Review by Tim Kirby G4VXE

Willowside, Bow Bank, Longworth, Oxfordshire OX13 5ER
● E-mail: tim@g4vxe.com ● Twitter: g4vxe

The TYT Tytera MD-380 430MHz DMR Handheld

Tim Kirby G4VXE has been looking at an interesting new DMR handheld, a welcome addition to the range of rigs supporting the increasingly popular DMR mode.

I was very pleased to be offered the chance to review the TYT Tytera MD-380 DMR handheld. I had enjoyed my last venture into the world of Digital Mobile Radio (DMR) and was looking forward to trying it out. The MD-380 appears to be the next evolution in the more affordable stable of DMR handhelds, the first of which was the Connect Systems CS-700 that we previously reviewed in *PW* (October 2014).

The radio is marketed under the TYT name and with the 'Tytera' mark, which, of course, sounds very similar to Hytera, a very well known brand in DMR. There is no connection at all.

What do the manufacturers say about the radio? Well, actually not very much. The review model did not come with any documentation. More on that in a little while. I had to resort to the web for some marketing information. The data is summarised in the sidebar on p.14.

What's in the Box
The rig came well packaged and the box contained the radio itself, the battery, two antennas (one longer, one stubby), a belt clip, a USB programming lead and a USB drive with the rig's programming software as well as a charger. You will note that I make no mention of an instruction manual. That's because there wasn't one. I've spoken to **Adam Lowery** at HamDMR, the retailers, and he tells me that they are working on a Quick Start Guide but at the time of writing there is no documentation included. You may or may not consider it a problem.

If you have some experience with DMR or even just a little patience, then the lack of documentation won't really present a

The author enjoying using the Tytera MD-380.

problem but if you are the sort of person who needs to read the manual before getting started, then you'll probably want to steer clear. However, there is a good reason why there is no manual. Because many of the controls are programmed as part of the codeplug, which holds the rig's configuration, it makes almost no sense for the manufacturers to write a manual because use of the different buttons may vary from codeplug to codeplug.

The MD-380 feels nicely made and robust and is pleasant to hold in the hand. My only slight criticism is that the colour screen can be a little difficult to see in bright sunlight but with a bit of judicious shading with the hand, you can see whatever you need to in the display.

Switching On
In practice, this compact handheld transceiver proved to be very simple to use in basic operation. It comes configured with your callsign and DMR ID. Remember that if you have not used DMR before, you will need to obtain a DMR ID. The resource I used to do this was Ham-Digital site (below) although I note that the DMR-MARC website (also below) offers a similar facility.

http://register.ham-digital.net
http://dmr-marc.net/cgi-bin/trbo-database/register.cgi

The review radio had an early version of the codeplug so it wasn't configured with all the DMR repeaters in the UK but it did have all the ones I was likely to use. Do check with the vendor that the rig will be programmed sufficiently to get you started with your local DMR repeaters. Because the rig comes with programming software and a cable, it's not actually that difficult to make changes yourself but it's nice to get started simply and quickly.

Tim's Quick Start
Given that there's no documentation included, here's *Tim's Quick Start guide:*

- Switch on with the knob on the far right on the top of the rig. A 'Welcome' screen will be displayed.
- If the repeater you want to use is not shown on the screen, then press the green 'menu' key and scroll down to find 'Zone' and hit 'Confirm'.
- You can then scroll through the various DMR (and analogue) repeaters and simplex channels that the rig may have been programmed with. In my case, I wanted to use GB7NS, so scroll until you find that and then hit 'Confirm'.
- You will then receive a message saying (in my case) 'GB7NS selected' and one of the programmed channels on GB7NS will be displayed.
- Remembering that DMR supports two timeslots and multiple talkgroups per repeater, each repeater many have many channels programmed up (such as Local talk, UK Wide, Worldwide). You can scroll through these manually

The MD-380 easily fits within a small rucksack.

A screenshot of the MD-380 customer programming software.

