Product Review

TYT MD-2017 Dual-Band Analog and DMR Handheld Transceiver

Reviewed by Pascal Villeneuve,
VA2PV
va2pv@arrl.net

For several months, I was not very active on DMR (digital mobile radio), and when I started working on this review, I was surprised at how much activity has grown. Contacts occur almost continuously on my local reflector, and this suggests that DMR is doing very well among our local ham community. One reason it's so popular is the availability of low-cost, high-quality radios, such as those from TYT. These radios are built for commercial applications, but the TYT MD-2017 reviewed here better meets our operational needs than older models.

Overview

When I got the TYT MD-2017, I expected something very similar to the popular MD-380. The programming software does look alike for the most part, but the operation has been improved. Most DMR radios do not have direct access for frequency configuration, but this is possible with the MD-2017, as I will discuss later.

This radio is dual band — VHF (136 – 174 MHz) and UHF (400 – 480 MHz). It can monitor any frequency on VHF or UHF on both VFOs (V/V, U/U), in digital or analog (FM), but it

can only receive one signal from one VFO at a time. It is compatible with DMR Tier I and Tier II (see the sidebar, "DMR Basics"), so it can be used on the ham radio repeater networks and with any digital hotspots compatible with DMR. It is IP67 certified (protected from water and dust), and can be equipped with an optional GPS (not included in our review unit). The MD-2017 has a long-lasting 2,200 mAh lithium-ion battery; 3,000 channels; tone capability (CTCSS and DCS) for conventional analog FM repeater use, and enough memory for up to 100,000 DMR contacts (more on this later). The maximum power output is 5 W (high). Low and medium settings are also available.

The box includes the radio, a dual-band antenna (SMA female), a battery, a belt clip, a desktop charger, and an instruction manual. Our package also included the optional programming cable. The cable is required to configure the radio (at

least for the first time) and still uses the speaker/mic connector (see Figure 1), but it is different from the MD-380. Figure 2 shows various views of the radio.

Programming the Radio

Before you can program the MD-2017 manually, you must set it up initially using the programming software (*CPS*) and create a *codeplug*. The codeplug is a configuration file that includes memory channels, scan lists, user preferences, menu options, and other settings. Don't be confused by the DMR terminology — just keep in mind that to configure a memory channel for DMR, you need to set up a contact and a channel, and assign it to a zone.
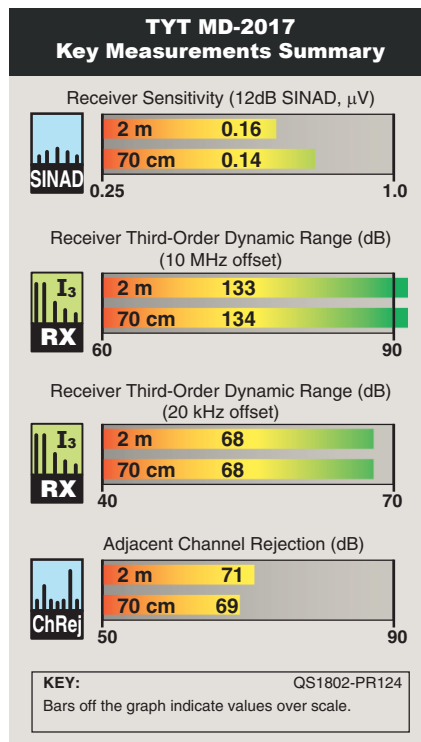
DMR Basics

There are three types of DMR — Tier I, Tier II, and Tier III. For this review, we will concentrate on the widespread Tier II DMR network, and we will refer to an earlier TYT DMR radio, the very popular MD-380. If you want to compare the MD-380 with the MD-2017, check out "Tytera (TYT) MD-380 Analog and DMR Handheld Transceiver" by Jim MacKenzie, VE5EIS, in the November 2017 issue of *QST*. To learn more about DMR in general, I strongly suggest that you read, "Introduction to Digital Mobile Radio (DMR)" by John S. Burningham, W2XAB, in the October 2015 issue of *QST*. Also, I have quite a bit of information about DMR and digital voice communication on my YouTube channel, **Laboenligne.ca** (or search for VA2PV). — *Pascal Villeneuve, VA2PV*

