

Amateur Radio Notes V

by Toshen, KE0FHS

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Discovering DMR – 2

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2) Choosing a way forward

Since I wasn't clear what I was getting into with DMR, initially the operative words for me when choosing my DMR hardware were "inexpensive" and as "easy to use" as possible.

2a) Choosing a DMR radio

Since I already had a nice D-STAR radio for all-around, multi-mode use, I decided to just barely stick my toe in the DMR soup to begin with. So initially to get up and running with DMR, I chose a cheap, single-mode radio, the CS580 UHF.

After I had explored DMR for a while, I decided I wanted a bit higher quality radio. I tried a couple different radios over the course of the next couple of years, the Connect Systems CS760 (a good concept, but ultimately a bust, soon discontinued), and the Hytera AR-685 (a quite nice radio, but unfortunately with a dead-end development path).

Then, I picked up an [AnyTone AT-D878UV](#) [↗](#). It's a nice, solid unit with a good screen (a black screen like my Kenwood TH-D74A, which I prefer), a large memory capacity (it easily holds the entire worldwide

CCS7 ID contact list), and extra capacity for future feature expansion. It also comes with a decent CPS software package. Most importantly, the AnyTone AT-D878UV, like the AT-D868UV before it, is designed to accommodate amateur radio use well (most DMR radios are designed primarily for commercial use). For me, this one's a keeper.



AnyTone is proving itself to be a leader in DMR radios for the amateur radio community. Their AT-D878UV catapulted them to the front of the pack. Their mobile unit, the [AnyTone AT-D578UV](#), which they released late 2019, shows that they are taking the lead in both listening to hams and innovating; there's nothing else quite like it in the mobile space (especially with its cross-band and cross-mode flexibility).



Hint: A good source for AnyTone radios is Lets Get Ready, which has an online store on eBay and provides good, friendly support: [Lets Get Ready](#).

More info about the 878/868

- [AnyTone Firmware Update process](#)
- There are some helpful downloads made available by Andy Taylor, MW0MWZ, on his Pi-Star site: [AnyTone DMR Downloads](#). Includes the following full lists: DMR User, BrandMeister TalkGroup, DMR+ TalkGroup, TGIF TalkGroup, and UK Repeater. The files are generated when you download them, so they're always up to date. See also the Pi-Star note [DMRGateway rewrite rules](#).
- [AnyTone AT-D868UV/AT-D878UV DMR Users Group](#) (Facebook)

- The [PAPA System](#) provides its members with excellent guides and tutorials related to digital radio including the best and most comprehensive guide for creating codeplugs for the Anytone 868 & 878 that I've seen: [DMR CodePlug 101 AnyTone AT-D878UV](#) by David Hull, KC6N, June 2018 (the PAPA System, which is a 501(c)(3) organization, and operates for the benefit of the amateur radio community, offers trial guest memberships).
- From what I've been told by people who know more than I do, the AnyTone radios work well with the Talker Alias feature. In that case, you actually don't need to load a contact list. If you do want to load a contact list, a decent download tool you can use is made available by the DMR Team: [DMR Database](#). Another source is the ContactLists Telegram group: <https://t.me/contactlists>
- *Hint:* If you ever need to pick up another USB cable for your 878/868 (or a TYT MD-380, Retevis RT3, or Radioddity GD-77), you can use a "dumb" cable, as all of these radios have the UART built into them. Thanks to Jeff, N4CLR, for this info.
- Let's Get Ready: [AnyTone AT-D878UV official release Firmware and CPS](#)
- [Modifications, hints, tips and technical information for the AnyTone AT-D878UV, AT-D878UV-II, AT-D868UV, and B-Tech DMR-6X2 dual band DMR digital handheld radio](#). Originally written by Jason Reilly, VK7ZJA, who went Silent Key in January 2023. According to Inga Muste, YL3IM: "Shortly before his passing, he ensured his info would live on and coordinated mirrors of his sites with his Facebook buddies."
Also: [Modifications, hints, tips and technical information for the AnyTone AT-D578UV dual / tri band DMR digital mobile radio](#)

Some good videos about the 878/868

The AnyTone approach to its CPS software is a bit different than others I've tried. Here are some good videos that provide an overview of how all the pieces fit together; while there is some overlap, I learned different things from each of them:

- [Anytone D868 Tutorial](#) by WoodburyMan.
- [Anytone 868 from New to First DMR Contact](#) by Chris, 2E0UKH.
- [AnyTone D868 D878 New User StartupVideo](#) by Duane, N6DMR.

