, because the signal will be retransmitted by the FTM-200DR.

Choosing an SCU Cable

Many SCU cable assemblies to connect your radio to a PC are available to use with the WIRES-X network. Depending on your radio model and the intended usage, you will have to choose the right one for you.

For this review, I used the FTM-200DR set up with a Yaesu FT5DR portable radio. I used the SCU-58 cable kit, which I had to order separately. It is compatible with the Windows 8.1 – 11 operating system, and it included the SCU-56 with an audio cable. For my setup, I only connected the SCU-56 to the computer; I did not use the audio cable assembly (that's only needed if you intend to use the FM mode with the WIRES-X network).

Using the FT5DR as the WIRES-X Node

With a combination of two C4FM radios like the FTM-200DR and the FT5DR, you can set your WIRES-X network the other way around. If you wish, you can use the FT5DR as the WIRES-X node with all of the same features, and use the FTM-200DR to remotely access the WIRES-X network via the FT5DR. But keep in mind that you will need a different cable to connect the FT5DR to a computer (SCU-39).

Preparation Procedure

Yaesu included a well-detailed preparation procedure in the PDN instruction manual that indicates the five actions you must take prior to using the PDN function with the FTM-200DR. These actions are:

1. *User registration to get your WIRES-X ID.* This step usually requires 2 – 3 business days to process. You

will need your unique radio ID available through the menu of the radio. You need to do this only once.

2. Installation of the WIRES-X software on your PC. The software is available through the WIRES-X page on Yaesu's website, and it's a simple step-by-step process to install the software.

3. Installation of the USB device driver for the PC connection cable. Prior to connecting and using the SCU cable, you must properly install the driver. The driver is needed to emulate an RS-232 COM port over a USB connection. The setup is easy to complete using the prolific driver installation manual included both in the software zip file and on the Yaesu website. The installation process can also be performed using the internal Windows driver update function.

4. Updating the firmware of the transceiver (if required). You should install the latest firmware available for the radio. The PDN manual contains a section titled "System Requirement," which describes the latest firmware required. Yaesu published the manual and an installation procedure for any new firmware release. It can be found on Yaesu's website.

5. Connecting the transceiver to the PC. The last step is to connect the PC to the radio and run the WIRES-X software (which was installed in step 2). But before doing that, you must put the radio in PDN mode before starting the WIRES-X software. If you don't put the radio in PDN mode, you won't be able to register the radio as a PDN, and you'll be stuck. The process differs for each radio and depends on whether you are using the PDN mode or the portable HRI mode. For the FTM-200DR, and because I was using only the PDN mode (not the HRI mode), the procedure was simple. The radio must be off, and the **DX** button must be pressed while turning the radio on.

Using the Portable Digital Mode

When the preparation procedure is completed and the radio is in PDN mode, you must open the WIRES-X software. You will be prompted the first time to select the serial port. If you followed the procedure, you should be able to identify it as "Prolific USB-to-Serial Comm Port (COM#)." For the rest of the setup, you can refer to the PDN manual that describes the configuration in detail.

After configuring the WIRES-X software, be sure that it communicates with the radio. I configured the radio with its proper RF parameters to use it as an access

point. I chose a frequency that didn't interfere with any local repeaters. I live in a rural area, so the spectrum is not crowded. I selected the band, frequency, and power, and configured the radio. After establishing these settings, I could start the operation of the portable node. For the FTM-200DR, I pressed the **DW** button once, and a flashing red **X** appeared on the upper left corner of the display. This indicates that the radio communicates with the PC to complete the connection. When the PDN is started, the **X** stops blinking and stays red. The display shows the node ID and the city where the station is installed, below the operating frequency. Using the access point, you'll hear all traffic on the frequency within the radio speaker. If you don't want to hear these communications, you can mute them using the **MUTE** key located on the microphone.

Connecting a Node or a Room

When using PDN as the access point, you can connect a node or a room on the internet three different ways:

1. You can use the WIRES-X software directly. This is probably the easiest way to do it, but it must be done directly on the computer. Select the room or node in the WIRES-X software, right-click with the mouse on it, and click **CONNECT**. On the right side of the screen, you should see the connection establishing. When connected, you should hear three beeps on the radio and see a pop-up window appear on the computer screen, displaying the room or node status.