Table 1
TYT MD-2017, serial number 1706A00587

Manufacturer's Specifications	Measured in ARRL Lab
Frequency coverage: Receive, 136 – 174, 400 – 480 MHz.	As specified.
Modes: DMR, analog FM.	As specified.
Power requirements: 7.4 V dc (2,200 mAh Li-ion battery supplied).	Receive, 550 mA (max volume, backlight on); 445 mA (max volume, backlight off); standby, lights off, 80 mA. Transmit (high/medium/low): 146 MHz, 1.74 / 1.14 / 0.875 A 440 MHz, 1.59 / 1.16 / 0.9 A
Receiver	**Receiver Dynamic Testing**
Sensitivity: FM, 0.2 µV for 12 dB SINAD, digital, 0.25 µV (BER 5%).	FM, for 12 dB SINAD: 146 MHz, 0.16 µV; 440 MHz, 0.14 µV.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset: 146 MHz, 68 dB; 440 MHz, 68 dB. 10 MHz offset: 146 MHz, >133 dB; 440 MHz, >134 dB.
FM two-tone, second-order IMD dynamic range: Not specified.	146 MHz, 67 dB; 440 MHz, >134 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset, 146 MHz, 71 dB; 440 MHz, 69 dB.
Squelch sensitivity: Not specified.	At threshold: 146 MHz, 0.16 µV (normal), 0.33 µV (tight); 440 MHz, 0.14 µV (normal), 0.28 µV (tight).
Transmitter	**Transmitter Dynamic Testing**
Power output: VHF, ≥4 W; UHF ≤5 W.	At 8.4 V dc (full charge), high/med/low: 146 MHz, 6.5 / 3.0 / 1.6 W 440 MHz, 5.0 / 3.0 / 1.7 W At 7.4 V dc, high/med/low: 146 MHz, 5.3 / 2.8 / 1.5 W 440 MHz, 3.8 / 2.6 / 1.5 W
Spurious signal and harmonic suppression: Not specified.	>70 dB; meets FCC requirements.
Size (height, width, depth): 5.5 × 2.5 × 1.3 inches (including protrusions). Belt clips, add 0.5 inches to depth. Antenna length: 6.3 inches. Weight: 10.6 ounces (including battery and antenna).	

The fastest way to get started in DMR is to ask a friend who is already active for a copy of his or her codeplug, which you can modify for your preferences. The codeplug needs to be compatible with your radio, though. The latest *CPS* software for the MD-2017 supports converting codeplugs for the MD-380, which are readily available.

In this review, I will cover only some of the *CPS* functions I used while programming the MD-2017. For more information about setting up a DMR radio, you can download a PDF from one of my previous reviews. That file, with more detailed screenshots to illustrate basic DMR programming steps, is available online from **www.arrl.org/qst-in-depth** (look for the March 2017 issue files).

Customizing the MD-2017 Using the CPS

First, I searched online for the latest firmware and programming software. I found that, at the time, the latest one was available only via TYT's Facebook page. Then I had to ask if I have the GPS version. The only clue

that I had was the original firmware version in the unit, D003.033. When I downloaded the latest version, there were two firmware files available — D003.040 and S03.040 with GPS in the file name — so I used the D003.040 standard version. TYT support later indicated that the firmware version is the way to confirm if the GPS is present.

Using the *CPS* software (the new version, 1.17, included in the firmware file), I started creating the codeplug and found out that I could import configurations from my TYT MD-380 handheld. I worked on this for a full day, testing options while uploading different configurations into the radio.

Figure 1 — The TYT MD-2017 speaker/mic connector (programming cable).

Figure 2 — The TYT MD-2017 viewed from different angles.

General Settings and Customization

Figure 3 shows the **GENERAL SETTING** screen. The default voice announcement feature annoyed me, because it makes channel change a long process, as it must finish speaking before you can change channels again. This is a very important feature for those who need it, but I unchecked that option, and now the channels change with a normal delay.

