

DMR OPERATING BASICS & BEST PRACTICES

KØNGA MIKE

ROCKY MOUNTAIN HAM RADIO



MIKE'S DMR DOCTRINE

If something about using DMR for Amateur Radio doesn't make sense, remember that DMR was created for commercial use, and was never designed nor intended for Amateur Radio use.



WHAT IS DMR/TRBO?

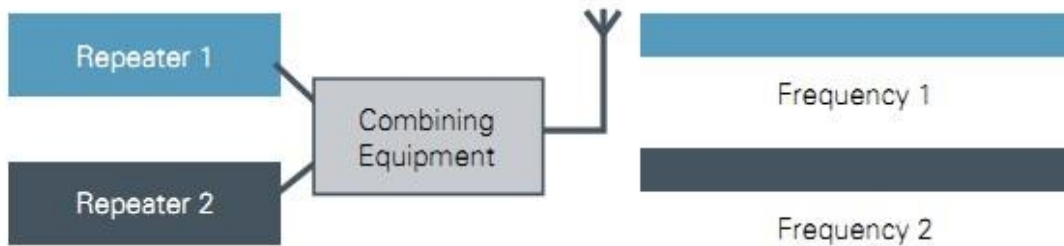
- DMR (Digital Mobile Radio) is an international commercial digital radio standard that originated in Europe
- TRBO refers to MotoTRBO which is Motorola's implementation of the DMR standard
- Many Amateur Radio repeater networks use MotoTRBO equipment, which is why they are commonly referred to as "TRBO" networks
- You do not need to use a Motorola MotoTRBO radio to use these networks



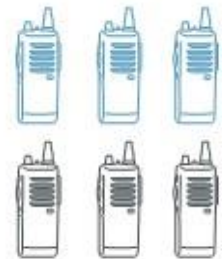
TWO REPEATERS IN ONE!

TDMA saves licensing and equipment costs by enabling the equivalent of two 6.25 kHz channels within a single licensed 12.5 kHz channel

Two-channel Analog or Digital FDMA System

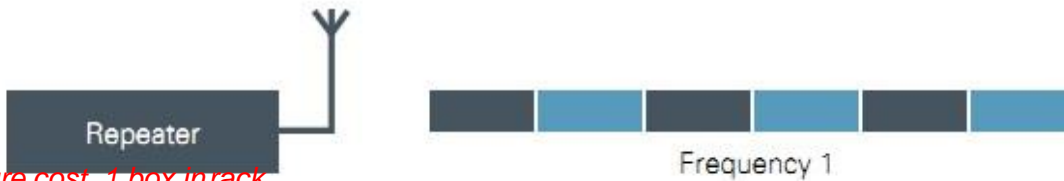


One call per repeater and channel



Radio Groups

Two-channel Digital TDMA System



Two calls per repeater and channel



Radio Groups

*Lower infrastructure cost, 1 box in rack
TWO voice channels from one repeater*



NEW CONCEPTS

- Frequency Pair – not new
- Color Code – Functions similar to a CTCSS or DCS access tone
- Repeater Slot – Each DMR Repeater has two, you must specify which one to use
- Talk Group – Each repeater slot can be logically segmented further into talk groups
- Receive Group – List of talk groups to monitor on the channel's assigned repeater slot



GET A RADIO

- You must have a Tier 2 DMR Radio (very common)
- You get what you pay for
 - Low cost radios on the market are not created equal
 - Ask around about user experience
 - Check the radio list at rmham.org
- Feature sets can vary widely among manufacturers
- Choice of radio is mainly a matter of what is important to you. I'm a contact list junkie.
- Recommendation: Get a radio that has sample codeplugs available, or is supported by the N0GSG utility.



GET A RADIO ID

- <https://www.radioid.net/> -> Register ID -> User Registration (at the bottom of the page)
- Everything works best when each radio has a unique ID
- Put your Radio ID in the codeplug and upload to the radio
- Radio ID is NOT a replacement for ID'ing. You must still ID vocally every 10 minutes per FCC regulations.