using the knob on the top of the rig or by using the scan facility. You can switch on scan using the button on the left hand side of the rig just below the PTT.
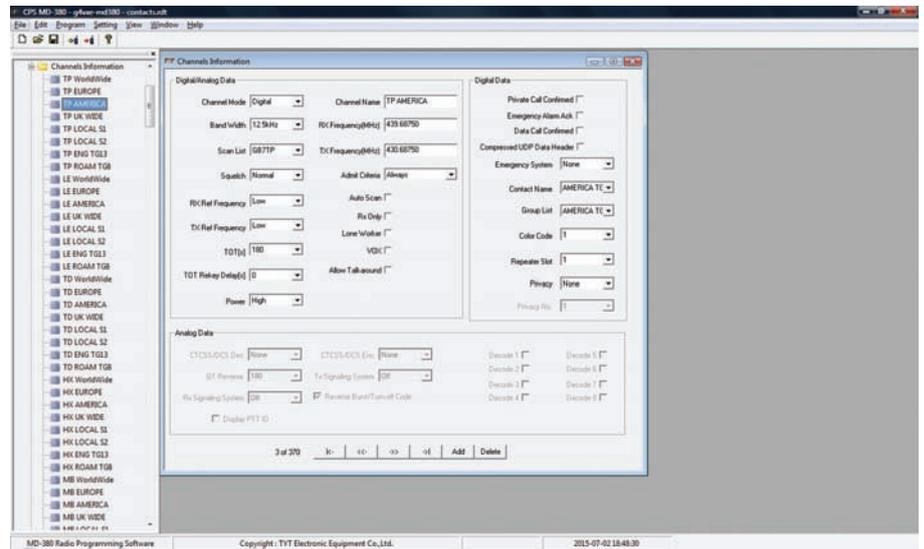
- The rig has high power (5W) and low power (1W) settings that can be toggled with the button on the left hand side of the rig just above the PTT.
- To transmit, hit the PTT button (you guessed that!).

Getting on the Air

Having made these discoveries, I wanted to put the rig on the air. Because here at home in Oxfordshire we don't have a UHF DMR repeater that is useable with a handheld rig and antenna, I decided to connect the MD-380 to my V-2000 triband antenna on the roof. The antenna connection is an SMA, so I got out an SMA to SO-239 adapter cable and connected it up. I 'tuned' to GB7NS and hit the 'scan' button. Fortunately, I was soon rewarded when the rig stopped on the 'UK Wide' talkgroup where a net was taking place.

I was pleased to find that the receiver worked very well indeed and there was almost no digital garble, something that has been noticeable across many listening sessions. The receiver seems very sensitive and the error correction routines built into the radio are obviously very efficient. Receive audio was very clear and a pleasure to listen to.

Sadly, 5W from the handheld to the V2000 was not enough to access GB7NS some 70 miles or so away, although I

am sure it would be possible in good conditions, so in the shack the MD-380 was only able to serve as a receiver.

Fortunately, or unfortunately, depending on how you look at it, I travel into London most weekdays so I put the rig in my rucksack ready to use as time permitted during lunchtimes and breaks. For the first couple of lunchtimes, I didn't find much activity in my brief operating sessions although I could see that my calls through the GB7NS repeater were successful, looking at the CC-3 monitor website, below.

www.cc-3.net/monitor.
php?range=450&filter=uk

Walking back from the tube station to Paddington, I stopped off at a little green with some seats and put out a call on the UK-Wide talkgroup through GB7NS and was pleased to have a brief QSO with **Ron Scholefield M0UEZ** followed by another with **Simon Harrison G4JJS** who were both kind enough to confirm that everything sounded fine. Lots of other enjoyable QSOs followed across a number of lunchtime and evening operating sessions. A chat with **Chris Young G4CCC** was particularly interesting. Chris and I have known each other for a good number of years and we both remarked that we wouldn't necessarily have recognised each other's voices on the air. I hasten to add that's nothing detrimental about the MD-380's audio on transmit or receive – more about the CODEC used in DMR which somehow seems to flatten the inflexions in people's voices.

Something that became apparent after a number of days is that the rig's battery life is very good and I was able to use it for several days' lunchtime and evening operating sessions without having to remember to charge it. When I did

come to charge it, I discovered that the desktop charger seemed to take quite a while to achieve a full charge – perhaps in the region of five to six hours, which was a little surprising but not a problem when charging overnight. The lights on the desktop charger are quite bright – enough to light up a room at night – so it's probably best not to have the rig on charge in your bedroom.

Another interesting QSO was with **Dennis Fitch G8IMN**. Dennis had been working on getting contact names imported into a codeplug so that when a station is heard on DMR, the callsign and name is displayed on the screen. Dennis very kindly agreed to send me some details of how to do it.

I tried both antennas. The stubby one obviously provided a little less gain but worked well enough for me to access GB7NS from most of my usual urban spots in London. You might find the stubby antenna makes the rig a little more portable or easier to carry in a coat pocket.

Programming the MD-380

Installation of the MD-380 programming and software provided was straightforward. Initially, I was concerned that the USB driver hadn't installed properly but this was because although I had the programming lead plugged into the PC, I hadn't put the other end into the rig and switched on. As soon as I did this, the driver software was installed and useable.

My first task was to take a backup of the codeplug from the MD-380, which was simply done by doing a 'read' of the data from the rig onto the PC and saving it. That way if I did anything disastrous, I could revert to a good copy of the file.

The first couple of changes I made in the codeplug were to add two local analogue 70cm repeaters into the configuration, GB3UK and GB3TD, which was straightforward enough. I'd also noticed that the codeplug settings for the digital GB7BS repeater at Bristol weren't quite right so I tweaked those and saved them back to the rig very easily.