The default setting for the display backlight timer shut off the backlight after 5 seconds of inactivity, turning the display completely black. I changed it to **ALWAYS**. The battery lasts a long time, and I prefer to leave the backlight on all the time.

The third customization I made is the **FREQ/CHANNEL MODE**. By default, **CHANNEL** is selected, and in this mode, you cannot manually enter a frequency via the keypad. If you change it to **FREQ** while in memory mode (changeable via the radio menu), you can do a long push (1 second) on the **BACK** button, and go into VFO mode. After this maneuver, you can now enter a frequency directly on the keypad (with pre-selected configuration in the *CPS* **VFO MODE** tab). For this review, I pre-configured a digital channel for a hotspot on VFO A (top) and an analog frequency on VFO B (bottom). Now I can manually set up a frequency for common portable opera-

Figure 3 — The *CPS* version 1.17 **GENERAL SETTING** tab.

tions, digital hotspots, and simplex frequencies.

For more complex programming, such as an analog repeater with a tone or a digital repeater, you can add and edit a channel via the radio interface under **UTILITIES / PROGRAM RADIO / EDIT CHANNEL**. This is only possible if you have previously checked **PROGRAM RADIO** in the **MENU ITEM** tab in the *CPS* (code-plug).

While searching for the latest update, I found two versions of the same firmware (non-GPS versions). The first one can accommodate 10,000

contacts with 8 hours of internal recording time, and the second one supports 100,000 contacts with no recording capabilities. I selected the second one, went on the DMR-MARC website, downloaded the full worldwide database of DMR IDs, and uploaded the 72,530 contacts into the radio.

Loading the contacts requires some file manipulation skills. When you download the file, it will be called datadump.cgi. You need to change the file extension manually from .cgi to .csv. You may have to do some editing prior to uploading the file to the radio. For uploading, in the top
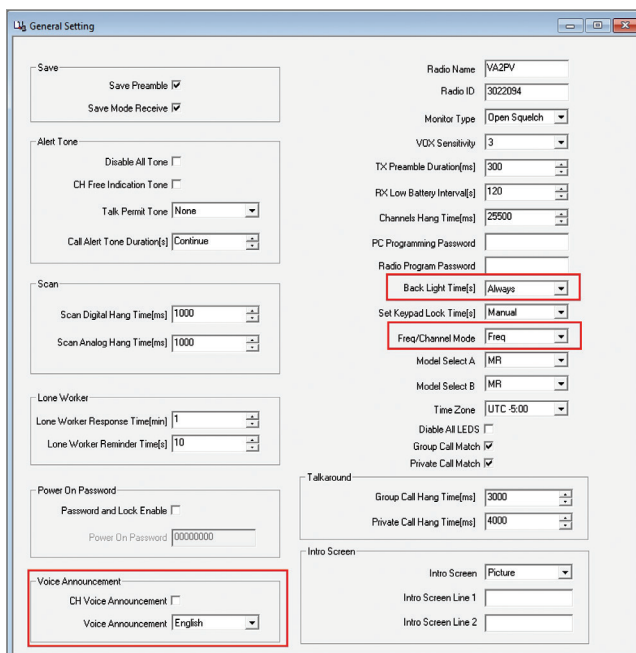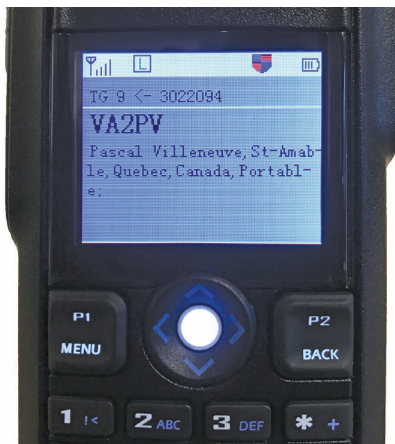
Figure 4 — With the full DMR-MARC ID database loaded, the MD-2017 displays call sign, name, and location for received stations.

menu of the *CPS*, go into the **PROGRAM** tab and select **WRITE CONTACTS**. Then import the .csv file, and click on **WRITE**. After the file is transferred into the radio, go into the **RADIO SETTINGS** menu, find **ContactsCSV**, and turn on the **.CSV LOOKUP**.