RADIO ID

The screenshot displays the 'Customer Programming Software - HAM2000 [Untitled.rdb] - [Setting]' window. The interface includes a menu bar (File, Edit, Program, Option, View, Tools, Window, Help) and a toolbar with icons for file operations. A left-hand tree view shows the 'Setting' folder expanded under 'Radio Information'. The main area is divided into several sections: 'Basic', 'Scan', 'Channel Display Mode', 'Battery Save', 'TalkAround', and 'Power-On Screen'. In the 'Basic' section, the 'Radio ID' field is highlighted with a red circle and contains the value '3108111'. Other settings in 'Basic' include 'Radio Alias [P.O.M Line 1]' set to '-> KONGA Mike <-', 'Power On Message Line 2' set to 'HELLO HAMCON!', 'Unique Radio ID' set to '00', 'Squelch Normal Level' set to '3', 'Squelch Tight Level' set to '9', 'Radio Language' set to 'English', 'Monitor Type' set to 'Open Squelch', 'Tx Preamble Duration [ms]' set to '960', and 'Digital RX Voice Gain Level' set to '6'. The 'Scan' section has 'Analog Hang Time [ms]' and 'Digital Hang Time [ms]' both set to '500'. 'Channel Display Mode' has 'Auto Lock Keypad' unchecked and 'Auto Lock Delay Time [s]' set to '5'. 'Battery Save' has 'Save Preamble' and 'Save Mode Receive' both checked. 'TalkAround' has 'Group Call Hang Time [ms]' set to '3000' and 'Private Call Hang Time [ms]' set to '4000'. 'Power-On Screen' has 'Channel Display Mode' set to 'Alias', 'Power Up Designated Zone' set to 'Zone 1', and 'Designated Home Zone' set to 'Zone 1'. At the bottom, there are 'Close', 'Print', and 'Help' buttons. The status bar at the very bottom shows 'Ready', 'CS750', '400-470 MHz', 'USB', and '2016-04-04 08:45:06'. A red circular logo is visible in the bottom right corner.

LEVERAGE THE SAMPLE CODEPLUGS

- Available on the RMHAM Website
 - www.rmham.org
 - MotoTRBO/DMR -> Sample Codeplugs
- All RMHAM TRBO repeaters programmed in
- Quickest way to get on the air
- Use as a foundation for your own codeplug
- Use as a starting point for the NOGSG utility



ID YOUR TALK GROUP

- When calling, identify which talk group you are transmitting on.
- “This is K-0-N-G-A on Rocky Mountain”
- Many Hams scan various channels and may want or need to turn scan off and tune to your channel to respond.
- If you don’t ID the talk group, the responding ham may not know which channel to tune to.



KNOW YOUR NETWORK

- Network: A collection of repeaters linked together to achieve a larger area of coverage
- Three most well-known networks in Colorado:
 - Rocky Mountain Ham Radio (RMHAM)
 - DMR-MARC
 - Brandmeister
- Each network works a little differently in how the repeaters interact with each other
- Read up on each network's website
- Know the difference between static and dynamic (user-activated) talk groups



TALK GROUPS AND REPEATER SLOTS

- Each repeater has 2 repeater slots (time slots)
- Each slot can handle 1 conversation at a time. Thus, each repeater can handle 2 simultaneous separate conversations
- Some networks allow multiple talk groups on the same repeater slot
- Only one talk group can be transmitting at a time on a single repeater slot
- It may be necessary to monitor the other talk groups on a repeater slot to determine if the slot is free to operate on



DMR NETS

- **RMHAM TRBO Tech Net**
 - First Saturday of the Month, 7:00 PM, Rocky Mountain talk group
- **World Wide DMR-MARC Net**
 - World Wide talk group, Saturdays, 16:00 UTC Summer, 17:00 UTC Winter
- **DMR-MARC Tech Net**
 - North America talk group, Thursdays, 01:00 UTC Summer, 02:00 UTC Winter (This translates to Wednesday Night in the States)



QUESTIONS?



STUFF AND THINGS

- RMHAM Website – <http://www.rmham.org>
- Interactive DMR repeater map: <http://bit.ly/rmham-trbo-map>
- Radio ID – <https://www.radioid.net/>
- DMR-MARC Website – <http://www.dmr-marc.net>
- Brandmeister
- Dashboard: <https://brandmeister.network/>
- Audio Feeds: <http://hose.brandmeister.network/>
- Wiki: <https://wiki.brandmeister.network>
- Contact Me: KONGA@arrl.net

