

## **DMR Talk groups and timeslots**

Prior reading: "You just bought a DMR Radio.pdf"

### **Intro: (If we had no talkgroups)**

Digital mobile radio is a technology for voice transmission over radio using digital modulation. Communication can be simplex radio to radio or via repeaters (duplex base stations).

Like other digital radio systems DMR repeaters can be a stand alone device or be interconnected with other repeaters to further extend coverage. With such an interconnection any station using any repeater could communicate with any other station on any repeater. Such networks do exist (even with other technologies).

However once a network reaches a certain size (number of repeaters or geographical coverage) it is wasteful to have all repeaters broadcasting all the traffic of one conversation (an amateur QSO).

Some sort of traffic control can enable a large number of interconnected repeaters be used more efficiently. Ideally equipment not already in use can be available for more users.

To achieve this in DMR we have networks of one or a group of servers. (ie Brandmeister, DMR Marc, FreeDMR, TGIF and more)

DMR repeaters can be connected to a port on one of these servers. Nearly all traffic from each repeater is passed to the server and so becomes "Network Traffic" it is "on the network" (I will use the term network traffic further on.)

Network traffic is available to all repeaters and has the capability of being broadcast by all repeaters. Broadcasting all traffic from all repeaters is not efficient as described earlier.

### **To allow some sort of control we introduce the "Talk Group".**

This is just a digital tag (or label) to every transmission by a digital radio (the user's hand held or mobile radio). A radio is programmed with a number of channels. One of the channel parameters is its Talk Group which in the configuration is just a number. On TX the Talk group is added. On RX only signals with that Tg will be received. Other traffic (even on the same frequency) will not be heard.

The traffic from the user is repeated locally (as a stand alone repeater) and is also passed to the server to become "Network Traffic". "Network traffic retains the original "talk Group" tag.

Now "Network traffic" is useless if it cannot be heard! To be heard it must be passed to one or more repeaters to be broadcast.

### **Here is the first smart part of our network;**

If a user transmits a signal (on a particular TG) to a local repeater then for a time (usually 15 minutes) then that repeater will be enabled to broadcast any Network Traffic with the same Talk Group.

A repeater in this state is said to be "Dynamically Active" on that Talk Group.

A problem appears with this. The first user to TX will not be heard by any one except those on the local repeater. A work around could be that users key up or "Kerchunk" to make their local repeater active just in case there is a call.

Here is the next smart part of our network:

### **Introducing “Static” Talk Group activation.(this term is used often)**

This is where a repeater is permanently active on a nominated Talk group. If it is otherwise idle it will broadcast network traffic with that TG to air.

In amateur radio parlance a TG which is “Static” on many repeaters is a “Call” TG (akin to a “Call channel” in VHF/UHF FM operation). Standard etiquette is that amateur stations make contact on a “Call” TG then change to another TG which is “Dynamically active”. This leaves the “Call TG” free and all unused repeaters, free for others to use.

(Before continuing it is worth noting the use of DMR personal hotspots (micro base stations/repeaters) that can be connected to DMR servers but only used by one operator).

TalkGroups that are (mostly) dynamic are known as “Chat Talkgroups” . For that long QSO choose a Chat Talkgroup if you can,

A particular TalkGroup may be “Static” on a large number of repeaters but “Dynamic” on many others. Such is the case where repeaters in one area (state or country) have a common static TG but that TG can be used dynamically in another location. There is a loose convention that a county's “Mobile County Code” is copied as a TalkGroup or part of a TalkGroup in that country.

Some repeaters may have one “static” talkgroup to itself. This would enable a station travelling to make a call to that repeater only (may be a call home). It would assume there would have to be some locals monitoring that talkgroup. The repeater may have both the “Call TG” and another TG as static.

Although all TalkGroups are created equal, each develops a character of its own according to what repeaters are “Static” on that Talkgroup.

Who decides what is “Static” or not?

It may be the repeater operator, the network server administrator or both. In the case of personal hotspots it is the user.

What else?

The network admin may restrict some or all talkgroups even entering their network

Repeater operators may use TalkGroup rewrite rules to direct calls to one of multiple networks.

Some TalkGroups may be “Bridged” to other networks either permanently or on a time basis. These may be other DMR networks or others such as D-Star, YSF, P25, NXDN, AllStar, Echolink and so on. The originating TalkGroup tag does not pass through the bridge. In the case where the bridge is to another DMR network the bridge may insert a new TalkGroup that is the same or different to the original. For other network that carry originators id then the RadioID database used to translate DMRID to callsign & vice versa.

Some entities have taken connecting to multiple networks to the extreme as their purpose is to connect as many technologies together. These include Quadnet Array, America Link, DoDropIn, CQ-UK. There

are commonly world wide nets on these systems on various subjects like Trains, Astronomy, Tech, Raspberry Pi & Zum, Trivia quiz, Young Amateurs & just plain fun social subjects.

Some TalkGroups have developed their own character by the users themselves. This may be some common interest eg Blind hams, Scouting or just language group

Lastly a few special talkgroups generally:

TG9 on slot 2 on IPSC2 servers is to access DMR+ reflectors 4001 to 5000.

TG9 on slot2 forHBLink & Ryzen servers is for "Dial a TG"

TG9 on slot 1 on a repeater is local access only (no access to network).

TG9 on a simplex hotspot will be treated as being slot 2.

TG9990 the parrot repeats your audio back to you (as others would hear you). No need to get someone else's opinion on your voice quality. Warning: It is not 100% reliable as an access test so if you don't get a reply the first time don't assume your radio or code plug is faulty. Just try again.

TG99 is to give common ground to simplex (radio to radio) operation.

### **So what TalkGroups should you have in your radio and how do you decide what to use?**

To start with have a look at the website for the repeater you are planning to use for any local info. Next look at the website for the network your repeater or hotspot uses.

For a general overview <https://www.pistar.uk/index.php> is useful, Just select the tab for the system you will use,

To see the TalkGroups in action on a network look at the network dashboard for the network you will be using. You will see some TGs quite busy and some rarely appear:

Quadnet: <https://dmr.openquad.net/>  
or any other bMaster+ at <http://xreflector.net/>

Brandmeister: <https://brandmeister.network/>

FreeDMR: Look at dashboards at:  
<https://www.freedmr.uk/index.php/freedmr-servers/>

System X: <https://freestar.network/systemx-dmr/>

### **A note about Time Slots ( TS or just Slot) and TalkGroups (TGs).**

For DMR simplex operation, the Timeslot is irrelevant (radio to radio or radio to simplex hotspot)

For radio to repeater Slots 1 & 2 are available (independent channels). The locally repeated signal uses the original slot ( on the output frequency). Once the signal enters the network the slot is irrelevant. As the signal leaves the network via a repeater or duplex hotspot the Slot is determined by the repeater according to settings by the network admin or repeater operator.

Some networks will only accept certain Talkgroups from specific Timeslots.