Performance on Analogue Repeaters

Having programmed up GB3TD and GB3UK, I wasn't initially sure that I had got it right. I'd hit the transmit button and it wasn't immediately obvious that I was transmitting (I was but I was expecting something to display on the screen. Instead, the LED on the top of the rig was showing red). However, I couldn't hear anything on receive and wasn't sure why. Normally both repeaters are audible on a handheld in the shack, albeit not terribly strongly, but I couldn't hear anything on the MD-380. I connected the external antenna and tried again – sure enough the repeaters were there. I fiddled around with Squelch settings but this did not seem to be the issue. I also tried the antenna from my Icom E-92 but this didn't yield any better performance. So, it looks as though the receive performance on analogue repeaters is not quite so good. You will probably not be buying the MD-380 to use on analogue repeaters so this isn't a serious problem but if you plan to use analogue as well as digital repeaters, it might be something to bear in mind.

Adding Contact Information to the Codeplug

I wanted to see whether I could follow the instructions that Dennis G8IMN had kindly supplied to add contact information to the codeplug so that name and callsign information would be displayed on the screen, rather than just the DMR ID. This proved very simple and required the use of an external contacts manager program from G4EML (the first link below) as well as downloading contact information as a comma separated value file (the second link – the 700 at the end determines how many callsigns you will download, 700 in this case).

https://copy.com/T8R99FwGNpumkteS
www.cc-3.net/uk_lastusers_nodate.
php?limit=700

These links works for UK callsigns but if you want callsigns for other areas, you can use the N6DVA site, below. Import the CSV file into Contacts manager and you can then append the contact information into the codeplug that you are using. Simply upload the codeplug back to the rig with

the MD-380 programming software and you're in business. It works well. Thank you Dennis for this useful addition to the codeplug. You will probably want to refresh the contacts information from time to time as new people come onto DMR. www.n6dva.org/trbo-database/trbo_users_view.php

Front Panel Programming

A nice feature of the MD-380 is that you can modify the programming settings from the front panel. You would not want to program a complete codeplug with this method but if you find yourself away from home without the programming lead and a PC, you would be able to program up the nearest DMR repeater's frequencies, colour code and so on.

Conclusion

I thoroughly enjoyed using the MD-380 handheld. I carried it with me in my rucksack and found it a source of some very interesting QSOs. I found it easy to use. There is no documentation or Quick Start Guide provided although I hope I have provided enough information to help you to get started. It's possible that I have missed some features owing to the lack of documentation.

I found the radio's DMR performance to be very good indeed, with good reports of transmit audio and pleasing receive audio. Analogue performance seemed less good, which was a little puzzling but not necessarily a problem.

The MD-380 programming software was easy to install and to use, particularly when modifying an existing codeplug although I gather some people have discovered it is somewhat quirky and restrictive if trying to use it to build their own codeplug with many repeaters and channels. For the average user, I don't expect this to be a problem and it can be hoped that there will be further releases of the programming software to resolve these issues.

If you are looking for a cost effective way of discovering DMR and have DMR activity close to you, the TYT Tytera MD-380 might very well be the way to do it. I should probably add that I liked the MD-380 so much that I decided it was going to be my first DMR rig.

My thanks to Adam Lowery of HamDMR for the loan of the MD-380 and his prompt and enthusiastic responses to my questions. The TYT Tytera MD-380 costs £149.95 including VAT and can be ordered from the HamDMR website. www.hamdmr.co.uk

Features

- Uses TDMA digital
- 12.5kHz channel compliant with DMR digital protocol
- Private call, group call, all call
- CTCSS/DCS, Auto scan
- English Voice Prompt
- Wide/Narrow selection
- High/Low power
- Emergency Alarm
- Time out timer
- Encryption

Technical Specifications

General

Frequency Range	400-480MHz
Channel No.	1000
Antenna impedance	50Ω
Antenna	High and gain
Operating Voltage	7.2V DC
Operating Temperature	-30°C~+60°C
Dimensions (H x W x D)	61 x 128 x 38mm
Battery	1700mAh Li-ion

Transmitter

Output power	≥5W (H) ≥1W (L)
Vocoder type	TDMA
Frequency Stability	± 1.0 PPM
Adjacent channel power	≤-60dB
Spurious Radiation	Antenna: 9kHz-1GHz, ≤ -36dBm
	1GHz-12.75GHz, ≤-30dBm
Hum and noise	-40dB 12.5kHz
4 FSK Digital Mode	12.5kHz(data only): 7k60FXD
	12.5kHz (data+voice): 7k60FXE

Receiver

Digital sensitivity	0.3µV/-117.4dBm (BER 5%)
	0.22µV/-100dBm (BER 1%)
Audio distortion	3% (TYPE)
Audio power	1W
Audio response	=1dB-3dB
Adjacent Channel Selectivity	Tia603C: 65dB, ETSI: 60dB
Spurious	Tia603C: 75dB, ETSI: 70dB
Co Channel rejection	≥-12 dB