2. To use the FTM-200DR directly, you must rotate the dial knob over **SEARCH & DIRECT** and press the rotary knob. You'll enter the category view. Rotate the knob on **ALL**, and press it again. It will show you the available rooms sorted by the number of nodes connected to them. The most occupied node will be displayed first. To connect to one of them, rotate the knob, and when selected, press the rotary knob to connect.

If you want to connect a specific node that does not appear, in the category view, select the **SEARCH & DIRECT** item with the rotary knob. Using the rotary knob, enter the node ID or a part of the node ID that you want to search, and press the rotary knob. All rooms and nodes starting with the character that you entered will be displayed. Once you select the room of the node you want, press the rotary knob again to connect. You'll be redirected to the initial display showing the selected room or node ID.

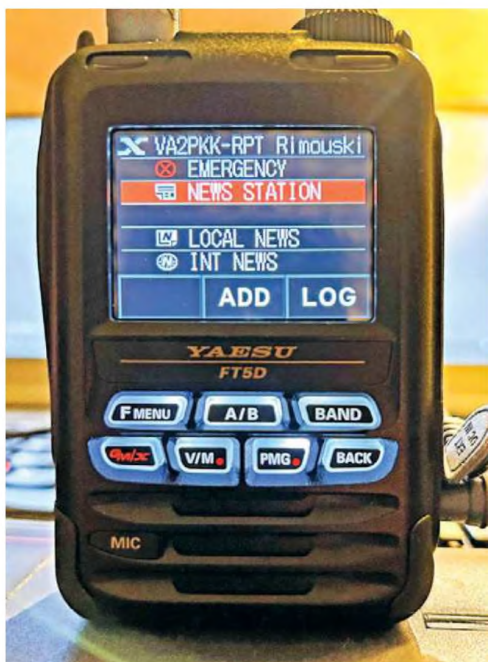


Figure 2 — The Yaesu FT5DR using RF to the FTM-200DR and connected to the VA2PKK repeater in Rimouski, Quebec.

3. The third way is available remotely using a C4FM digital radio within reach of the PDN station. I have used two different handheld radios, the Yaesu FT5DR and the Yaesu FT2DR. To work properly, both the FTM-200DR and the remote radio need to be on VFO A with the proper RF setting (frequency, split, modes, power, etc.). All radios should have their internal call sign properly configured. Once the radio is configured, press the **GM/X** key on the FT5DR (or the **X** key on the FT2DR) to activate the WIRES-X mode. Then, it will connect to the PDN and display its status on the handheld radio. In Figure 2, you can see that I was connected to the VA2PKK-RPT repeater in Rimouski.

After a connection is established with the room or another node, the FTM-200DR can display some information when receiving a signal. Using the **DISP** button, you can toggle between the standard view (see Figure 3) and the compass view (see Figure 4). At this point, all WIRES-X activities received by the node will be retransmitted on the air and can be heard by other radios in reach of the node.

Documentation

Yaesu offers many manuals that include comprehensive information for basic and advanced operation of the FTM-200DR. You'll find all manuals on the Yaesu website under the file section of the FTM-200DR page.



Figure 3 — WIRES-X standard view on the FTM-200DR display.



Figure 4 — WIRES-X compass view on the FTM-200DR display.

Two manuals require more attention — the “Operating Manual,” which incorporates basic operations, and the “Advance Manual,” which explains signaling functions (CTCSS, DCS, etc.), memory functions, DTMF operation, GPS function, and the entire setup menu operation for a comprehensive usage of the menu.

You'll also find specific manuals for APRS, WIRES-X, PDN, and group monitor function.

Conclusion

The FTM-200DR is easy to operate with its custom function list. Its size makes it useful for mobile operations. Digital mode is easy to operate and offers different ways to operate from anywhere around your station; it's useful if you're out of range from the nearest WIRES-X repeater. I like the fact that Yaesu included a mounting bracket for the radio, plus its clever approach with their quick-release mobile mount is great and can help to move the radio from the car to the station. Overall, this is a very versatile radio.

Manufacturer: Yaesu USA.