Previously, I was only seeing the call sign of an individual that I had manually programmed. Now, I can see the DMR ID, call sign, name, and location for all. This procedure needs to be done occasionally to update the radio with the latest added call signs.

There is a lighted button located in the center of the radio right under the display. It has arrows around it, but they are just for indication, as you need to use the center button like a trackball to navigate through the menus. I found the center button to be way too sensitive and hard to work with. Fortunately, you can customize buttons to do the same tasks. I use the orange button on the top of the radio to switch power levels (low, medium, and high), and the blue button above the PTT is used to switch between VFO A (top) and the VFO B (bottom). I use the up and down arrow buttons under the PTT to change channels in a zone on the active VFOs and to navigate through the menus.

If you want, you can even customize the welcome screen.

Operation on the Air

Operation became very easy once the MD-2017 was fully configured and customized for my needs. On VFO A, I usually monitor my digital hotspot. On VFO B, I have a simplex analog frequency or a local repeater. With the full DMR-MARC contact list loaded, I see all the information on the radio screen when a digital station is received (see Figure 4).

In analog mode, the MD-2017 has very good sensitivity. I compared it with several other handhelds, all using their stock antennas. While I was walking down the stairs into the basement, the MD-2017 was the last one to lose my local repeater signal.

The audio in DMR mode is nearly perfect in transmission and reception, and the receiver speaker sounds loud and clear. I received no complaints about my audio in either analog or digital mode while transmitting.

This radio can scan, but you will need to add the desired channels into the scan list first. This is also done via the programming software. Please note that all the channels created for each Talk Group (TG) need

to be on the scan list, otherwise they won't be scanned.

Every time I use my MD-380 handheld, I feel stuck, because I have to go into the *CPS* software to make any changes to the configuration. With the MD-2017, I feel free to adjust settings a lot more easily.

Conclusion

While writing this review, I changed the firmware, changed the codeplug more than a dozen times, made a number of contacts, monitored local activities all day, and always had the display turned on — yet I never ran out of battery. At the end of a full day — more than 12 hours of operation — the MD-2017 was still working, although the battery indicator showed empty.

I'm very impressed with this radio. When configured properly, it is one of the most ham-friendly DMR radios
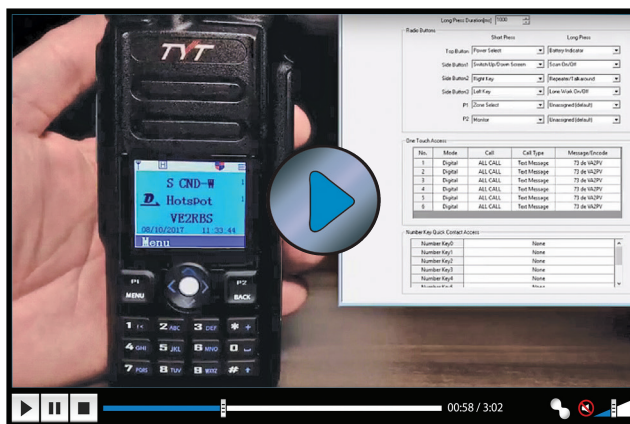
Visit https://youtu.be/Ekb0-4t9yNM to see our review of the TYT MD-2017 Dual-Band Analog and DMR Handheld Transceiver on YouTube.

I have used. I really enjoyed the fact that I could upload the full list of DMR IDs into it. This radio is just fun to play with, even if it took me some time to master the software. For the time spent studying the software, I was rewarded with some really interesting features.

If you need a good, customizable DMR/analog dual-band handheld, this radio is a good choice.

As we were going to press, TYT released a new firmware version with a number of changes and improvements. You can now store four radio IDs and change them at any time. The squelch now has nine levels instead of two, and the mic gain is adjustable with six levels. Users can add a group call contact list and new contact IDs from the radio. Check the TYT website and Facebook page for more information about these new features.

Manufacturer: TYT Electronic Co. Ltd., Block 39-1, Opto-electronics Industry Base, Nanan, Quanzhou, Fujian, China; **www.tyt888.com**. Available from many US Amateur Radio dealers. Price: $180.