A good video about the digital monitor feature: [Anytone 868 878 dig monitor features](#) by Chris, 2E0UKH.

AnyTone AT-D878UV icons & symbols

For some reason, the user manual doesn't include an explanation of the icons and symbols used on the display. Here's what I've figured out so far:

- **Antenna icon + Reception bars** – Signal strength (1 - 4)
- **[L/M/H/T]** – Tx power level: Low, Medium, High, Turbo
- **Speaker icon** – Digital Monitor (promiscuous mode) enabled for 1 or 2 slots
- **Microphone icon** – Recording on
- **GPS icon** – gray = no signal received; red = signal received
- **Bluetooth icon** – gray = on, not connected; blue = on, connected
- **P (Bluetooth PTT button)** – gray = not connected; blue = connected
- **A** – Automatic Power Off enabled
- **Codes/Tones:**
 - **C##** – Color Code (primary digital channel)
 - **DCS/CTC** – Tone Signal Squelch (analog channel)
- **DIG/ANA CH-#** – Digital or Analog Channel and #
- **T1/T2 A/B** – Time Slot for A or B channel
- **R** – Repeater with offset RX/TX frequencies; Red = Reversed

AnyTone AT-D878UV Tx power levels

- Super high (Turbo) = UHF: 6 Watts / VHF: 7 watts
- High = 5 Watts
- Middle = 2.5 Watts
- Low = 1 Watt

Over the past few years I've used a bunch of different hotspots, each of which has its own strengths, and new ones are released regularly.

This is such a big topic that I've spun off an entire article describing how hotspots work and discussing various available choices: [Hanging out with hotspots](#).

Have fun choosing!



BrandMeister repeater usage stats

In late May 2017, I took a look at the repeater/hotspot usage stats on the [BrandMeister dashboard](#). At the time I looked, the top six were:

1. 33% – **openSPOT** hotspot
2. 23% – **DVMEGA** – about 83% of that is the DVMEGA running MMDVM, while the remaining is the DVMEGA running BlueDV for Windows, Android, and Linux
3. 15% – **MMDVM** – about 80% of that is MMDVM running as a repeater, while the remaining 20% is MMDVM running as a hotspot
4. 11% – **Motorola** repeaters
5. 11% – **Hytera** repeaters
6. 5% – **DV4mini** hotspot

By Nov 2017 (BrandMeister's 2nd birthday), things were changing:

1. 38% – **openSPOT** hotspot
2. 22% – **DVMEGA** – about 85% of that is the DVMEGA running MMDVM, while the remaining is the DVMEGA running BlueDV for Windows, Android, and Linux; Pi-Star is 43% of the firmware [Note: "firmware" is the term used on the BrandMeister dashboard website, even though I'd call it the software or app.]
3. 17% – **MMDVM** (about 66% of that is MMDVM running as a repeater, while the remaining is MMDVM running as a hotspot; Pi-Star is 35% of the firmware
4. 9% – **Motorola** repeaters
5. 8% – **Hytera** repeaters

6. 3% – **DV4mini** hotspot

By Nov 2018 (BrandMeister's 3rd birthday), MMDVM and Pi-Star had become the undisputed champs:

1. 52% – **MMDVM** – about 27% of that is MMDVM running as a repeater, while the remaining is MMDVM running as a hotspot; Pi-Star is more than 84% of the firmware
2. 24% – **openSPOT** v1 and v2
3. 13% – **DVMEGA** – about 89% of that is the DVMEGA running MMDVM; Pi-Star is more than 68% of the firmware
4. 5% – **Motorola** repeaters
5. 5% – **Hytera** repeaters
6. 1% – **DV4mini** hotspot

By Aug 2020, MMDVM usage had increased to nearly 70%, with Pi-Star the most used firmware by far. The openSPOT models remained in 2nd place with 14%, and the DVMEGA in 3rd place with 9%. Hytera and Motorola repeaters are between 3 - 4% each, while the DV4mini has virtually disappeared.

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